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NASA APPROVED

DATA BOOK
SPACE STATION/BASE FOOD SYSTEM STUDY
BOOK I
ELEMENT CONCEPT DATA SHEETS

Prepared for
NATIONAL AERONAUTICS and SPACE ADMINISTRATION
Manned Spacecraft Center
Houston, Texas 77058

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Manned Spacecraft Center
Houston, Texas 77058

Contract NAS9-11139
DRL Line Item No.12

OFFICE OF PRIME RESPONSIBILITY

Prepared by
Manned Space Systems

FAIRCHILD HILLER
FAIRCHILD REPUBLIC DIVISION
FARMINGDALE NEW YORK 11735

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ABSTRACT

The Fairchild Hiller Corporation, Republic Aviation Division, performed a seven-month study under Contract Number NAS9-11139 entitled "Space Station/Base Food System Study" for the National Aeronautics and Space Administration, Manned Spacecraft Center. The study was conducted so as to identify and define engineering data for a spectrum of possible items and equipment comprising potential food systems for use on manned spacecraft and assemble these data in a Final Report and Data Book.

This document is Book I of the Data Book. The Data Book, containing the detailed technical data, supporting analysis, and selection rationale for each of the concepts considered in the Final study, has been prepared in three books:

Book I - Element Concept Data Sheets

This book contains the detail engineering data sheets for all concepts studied in the Final phase of the contract effort as well as those concept sheets only carried through the Interim phase due to non-applicability or deleted missions.

Book II - Supporting Technical Data

This book contains formulae, assumptions, calculations, and supporting analyses for the element concept data sheets.

Book III - Study Selection Rationale Sheets

This book contains the supporting rationale sheets utilized in selection and support of those concepts studied in the Final phase of the contract.

The results of the study have been compiled in the Final Report - Volumes I and II, which contain the documentation and summary of the contract effort.

The program was performed under the technical direction of Mr. Dean Glenn, Habitability Technology/Spacecraft Design Office of the Manned Spacecraft Center.

SECTION I

INTRODUCTION AND SUMMARY

The purpose of the Food System Study conducted by Fairchild Hiller was to identify and define characteristic concepts, performance requirements, quantitative requirements, functional features and engineering data for a spectrum of possible items or systems.

This document contains the performance characteristics and technical data for each of the candidate element concepts considered in the final study. The data sheets fulfill the requirements of the data requirement description of the contract statement of work and are applicable to the specific missions indicated in terms of quantified parameters. The book can be used as a manual for designers in determining each concept's applicability for the considered mission and the resulting assessments that must be allocated. The elements can then be combined by function into potential systems and evaluated by use of the modeling technique described in the Final Report, Volume II.

Finally, this book also contains data sheets for those concepts that were not studied in the Final phase of the contract effort due to either non-applicability of the concept or because of a deleted mission. The data contained on these sheets represent basic performance characteristics generated during the Interim phase effort but updated if required as a result of Final phase studies. These data are usable to provide additional information for concepts that may later be applicable as mission models change.

SECTION II

ELEMENT CONCEPT DATA SHEETS

A. GENERAL

The technical data generated for each of the element concepts carried into the final study phase of the contract has been compiled on an applicable data sheet. The data sheets presented in this section of the Data Book, therefore, represent a significant engineering output of the study.

B. FUNCTIONAL AREAS AND MISSIONS

The requirements for a food system have been allocated by primary functional subsystem areas. These areas have been identified as follows:

1.0 Provide for Food
2.0 Provide for Storage of Food
3.0 Provide for Preparation of Food
4.0 Provide for Serving of Food
5.0 Provide for Consumption of Food
6.0 Provide for Clean-Up of Food
7.0 Provide for Recording of Food

The food system concepts are constrained to satisfy a group of mission models developed and modified during the course of the study. The Mission model matrix presented in Figures II-1 and II-2 depict the guidelines selected for the final study effort.

C. NUMBERING LEVELS

In order to differentiate between a specific equipment item, the category concept to which the equipment item applies, the grouping of these categories into subsystems, and finally the functional area for these subsystems, a numbering sequence has been utilized as follows, using functional subsystem area 2.0 - Provide for Food Storage as an example:

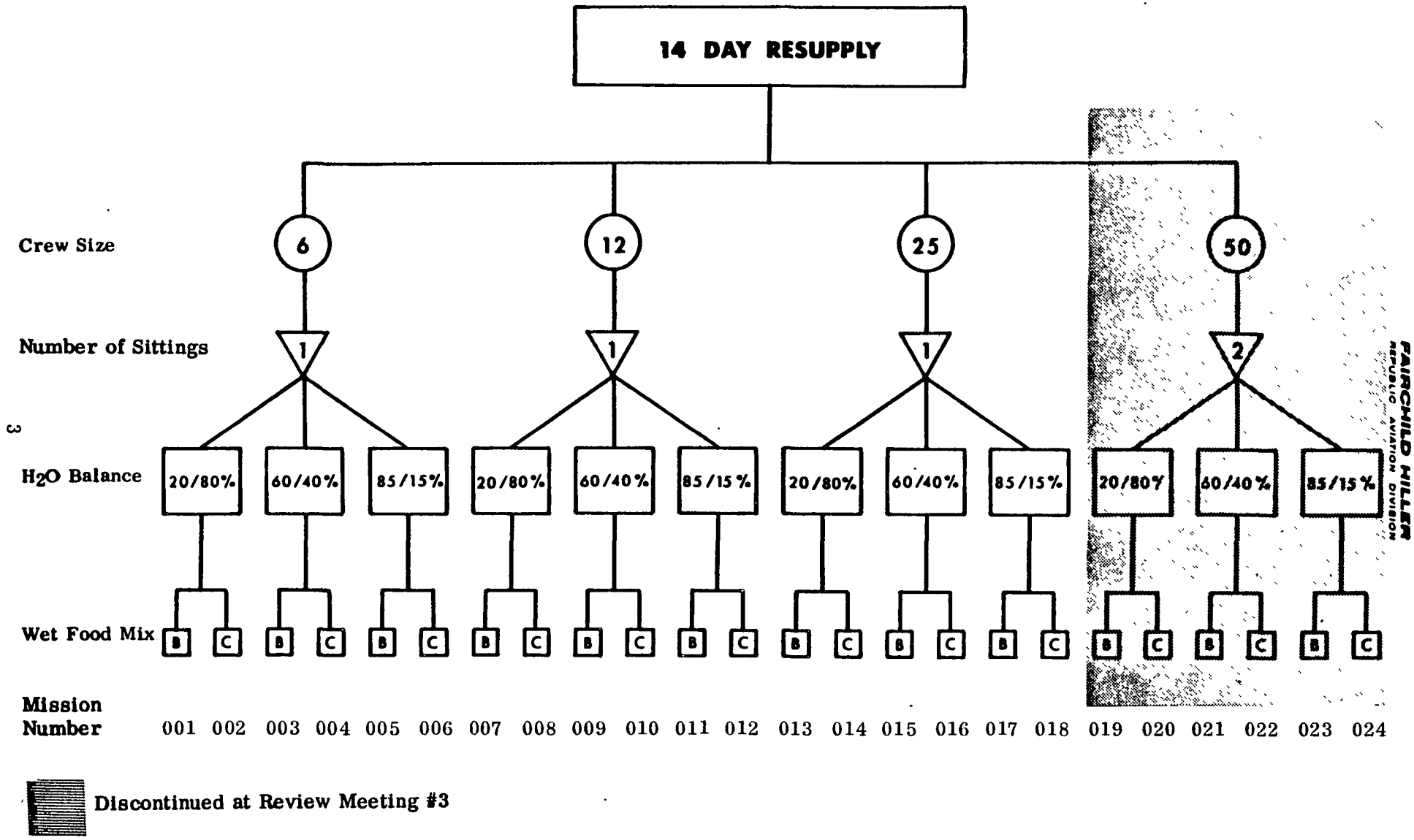

Figure II-1. Mission Model Matrix - 14-Day Resupply

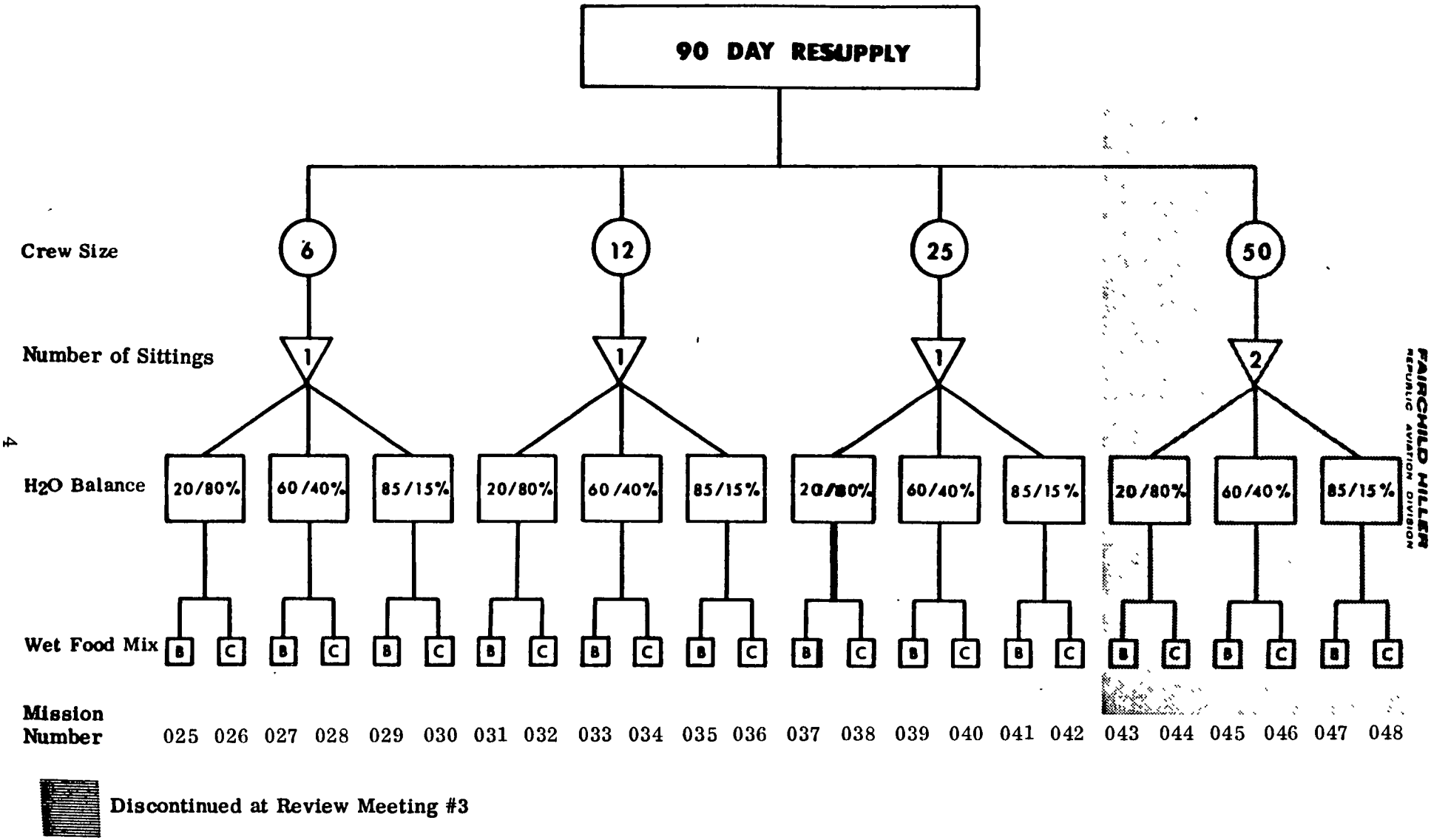

Figure II-2. Mission Model Matrix - 90-Day Resupply

Levels	Description
2.0	Functional Subsystem: In this case "Provide for Food Storage".
2.1	Functional Subsystem Sub-Function: This is a device which allows the computers to sum data by sub-function category such as "freeze food" or "store ambient food". A miscellaneous category may be used if so indicated.
2.1.1	Concept: This is the identification for the various equipment categories which will perform the sub-function above, such as a solid CO_2 freezer, space radiator freezer, or a storage locker. This is the number used on the concept evaluation, summary, and rationale sheets.
2.1.1.1	Equipment Item: This is the number used on the Data Sheets. Assume that 2.1.1 is the concept number for a solid CO_2 freezer. 2.1.1.1 would be the number used on the Data Sheet for the solid CO_2 freezer sized to meet the requirement of all missions having the same set of common sizing, total weight, total volume, total power, etc. There may be many Equipment Item Data Sheets for any given concept. A different size CO_2 freezer or a mission which uses the same freezer, but a different number of units, requires a new data sheet with a new number; i.e., 2.1.1.2, 2.1.1.3, etc. If any of the data on the data sheet change for any other mission, a new data sheet with a new number is used.

D. FORMAT AND DESCRIPTION

The data sheet format is depicted in Figure II-3 and is used to assemble all pertinent information for each concept and variation considered. A description of the data sheet follows:

- Element Concept: A single equipment item in a system.
- Data Sheet Number: Assigned in accordance with numbering instructions of paragraph C above.
- Title: Descriptive title of the concept.
- Applicable Mission Numbers: In accordance with Figures II-1 and II-2.
- Function Reference: Applicable functional area as described in paragraph B above.
- Drawing Reference: This is the number assigned to sketches as applicable to the concepts described on the data sheet. Numbers will be the same as that for the concept category, but preceded with a capital "D". If a drawing is applicable to a particular equipment item it will be identified at that level.

ELEMENT CONCEPT DATA SHEET #_____

Title: _____ Applicable Mission Numbers

Function Reference: _____ _____ _____

Drawing Reference: _____ _____ _____

Physical Description: _____

_____

_____

_____

Functional Description: _____

_____

_____

_____

Detail Data

Reliability: _____ 10 Year Resupply Volume: _____

Maintainability: _____ Peak Power: _____

Safety: _____ Energy: _____

Crew Acceptance: _____ Water (155°F): _____

Installed Weight: _____ Water (50°F): _____

Resupply Weight: _____ Crew Operating Time: _____

10 Year Resupply Weight: _____ Total Cost: _____

Installed Volume: _____ Development Risk: _____

Resupply Volume: _____

Rationale: _____

_____

Merits/Deficiencies: _____

_____

Data Sources: _____

_____

Figure II-3. Element Concept Data Sheet Format

- Physical Description: A configuration description; may be similar to description on sketches.

- Functional Description: If the equipment item function is unique in its relationship to other system elements, these functional interfaces are described.

- Detail Data: These items are given quantitative values for the mission, not a single unit; i.e., if 2 rather than 1 IR ovens will be used in the system, the data sheet for the IR oven will be for 2 rather than 1 unit. If one oven weighs 5 pounds, then 10 pounds is inserted for "Installed Weight".

- Reliability: Two numbers are required:

  1) MTBF = mean operating time of the unit between failures, expressed in hours.

  2) Operating Hours = total operating time of the unit for a 10-year mission, expressed in hours.

- Maintainability: MTTR = mean time to repair the unit, expressed in hours.

- Safety: Accidents per mission hour.

- Crew Acceptance: This is a scaled number ranging as follows: 0-2 Poor; 2-4 Fair; 4-6 Good; 6-8 Excellent. This permits varying degrees of poor, fair, good, and excellent.

- Installed Weight: Weight of unit(s) plus installation hardware. (Does not include expendables or spares) in pounds.

- Resupply Weight: The total weight per resupply mission. (Includes expendables and spares) in pounds.

- 10 Year Resupply Weight: The sum of the resupply weights above, but for a 10 year mission (in pounds).

- Installed Volume: Cubic footage of the equipment installed in the spacecraft, but exclusive of expendables and spares.

- Resupply Volume: Cubic footage of the expendables and spares per resupply period.

- 10 Year Resupply Volume: The cubic footage of the resupply volume above, but for a 10 year mission.

- Peak Power: Peak operating power in watts.

- Energy: Daily consumption of energy in watt-hours/day.

- Water (150°F): Demand on the water supply system in pounds/day.
- Water (50°F): Demand on the water supply system in pounds/day.
- Crew Operating Time: Man-hours per day.
- Total Cost: Development (Engineering and Test) plus acquisition cost (procurement) of an installed set of flight qualified equipment (excludes) resupply or spares) expressed in dollars.
- Development Risk: This is a scaled number ranging as follows and permitting variations within the ranges: 0-2 Major Development Required or Not Feasible; 2-4 Broad Development; 4-6 Some Development; 6-8 Available.
- Rationale: The rationale for the consideration of this concept is described here.
- Merits/Deficiencies: Brief description not obvious from above.
- Data Sources: Reference items listed, if any.

E. ELEMENT CONCEPT DATA SHEETS

The following Element Concept Data Sheets have been completed during the Final Study phase for all concepts selected for detail study at the conclusion of the Interim phase of the program. Each sheet contains detailed performance data for a particular concept applicable to a specific mission or missions. The data sheets are listed consecutively by functional area.

ELEMENT CONCEPT DATA SHEET NUMBER 1.1 (MISSION SUMMARY)

Mission Number	Diet Mix	Crew Acceptance	Resupply Weight (Lb)	Resupply Vol. (Ft^3)	10 Yr. Resupply Weight (Lb)	10 Yr. Resupply Vol. (Ft^3)	Water (Lb/Day) 155°F	Water (Lb/Day) 50°F	Development Risk
001	20/80 B	7	351.0	17.74	91,260.	4612.	5.178	14.62	4
002	C	8	377.0	13.73	98,020.	3570.	4.881	14.39	4
003	60/40 B	6	249.7	12.88	64,922.	3349.	8.337	17.84	5
004	C	6	262.8	10.88	68,328.	2829.	8.217	17.72	5
005	85/15 B	5	186.3	9.84	48,438.	2558.	10.35	19.86	6
006	C	5	191.3	9.09	49,738.	2363.	10.31	19.81	6
007	20/80 B	7	702.0	35.50	182,520.	9230.	10.36	29.24	4
008	C	8	754.3	27.47	196,118.	7142.	9.762	28.77	4
009	60/40 B	6	499.5	25.96	129,870.	6750.	16.67	35.68	5
010	C	6	525.7	21.74	136,682.	5652.	16.43	35.44	5
011	85/15 B	5	372.6	19.66	96,876.	5112.	20.71	39.71	6
012	C	5	382.5	18.15	99,450.	4719.	20.62	39.62	6
013	20/80 B	7	1463.	73.96	380,380.	19230.	21.58	60.93	4
014	C	8	1571.	57.23	408,460.	14880	20.34	59.94	4
015	60/40 B	6	1041.	53.67	270,660.	13954.	34.74	74.34	5
016	C	6	1095.	45.31	284,700.	11781.	34.24	73.84	5
017	85/15 B	5	776.3	40.97	201,838.	10652.	43.14	82.74	6
018	C	5	796.6	37.81	207,116.	9831.	42.95	82.55	6
025	20/80 B	7	2256.	114.1	90,240.	4564.	5.178	14.62	4
026	C	8	2424.	88.27	96,960.	3531.	4.881	14.39	4
027	60/40 B	6	1605.	82.81	64,200.	3312.	8.337	17.84	5
028	C	6	1690.	69.91	67,600.	2796.	8.217	17.72	5
029	85/15 B	5	1198.	63.21	47,920.	2528.	10.35	19.86	6
030	C	5	1229.	58.33	49,160.	2333.	10.31	19.81	6
031	20/80 B	7	4512.	228.2	180,480.	9128.	10.36	29.24	4
032	C	8	4848.	176.6	193,920.	7064.	9.762	28.77	4

ELEMENT CONCEPT DATA SHEET NUMBER 1.1 (MISSION SUMMARY) (concluded)

Mission Number	Diet Mix	Crew Acceptance	Resupply Weight (Lb)	Resupply Vol. (Ft^3)	10 Yr. Resupply Water (Lb/Day) Weight (Lb)	Vol (Ft^3)	Water (Lb/Day) 155°F	50°F	Development Risk
033	60/40 B	6	3210.	165.6	128,400.	6624.	16.67	35.68	5
034	C	6	3380.	139.8	135,200.	5592.	16.43	35.44	5
035	85/15 B	5	2394.	126.4	95,760.	5056.	20.71	39.71	6
036	C	5	2458.	116.7	98,320.	4668.	20.62	39.62	6
037	20/80 B	7	9401.	475.5	376,040.	19020.	21.58	60.93	4
038	C	8	10102	367.8	404,800.	14712.	20.34	59.94	4
039	60/40 B	6	6688.	345.0	267,520.	13800.	34.74	74.34	5
040	C	6	7039.	291.2	281,560.	11648.	34.24	73.84	5
041	85/15 B	5	4989.	263.4	199,560.	10536.	43.14	82.74	6
042	C	5	5122.	243.1	204,880.	9724.	42.95	82.55	6

ELEMENT CONCEPT DATA SHEET # 2.1.6.1

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 001, 009, 024

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	5.5 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	115.5 lbs	Water (50°F):	0
Resupply Weight:	.17 lbs	Crew Operating Time.	.0616 hrs/day
10 Year Resupply Weight:	34.lbs	Total Cost:	$ 70000
Installed Volume:	18.4 ft^3	Development Risk:	5
Resupply Volume:	.03 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.2

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 002, 010

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability:	Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	4.2 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	95.8 lbs	Water (50°F):	0
Resupply Weight:	.15 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	29.1 lbs	Total Cost:	$70000
Installed Volume:	14.14 ft^3	Development Risk:	5
Resupply Volume:	.02 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.3

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 003, 018

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	3.6 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	86.3 lbs	Water (50°F):	0
Resupply Weight:	.15 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	27.0 lbs.	Total Cost:	$70000
Installed Volume:	12.02 ft^3	Development Risk:	5
Resupply Volume:	.02 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.4

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 004

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 105000 hrs Op. Hrs= 69.4×10^3	10 Year Resupply Volume:	2.8 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	72.6 lbs	Water (50°F):	0
Resupply Weight:	.13 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	25.0 lbs	Total Cost:	$70000
Installed Volume:	9.33 ft^3	Development Risk:	5
Resupply Volume:	.01 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.5

Title: Space Radiator Freezer Concept

Applicable Mission Numbers

005

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability: Op. Hrs = 69.4×10^3

Maintainability: MTTR = .50 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 63.2 lbs

Resupply Weight: .10 lbs

10 Year Resupply Weight: 19.2 lbs

Installed Volume: 7.69 ft^3

Resupply Volume: .01 ft^3

10 Year Resupply Volume: 2.4 ft^3

Peak Power: 50 watts

Energy: 3.08 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $ 70000

Development Risk: 5

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.6

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 006

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	1.84
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	56.8 lbs	Water (50°F):	0
Resupply Weight:	.10 lbs.	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	17.4 lbs	Total Cost:	$70000
Installed Volume:	6.59 ft^3	Development Risk:	5
Resupply Volume:	.005 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.7

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 007

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability:	Op. Hrs = 69.4×10^3	10 Year Resupply Volume:	8.10 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	156 lbs	Water (50°F):	0
Resupply Weight:	.20 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	47.3 lbs	Total Cost:	$70000
Installed Volume:	27 ft^3	Development Risk:	5
Resupply Volume:	.04 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penaltites/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.8

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 008

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF-105000 hrs Op. hrs = 69.4x10^3	10 Year Resupply Volume:	6.24 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	124 lbs	Water (50°F):	0
Resupply Weight:	.20 lbs	Crew Operating Time:	.0616
10 Year Resupply Weight:	37.4 lbs	Total Cost:	$70000
Installed Volume:	20.5 ft^3	Development Risk:	5
Resupply Volume:	.03 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.9

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 011

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability: Op. hrs = 69.4×10^3

Maintainability: MTTR = .50 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 78 lbs

Resupply Weight: .15 lbs

10 Year Resupply Weight: 26.2 lbs

Installed Volume: 11 ft^3

Resupply Volume: .02 ft^3

10 Year Resupply Volume: 3.3 ft^3

Peak Power: 50 watts

Energy: 3.08 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $70000

Development Risk: 5

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/ attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.10

Title: Space Radiator Freezer Concept

Applicable Mission Numbers

012

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF= 105000 hrs

Reliability: Op.hrs = 69.4×10^3

Maintainability: MTTR = .50 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 67 lbs

Resupply Weight: .10 lbs

10 Year Resupply Weight: 16.1 lbs

Installed Volume: 8.1 ft^3

Resupply Volume: .01 ft^3

10 Year Resupply Volume: 2,61 ft^3

Peak Power: 50 watts

Energy: 3.08 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $70000

Development Risk: 5

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/ attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.11

Title: Space Radiator Freezer Concept

Applicable Mission Numbers

013, 021, 026
032, 034

Function Reference: Provide For Storage

Drawing Reference: D.2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability: Op.hrs = 69.4×10^3

Maintainability: MTTR = .50 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 207.6 lbs

Resupply Weight: .30 lbs

10 Year Resupply Weight: 62.7 lbs

Installed Volume: 41. ft^3

Resupply Volume: .08 ft^3

10 Year Resupply Volume: 11.5 ft^3

Peak Power: 50 watts

Energy: 3.08 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $70000

Development Risk: 5

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.12

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 014

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 105000 hrs Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	8.89 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	166 lbs	Water (50°F):	0
Resupply Weight:	.30 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	50.9 lbs	Total Cost:	$70000
Installed Volume:	29.6 ft^3	Development Risk:	5
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.13

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 016

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 105000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	6.70 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	132 lbs	Water (50°F):	0
Resupply Weight:	.20 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	39.4 lbs	Total Cost:	$70000
Installed Volume:	22.4 ft^3	Development Risk:	5
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.14

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 017, 030

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	4.77 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	104.2 lbs	Water (50°F):	0
Resupply Weight:	.20 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	32.1 lbs	Total Cost:	$ 70000
Installed Volume:	15.76 ft^3	Development Risk:	5
Resupply Volume:	.02 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.15

Title: Space Radiator Freezer Concept

Applicable Mission Numbers

019,040 - ____ - ____

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 105000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	13.6 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	291 lbs	Water (50°F):	0
Resupply Weight:	.45 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	88.0 lbs	Total Cost:	$70000
Installed Volume:	61.13 ft^3	Development Risk:	5
Resupply Volume:	.10 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.18

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 023,036,054

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 105000 hrs Op.hrs = 69.4 x 10^3	10 Year Resupply Volume:	7.33 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	140 lbs	Water (50°F):	0
Resupply Weight:	.21 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	42.3 lbs	Total Cost:	$70000
Installed Volume:	24.22 ft^3	Development Risk:	5
Resupply Volume:	.35 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.19

Title: Space Radiator Freezer Concept

Applicable Mission Numbers

025, 033, 048
051, 066

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 105000 hrs Op. hrs - 69.4 x 10^3	10 Year Resupply Volume:	12.5 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	253.1 lbs	Water (50°F):	0
Resupply Weight:	.40 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	76.7 lbs	Total Cost:	$70000
Installed Volume:	50.78 ft^3	Development Risk:	5
Resupply Volume:	.06 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.20

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 027, 042, 060

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF =105000 hrs

Reliability:	Op. hrs - 69.4×10^3	10 Year Resupply Volume:	10.3 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	186.7 lbs	Water (50°F):	0
Resupply Weight:	.26 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	57.3 lbs	Total Cost:	$70000
Installed Volume:	34.91 ft^3	Development Risk:	5
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.21

Title: Space Radiator Freezer Concept

Applicable Mission Numbers

029

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 105000 hrs Op. Hrs = 69.4×10^3	10 Year Resupply Volume:	7.62 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	125.1 lbs	Water (50°F):	0
Resupply Weight:	.20 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	37.5 lbs	Total Cost:	$70000
Installed Volume:	25.53 ft^3	Development Risk:	5
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.22

Title: Space Radiator Freezer Concept

Applicable Mission Numbers

031,039,049

057, 072

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 105000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	2.67 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	381 lbs	Water (50°F):	0
Resupply Weight:	.56 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	111.7 lbs	Total Cost:	$70000
Installed Volume:	87.03 ft^3	Development Risk:	5
Resupply Volume:	.15 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.23

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 032, 050, 058

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability	MTBF = 105000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	14.0 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	296 lbs	Water (50°F):	0
Resupply Weight:	.45 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	89.0 lbs	Total Cost:	$70000
Installed Volume:	62.5 ft^3	Development Risk:	5
Resupply Volume:	.08 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.24

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 035, 053

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability:	Op Hrs = 69.4 x 10^3	10 Year Resupply Volume:	8.71 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	167.6 lbs	Water (50°F):	0
Resupply Weight:	.20 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	50.1 lbs	Total Cost:	$70000
Installed Volume:	29 ft^3	Development Risk:	5
Resupply Volume:	.04 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.25

Title: Space Radiator Freezer Concept

Applicable Mission Numbers

Function Reference: Provide For Storage — 037, 045, 055 / 063

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 10500 hrs Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	49.0 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	654 lbs	Water (50°F):	0
Resupply Weight:	.075 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	145.0 lbs	Total Cost:	$70000
Installed Volume:	164.5 ft^3	Development Risk:	5
Resupply Volume:	.30 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.26

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 038,046,064

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 105000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	32.3 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	445 lbs	Water (50°F):	0
Resupply Weight:	.60 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	129.3 lbs	Total Cost:	$70000
Installed Volume:	103 ft^3	Development Risk:	5
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.27

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 041, 059

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 105000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	11.7 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	222.4 lbs	Water (50°F):	0
Resupply Weight:	.35 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	67.3 lbs	Total Cost:	$70000
Installed Volume:	44 ft^3	Development Risk:	5
Resupply Volume:	.06 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/ attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.35

Title: Space Radiator Freezer Concept

Applicable Mission Numbers

015, 028

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability: Op. hrs = 69.4×10^3

Maintainability: MTTR = .50 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 157.3 lbs.

Resupply Weight: .25 lbs

10 Year Resupply Weight: 47.2 lbs

Installed Volume: 28.19 ft^3

Resupply Volume: .05 ft^3

10 Year Resupply Volume: 8.60 ft^3

Peak Power: 50 watts

Energy: 3.08 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $70000

Development Risk: 5

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties / attitude control required

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.1

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers: 001, 009, 024

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 150.000 Hrs OP HRS = 69.4 x 10^2	10 Year Resupply Volume:	16.5 ft^3
Maintainability:	MTTR = .50 Hrs	Peak Power:	793 watts
Safety:	0	Energy:	14700 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	172.8 lbs	Water (50°F):	0
Resupply Weight:	.50 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	- 125 lbs.	Total Cost:	$90,000
Installed Volume:	22.6 ft^3	Development Risk:	.6
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.2

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers

002, 010

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op Hrs = 69.4×10^3	10 Year Resupply Volume:	13.0 ft^3
Maintainability:	MTTR = .5 Hrs	Peak Power:	644.5 watts
Safety:	0	Energy:	12000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	139.4 lbs	Water (50°F):	0
Resupply Weight:	.50 lbs	Crew Operating Time:	.0616
10 Year Resupply Weight:	101 lbs	Total Cost:	$ 90000
Installed Volume:	17.8 ft^3	Development Risk:	6
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.3

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers

003,018

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op Hrs = 69.4×10^3	10 Year Resupply Volume:	11.5 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	606 watts
Safety:	0	Energy:	11600 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	127.7 lbs	Water (50°F):	0
Resupply Weight:	.5 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	94.0	Total Cost:	$ 90000
Installed Volume:	15.6 ft^3	Development Risk:	6
Resupply Volume:	.10 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.4

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers

004

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op Hrs = 69.4 x 10^3	10 Year Resupply Volume:	9.2 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	511 watts
Safety:	0	Energy:	10000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	103.0 lbs	Water (50°F):	0
Resupply Weight:	.20 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	78.3 lbs	Total Cost:	$90000
Installed Volume:	12.4 ft^3	Development Risk:	6
Resupply Volume:	.005 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.5

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers

005

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability: MTBF = 150,000 hrs; Op Hrs = 69.4×10^3

Maintainability: MTTR = .5 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 87 lbs

Resupply Weight: .30 lbs.

10 Year Resupply Weight: 63.0 lbs.

Installed Volume: 9.5 ft^3

Resupply Volume: .04 ft^3

10 Year Resupply Volume: 6.90 ft^3

Peak Power: 453 watts

Energy: 8700 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $ 90000

Development Risk: 6

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.6

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers: 006

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability: MTBF = 150,000 hrs; Op Hrs = 69.4 x 10 3

Maintainability: MTTR = .5 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 77.1 lbs

Resupply Weight: .30 lbs,

10 Year Resupply Weight: 56.3 lbs

Installed Volume: 8.2 ft^3

Resupply Volume: .003 ft^3

10 Year Resupply Volume: 6.0 ft^3

Peak Power: 417 watts

Energy: 8000 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $90000

Development Risk: 6

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.7

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers: 007

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op Hrs = 69.4 x 10 3	10 Year Resupply Volume:	24.1 ft 3
Maintainability:	MTTR = .5 hrs	Peak Power:	1220 watts
Safety:	0	Energy:	23400 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	239.6 lbs	Water (50°F):	0
Resupply Weight:	0.9 lbs.	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	170.2 lbs	Total Cost:	$ 90000
Installed Volume:	33.1 ft 3	Development Risk:	6
Resupply Volume:	.15 ft 3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1 7.8

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers: 008

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op Hrs. = 69.4 x 10^3	10 Year Resupply Volume:	19.2 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	902 watts
Safety:	0	Energy:	17600 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	195.9 lbs	Water (50°F):	0
Resupply Weight:	.75 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	142.3 lbs	Total Cost:	$90000
Installed Volume:	26.3 ft^3	Development Risk:	6
Resupply Volume:	.10 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.9

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers

011

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability: MTBF = 150,000 hrs Op Hrs = 69.4×10^3	10 Year Resupply Volume: 10.0 ft^3
Maintainability: MTTR = .5 hrs	Peak Power: 529.5 watts
Safety: 0	Energy: 10200 watt hrs/day
Crew Acceptance: 8	Water (155°F): 0
Installed Weight: 111 lbs	Water (50°F): 0
Resupply Weight: .45 lbs	Crew Operating Time: .0616 hrs/day
10 Year Resupply Weight: 90.0 lbs	Total Cost: $90000
Installed Volume: 13.5 ft^3	Development Risk: 6
Resupply Volume: .05 ft^3	

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.10

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers

012

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op Hrs = 69.4 x 10^3	10 Year Resupply Volume:	8.11 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	474 watts watt
Safety:	0	Energy:	9050 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	93.2 lbs	Water (50°F):	0
Resupply Weight:	.35 lbs.	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	68.5 lbs	Total Cost:	$90000
Installed Volume:	11.1 ft^3	Development Risk:	6
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.11

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers

014

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op Hrs = 69.4 x 10 3	10 Year Resupply Volume:	28.1 ft 3
Maintainability:	MTTR = .5 hrs	Peak Power:	1511 watts
Safety:	0	Energy:	29100 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	284.4 lbs	Water (50°F):	0
Resupply Weight:	1.0 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	200.0 lbs	Total Cost:	$90000
Installed Volume:	38.1 ft^3	Development Risk:	6
Resupply Volume:	.15 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7 12

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers

915, 928

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 150,000 hrs

Reliability: Op. hrs = 69.4×10^3

Maintainability: MTTR = .50 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 249.5 lbs

Resupply Weight: 1.0 lbs

10 Year Resupply Weight: 181.3 lbs

Installed Volume: 34.4 ft^3

Resupply Volume: .15 ft^3

10 Year Resupply Volume: 25.1 ft^3

Peak Power: 1285 watts

Energy: 24500 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $ 90000

Development Risk: 6

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.13

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers: 016

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 150,000 hrs

Reliability: Op. Hrs = 69.4×10^3

Maintainability: ~~MTTR = .50 hrs~~

Safety: 0

Crew Acceptance: 8

Installed Weight: 194 lbs

Resupply Weight: .70 lbs

10 Year Resupply Weight: 140.0 lbs

Installed Volume: 26.6 ft^3

Resupply Volume: .10 ft^3

10 Year Resupply Volume: 19.2 ft^3

Peak Power: 925 watts

Energy: 17800 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $ 90000

Development Risk: 6

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.14

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers: 017, 030

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability: MTBF = 150,000 hrs Op. Hrs = 69.4×10^3

Maintainability: MTTR = .50 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 154.5 lbs

Resupply Weight: .60 lbs

10 Year Resupply Weight: 113.2 lbs

Installed Volume: 19.6 ft^3

Resupply Volume: .05 ft^3

10 Year Resupply Volume: 14.3 ft^3

Peak Power: 686 watts

Energy: 11500 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $90000

Development Risk: 6

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.15

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers: 023,036,054

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	22.0 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	1042.5 watts
Safety:	0	Energy:	20000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	207 lbs	Water (50°F):	0
Resupply Weight:	.8 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	150.2 lbs	Total Cost:	$ 90000
Installed Volume:	29.3 ft^3	Development Risk:	6
Resupply Volume:	.15 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.16

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers: 027, 042, 060

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 150,000 hrs

Reliability: Op. Hrs = 69.4×10^3

Maintainability: MTTR = .50 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 317 lbs

Resupply Weight: 1.2 lbs

10 Year Resupply Weight: 235.2 lbs

Installed Volume: 35 ft^3

Resupply Volume: .15 ft^3

10 Year Resupply Volume: 25.8 ft^3

Peak Power: 1696.5 watts

Energy: 32100 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $90000

Development Risk: 6

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.17

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers

029

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. Hrs = 69.4×10^3	10 Year Resupply Volume:	18.0 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	900 watts
Safety:	0	Energy:	17200 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	190.3 lbs	Water (50°F):	0
Resupply Weight:	.8 lbs	Crew Operating Time:	.0616
10 Year Resupply Weight:	140. lbs	Total Cost:	$90000
Installed Volume:	25.1 ft^3	Development Risk:	6
Resupply Volume:	.10 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.18

Title: Thermoelectric Freezer Unit

Applicable Mission Numbers: 035, 053

Function Reference: Provide For Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear freezer bulkhead.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op.hrs - 69.4×10^3	10 Year Resupply Volume:	26.5 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	1248 watts
Safety:	0	Energy:	23700 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	267.6 lbs	Water (50°F):	0
Resupply Weight:	1.0 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	195.2 lbs	Total Cost:	$90000
Installed Volume:	36.7 ft^3	Development Risk:	6
Resupply Volume:	.15 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Heat is dumped into cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.19

Title: Thermoelectric Freezer

Applicable Mission Numbers: 013, 021, 026; 034, 052

Function Reference: Provide for Storage

Drawing Reference:

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10° F.

Detail Data

Reliability:	MTBF = 150,000 Hrs. Op.Hrs = 69.4×10^3	10 Year Resupply Volume:	34.0 ft^3
Maintainability:	MTTR = .5 hrs.	Peak Power:	2280 watts
Safety:	0	Energy:	43200 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	359 lbs	Water (50°F):	0
Resupply Weight:	1.5 lbs.	Crew Operating Time:	.0616 Hrs/day
10 Year Resupply Weight:	270.0 lbs	Total Cost:	$90000
Installed Volume:	47 ft^3	Development Risk:	6
Resupply Volume:	.20 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.20

Title: Thermoelectric Freezer

Applicable Mission Numbers: 019, 040

Function Reference: Provide for Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	50.3 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	3400 watts
Safety:	0	Energy:	65000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	547 lbs	Water (50°F):	0
Resupply Weight:	2.0 lbs	Crew Operating Time:	.0616
10 Year Resupply Weight:	400. lbs	Total Cost:	$ 90000
Installed Volume:	69 ft^3	Development Risk:	6
Resupply Volume:	.3 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

2

ELEMENT CONCEPT DATA SHEET # 2.1.7.23

Title: Thermoelectric Freezer

Applicable Mission Numbers

025, 033, 048

051, 066

Function Reference: Provide for Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. Hrs = 69.4 x 10^3	10 Year Resupply Volume:	44. ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	2570 watts
Safety:	0	Energy:	49000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	483 lbs	Water (50°F):	0
Resupply Weight:	2.0 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	350.2 lbs	Total Cost:	$90000
Installed Volume:	60 ft^3	Development Risk:	6
Resupply Volume:	.25 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.24

Title: Thermoelectric Freezer

Applicable Mission Numbers: 031, 039, 049; 057, 072

Function Reference: Provide for Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 150,00 hrs

Reliability: Op. hrs - 69.4×10^3

Maintainability: MTRR = .50 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 690 lbs

Resupply Weight: 2.5 lbs.

10 Year Resupply Weight: 504.2 lbs.

Installed Volume: 99 ft^3

Resupply Volume: .40 ft^3

10 Year Resupply Volume: 73. ft^3

Peak Power: 3600 watts

Energy: 69000 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $ 90000

Development Risk: 6

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.25

Title: Thermoelectric Freezer

Applicable Mission Numbers: 032, 050, 058

Function Reference: Provide for Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	56.0 ft^3
Maintainability:	MTRR = .50 hrs	Peak Power:	3080 watts
Safety:	0	Energy:	59000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	535 lbs	Water (50°F):	0
Resupply Weight:	2.0 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	394.2 lbs	Total Cost:	$ 90000
Installed Volume:	76 ft^3	Development Risk:	6
Resupply Volume:	.20 ft3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.26

Title: Thermoelectric Freezer

Applicable Mission Numbers: 037, 045, 055; 063

Function Reference: Provide for Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op hrs = 69.4 x 10^3	10 Year Resupply Volume:	115. ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	6100 watts
Safety:	0	Energy:	116000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	958 lbs	Water (50°F):	0
Resupply Weight:	3.6 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	702.0 lbs	Total Cost:	$90000
Installed Volume:	157 ft^3	Development Risk:	6
Resupply Volume:	.50 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.27

Title: Thermoelectric Freezer

Applicable Mission Numbers: 038, 046, 064

Function Reference: Provide for Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	91.2 ft^3
Maintainability:	MTTR - .50 hrs	Peak Power:	4900 watts
Safety:	0	Energy:	94000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	780 lbs	Water (50°F):	0
Resupply Weight:	3.0 lbs	Crew Operating Time:	.0616
10 Year Resupply Weight:	570.1 lbs	Total Cost:	$90000
Installed Volume:	126 ft^3	Development Risk:	6
Resupply Volume:	.5 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.28

Title: Thermoelectric Freezer

Applicable Mission Numbers: 041, 059

Function Reference: Provide for Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op hrs = 69.4×10^3	10 Year Resupply Volume:	40.2 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	2040 watts
Safety:	0	Energy:	39200 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	419 lbs	Water (50°F):	0
Resupply Weight:	1.5 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	307. lbs.	Total Cost:	$90000
Installed Volume:	55.4 ft^3	Development Risk:	6
Resupply Volume:	.2 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.8.1

Title: Turbo-Compressor/Air Cycle Freezer

Applicable Mission Numbers

001 - 004
009 - 011
017, 018, 030

Function Reference: Provide For Storage

Drawing Reference: D-2.1.8

Physical Description: The air cycle freezer uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the frozen food removes heat leakages.

Functional Description: The unit will maintain frozen foods at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 7000 Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	44.6 ft^3
Maintainability:	MTTR=.75 hrs	Peak Power:	15,000 Watts
Safety:	0	Energy:	286,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	220 lbs	Water (50°F):	0
Resupply Weight:	4.0 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	123 lbs	Total Cost:	$100,000
Installed Volume:	80 ft^3	Development Risk:	4
Resupply Volume:	1.65 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.1.8.2

Title: Turbo-Compressor/Air Cycle Freezer

Applicable Mission Numbers: 005, 006; 012

Function Reference: Provide For Storage

Drawing Reference: D-2.1.8

Physical Description: The air cycle freezer uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the frozen food removes heat leakages.

Functional Description: The unit will maintain frozen foods at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 7000 Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	43.2 ft^3
Maintainability:	MTTR = .75 hrs	Peak Power:	15,000 Watts
Safety:	0	Energy:	286,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	215 lbs	Water (50°F):	0
Resupply Weight:	4.0 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	120 lbs	Total Cost:	$100,000
Installed Volume:	77 ft^3	Development Risk:	4
Resupply Volume:	1.24 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.1.8.3

Title: Turbo-Compressor/Air Cycle Freezer

Applicable Mission Numbers: 007, 015; 028

Function Reference: Provide For Storage

Drawing Reference: D-2.1.8

Physical Description: The air cycle freezer uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the frozen food removes heat leakages.

Functional Description: The unit will maintain frozen foods at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 7000 Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	44.6 ft^3
Maintainability:	MTTR = .75 Hrs.	Peak Power:	16,000 Watts
Safety:	0	Energy:	304,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	310 lbs	Water (50°F):	0
Resupply Weight:	5.72 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	173 lbs	Total Cost:	$100,000
Installed Volume:	80 ft^3	Development Risk:	4
Resupply Volume:	1.47 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.1.8.4

Title: Turbo-Compressor/Air Cycle Freezer

Applicable Mission Numbers: 008, 016; 029, 036

Function Reference: Provide For Storage

Drawing Reference: D-2.1.8

Physical Description: The air cycle freezer uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the frozen food removes heat leakages.

Functional Description: The unit will maintain frozen foods at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 7000 Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	44.1 ft^3
Maintainability:	MTTR = .75 hrs	Peak Power:	15,500 Watts
Safety:	0	Energy:	296,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	290 lbs	Water (50°F):	0
Resupply Weight:	5.4 lbs.	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	162 lbs	Total Cost:	$100,000
Installed Volume:	79 ft^3	Development Risk:	4
Resupply Volume:	1.46 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.1.8.5

Title: Turbo-Compressor/Air Cycle Freezer

Applicable Mission Numbers: 013, 026; 034

Function Reference: Provide For Storage

Drawing Reference: D-2.1.8

Physical Description: The air cycle freezer uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the frozen food removes heat leakages.

Functional Description: The unit will maintain frozen foods at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 7000 Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	46.0 ft^3
Maintainability:	MTTR = .75 hrs	Peak Power:	16,900 Watts
Safety:	0	Energy:	321,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	399 lbs	Water (50°F):	0
Resupply Weight:	7.4 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	223 lbs	Total Cost:	$100,000
Installed Volume:	82 ft^3	Development Risk:	4
Resupply Volume:	1.52 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.1.8.6

Title: Turbo-Compressor/Air Cycle Freezer

Applicable Mission Numbers: 014 , 035

Function Reference: Provide For Storage

Drawing Reference: D-2.1.8

Physical Description: The air cycle freezer uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the frozen food removes heat leakages.

Functional Description: The unit will maintain frozen foods at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 7000 Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	42.6 ft^3
Maintainability:	MTTR = .75 hrs	Peak Power:	15,500 watts
Safety:	0	Energy:	295,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	300 lbs	Water (50°F):	0
Resupply Weight:	5.5 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	168 lbs	Total Cost:	$100,000
Installed Volume:	76 ft^3	Development Risk:	4
Resupply Volume:	1.41 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.1.8.7

Title: Turbo-Compressor/Air Cycle Freezer

Applicable Mission Numbers: 025, 033

Function Reference: Provide For Storage

Drawing Reference: D-2.1.8

Physical Description: The air cycle freezer uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the frozen food removes heat leakages.

Functional Description: The unit will maintain frozen foods at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 7000 Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	46.5 ft^3
Maintainability:	MTTR - .75 hrs	Peak Power:	16,200 watts
Safety:	0	Energy:	308,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	445 lbs	Water (50°F):	0
Resupply Weight:	8.0 ft^3	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	249 lbs.	Total Cost:	$100,000
Installed Volume:	82 ft^3	Development Risk:	4
Resupply Volume:	1.56 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.1.8.8

Title: Turbo-Compressor/Air Cycle Freezer

Applicable Mission Numbers: 027, 042

Function Reference: Provide For Storage

Drawing Reference: D-2.1.8

Physical Description: The air cycle freezer uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the frozen food removes heat leakages.

Functional Description: The unit will maintain frozen foods at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 7000 Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	44.4 ft^3
Maintainability:	MTTR = .75 hrs	Peak Power:	15,600 watts
Safety:	0	Energy:	297,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	321 lbs	Water (50°F):	0
Resupply Weight:	5.5 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	180.5 lbs	Total Cost:	$100,000
Installed Volume:	79 ft^3	Development Risk:	4
Resupply Volume:	1.49 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.1.8.9

Title: Turbo-Compressor/Air Cycle Freezer

Applicable Mission Numbers: 031 , 039

Function Reference: Provide For Storage

Drawing Reference: D-2.1.8

Physical Description: The air cycle freezer uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the frozen food removes heat leakages.

Functional Description: The unit will maintain frozen foods at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 7000 Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	58.8 ft^3
Maintainability:	MTTR = .75 hrs	Peak Power:	17,500 watts
Safety:	0	Energy:	333,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	604 lbs	Water (50°F):	0
Resupply Weight:	342 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	10 lbs	Total Cost:	$100,000
Installed Volume:	106 ft^3	Development Risk:	4
Resupply Volume:	1.96 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.1.8.10

Title: Turbo-Compressor/Air Cycle Freezer

Applicable Mission Numbers: 032 , 040

Function Reference: Provide For Storage

Drawing Reference: D-2.1.8

Physical Description: The air cycle freezer uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the frozen food removes heat leakages.

Functional Description: The unit will maintain frozen foods at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 7000 Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	49.9 ft^3
Maintainability:	MTTR = .75 hrs	Peak Power:	16,600 Watts
Safety:	0	Energy:	316,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	499 lbs	Water (50°F):	0
Resupply Weight:	9.0 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	279 lbs	Total Cost:	$100,000
Installed Volume:	89 ft^3	Development Risk:	4
Resupply Volume:	1.66 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.1.8.11

Title: Turbo-Compressor/Air Cycle Freezer

Applicable Mission Numbers: 037

Function Reference: Provide For Storage

Drawing Reference: D-2.1.8

Physical Description: The air cycle freezer uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the frozen food removes heat leakages.

Functional Description: The unit will maintain frozen foods at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 7000 Hrs. Op. Hrs. = 69,400	10 Year Resupply Volume:	54.1 ft^3
Maintainability:	MTTR = .75 hrs	Peak Power:	19,600 Watts
Safety:	0	Energy:	373,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	840 lbs	Water (50°F):	0
Resupply Weight:	12. lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	471.0 lbs	Total Cost:	$100,000
Installed Volume:	170 ft^3	Development Risk:	4
Resupply Volume:	1.81 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.1.8.12

Title: Turbo-Compressor/Air Cycle Freezer

Applicable Mission Numbers: 038

Function Reference: Provide For Storage

Drawing Reference: D-2.1.8

Physical Description: The air cycle freezer uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the frozen food removes heat leakages.

Functional Description: The unit will maintain frozen foods at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 7000 Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	67.5 ft^3
Maintainability:	MTTR = .75 hrs	Peak Power:	180,000 Watts
Safety:	0	Energy:	344,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	698 lbs	Water (50°F):	0
Resupply Weight:	12.5 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	390.0 lbs	Total Cost:	$100,000
Installed Volume:	128 ft^3	Development Risk:	4
Resupply Volume:	2.0 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.1.8.13

Title: Turbo-Compressor/Air Cycle Freezer

Applicable Mission Numbers: 039

Function Reference: Provide For Storage

Drawing Reference: D-2.1.8

Physical Description: The air cycle freezer uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the frozen food removes heat leakages.

Functional Description: The unit will maintain frozen foods at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 7000 Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	63.2 ft^3
Maintainability:	MTTR = .75 hrs	Peak Power:	17,500 Watts
Safety:	0	Energy:	333,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	630 lbs	Water (50°F):	0
Resupply Weight:	11.0 lbs	Crew Operating Time:	.08 Hrs/day
10 Year Resupply Weight:	353. lbs	Total Cost:	$100,000
Installed Volume:	110 ft^3	Development Risk:	4
Resupply Volume:	1.9 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.1.8.14

Title: Turbo-Compressor/Air Cycle Freezer

Applicable Mission Numbers: 041

Function Reference: Provide For Storage

Drawing Reference: D-2.1.8

Physical Description: The air cycle freezer uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the frozen food removes heat leakages.

Functional Description: The unit will maintain frozen foods at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 7000 Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	44.7 ft^3
Maintainability:	MTTR = .75 hrs	Peak Power:	16,200 Watts
Safety:	0	Energy:	309,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	405 lbs	Water (50°F):	0
Resupply Weight:	7.1 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	227.3 lbs	Total Cost:	$100,000
Installed Volume:	80 ft^3	Development Risk:	4
Resupply Volume:	1.49 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.4.1

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers

001.009.036
054

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op Hrs. 69.4 x 10^3	10 Year Resupply Volume:	6.8 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	193.8 lbs	Water (50°F):	0
Resupply Weight:	.5 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	94.0 lbs	Total Cost:	$80,000
Installed Volume:	14.45 ft^3	Development Risk:	4
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.2

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 002, 010, 011

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3 hrs	10 Year Resupply Volume:	4.3 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	141.1 lbs	Water (50°F):	0
Resupply Weight:	.4 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	75. lbs	Total Cost:	$80,000
Installed Volume:	8.96 ft^3	Development Risk:	4
Resupply Volume:	.02 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.3

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 003,030

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3 hrs	10 Year Resupply Volume:	5.2 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	151.6 lbs	Water (50°F):	0
Resupply Weight:	.4 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	76.0 lbs	Total Cost:	$80,000
Installed Volume:	10.1 ft^3	Development Risk:	4
Resupply Volume:	.03 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.4

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 004, 005

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs. 69.4×10^3 hrs	10 Year Resupply Volume:	2.9 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	100.4 lbs	Water (50°F):	0
Resupply Weight:	.25 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	47. lbs	Total Cost:	$80,000
Installed Volume:	5.98 ft^3	Development Risk:	4
Resupply Volume:	.02 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.5

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 006

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	21.6 ft^3
Maintainability:	MTTR .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	95.4 lbs	Water (50°F):	0
Resupply Weight:	.25 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	46.0 lbs	Total Cost:	$80,000
Installed Volume:	4.48 ft^3	Development Risk:	4
Resupply Volume:	.1 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.6

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 007

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4 x 10^3	10 Year Resupply Volume:	10.6 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	262.4 lbs	Water (50°F):	0
Resupply Weight:	.6 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	125. lbs	Total Cost:	$80,000
Installed Volume:	22.6 ft^3	Development Risk:	4
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.7

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 008, 017

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	60.0 ft^3
Maintainability:	MTTR= .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	172.5 lbs	Water (50°F):	0
Resupply Weight:	.45 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	89. lbs	Total Cost:	$80,000
Installed Volume:	12.7 ft^3	Development Risk:	4
Resupply Volume:	.3 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.8

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 012

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	2.9 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	115.8 lbs	Water (50°F):	0
Resupply Weight:	.3 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	55.0 lbs	Total Cost:	$80,000
Installed Volume:	6.2 ft^3	Development Risk:	4
Resupply Volume:	.015 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.9

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 013

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	16.2 ft^3
Maintainability:	MTTR = .5 Hrs.	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	357.4 lbs	Water (50°F):	0
Resupply Weight:	.9 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	173. lbs	Total Cost:	$80,000
Installed Volume:	33.51 ft^3	Development Risk:	4
Resupply Volume:	.1 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.10

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 014, 022, 023

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs. = 69.4×10^3	10 Year Resupply Volume:	9.5 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	239.1 lbs	Water (50°F):	0
Resupply Weight:	.6 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	115. lbs	Total Cost:	$80,000
Installed Volume:	19.7 ft^3	Development Risk:	4
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.11

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 015, 060

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	10.8 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	263.4 lbs	Water (50°F):	0
Resupply Weight:	.65 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	128. lbs	Total Cost:	$ 80,000
Installed Volume:	22.6 ft^3	Development Risk:	4
Resupply Volume:	.1 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.12

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers

016

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability: MTBF = 92,000 hrs Op hrs = 69.4 x 10^3	10 Year Resupply Volume: 58.7 ft^3
Maintainability: MTTR = .5 hrs	Peak Power: 50 watts
Safety: 0	Energy: 3.08 watt hrs/day
Crew Acceptance: 8	Water (155°F): 0
Installed Weight: 177.9 lbs	Water (50°F): 0
Resupply Weight: .45 lbs	Crew Operating Time: .0616 hrs/day
10 Year Resupply Weight: 90. lbs	Total Cost: $80,000
Installed Volume: 128 ft^3	Development Risk: 4
Resupply Volume: .3 ft^3	

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.13

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 018

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	3.8 ft^3
Maintainability:	MTTR = .5	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	134.7 lbs	Water (50°F):	0
Resupply Weight:	.35 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	68.0 lbs	Total Cost:	$80,000
Installed Volume:	7.9 ft^3	Development Risk:	4
Resupply Volume:	.02 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.18

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 025, 033, 051

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	19.2 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	428.4 lbs	Water (50°F):	0
Resupply Weight:	1.0 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	206. lbs	Total Cost:	$80,000
Installed Volume:	40.23 ft^3	Development Risk:	4
Resupply Volume:	.1 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.19

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers
026, 034, 042
052

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	$12.4\ ft^3$
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	288.8 lbs	Water (50°F):	0
Resupply Weight:	.7 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	137. lbs	Total Cost:	$80,000
Installed Volume:	$25.84\ ft^3$	Development Risk:	4
Resupply Volume:	$.1\ ft^3$		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.20

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 027

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	$16.1\ ft^3$
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	322.6 lbs	Water (50°F):	0
Resupply Weight:	.75 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	155. lbs	Total Cost:	$80,000
Installed Volume:	$33.2\ ft^3$	Development Risk:	4
Resupply Volume:	$.1\ ft^3$		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.21

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 028

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	$8.4\ ft^3$
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	212.7 lbs	Water (50°F):	0
Resupply Weight:	.5 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	105. lbs	Total Cost:	$80,000
Installed Volume:	$17.1\ ft^3$	Development Risk:	4
Resupply Volume:	$.05\ ft^3$		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.22

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 029

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op Hrs = 69.4×10^3	10 Year Resupply Volume:	8.0 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	209.5 lbs	Water (50°F):	0
Resupply Weight:	.5 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	103. lbs	Total Cost:	$80,000
Installed Volume:	16.08 ft^3	Development Risk:	4
Resupply Volume:	.1 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.23

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 031, 049, 057

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	29.3 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	585.16 lbs	Water (50°F):	0
Resupply Weight:	1.4 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	280. lbs	Total Cost:	$ 80,000
Installed Volume:	61.5 ft^3	Development Risk:	4
Resupply Volume:	.15 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.24

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 031,041,050; 058,059

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	17.2 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	394.6 lbs	Water (50°F):	0
Resupply Weight:	.85 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	190.3 lbs	Total Cost:	$80,000
Installed Volume:	36.2 ft^3	Development Risk:	4
Resupply Volume:	.1 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.25

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers

035, 053

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	11.8 ft^3
Maintainability:	MTTR = .5 hrs.	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	284.5 lbs	Water (50°F):	0
Resupply Weight:	.70 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	137. lbs	Total Cost:	$80,000
Installed Volume:	24.8 ft^3	Development Risk:	4
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.26

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 037

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	55. ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	908.6 lbs	Water (50°F):	0
Resupply Weight:	2.22 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	434. lbs	Total Cost:	$80,000
Installed Volume:	114.1 ft^3	Development Risk:	4
Resupply Volume:	.3 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.27

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 038, 046, 061

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 Op Hrs = 69.4×10^3	10 Year Resupply Volume:	26.0 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	532.3 lbs	Water (50°F):	0
Resupply Weight:	1.3 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	263. lbs	Total Cost:	$80,000
Installed Volume:	54.1 ft^3	Development Risk:	4
Resupply Volume:	.15 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.28

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 039

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4 x 10^3	10 Year Resupply Volume:	32.7 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	597.1 lbs	Water (50°F):	0
Resupply Weight:	1.4 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	287 lbs	Total Cost:	$ 80,000
Installed Volume:	68 ft^3	Development Risk:	4
Resupply Volume:	.2 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.29

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers

040

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op Hrs. 69.4×10^3	10 Year Resupply Volume:	17.7 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	386.6 lbs	Water (50°F):	0
Resupply Weight:	1.0 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	185.0 lbs	Total Cost:	$80,000
Installed Volume:	36.9 ft^3	Development Risk:	4
Resupply Volume:	.1 ft^3		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.6.1

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 001, 009, 034

Function Reference: Provide For Storage

Drawing Reference: D- 2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F

Detail Data

Reliability:	MTBF = 150,000 hrs Op.hrs = 69.4×10^3	10 Year Resupply Volume:	4.90 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	89.77 lbs	Water (50°F):	0
Resupply Weight:	.20 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	32.7 lbs	Total Cost	$70,000
Installed Volume:	13.4 ft^3	Development Risk:	5
Resupply Volume:	.02 ft^3		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.2

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 002, 010, 011

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F.

Detail Data

Reliability: MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume: 3.06 ft^3
Maintainability: MTTR = .5 hrs	Peak Power: 50 watts
Safety: 0	Energy: 3.08 watt hrs/day
Crew Acceptance: 8	Water (155°F): 0
Installed Weight: 64.58 lbs	Water (50°F): 0
Resupply Weight: .15 lbs	Crew Operating Time: .0616 hrs/day
10 Year Resupply Weight: 23.8 lbs	Total Cost: $ 70,000
Installed Volume: 8.25 ft^3	Development Risk: 5
Resupply Volume: .02 ft^3	

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.3

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers
003, 030

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs $\doteq 69.4 \times 10^3$	10 Year Resupply Volume:	3.40 ft^3
Maintainability:	MTTR $\doteq$ .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	69.61 lbs	Water (50°F):	0
Resupply Weight:	.15 lbs.	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	25.6 lbs	Total Cost:	$70,000
Installed Volume:	9.27 ft^3	Development Risk:	5
Resupply Volume:	.015 ft^3		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.4

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 004, 005

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	$2.03\ ft^3$
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	50.38 lbs	Water (50°F):	0
Resupply Weight:	.12 lbs.	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	18.6 lbs.	Total Cost:	$70,000
Installed Volume:	$5.57\ ft^3$	Development Risk:	5
Resupply Volume:	$.02\ ft^3$		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.5

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 006

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	1.40 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	45.38 lbs	Water (50°F):	0
Resupply Weight:	.10 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	16.8 lbs	Total Cost:	$70,000
Installed Volume:	4.07 ft^3	Development Risk:	5
Resupply Volume:	.005 ft^3		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.6

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 007

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F.

Detail Data

MTBF = 150,000 hrs.

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	$8.8\ ft^3$
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	121.62 lbs	Water (50°F):	0
Resupply Weight:	.25 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	45.0 lbs	Total Cost:	$ 70,000
Installed Volume:	$20.61\ ft^3$	Development Risk:	5
Resupply Volume:	$.05\ ft^3$		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.7

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

008, 017

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F.

Detail Data

MTBF = 150,000 hours

Reliability: θn. hrs = 69.4×10^3

Maintainability: MTTR = .5 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 81.68 lbs

Resupply Weight: .15 lbs

10 Year Resupply Weight: 29.3 lbs

Installed Volume: 11.83 ft^3

Resupply Volume: .02 ft^3

10 Year Resupply Volume: 4.21 ft^3

Peak Power: 50 watts

Energy: 3.08 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $70,000

Development Risk: 5

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.8

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

012

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability: Op. hrs = 69.4×10^3

Maintainability: MTTR = .5 hrs.

Safety: 0

Crew Acceptance: 8

Installed Weight: 51.48 lbs

Resupply Weight: .1 lb.

10 Year Resupply Weight: 18.6 lbs.

Installed Volume: 5.66 ft^3

Resupply Volume: .005 ft^3

10 Year Resupply Volume: 2.07 ft^3

Peak Power: 50 watts

Energy: 3.08 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $70,000

Development Risk: 5

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.9

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

013

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs. Op. hrs = 69.4×10^3	10 Year Resupply Volume:	11.2 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	164.78 lbs	Water (50°F):	0
Resupply Weight:	.35 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	68.2 lbs	Total Cost:	$70,000
Installed Volume:	30.89 ft^3	Development Risk:	5
Resupply Volume:	.06 ft^3		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.10

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

014, 022, 023

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	7.6 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	111.23 lbs	Water (50°F):	0
Resupply Weight:	.25 lbs.	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	41.2 lbs.	Total Cost:	$70,000
Installed Volume:	18.28 ft^3	Development Risk:	5
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.11

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 015

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	8.2 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	122.62 lbs	Water (50°F):	0
Resupply Weight:	.25 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	47.0 lbs	Total Cost:	$70,000
Installed Volume:	21.11 ft^3	Development Risk:	5
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.12

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 016

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs. Op. hrs = 69.4×10^3	10 Year Resupply Volume:	$4.20\ ft^3$
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	83.00 lbs	Water (50°F):	0
Resupply Weight:	.16 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	30.2 lbs	Total Cost:	$70,000
Installed Volume:	$11.85\ ft^3$	Development Risk:	5
Resupply Volume:	$.02\ ft^3$		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.13

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

018

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F.

Detail Data

Reliability: MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume: 2.7 ft^3
Maintainability: MTTR = .5 hrs	Peak Power: 50 watts
Safety: 0	Energy: 3.08 watt hrs/day
Crew Acceptance: 8	Water (155°F): 0
Installed Weight: 61.54 lbs	Water (50°F): 0
Resupply Weight: .15 lbs	Crew Operating Time: .0616 Hrs/day
10 Year Resupply Weight: 22.7 lbs	Total Cost: $70,000
Installed Volume: 7.22 ft^3	Development Risk: 5
Resupply Volume: .02 ft^3	

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.18

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

025, 033

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	13.3 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	194.06 lbs	Water (50°F):	0
Resupply Weight:	.45 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	81.3 lbs	Total Cost:	$70000
Installed Volume:	37.11 ft^3	Development Risk:	5
Resupply Volume:	.1 ft^3		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

3

ELEMENT CONCEPT DATA SHEET # 2.2.6.19

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

026, 034, 042

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability: Op. hrs = 69.4×10^3

Maintainability: MTTR = .5 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 134.12 lbs

Resupply Weight: .25 lbs

10 Year Resupply Weight: 48.2 lbs

Installed Volume: 23.68 ft^3

Resupply Volume: .05 ft^3

10 Year Resupply Volume: 8.9 ft^3

Peak Power: 50 watts

Energy: 3.08 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $70000

Development Risk: 5

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.20

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 027

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	11.5 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	148.15 lbs	Water (50°F):	0
Resupply Weight:	.3 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	53.0 lbs	Total Cost:	$70000
Installed Volume:	31.29 ft^3	Development Risk:	5
Resupply Volume:	.1 ft^3		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.21

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

028

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	5.7 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	99.43 lbs	Water (50°F):	0
Resupply Weight:	.20 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	36.2 lbs	Total Cost:	$70000
Installed Volume:	15.65 ft^3	Development Risk:	5
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.22

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

029

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability: $\frac{Op. hrs}{} = 69.4 \times 10^3$

Maintainability: MTTR = .5 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 97.61 lbs

Resupply Weight: .2 lbs

10 Year Resupply Weight: 35.7 lbs

Installed Volume: 14.94 ft^3

Resupply Volume: .03 ft^3

10 Year Resupply Volume: 5.5 ft^3

Peak Power: 50 watts

Energy: 3.08 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $70000

Development Risk: 5

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.23

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 031, 049, 057

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	~~Op. hrs = 69.4 x 10^3~~	10 Year Resupply Volume:	21.2 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	275.18 lbs	Water (50°F):	0
Resupply Weight:	.51 lbs.	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	103. lbs	Total Cost:	$70000
Installed Volume:	58.01 ft^3	Development Risk:	5
Resupply Volume:	.15 ft^3		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.24

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 032, 041, 050; 058, 059

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	12.0 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	179.44 lbs	Water (50°F):	0
Resupply Weight:	.4 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	75.3 lbs	Total Cost:	$70000
Installed Volume:	33.77 ft^3	Development Risk:	5
Resupply Volume:	.1 ft^3		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.25

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 035, 053

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability: Op. hrs = 69.4×10^3

Maintainability: MTTR = .5 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 132.1 lbs

Resupply Weight: .25 lbs

10 Year Resupply Weight: 48.2 lbs

Installed Volume: 23.18 ft^3

Resupply Volume: .05 ft^3

10 Year Resupply Volume: 8.9 ft^3

Peak Power: 50 watts

Energy: 3.08 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $70000

Development Risk: 5

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.26

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

037

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability: Op. hrs = 69.4×10^3

Maintainability: MTTR = .5 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 449.47 lbs

Resupply Weight: .80 lbs

10 Year Resupply Weight: 165.0 lbs

Installed Volume: 108.78 ft^3

Resupply Volume: .2 ft^3

10 Year Resupply Volume: 40.5 ft^3

Peak Power: 50 watts

Energy: 3.08 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $70000

Development Risk: 5

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.27

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 038, 046, 064

Function Reference: Provide For Storage

Drawing Reference: D-2;2;6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability: Op. hrs = 69.4×10^3	10 Year Resupply Volume: 18.5 ft^3
Maintainability: MTTR = .5 hrs	Peak Power: 50 watts
Safety: 0	Energy: 3.08 watt hrs/day
Crew Acceptance: 8	Water (155°F): 0
Installed Weight: 247.01 lbs	Water (50°F): 0
Resupply Weight: .5 lbs	Crew Operating Time: .0616 hrs/day
10 Year Resupply Weight: 91.0 lbs	Total Cost: $70000
Installed Volume: 50.88 ft^3	Development Risk: 5
Resupply Volume: .1 ft^3	

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.28

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

039

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	25. ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	281.71 lbs	Water (50°F):	0
Resupply Weight:	.5 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	104.0 lbs	Total Cost:	$70000
Installed Volume:	68 ft^3	Development Risk:	5
Resupply Volume:	.15 ft^3		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.29

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

040

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	12.6 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	181.44 lbs	Water (50°F):	0
Resupply Weight:	.45 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	81.2 lbs	Total Cost:	$70000
Installed Volume:	34.52 ft^3	Development Risk:	5
Resupply Volume:	.1 ft^3		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.1

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 001, 009, 036, 054

Function Reference: Provide For Storage

Drawing Reference: D- 2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op Hrs = 69.4×10^3	10 Year Resupply Volume:	$9.72\ ft^3$
Maintainability:	MTTR = .5 hrs	Peak Power:	165 watts
Safety:	0	Energy:	3250 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	69 lbs	Water (50°F):	0
Resupply Weight:	.25 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	47.2 lbs	Total Cost:	$ 85000
Installed Volume:	$14.3\ ft^3$	Development Risk:	6
Resupply Volume:	$.05\ ft^3$		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.2

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 002, 010, 011

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op Hrs = 69.4×10^3	10 Year Resupply Volume:	6.2 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	152.5 watts
Safety:	0	Energy:	2980 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	47 lbs	Water (50°F):	0
Resupply Weight:	.2 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	.32.0 lbs	Total Cost:	$85000
Installed Volume:	9.3 ft^3	Development Risk:	6
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.3

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 003, 030

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	7.36 ft^3
Maintainability:	MTTR .5 hrs	Peak Power:	152.5 watts
Safety:	0	Energy:	3000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	51 lbs	Water (50°F):	0
Resupply Weight:	.20 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-35.2 lbs	Total Cost:	$85000
Installed Volume:	10.4 ft^3	Development Risk:	6
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.4

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 004, 005

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability	MTBF = 150,000 hrs Op hrs = 69.4 x 10^3	10 Year Resupply Volume	4.6 ft^3
Maintainability	MTTR = .5 hrs	Peak Power	145 watts
Safety	0	Energy	2840 watt hrs/day
Crew Acceptance	8	Water (155°F)	0
Installed Weight	38 lbs	Water (50°F)	0
Resupply Weight	.15 lbs.	Crew Operating Time	.0616 Hrs/day
10 Year Resupply Weight	26.1 lbs	Total Cost	$ 85000
Installed Volume	6.8 ft^3	Development Risk	6
Resupply Volume	.02 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.5

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 006

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op hrs = 69.4 x 10^3	10 Year Resupply Volume:	3.5 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	140 watts
Safety:	0	Energy:	2760 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	32.8 lbs	Water (50°F):	0
Resupply Weight:	.15 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	22.7 lbs	Total Cost:	$85000
Installed Volume:	5.3 ft^3	Development Risk:	6
Resupply Volume:	.02 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.6

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 007

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op hrs = 69.4×10^3 hrs	10 Year Resupply Volume:	14.6 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	185 watts
Safety:	0	Energy:	3620 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	96 lbs	Water (50°F):	0
Resupply Weight:	.35 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	65.3 lbs	Total Cost:	$ 85000
Installed Volume:	21.5 ft^3	Development Risk:	6
Resupply Volume:	.10 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.7

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 008, 017

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op hrs = 69.4 x 10^3	10 Year Resupply Volume:	8.9 ft^3
Maintainability:	MTTR = 5 hrs	Peak Power:	158 watts
Safety:	0	Energy:	3100 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	62 lbs	Water (50°F):	0
Resupply Weight:	.25 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	- 41.7 lbs	Total Cost:	$85000
Installed Volume:	12.8 ft^3	Development Risk:	6
Resupply Volume:	.04 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7 8

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers

012

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op Hrs. = 69.4 x 10^3	10 Year Resupply Volume:	4.61 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	148 watts
Safety:	0	Energy:	2900 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	36.8 lbs	Water (50°F):	0
Resupply Weight:	.15 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	25.0 lbs.	Total Cost:	$85000
Installed Volume:	6.8 ft^3	Development Risk:	6
Resupply Volume:	.02 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.9

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 013

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op hrs = 69.4 x 10^3	10 Year Resupply Volume:	21.8 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	207.5 watts
Safety:	0	Energy:	4100 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	134 lbs	Water (50°F):	0
Resupply Weight:	.5 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	91.0 lbs	Total Cost:	85000
Installed Volume:	32.1 ft^3	Development Risk:	6
Resupply Volume:	.12 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.10

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 014, 023, 024

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op Hrs. 69.4 x 10^3	10 Year Resupply Volume:	13.1 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	177.5 watts
Safety:	0	Energy:	3470 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	87 lbs	Water (50°F):	0
Resupply Weight:	.30 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	59.2 lbs	Total Cost:	$85000
Installed Volume:	19.2 ft^3	Development Risk:	6
Resupply Volume:	.10 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.11

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 015, 060

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	14.9 ft^3
Maintainability:	MTTR = .05 hrs	Peak Power:	185 watts
Safety:	0	Energy:	3620 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	97.1 lbs	Water (50°F):	0
Resupply Weight:	.35 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	66.2 lbs	Total Cost:	$ 85000
Installed Volume:	22 ft^3	Development Risk:	6
Resupply Volume:	.07 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.12

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 016

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	8.3 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	160 watts
Safety:	0	Energy:	3150 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	63 lbs	Water (50°F):	0
Resupply Weight:	.25 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	43.3 lbs	Total Cost:	$85000
Installed Volume:	12.8 ft^3	Development Risk:	6
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.13

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers

018

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op Hrs. = 69.4×10^3	10 Year Resupply Volume:	5.5 ft^3
Maintainability:		Peak Power:	149.5 watts
Safety:	0	Energy:	2930 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	45 lbs	Water (50°F):	0
Resupply Weight:	.2 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	30.8 lbs	Total Cost:	$ 85000
Installed Volume:	8.3 ft^3	Development Risk:	6
Resupply Volume:	.02 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.18

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 025, 051 033

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs. Op. Hrs = 69.4 x 10^3	10 Year Resupply Volume:	26.0 ft^3
Maintainability:	MTTR = .5 hrs.	Peak Power:	227.5 watts
Safety:	0	Energy:	4450 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	161 lbs	Water (50°F):	0
Resupply Weight:	.51 lbs.	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	109.3 lbs.	Total Cost:	$85000
Installed Volume:	38.3 ft^3	Development Risk:	6
Resupply Volume:	.15 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.19

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 026, 034, 042; 052

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs. Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	16.7 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	190 watts
Safety:	0	Energy:	3720 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	107 lbs	Water (50°F):	0
Resupply Weight:	.5 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	93.2 lbs	Total Cost:	$ 85000
Installed Volume:	24.5 ft^3	Development Risk:	6
Resupply Volume:	.1 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.20

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 027

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs. Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	21.8 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	200.5 watts
Safety:	0	Energy:	3970 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	119.5 lbs	Water (50°F):	0
Resupply Weight:	.41 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-80.0 lbs.	Total Cost:	$85000
Installed Volume:	32.1 ft^3	Development Risk:	6
Resupply Volume:	.15 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.21

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 028

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs. Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	11.2 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	167 watts
Safety:	0	Energy:	3280 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	77 lbs	Water (50°F):	0
Resupply Weight:	.3 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	53.6 lbs.	Total Cost:	$85000
Installed Volume:	16.6 ft^3	Development Risk:	6
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.22

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 029

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 Hrs Op.hrs = 69.4 x 10^3	10 Year Resupply Volume:	10.80 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	175 watts
Safety:	0	Energy:	3430 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	76 lbs	Water (50°F):	0
Resupply Weight:	.30 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	52.0 lbs	Total Cost:	$85000
Installed Volume:	15.9 ft^3	Development Risk:	6
Resupply Volume:	.06 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.23

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 031, 049, 057

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability: Op. hrs = 69.4 x 10^3

Maintainability: MTTR = .5 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 238 lbs

Resupply Weight: .8 lbs

10 Year Resupply Weight: 162.0 lbs

Installed Volume: 58.7 ft^3

Resupply Volume: .2 ft^3

10 Year Resupply Volume: 39.6 ft^3

Peak Power: 267.5 watts

Energy: 5220 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $85000

Development Risk: 6

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.24

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers

032, 041, 059
058, 059

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	23.5 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	220 watts
Safety:	0	Energy:	4320 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	147 lbs	Water (50°F):	0
Resupply Weight:	.51 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	101.0 lbs	Total Cost:	$85000
Installed Volume:	34.5 ft^3	Development Risk:	6
Resupply Volume:	.15 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.25

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 035, 053

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs $\Omega p. hrs = 69.4 \times 10^3$	10 Year Resupply Volume:	16.3 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	190 watts
Safety:	0	Energy:	3720 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	106 lbs	Water (50°F):	0
Resupply Weight:	.5 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	90.3 lbs	Total Cost:	$85000
Installed Volume:	24 ft^3	Development Risk:	6
Resupply Volume:	.07 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.26

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 037

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	74.2 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	357.5 watts
Safety:	0	Energy:	7000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	407 lbs	Water (50°F):	0
Resupply Weight:	1.4 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	276. lbs	Total Cost:	$85000
Installed Volume:	109.6 ft^3	Development Risk:	6
Resupply Volume:	.4 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.27

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 038, 046, 064

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	35.2 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	257.5 watts
Safety:	0	Energy:	5050 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	210 lbs	Water (50°F):	0
Resupply Weight:	.79 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	142.0 lbs	Total Cost:	$ 85000
Installed Volume:	51.6 ft^3	Development Risk:	6
Resupply Volume:	.2 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.28

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 039

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	41.1 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	274 watts
Safety:	0	Energy:	5400 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	243.5 lbs	Water (50°F):	0
Resupply Weight:	.95 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	165.2 lbs	Total Cost:	$85000
Installed Volume:	60.8 ft^3	Development Risk:	6
Resupply Volume:	.25 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.29

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 040

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	24.2 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	220 watts
Safety:	0	Energy:	4310 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	149 lbs	Water (50°F):	0
Resupply Weight:	.5 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	101. lbs	Total Cost:	$85000
Installed Volume:	35.2 ft^3	Development Risk:	6
Resupply Volume:	.15 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.1

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers

	001	009
Function Reference: Provide For Storage	036	014
Drawing Reference: D-2.2.8	028	029

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000; Hrs. Op. Hrs. = 69,400	10 Year Resupply Volume:	30 ft^3
Maintainability:	MTTR=.75 Hrs.	Peak Power:	10,000 watts
Safety:	0	Energy:	192,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	190 lbs	Water (50°F):	0
Resupply Weight:	4.0 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	114.0 lbs	Total Cost:	$100,000
Installed Volume:	50 ft^3	Development Risk:	4
Resupply Volume:	1.0 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.2

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers

002 010
011 018

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000; Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	30. ft^3
Maintainability:	MTTR=.75 hrs	Peak Power:	10000 watts
Safety:	0	Energy:	192000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	170 lbs	Water (50°F):	0
Resupply Weight:	4.0 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	102.0 lbs	Total Cost:	$100,000
Installed Volume:	50 ft^3	Development Risk:	4
Resupply Volume:	1.0 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.3

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers: 003, 016, 030

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000; Hrs Op. Hrs. = 69.400	10 Year Resupply Volume:	30. ft^3
Maintainability:	MTTR=.75 hrs	Peak Power:	10,000 watt
Safety:	0	Energy:	192,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	186 lbs	Water (50°F):	0
Resupply Weight:	4.0 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	110. lbs	Total Cost:	$100,000
Installed Volume:	50 ft^3	Development Risk:	4
Resupply Volume:	1.0 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.4

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers: 004, 005, 012

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000; Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	30. ft^3
Maintainability:	MTTR=.75 Hrs.	Peak Power:	10,000 watts
Safety:	0	Energy:	192,000 watt-hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	150 lbs	Water (50°F):	0
Resupply Weight:	4.0 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	100.lbs	Total Cost:	$100,000
Installed Volume:	50 ft^3	Development Risk:	4
Resupply Volume:	1.0 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.5

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers: 006

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000; Hrs. Op. Hrs. = 69,400	10 Year Resupply Volume:	30 ft^3
Maintainability:	MTTR=.75 Hrs.	Peak Power:	9,000 watts
Safety:	0	Energy:	186,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	120 lbs	Water (50°F):	0
Resupply Weight:	4.0 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	75.0 lbs	Total Cost:	$100,000
Installed Volume:	50 ft^3	Development Risk:	4
Resupply Volume:	1.0 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.6

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers: 007, 015

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000; Op. Hrs. = 69,400 Hrs.	10 Year Resupply Volume:	30 ft^3
Maintainability:	MTTR= .75 Hrs.	Peak Power:	11,500 watts
Safety:	0	Energy:	219,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	200 lbs	Water (50°F):	0
Resupply Weight:	4.1 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	110 lbs	Total Cost:	$100,000
Installed Volume:	50 ft^3	Development Risk:	4
Resupply Volume:	1.2 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.7

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers: 008, 017

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000; Hrs. Op. Hrs. = 69,400	10 Year Resupply Volume:	30. ft^3
Maintainability:	MTTR=.75 Hrs.	Peak Power:	10,200 watts
Safety:	0	Energy:	195,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	190 lbs	Water (50°F):	0
Resupply Weight:	4.0 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	110. lbs	Total Cost:	$100,000
Installed Volume:	50 ft^3	Development Risk:	4
Resupply Volume:	1.0 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.8

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers: 013

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000; Op. Hrs. = 69,400	10 Year Resupply Volume:	30 ft^3
Maintainability:	MTTR=.75 hrs.	Peak Power:	11,200 watts
Safety:	0	Energy:	213,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	230 lbs	Water (50°F):	0
Resupply Weight:	4.1 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	120. lbs	Total Cost:	$100,000
Installed Volume:	52 ft^3	Development Risk:	4
Resupply Volume:	1.3 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.9

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers: 025, 033

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000; Op. Hrs. = 69,400	10 Year Resupply Volume:	31 ft^3
Maintainability:	MTTR = 75 Hrs.	Peak Power:	11,500 watts
Safety:	0	Energy:	219,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	290 lbs	Water (50°F):	0
Resupply Weight:	4.2 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	155. lbs	Total Cost:	$100,000
Installed Volume:	59 ft^3	Development Risk:	4
Resupply Volume:	1.3 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.10

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers: 026, 034, 042, 027

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000; Op. Hrs. = 69,400	10 Year Resupply Volume:	30. ft^3
Maintainability:	MTTR = .75 Hrs.	Peak Power:	11,600 watts
Safety:	0	Energy:	220,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	205 lbs	Water (50°F):	0
Resupply Weight:	4.1 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	110 lbs	Total Cost:	$100,000
Installed Volume:	51 ft^3	Development Risk:	4
Resupply Volume:	1.2 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.11

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers: 031

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000; Hrs. Op. Hrs. = 69,400	10 Year Resupply Volume:	42 ft^3
Maintainability:	MTTR = .75 Hrs.	Peak Power:	13,000 watts
Safety:	0	Energy:	248,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	400 lbs	Water (50°F):	0
Resupply Weight:	4.5 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	210. lbs	Total Cost:	$100,000
Installed Volume:	80 ft^3	Development Risk:	4
Resupply Volume:	1.5 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.12

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers: 032, 041

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000; Hrs. Op. Hrs. = 69.400	10 Year Resupply Volume:	30. ft^3
Maintainability:	MTTR= .75 Hrs.	Peak Power:	11,800 watts
Safety:	0	Energy:	227,000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	230 lbs	Water (50°F):	0
Resupply Weight:	4.1 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	120 lbs	Total Cost:	$100,000
Installed Volume:	52 ft^3	Development Risk:	4
Resupply Volume:	1.1 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.13

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers: 035

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000; Hrs. Op. Hrs. = 69,400	10 Year Resupply Volume:	30 ft^3
Maintainability:	MTTR=.75 Hrs.	Peak Power:	11,000 watts
Safety:	0	Energy:	209,000 watt hr/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	202 lbs	Water (50°F):	0
Resupply Weight:	4.0 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	110 lbs	Total Cost:	$100,000
Installed Volume:	50 ft^3	Development Risk:	4
Resupply Volume:	1.0 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.14

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers: 037

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000; Hrs. Op. Hrs. = 69,400	10 Year Resupply Volume:	63.0 ft^3
Maintainability:	MTTR=75 Hrs.	Peak Power:	14,450 watts
Safety:	0	Energy:	275,000 watt hr/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	588 lbs	Water (50°F):	0
Resupply Weight:	8.8 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	280 lbs	Total Cost:	$100,000
Installed Volume:	115.4 ft^3	Development Risk:	4
Resupply Volume:	2.2 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.15

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers: 038

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000 Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	33 ft^3
Maintainability:	MTTR=.75 Hrs.	Peak Power:	12,400 watts
Safety:	0	Energy:	236,000 watt hr/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	381 lbs	Water (50°F):	0
Resupply Weight:	4.5 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	180 lbs	Total Cost:	$100,000
Installed Volume:	62 ft^3	Development Risk:	4
Resupply Volume:	1.6 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.16

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers: 039

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000 Hrs Op. Hrs. = 69,400	10 Year Resupply Volume:	46 ft^3
Maintainability:	MTTR=.75 Hrs	Peak Power:	12,800 watts
Safety:	0	Energy:	243,000 watt hr/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	402 lbs	Water (50°F):	0
Resupply Weight:	4.7 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	220 lbs	Total Cost:	$100,000
Installed Volume:	81 ft^3	Development Risk:	4
Resupply Volume:	2.0 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.8.17

Title: Turbo-Compressor/Air Cycle Refrigerator

Applicable Mission Numbers: 040

Function Reference: Provide For Storage

Drawing Reference: D-2.2.8

Physical Description: The air cycle refrigerator uses air as a circulating refrigerant. The air is compressed, cooled, and expanded to low temperature levels. Air circulating over the refrigerated food removes heat leakages.

Functional Description: The refrigerator will maintain foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 7000. Hrs. Op. Hrs. = 69.400	10 Year Resupply Volume:	30 ft^3
Maintainability:	MTTR = .75 Hrs.	Peak Power:	11,400 watts
Safety:	0	Energy:	217,000 watt hr/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	250 lbs	Water (50°F):	0
Resupply Weight:	4.1 lbs	Crew Operating Time:	.08 hrs/day
10 Year Resupply Weight:	130 lbs	Total Cost:	$100,000
Installed Volume:	52 ft^3	Development Risk:	4
Resupply Volume:	1.2 ft^3		

Rationale:

Merits/Deficiencies: Extremely inefficient operation.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.1

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 001

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP.Hrs=170	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	3.30 lbs	Water (50°F):	0
Resupply Weight:	0 -	Crew Operating Time:	.0466 hrs/day
10 Year Resupply Weight:	0 -	Total Cost:	$8000
Installed Volume:	2.46 ft^3	Development Risk:	7
Resupply Volume:	0 -		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.2

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 002

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞;OP. Hrs=170	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	7.30 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0466 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	4.74 ft^3	Development Risk:	7
Resupply Volume:	0 -		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.3

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 003

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability	MTBF=∞:OP.Hrs=170.	10 Year Resupply Volume	0
Maintainability	MTTR = .25 hrs	Peak Power	0
Safety	0	Energy	0
Crew Acceptance	8	Water (155°F)	0
Installed Weight	4.15 lbs	Water (50°F)	0
Resupply Weight	0	Crew Operating Time	.0466 hrs/day
10 Year Resupply Weight	0	Total Cost	$8000
Installed Volume	4.11 ft^3	Development Risk	7
Resupply Volume	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.4

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 004

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP.Hrs=170.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	6.17 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0466 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	5.25 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET #2.3.1.5

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 005

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP.Hrs=170.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	4.71 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0466 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	5.14 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.6

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 006

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞; OP. Hrs=170.	10 Year Resupply Volume:	0
Maintainability:	MTTR= .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	5.47 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0466 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	5.57 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

4

ELEMENT CONCEPT DATA SHEET # 2.3.1.7

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 007

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞OP.Hrs=243.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	6.60 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0666 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	4.91 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.8

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 008

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞OP. Hrs=243.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	14.50 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0666 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	9.48 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.9

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 009

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞OP. Hrs=243.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	8.32 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0666 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	8.23 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.10

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 010

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞OP.Hrs =243.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	12.30 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0666 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	10.51 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.11

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 011

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞OP.Hrs =243,	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	9.84 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0666 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$ 8000
Installed Volume:	10.29 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.12

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 012

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP.Hrs -243.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	10.95 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0666 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	11.16 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.13

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 013

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP.Hrs =315.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	13.70 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0865 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$ 8000
Installed Volume:	10.24 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.14

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 014, 029

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP.Hrs= 315.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	30.30 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0865 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$ 8000
Installed Volume:	19.75 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.15

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 015

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP. Hrs= 315.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	17.40 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0865 hr/day
10 Year Resupply Weight:	0	Total Cost:	$ 8000
Installed Volume:	17.16 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.16

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 016

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP.Hrs = 315.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	25.70 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0865 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$ 8000
Installed Volume:	21.92 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET #2.3.1.17

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 017

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP.Hrs= 315.	10 Year Resupply Volume:	
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	19.60 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0865 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	21.46 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.18

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers

018

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP.Hrs = 315.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	22.80 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0865 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	23.25 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.25

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 025

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP. Hrs = 170.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	21.2 lbs	Water (50°F):	0
Resupply Weight:	θ	Crew Operating Time:	.0466 hrs/day
10 Year Resupply Weight:	θ	Total Cost:	$ 8000
Installed Volume:	15.80 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.26

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 026

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP.Hrs = 170.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	46.7 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0466 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	30.49 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.27

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 027

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP. Hrs = 170.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	26.8 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0466 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	25.37 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.28

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 028

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞; OP.Hrs= 170.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	39.6 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0466 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	33.82 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.29

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 030

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP.Hrs - 170.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	35.2 lbs	Water (50°F):	0
Resupply Weight:		Crew Operating Time:	.0466 hrs/day
10 Year Resupply Weight:		Total Cost:	$8000
Installed Volume:	35.88 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.30

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 031, 049

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP.Hrs = 243.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	42.5 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0666 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	31.61 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.31

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 032

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞; OP. Hrs = 243.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	93.5 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0666 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	60.97 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.32

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 033, 051

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞: OP. Hrs = 243.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	53.7 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0666 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	52.96 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.33

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 034, 052

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞; OP. Hrs = 243.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	79.5 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0666 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	67.65 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.34

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 036

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞: OP. Hrs = 243.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	70.4 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0666 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	71.76 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.35

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 037

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP. Hrs = 315.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	88.3 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0865 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	65.86 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.36

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers

038

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability: MTBF=∞; OP. Hrs. 315.	10 Year Resupply Volume: 0
Maintainability: MTTR = .25 hrs	Peak Power: 0
Safety: 0	Energy: 0
Crew Acceptance: 8	Water (155°F): 0
Installed Weight: 195 lbs	Water (50°F): 0
Resupply Weight: 0	Crew Operating Time: .0865 hrs/day
10 Year Resupply Weight: - 0	Total Cost: $ 8000
Installed Volume: 127 ft^3	Development Risk: 7
Resupply Volume: 0	

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET 2.3.1.37

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 039

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP. Hrs = 315.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	111.9 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0865 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$ 8000
Installed Volume:	110.33 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.38

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 040

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞ OP. Hrs = 315.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	164.0 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0865 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$ 8000
Installed Volume:	140.92 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.39

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 041

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞. OP. Hrs = 315.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	126.3 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0865 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	138 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.40

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 042

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞: OP. Hrs = 315.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	146 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0865 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	149.53 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.1

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 001

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF = ∞; OP. Hrs = 550	10 Year Resupply Volume:	~ 0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	.33 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.15 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.2

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 002

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF= ∞; OP. Hrs = 550	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	.73 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.15 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.3

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 003

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF = ∞: OP. Hrs = 550	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	.415 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.15 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.4

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 004

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF = ∞; OP. Hrs = 550	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	.617 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.15 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.5

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 005

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF = ∞: OP. Hrs = 550	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	.471 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.15 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.6

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 006

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF= ∞; OP. Hrs = 550	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	.547 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.15 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.7

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 007

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF = ∞ ; OP. Hrs = 775	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	.66 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.213 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.8

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 008

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞: OP. Hrs = 775	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	1.45 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.213 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.9

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 009

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞: OP. Hrs = 775	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	.832 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.213 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.10

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 010

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞; OP. Hrs = 775	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	1.23 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.213 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.11

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 011

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞ : OP. Hrs = 775	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	.984 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.213 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.12

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 012

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞ : OP. Hrs = 775	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	1.095 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.213 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$ 2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.13

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 013

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞: OP. Hrs = 1010	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	1.37 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.275 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.14

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 014, 029

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞: OP. Hrs = 1010	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	3.03 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.275 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.15

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 015

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞ OP. Hrs = 1010	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	1.74 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.275 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.16

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 016

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞: OP. Hrs=1010	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	2.57 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.275 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.17

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 017

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞; OP. Hrs = 1010	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	1.96 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.275 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.18

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 018

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞; OP. Hrs = 1010	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	2.28 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.275 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.25

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 025

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞:OP. Hrs = 550	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	2.12 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.15 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.26

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 026

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞: OP. Hrs = 550	10 Year Resupply Volume:	0
Maintainability:	MTTR =.25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	4.67 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.15 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.27

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 027

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF : ∞ : OP Hrs = 550	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	2.68 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.15 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.28

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 028

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞: OP. Hrs = 550	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	3.96 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.15 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.29

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 030

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞: OP. Hrs = 550	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	3.52 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.15 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$ 2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.30

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 031, 049

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞ ; OP. Hrs = 775	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	4.25 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.213 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.31

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 032

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞ ; OP. Hrs = 775	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	9.35 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.213 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.32

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 033, 051

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF : ∞ ; OP. Hrs= 775	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	5.37 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.213 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.33

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 034, 052

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞; OP.Hrs=775	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	7.95 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.213hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.34

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 036

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞ : OP.Hrs = 775	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	7.04 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.213 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$ 2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.35

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 037

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞ : OP Hrs = 1010	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	8.83 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.275 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.36

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 038

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞; OP Hrs=1010	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	19.5 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.275 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.37

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 039

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞; OP Hrs =1010	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	11.19 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.275 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.38

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 040

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞ : OP Hrs = 1010	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	16.40 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.275 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.39

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 041

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞; OP Hrs = 1810	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	12.63 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.275 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.40

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 042

Function Reference: Provide For Storage

Drawing Reference: D-2.3.2

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞: OP Hrs = 1010	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	14.60 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.275 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.1.1

Title: Hot Air Convective Warming Oven

Applicable Mission Numbers

001-006
025-030

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.1

Physical Description: Air is circulated over resistance heaters and warmed to approximately 375°F. The warmed air circulates rapidly about the food, raising the food temperature to predetermined levels.

Functional Description: This oven concept warms frozen foods from -10°F to 160°F in approximately 30 minutes.

Detail Data

Reliability: MTBF = 3700 hrs Op Hrs. = 4380	10 Year Resupply Volume: .5 ft^3
Maintainability: MTTR = .5 hrs	Peak Power: 1450 watts
Safety: 3	Energy: 1740. watt hrs/day
Crew Acceptance: 8	Water (155°F): 0
Installed Weight: 24 lbs	Water (50°F): 0
Resupply Weight: .05 lbs	Crew Operating Time: .12 hrs/day
10 Year Resupply Weight: 10 lbs	Total Cost: $ 20,000
Installed Volume: 1.50 ft^3	Development Risk: 7
Resupply Volume: .003 ft^3	

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: Conventional, highly acceptable technique, not gravity limited.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.1.2

Title: Hot Air Convective Warming Oven

Applicable Mission Numbers

007-012

031-036

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.1

Physical Description: Air is circulated over resistance heaters and warmed to approximately 375°F. The warmed air circulates rapidly about the food, raising the food temperature to predetermined levels.

Functional Description: This oven concept warms frozen foods from -10°F to 160°F in approximately 30 minutes.

Detail Data

MTBF = 20000 hrs

Reliability:	Op Hrs = 4400.	10 Year Resupply Volume:	1.0
Maintainability:	MTTR = 5 Hrs	Peak Power:	2960 watts
Safety:	3	Energy:	3600 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	40 lbs	Water (50°F):	0
Resupply Weight:	.10 lbs.	Crew Operating Time:	.158 hrs/day
10 Year Resupply Weight:	17. lbs	Total Cost:	$20,000
Installed Volume:	2.5 ft^3	Development Risk:	7
Resupply Volume:	.006 ft^3		

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: Conventional, highly acceptable technique, not gravity limited.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.1.3

Title: Hot Air Convective Warming Oven

Applicable Mission Numbers

013-018
037-042

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.1

Physical Description: Air is circulated over resistance heaters and warmed to approximately 375°F. The warmed air circulates rapidly about the food, raising the food temperature to predetermined levels.

Functional Description: This oven concept warms frozen foods from -10°F to 160°F in approximately 30 minutes.

Detail Data

Reliability:	MTBF = 10,000 Op Hrs = 4400	10 Year Resupply Volume:	1.5 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	6120 watts
Safety:	3	Energy:	7350 watt-hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	73 lbs	Water (50°F):	0
Resupply Weight:	.20 lb	Crew Operating Time:	.195 hrs/day
10 Year Resupply Weight:	30. lb	Total Cost:	$20,000
Installed Volume:	5.15 ft^3	Development Risk:	7
Resupply Volume:	.01 ft^3		

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: Conventional, highly acceptable technique, not gravity limited.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.2.1

Title: Microwave Warming Oven

Applicable Mission Numbers
001-006
025-030

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.2

Physical Description: Microwave energy is directed into a food cavity where the meals are located. Molecular agitation warms the food to predetermined temperature levels.

Functional Description: This oven concept warms frozen or room temperature foods to 160°F in 10 to 20 minutes.

Detail Data

Reliability:	MTBF = 23000 hrs Op. hrs = 4365	10 Year Resupply Volume:	1.5 ft^3
Maintainability:	MTTR = .5 Hrs.	Peak Power:	2000 watts
Safety:	1	Energy:	2400 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	81 lbs	Water (50°F):	0
Resupply Weight:	.20 lbs	Crew Operating Time:	.10 hrs/day
10 Year Resupply Weight:	35. lbs	Total Cost:	$25,000
Installed Volume:	4.5 ft^3	Development Risk:	7
Resupply Volume:	.01 ft^3		

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: Cooking time is rapid; power requirement is high; microwave concept cannot brown foods effectively.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.2.2

Title: Microwave Warming Oven

Applicable Mission Numbers

007-012
031-036
055-060

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.1

Physical Description: Microwave energy is directed into a food cavity where the meals are located. Molecular agitation warms the food to predetermined temperature levels.

Functional Description: This oven concept warms frozen or room temperature foods to 160°F in 10 to 20 minutes.

Detail Data

MTBF = 18000 hrs

Reliability:	Op. hrs = 4504	10 Year Resupply Volume:	3.0 ft^3
Maintainability:	MTTR=.5 Hrs.	Peak Power:	4000 watts
Safety:	1	Energy:	4800 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	181 lbs	Water (50°F):	0
Resupply Weight:	.4 lbs	Crew Operating Time:	.138 hrs/day
10 Year Resupply Weight:	72.0 lbs	Total Cost:	$25,000
Installed Volume:	6.8 ft^3	Development Risk:	7
Resupply Volume:	.02 ft^3		

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: Cooking time is rapid; power requirement is high; microwave concept cannot brown foods effectively.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.2.3

Title: Microwave Warming Oven

Applicable Mission Numbers
013-018
037-042

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.2

Physical Description: Microwave energy is directed into a food cavity where the meals are located. Molecular agitation warms the food to predetermined temperature levels.

Functional Description: This oven concept warms frozen or room temperature foods to 160°F in 10 to 20 minutes.

Detail Data

MTBF = 18000
Reliability: ~~Op hrs = 4640~~
Maintainability: MTTR = $\frac{.5}{1}$ hrs.
Safety:
Crew Acceptance: 8
Installed Weight: 362 lbs
Resupply Weight: .65 lbs
10 Year Resupply Weight: 120. lbs
Installed Volume: 12.2 ft^3
Resupply Volume: .03 ft^3

10 Year Resupply Volume: 5.0 ft^3
Peak Power: 8330 watts
Energy: 10,000 watt hrs/day
Water (155°F): 0
Water (50°F): 0
Crew Operating Time: .175 hrs/day
Total Cost: $25,000
Development Risk: 7

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: Cooking time is rapid; power requirement is high; microwave concept cannot brown foods effectively.

Data Sources:

ELEMENT CONCEPT DATA SHEET #3.2.3.1

Title: Radiant Warming Oven

Applicable Mission Numbers

001-006 _ _____

025-030 _ _____

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.3

Physical Description: Heat energy radiating from resistance heaters warms frozen foods to predetermined temperature levels.

Functional Description: This oven concept warms frozen food from -10°F to 160°F in approximately 30 minutes.

Detail Data

Reliability:	MTBF = 83000 hrs Op hrs =4365	10 Year Resupply Volume:	.80 ft^3
Maintainability:	MTTR=.5 Hrs.	Peak Power:	1425 watts
Safety:	4	Energy:	1720 watt hrs/day
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	53.5 lbs	Water (50°F):	0
Resupply Weight:	.15 lbs	Crew Operating Time:	.10 hrs/day
10 Year Resupply Weight:	24.0 lbs	Total Cost:	$20,000
Installed Volume:	3.15 ft^3	Development Risk:	6
Resupply Volume:	.005 ft^3		

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: May require food stirring to prevent scorching.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.3.2

Title: Radiant Warming Oven

Applicable Mission Numbers

007-012

031-036

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.3

Physical Description: Heat energy radiating from resistance heaters warms frozen foods to predetermined temperature levels.

Functional Description: This oven concept warms frozen food from -10°F to 160°F in approximately 30 minutes.

Detail Data

Reliability: MTBF = 43000 hrs	10 Year Resupply Volume: 2.0 ft^3
Maintainability: $MTTR_{\bar{4}}$ = .5 hrs	Peak Power: 2810 watts
Safety:	Energy: 3400 watt hrs/day
Crew Acceptance: 5	Water (155°F): 0
Installed Weight: 73.9 lbs	Water (50°F): 0
Resupply Weight: .2 lbs	Crew Operating Time: .138 hrs/day
10 Year Resupply Weight: 30. lbs	Total Cost: $ 20,000
Installed Volume: 4.41 ft^3	Development Risk: 6
Resupply Volume: .01 ft^3	

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: May require food stirring to prevent scorching.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.3.3

Title: Radiant Warming Oven

Applicable Mission Numbers

013-018

037-042

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.3

Physical Description: Heat energy radiating from resistance heaters warms frozen foods to predetermined temperature levels.

Functional Description: This oven concept warms frozen food from -10°F to 160°F in approximately 30 minutes.

Detail Data

MTBF = 22000 hrs

Reliability:	Op hrs = [illegible]	10 Year Resupply Volume:	1.10 ft^3
Maintainability:	MTTR= .5 Hrs.	Peak Power:	6000 watts
Safety:	4	Energy:	7200 watt hrs/day
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	107 lbs.	Water (50°F):	0
Resupply Weight:	.25 lbs	Crew Operating Time:	.175 hrs/day
10 Year Resupply Weight:	45. lbs	Total Cost:	$20,000
Installed Volume:	7.30 ft^3	Development Risk:	6
Resupply Volume:	.02 ft^3		

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: May require food stirring to prevent scorching.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.6.1

Title: Self-Heating Food Package Concept

Applicable Mission Numbers

001-006

025-030

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.6

Physical Description: Heating elements fabricated from aluminum foil are integral with food packaging concept. The evacuated package provides intimate contact with heated surface. A heat flux of 8 watts/in^2 is sufficient to warm the food packages.

Functional Description: The external electrical connections to the package are contained in a flip-up flap that is retained by a clipboard clamping device. The clamp provides electrical power also.

Detail Data

Reliability:	MTBF = 10000 hrs Op hrs = 4400.	10 Year Resupply Volume:	.70 ft^3
Maintainability:	MTTR = .5 Hrs.	Peak Power:	1000 watts
Safety:	4	Energy:	1200 watt hrs/day
Crew Acceptance:	4	Water (155°F):	0
Installed Weight:	10 lbs	Water (50°F):	0
Resupply Weight:	.26 lbs	Crew Operating Time:	.033 hrs/day
10 Year Resupply Weight:	4.50 lbs	Total Cost:	$25000
Installed Volume:	3.34 ft^3	Development Risk:	5
Resupply Volume:	.01 ft^3		

Rationale:

Merits/Deficiencies: Crew may be required to manipulate the package in some instances to relieve cold spots and aid reconstitution processes.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.6.2

Title: Self-Heating Food Package Concept

Applicable Mission Numbers

007-012

031-036

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.6

Physical Description: Heating elements fabricated from aluminum foil are integral with food packaging concept. The evacuated package provides intimate contact with heated surface. A heat flux of 8 watts/in^2 is sufficient to warm the food packages.

Functional Description: The external electrical connections to the package are contained in a flip-up flap that is retained by a clipboard clamping device. The clamp provides electrical power also.

Detail Data

Reliability: MTBF = 10000 hrs (Op hrs = ~~4464~~)

Maintainability: MTTR = .5 Hrs.

Safety: 4

Crew Acceptance: 4

Installed Weight: 20 lbs

Resupply Weight: .10 lbs

10 Year Resupply Weight: 8.0 lbs

Installed Volume: 6.60 ft^3

Resupply Volume: .02 ft^3

10 Year Resupply Volume: 3.0 ft^3

Peak Power: 2000 watts

Energy: 2400 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .046 hrs/day

Total Cost: $25,000

Development Risk: 5

Rationale:

Merits/Deficiencies: Crew may be required to manipulate the package in some instances to relieve cold spots and aid reconstitution processes.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.6.3

Title: Self-Heating Food Package Concept

Applicable Mission Numbers
013-018
037-042

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.6

Physical Description: Heating elements fabricated from aluminum foil are integral with food packaging concept. The evacuated package provides intimate contact with heated surface. A heat flux of 8 watts/in^2 is sufficient to warm the food packages.

Functional Description: The external electrical connections to the package are contained in a flip-up flap that is retained by a clipboard clamping device. The clamp provides electrical power also.

Detail Data

Reliability:	MTBF = 10000 hrs On hrs= [illegible]	10 Year Resupply Volume:	2.5 ft^3
Maintainability:	MTTR 0.5 Hrs.	Peak Power:	4170 watts
Safety:	4	Energy:	5070 watt hrs/day
Crew Acceptance:	4	Water (155°F):	0
Installed Weight:	40 lbs	Water (50°F):	0
Resupply Weight:	.10 lbs	Crew Operating Time:	.062 hrs/day
10 Year Resupply Weight:	9.0 lbs	Total Cost:	$25,000
Installed Volume:	13.5 ft^3	Development Risk:	5
Resupply Volume:	.015 ft^3		

Rationale:

Merits/Deficiencies: Crew may be required to manipulate the package in some instances to relieve cold spots and aid reconstitution processes.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.13.1

Title: Combination Microwave/Radiant Warming Oven

Applicable Mission Numbers: 001-006, 025-030

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.13

Physical Description: Microwave energy is directed into a food cavity where the meals are located. Molecular agitation warms the food to predetermined temperature levels.

Functional Description: This oven concept warms food to 160°F in about 10 to 20 minutes. This oven has the capability to brown meats, etc.

Detail Data

Reliability:	MTBF = 18000 hrs Op hrs = 4400	10 Year Resupply Volume:	2.0 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	2000 watts
Safety:	1	Energy:	2400 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	82 lbs	Water (50°F):	0
Resupply Weight:	.20 lbs.	Crew Operating Time:	.10 hrs/day
10 Year Resupply Weight:	35. lbs	Total Cost:	$25,000
Installed Volume:	4.5 ft^3	Development Risk:	7
Resupply Volume:	.01 ft^3		

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: Cooking time is rapid; power requirement is high.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.13.2

Title: Combination Microwave/Radiant Warming Oven

Applicable Mission Numbers: 007-012, 031-036

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.13

Physical Description: Microwave energy is directed into a food cavity where the meals are located. Molecular agitation warms the food to predetermined temperature levels.

Functional Description: This oven concept warms food to 160°F in about 10 to 20 minutes. This oven has the capability to brown meats, etc.

Detail Data

Reliability:	MTBF = 13000 Op hrs = 4400	10 Year Resupply Volume:	3.0 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	4000 watts
Safety:	1	Energy:	4800 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	183 lbs	Water (50°F):	0
Resupply Weight:	.4 lbs	Crew Operating Time:	138 hrs/day
10 Year Resupply Weight:	73. lbs	Total Cost:	$25,000
Installed Volume:	6.8 ft^3	Development Risk:	7
Resupply Volume:	.02 ft^3		

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: Cooking time is rapid; power requirement is high.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.13.3

Title: Combination Microwave/Radiant Warming Oven

Applicable Mission Numbers

013-018
037-042

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.13

Physical Description: Microwave energy is directed into a food cavity where the meals are located. Molecular agitation warms the food to predetermined temperature levels.

Functional Description: This oven concept warms food to 160°F in about 10 to 20 minutes. This oven has the capability to brown meats, etc.

Detail Data

Reliability:	MTBF = 10000 hrs On hrs= 4490 hrs	10 Year Resupply Volume:	5.0 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	8330 watts
Safety:	1	Energy:	10000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	365 lbs	Water (50°F):	0
Resupply Weight:	1.0 lbs	Crew Operating Time:	.175 hrs/day
10 Year Resupply Weight:	170. lbs	Total Cost:	$25000
Installed Volume:	12.2 ft^3	Development Risk:	7
Resupply Volume:	.03 ft^3		

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: Cooking time is rapid; power requirement is high.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.14.1

Title: Combination Hot Air Convection/Radiant Warming Oven

Applicable Mission Numbers: 001-006, 025-030

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.14

Physical Description: Air is circulated over resistance heaters and warmed to approximately 375°F. The warmed air circulates rapidly about the food, raising the food temperature to predetermined levels.

Functional Description: This oven concept warms frozen foods from -10°F to 160°F in approximately 30 minutes. The oven has the capability to brown meats, etc.

Detail Data

Reliability:	MTBF = 26000 hrs. Op Hrs= 4400.	10 Year Resupply Volume:	.5 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	1450 watts
Safety:	3	Energy:	1740 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	25 lbs	Water (50°F):	0
Resupply Weight:	.05 lbs	Crew Operating Time:	.12 hrs/day
10 Year Resupply Weight:	10. lbs	Total Cost:	$ 20,000
Installed Volume:	1.50 ft^3	Development Risk:	7
Resupply Volume:	.01 ft^3		

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.14.2

Title: Combination Hot Air Convection/Radiant Warming Oven

Applicable Mission Numbers

007-012
031-036

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.14

Physical Description: Air is circulated over resistance heaters and warmed to approximately 375°F. The warmed air circulates rapidly about the food, raising the food temperature to predetermined levels.

Functional Description: This oven concept warms frozen foods from -10°F to 160°F in approximately 30 minutes. The oven has the capability to brown meats, etc.

Detail Data

Reliability:	MTBF = 14000 hrs Op Hrs = 4400	10 Year Resupply Volume:	1.0 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	3000 watts
Safety:	3	Energy:	3600 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	42 lbs	Water (50°F):	0
Resupply Weight:	.10 lbs	Crew Operating Time:	.158 hrs/day
10 Year Resupply Weight:	20. lbs.	Total Cost:	$20000
Installed Volume:	2.50 ft^3	Development Risk:	7
Resupply Volume:	.05 ft^3		

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.14.3

Title: Combination Hot Air Convection/Radiant Warming Oven

Applicable Mission Numbers: 013-018, 037-042

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.14

Physical Description: Air is circulated over resistance heaters and warmed to approximately 375°F. The warmed air circulates rapidly about the food, raising the food temperature to predetermined levels.

Functional Description: This oven concept warms frozen foods from -10°F to 160°F in approximately 30 minutes. The oven has the capability to brown meats, etc.

Detail Data

Reliability:	MTBF = 7000 hrs Op hrs = 1400	10 Year Resupply Volume:	2.0 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	6130 watts
Safety:	3	Energy:	7350 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	76 lbs	Water (50°F):	0
Resupply Weight:	.2 lbs	Crew Operating Time:	.195 hrs/day
10 Year Resupply Weight:	35. lbs	Total Cost:	$20000
Installed Volume:	5.15 ft^3	Development Risk:	7
Resupply Volume:	.04 ft^3		

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.15.1

Title: Electrically Heated Food Tray

Applicable Mission Numbers
001 - 006
025 - 030

Function Reference: Provide For Preparation

Drawing Reference:

Physical Description: A self-contained serving tray has six cavities that are lined with electrically heated coils. The trays are plugged in at the dining area for power activation.

Functional Description: Food is placed in heating cavities and is warmed from -10°F to 160°F in 30 minutes.

Detail Data

Reliability:	MTBF = 11,000 hrs Op. Hrs. = 4,380	10 Year Resupply Volume:	1.45 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	3380 watts
Safety:	0	Energy:	4050 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	27 lbs	Water (50°F):	0
Resupply Weight:	.36 lbs	Crew Operating Time:	.055 hrs/day
10 Year Resupply Weight:	10.8 lbs	Total Cost:	$10,000
Installed Volume:	3.60 ft^3	Development Risk:	7
Resupply Volume:	.04 ft^3		

Rationale:

Merits/Deficiencies: Design is current Skylab baseline system/limits types of food that can be considered.

Data Sources: NASA/Manned Spacecraft Center, "Preliminary Skylab Food System Baseline Design", September 8, 1970.

ELEMENT CONCEPT DATA SHEET # 3.2.15.2

Title: Electrically Heated Food Tray

Applicable Mission Numbers: 007 - 012; 031 - 036

Function Reference: Provide For Preparation

Drawing Reference:

Physical Description: A self-contained serving tray has six cavities that are lined with electrically heated coils. The trays are plugged in at the dining area for power activation.

Functional Description: Food is placed in heating cavities and is warmed from -10°F to 160°F in 30 minutes.

Detail Data

Reliability:	MTBF = 9,000 hrs Op. Hrs. = 4,380 hrs	10 Year Resupply Volume:	2.86 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	6750 watts
Safety:	0	Energy:	8100 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	54 lbs	Water (50°F):	0
Resupply Weight:	.72 lbs	Crew Operating Time:	.071 hrs/day
10 Year Resupply Weight:	21.6 lbs	Total Cost:	$10,000
Installed Volume:	7.20 ft^3	Development Risk:	7
Resupply Volume:	.09 ft^3		

Rationale:

Merits/Deficiencies: Design is current Skylab baseline system/limits types of food that can be considered.

Data Sources: NASA/Manned Spacecraft Center, "Preliminary Skylab Food System Baseline Design", September 8, 1970.

ELEMENT CONCEPT DATA SHEET # 3.2.15.3

Title: Electrically Heated Food Tray

Applicable Mission Numbers
013 - 018
037 - 042

Function Reference: Provide For Preparation

Drawing Reference:

Physical Description: A self-contained serving tray has six cavities that are lined with electrically heated coils. The trays are plugged in at the dining area for power activation.

Functional Description: Food is placed in heating cavities and is warmed from -10°F to 160°F in 30 minutes.

Detail Data

Reliability:	MTBF = 7,000 hrs Op. Hrs. = 4,380	10 Year Resupply Volume:	6.0 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	14,000 watts
Safety:	0	Energy:	16,800 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	112.5 lbs	Water (50°F):	0
Resupply Weight:	1.52 lbs	Crew Operating Time:	.150 hrs/day
10 Year Resupply Weight:	45.3 lbs	Total Cost:	$10,000
Installed Volume:	15 ft^3	Development Risk:	7
Resupply Volume:	2.0 ft^3		

Rationale:

Merits/Deficiencies: Design is current Skylab baseline system/limits types of food that can be considered.

Data Sources: NASA/Manned Spacecraft Center, "Preliminary Skylab Food System Baseline Design", September 8, 1970.

ELEMENT CONCEPT DATA SHEET # 3.3.1.1

Title: Food Warming Plate

Applicable Mission Numbers: 001-006, 025-030

Function Reference: Food Preparation

Drawing Reference: D 3.3.1

Physical Description: 8" x 10" ceramic tray with electric heating element permanently embedded and capable of submersion in water for clean-up purposes. Handles and a grid cover to be provided for transport and hold-down.

Functional Description: The tray provides capacity for twelve dishes to be maintained at a temperature of 150°F. The grid cover maintains the dishes in intimate contact with the warming surface.

Detail Data

Reliability:	MTBF = 174000 hrs Op Hrs. = 438. hrs	10 Year Resupply Volume:	.087 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	100 watts
Safety:	0	Energy:	80 watt hrs/day
Crew Acceptance:	3	Water (155°F):	0
Installed Weight:	2.0 pounds	Water (50°F):	0
Resupply Weight:	2.0 pounds	Crew Operating Time:	.12 hrs/day
10 Year Resupply Weight:	2.0 pounds	Total Cost:	$3000
Installed Volume:	.087 ft^3	Development Risk:	.8
Resupply Volume:	.087 ft^3		

Rationale: Only one (1) tray is to be held for replacement due to high reliability. This 6-man tray is not considered satisfactory for larger crews.

Merits/Deficiencies: Ceramic material developed for atmosphere reentry cones has high thermal and mechanical shock resistance; also, clean-up is easier than metal pan.

Data Sources: Corning Ware Warming Plate

ELEMENT CONCEPT DATA SHEET # 3.3.1.2

Title: Food Warming Plate

Applicable Mission Numbers

007-012
031-036
055-060

Function Reference: Food Preparation

Drawing Reference: D 3.3.1.

Physical Description: 12" x 20" ceramic tray with electric heating element permanently embedded and capable of submersion in water for clean-up purposes. Handles and a grid cover to be provided for transport and hold-down.

Functional Description: The tray provides capacity for twelve (12) dishes to be maintained at a temperature of 150°F. The grid cover maintains the dishes in intimate contact with the warming surface.

Detail Data

MTBF = 17400 hrs

Reliability:	Op. Hrs= 438 hrs	10 Year Resupply Volume:	.174 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	150 watts
Safety:	0	Energy:	120 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	4.0 pounds	Water (50°F):	0
Resupply Weight:	4.0 pounds	Crew Operating Time:	.12 hrs/day
10 Year Resupply Weight:	4.0 pounds	Total Cost:	$3000
Installed Volume:	.174 ft^3	Development Risk:	.8
Resupply Volume:	.174 ft^3		

Rationale: Ceramic is chosen over glass because the glass tray is more easily broken; also exhibits a failure mode of disintegration due to expansion of circuit member embedded in it.

Merits/Deficiencies: Ceramic material developed for atmosphere reentry cones has high thermal and mechanical shock resistance; also clean-up is easier than metal pan.

Data Sources: Corning Ware Warming Plate

ELEMENT CONCEPT DATA SHEET # 3.3.1.3

Title: Food Warming Plate

Applicable Mission Numbers
013-018
037-042

Function Reference: Food Preparation

Drawing Reference: D 3.3.1.

Physical Description: 12" x 20" ceramic tray with electric heating element permanently embedded and capable of submersion in water for clean-up purposes. Handles and a grid cover to be provided for transport and hold-down.

Functional Description: The tray provides capacity for twelve (12) dishes to be maintained at a temperature of 150°F. The grid cover maintains the dishes in intimate contact with the warming surface.

Detail Data

Reliability:	MTBF = 17000 hrs Op hrs = 438	10 Year Resupply Volume:	.174 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	300 watts
Safety:	0	Energy:	280 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	8.0 pounds	Water (50°F):	0
Resupply Weight:	4.0 pounds	Crew Operating Time:	.12 hrs/day
10 Year Resupply Weight:	4.0 pounds	Total Cost:	$3000
Installed Volume:	.347 ft^3	Development Risk:	8
Resupply Volume:	.174 ft^3		

Rationale: Only one (1) tray is to be held for replacement due to high reliability.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.3.2.1

Title: Reconstitution Machine

Applicable Mission Numbers: 001-006

Function Reference: Food Preparation

Drawing Reference: D 3.3.2.

Physical Description: Table mounted cannister fitted with toroidal air pressure cells and/or heating liner and/or mixer attachments to agitate, mix, or heat powdered/frozen foodstuffs and water to a homogenized state and dispense same.

Functional Description: Proportionately charged bags shall be placed in the cannisters and, depending on charge, shall either be agitated, mixed, or heated by the operation of the appropriate controls. Removal of prepared food shall be by actuation of pressure cells exiting through appropriate lower dispensing cover.

Detail Data

Reliability: MTBF = 6700 hrs Op Hrs = 2120.	10 Year Resupply Volume: 17.1 ft^3
Maintainability: MTTR = .5 Hrs.	Peak Power: 1100 watts
Safety: 0	Energy: 1000 watt hrs/day
Crew Acceptance: 6	Water (155°F): 0
Installed Weight: 15 pounds	Water (50°F): 0
Resupply Weight: 12.6 pounds	Crew Operating Time: .15 hrs/day
10 Year Resupply Weight: 3285 pounds	Total Cost: $30000
Installed Volume: 0.78 ft^3	Development Risk: 7
Resupply Volume: 0.65 ft^3	

Rationale: All components of device, except for disposable bags, will last for the lifetime of the laboratory. Air pressure to actuate pressure cells is only power source deemed satisfactory. Ultrasonic mixer would be satisfactory for only 20/80 liquid reconstitution. Counter-rotating centrifuge would be satisfactory for 60/40 and 85/15 mixes only, with clean-up time consuming.

Merits/Deficiencies: Requires air pressure supply.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.3.2.2

Title: Reconstitution Machine

Applicable Mission Numbers
007-012

Function Reference: Food Preparation

Drawing Reference: D 3.3.2

Physical Description: Table mounted cannister fitted with toroidal air pressure cells and/or heating liner and/or mixer attachments to agitate, mix, or heat powdered/frozen foodstuffs and water to a homogenized state and dispense same.

Functional Description: Proportionately charged bags shall be placed in the cannisters and, depending on charge, shall either be agitated, mixed, or heated by the operation of the appropriate controls. Removal of prepared food shall be by actuation of pressure cells exiting through appropriate lower dispensing cover.

Detail Data

Reliability: MTBF = 67000 hrs Op.Hrs. = 2120	10 Year Resupply Volume: 171 ft^3
Maintainability: MTTR = .5 hrs	Peak Power: 1,100 watts
Safety: 0	Energy: 1000 watt hrs/day
Crew Acceptance: 6	Water (155°F): 0
Installed Weight: 15 pounds	Water (50°F): 0
Resupply Weight: 12.6 pounds	Crew Operating Time: .15 hrs/day
10 Year Resupply Weight: 3285 pounds	Total Cost: $ 30000
Installed Volume: 0.78 ft^3	Development Risk: 7
Resupply Volume: 0.65 ft^3	

Rationale: All components of device, except for disposable bags, will last for the lifetime of the laboratory. Air pressure to actuate pressure cells is only power source deemed satisfactory. Ultrasonic mixer would be satisfactory for only 20/80 liquid reconstitution. Counter-rotating centrifuge would be satisfactory for 60/40 and 85/15 mixes only, with clean-up time consuming.

Merits/Deficiencies: Requires air pressure supply.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.3.2.3

Title: Reconstitution Machine

Applicable Mission Numbers: 013-018

Function Reference: Food Preparation

Drawing Reference: D 3.3.2

Physical Description: Table mounted cannister fitted with toroidal air pressure cells and/or heating liner and/or mixer attachments to agitate, mix, or heat powdered/frozen foodstuffs and water to a homogenized state and dispense same.

Functional Description: Proportionately charged bags shall be placed in the cannisters and, depending on charge, shall either be agitated, mixed, or heated by the operation of the appropriate controls. Removal of prepared food shall be by actuation of pressure cells exiting through appropriate lower dispensing cover.

Detail Data

MTBF = 67000 hrs

Reliability: Op Hrs = 2120	10 Year Resupply Volume: 171 ft^3
Maintainability: MTTR = .5 hrs	Peak Power: 1,100 watts
Safety: 0	Energy: 1000 watt hrs/day
Crew Acceptance: 6	Water (155°F): 0
Installed Weight: 15 pounds	Water (50°F): 0
Resupply Weight: 12.6 pounds	Crew Operating Time: .15 hrs/day
10 Year Resupply Weight: 3285 pounds	Total Cost: $30000
Installed Volume: 0.78 ft^3	Development Risk: 7
Resupply Volume: 0.65 ft^3	

Rationale: All components of device, except for disposable bags, will last for the lifetime of the laboratory. Air pressure to actuate pressure cells is only power source deemed satisfactory. Ultrasonic mixer would be satisfactory for only 20/80 liquid reconstitution. Counter-rotating centrifuge would be satisfactory for 60/40 and 85/15 mixes only, with clean-up time consuming.

Merits/Deficiencies: Requires air pressure supply.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.3.2.5

Title: Reconstitution Machine

Applicable Mission Numbers: 025-030

Function Reference: Food Preparation

Drawing Reference: D 3.3.2.

Physical Description: Table mounted cannisters fitted with toroidal air pressure cells and/or heating liner and/or mixer attachments to agitate, mix, or heat powdered/frozen foodstuffs and water to a homogenized state and dispense same.

Functional Description: Proportionately charged bags shall be placed in the cannisters and, depending on charge, shall either be agitated, mixed, or heated by the operation of the appropriate controls. Removal of prepared food shall be by actuation of pressure cells exiting through appropriate lower dispensing cover.

Detail Data

Reliability:	MTBF = 67000 hrs Op. Hrs = 2120	10 Year Resupply Volume:	171 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	1,100 watts
Safety:	0	Energy:	1000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	15 pounds	Water (50°F):	0
Resupply Weight:	81 pounds	Crew Operating Time:	.15 hrs/day
10 Year Resupply Weight:	3285 pounds	Total Cost:	$ 30000
Installed Volume:	0.78 ft^3	Development Risk:	7
Resupply Volume:	4.2 ft^3		

Rationale: All components of device, except for disposable bags, will last for the lifetime of the laboratory. Air pressure to actuate pressure cells is only power source deemed satisfactory. Ultrasonic mixer would be satisfactory for only 20/80 liquid reconstitution. Counter-rotating centrifuge would be satisfactory for 60/40 and 85/15 mixes only, with clean-up time consuming.

Merits/Deficiencies: Requires air pressure supply.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.3.2.6

Title: Reconstitution Machine

Applicable Mission Numbers: 031-036

Function Reference: Food Preparation

Drawing Reference: D 3.3.2

Physical Description: Table mounted cannisters fitted with toroidal air pressure cells and/or heating liner and/or mixer attachments to agitate, mix, or heat powdered/frozen foodstuffs and water to a homogenized state and dispense same.

Functional Description: Proportionately charged bags shall be placed in the cannisters and, depending on charge, shall either be agitated, mixed, or heated by the operation of the appropriate controls. Removal of prepared food shall be by actuation of pressure cells exiting through appropriate lower dispensing cover.

Detail Data

Reliability:	MTBF = 6700 hrs Op Hrs = 2120	10 Year Resupply Volume:	171 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	1,100 watts
Safety:	0	Energy:	1000 watt hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	15 pounds	Water (50°F):	0
Resupply Weight:	81 pounds	Crew Operating Time:	.15 hrs/day
10 Year Resupply Weight:	3285 pounds	Total Cost:	$30000
Installed Volume:	0.78 ft^3	Development Risk:	7
Resupply Volume:	4.2 ft^3		

Rationale: All components of device, except for disposable bags, will last for the lifetime of the laboratory. Air pressure to actuate pressure cells is only power source deemed satisfactory. Ultrasonic mixer would be satisfactory for only 20/80 liquid reconstitution. Counter-rotating centrifuge would be satisfactory for 60/40 and 85/15 mixes only, with clean-up time consuming.

Merits/Deficiencies: Requires air pressure supply.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.3.2.7

Title: Reconstitution Machine

Applicable Mission Numbers

037-042

Function Reference: Food Preparation

Drawing Reference: D 3.3.2

Physical Description: Table mounted cannisters fitted with toroidal air pressure cells and/or heating liner and/or mixer attachments to agitate, mix, or heat powdered/frozen foodstuffs and water to a homogenized state and dispense same.

Functional Description: Proportionately charged bags shall be placed in the cannisters and, depending on charge, shall either be agitated, mixed, or heated by the operation of the appropriate controls. Removal of prepared food shall be by actuation of pressure cells exiting through appropriate lower dispensing cover.

Detail Data

MTBF = 6700 hrs

Reliability: Op Hrs = 2120

Maintainability: MTTR = .5 hrs

Safety: 0

Crew Acceptance: 6

Installed Weight: 15 pounds

Resupply Weight: 81 pounds

10 Year Resupply Weight: 3285 pounds

Installed Volume: 0.78 ft^3

Resupply Volume: 4.2 ft^3

10 Year Resupply Volume: 171 ft^3

Peak Power: 1,100 watts

Energy: 1000 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .15 hrs/day

Total Cost: $ 30000

Development Risk: 7

Rationale: All components of device, except for disposable bags, will last for the lifetime of the laboratory. Air pressure to actuate pressure cells is only power source deemed satisfactory. Ultrasonic mixer would be satisfactory for only 20/80 liquid reconstitution. Counter-rotating centrifuge would be satisfactory for 60/40 and 85/15 mixes only, with clean-up time consuming.

Merits/Deficiencies: Requires air pressure supply.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.3.3.1

Title: Chilled Display Cabinet

Applicable Mission Numbers

001-018

025-042

Function Reference: Food Preparation

Drawing Reference: D 3.3.3

Physical Description: Metal cabinet with hinged see-through cover and four independent drawers for storage of perishables. The cabinet is maintained at 38°F by means of a heat exchanger in the environmental control system. Latches maintain cover and drawers from accidental opening.

Functional Description: Upper Level has hinged cover for access to baked goods, etc.; Middle Level has a full width drawer for access to partially prepared foods; Lower Level has three equally sized drawers for fruit storage.

Detail Data

Reliability:	MTBF = 40,000 hrs Op Hrs = 14,600	10 Year Resupply Volume:	0
Maintainability:	MTTR = .5 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	30 pounds	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.12 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$10000
Installed Volume:	7.87 ft^3	Development Risk:	8
Resupply Volume:	0		

Rationale:

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.4.1.1

Title: Preparation Counter

Applicable Mission Numbers

001-006
025-033
049-054

Function Reference: Provide For Preparation

Drawing Reference: D-3.4.1

Physical Description: A wall-mounted preparation counter top with built-in chopping block type surface. Structure may be of honeycombed aluminum.

Functional Description: The countertop surface with a chopping block and drawers for utensils to be wall-mounted.

Detail Data

Reliability:	MTBF = 6; OPS HRS = 10,950	10 Year Resupply Volume:	4.1 cu. ft.
Maintainability:	MTTR = 0	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	8.5 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	3 M-Hrs/Day
10 Year Resupply Weight:	8.5 lbs	Total Cost:	$100,000
Installed Volume:	4.1 cu. ft.	Development Risk:	8
Resupply Volume:	0		

Rationale: The basic use of the wall-mounted counter top is preparation. Storage below is not needed.

Merits/Deficiencies: Minimizes weight of unit.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.4.1.2

Title: Preparation Counter

Applicable Mission Numbers

007-012
031-036
055-060

Function Reference: Provide For Preparation

Drawing Reference: D-3.4.1

Physical Description: A wall-mounted preparation counter top with built-in chopping block type surface. Structure may be of honeycombed aluminum.

Functional Description: The countertop surface with a chopping block and drawers for utensils to be wall-mounted.

Detail Data

Reliability:	MTBF = ∞ , OP. Hrs= 10,950	10 Year Resupply Volume:	8.2 cu ft
Maintainability:	MTTR = 0	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	17.0 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	6 M Hrs/Day
10 Year Resupply Weight:	17.0 lb	Total Cost:	$175,000
Installed Volume:	8.2 cu ft	Development Risk:	8
Resupply Volume:	0		

Rationale: The basic use of the wall-mounted counter top is preparation. Storage below is not needed.

Merits/Deficiencies: Minimizes weight of unit.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.4.1.3

Title: Preparation Counter

Function Reference: Provide For Preparation

Drawing Reference: D-3.4.1

Applicable Mission Numbers

013-018
037-042
061-066

Physical Description: A wall-mounted preparation counter top with built-in chopping block type surface. Structure may be of honeycombed aluminum.

Functional Description: The countertop surface with a chopping block and drawers for utensils to be wall-mounted.

Detail Data

Reliability:	MTBF = ∞ OP. Hrs = 10,950	10 Year Resupply Volume:	12.3 cu ft
Maintainability:	MTTR = 0	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	25.5 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	12 M-Hrs/Day
10 Year Resupply Weight:	25.5 lb	Total Cost:	$250,000
Installed Volume:	12.3 cu ft	Development Risk:	8
Resupply Volume:	0		

Rationale: The basic use of the wall-mounted counter top is preparation. Storage below is not needed.

Merits/Deficiencies: Minimizes weight of unit.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.4.2.1

Title: Counter With Electrical Power

Function Reference: Provide For Preparation

Drawing Reference: D-3.4.2

Applicable Mission Numbers

001-006
025-030
049-054

Physical Description: Counter top with a built-in electrical power outlet. Top surfaces should consist of impervious coatings for ease of cleaning. Structure may be of honeycombed aluminum.

Functional Description: A wall-mounted food preparation counter top with a power outlet for direct plug-in electrical preparation devices. Storage below will contain utensils and preparation devices.

Detail Data

Reliability:	MTBF= ∞, OP Hrs = 5,475	10 Year Resupply Volume:	4.8 cu ft
Maintainability:	MTTR = .25 hrs.	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	8.0 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	1.5 M-Hrs/Day
10 Year Resupply Weight:	8.0 lbs	Total Cost:	$100,000
Installed Volume:	4.8 cu ft	Development Risk:	7
Resupply Volume:	0		

Rationale: A power source for electrical preparation devices should be built into the counter. Further study is recommended.

Merits/Deficiencies: Minimum crew time; applicable to all crew sizes.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.4.2.2

Title: Counter With Electrical Power

Applicable Mission Numbers

007-012
031-036
055-060

Function Reference: Provide For Preparation

Drawing Reference: D-3.4.2

Physical Description: Counter top with a built-in electrical power outlet. Top surfaces should consist of impervious coatings for ease of cleaning. Structure may be of honeycombed aluminum.

Functional Description: A wall-mounted food preparation counter top with a power outlet for direct plug-in electrical preparation devices. Storage below will contain utensils and preparation devices.

Detail Data

Reliability:	MTBF = ∞, OP.Hr=5,475	10 Year Resupply Volume:	9.6 cu ft
Maintainability:	MTTR =.25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	16.0 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	3.0 M-Hr/Day
10 Year Resupply Weight:	16.0 lbs	Total Cost:	$175,000
Installed Volume:	9.6 cu ft	Development Risk:	7
Resupply Volume:	0		

Rationale: A power source for electrical preparation devices should be built into the counter. Further study is recommended.

Merits/Deficiencies: Minimum crew time; applicable to all crew sizes.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.4.2.3

Title: Counter With Electrical Power

Applicable Mission Numbers

013-018
037-042
061-066

Function Reference: Provide For Preparation

Drawing Reference: D-3.4.2

Physical Description: Counter top with a built-in electrical power outlet. Top surfaces should consist of impervious coatings for ease of cleaning. Structure may be of honeycombed aluminum.

Functional Description: A wall-mounted food preparation counter top with a power outlet for direct plug-in electrical preparation devices. Storage below will contain utensils and preparation devices.

Detail Data

Reliability:	MTBF=∞ OP .Hrs=5,475	10 Year Resupply Volume:	19.2 cu ft
Maintainability:	$\overline{M}TTR$ = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	32.0 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	6.0 M-Hr/Day
10 Year Resupply Weight:	32.0 lbs	Total Cost:	$250,000
Installed Volume:	19.2 cu ft	Development Risk:	7
Resupply Volume:	0		

Rationale: A power source for electrical preparation devices should be built into the counter. Further study is recommended.

Merits/Deficiencies: Minimum crew time; applicable to all crew sizes.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.4.3.1

Title: Fold-Away Preparation Counter

Applicable Mission Numbers

001-006
025-030
049-054

Function Reference: Provide For Preparation

Drawing Reference: D-3.4.3

Physical Description: A fold counter top surface constructed of aluminum and honeycomb. The top surface should be of impervious coatings for ease of cleaning.

Functional Description: The counter top surface, when needed, will be unfolded from the wall. It may be movable from area to area as a plug-in unit.

Detail Data

Reliability:	MTBF=∞, OP.Hrs = 5,475	10 Year Resupply Volume:	.55 cu ft
Maintainability:	MTTR=.25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	0
Installed Weight:	4.3 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	1.5 M-Hrs/Day
10 Year Resupply Weight:	4.3 lbs	Total Cost:	$100,000
Installed Volume:	.55 cu ft	Development Risk:	7
Resupply Volume:	0		

Rationale: When additional work surface is needed, a unit may be unfolded for use.

Merits/Deficiencies: Minimizes work area; has mobility.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.4.3.2

Title: Fold-Away Preparation Counter

Applicable Mission Numbers
007- 012
031-036
055-060

Function Reference: Provide For Preparation

Drawing Reference: D-3.4.3

Physical Description: A fold counter top surface constructed of aluminum and honeycomb. The top surface should be of impervious coatings for ease of cleaning.

Functional Description: The counter top surface, when needed, will be unfolded from the wall. It may be movable from area to area as a plug-in unit.

Detail Data

Reliability:	MTBF = ∞, Op.Hrs= 5,475	10 Year Resupply Volume:	1.10 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	0
Installed Weight:	8.6 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	3.0 M-Hr/Day
10 Year Resupply Weight:	8.6 lbs	Total Cost:	$175,000
Installed Volume:	1.10 cu ft	Development Risk:	7
Resupply Volume:	0		

Rationale: When additional work surface is needed, a unit may be unfolded for use.

Merits/Deficiencies: Minimizes work area; has mobility.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.4.3.3

Title: Fold-Away Preparation Counter

Applicable Mission Numbers

013-018
037-042
061-066

Function Reference: Provide For Preparation

Drawing Reference: D-3.4.3

Physical Description: A fold counter top surface eonstructed of aluminum and honeycomb. The top surface should be of impervious coatings for ease of cleaning.

Functional Description: The counter top surface, when needed, will be unfolded from the wall. It may be movable from area to area as a plug-in unit.

Detail Data

Reliability:	MTBF = ∞ OP.Hrs= 5,475	10 Year Resupply Volume:	2.20 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:		Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	17.2 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	6.0 M-Hr/Day
10 Year Resupply Weight:	17.2 lbs	Total Cost:	$250,000
Installed Volume:	2.20 cu ft	Development Risk:	7
Resupply Volume:	0		

Rationale: When additional work surface is needed, a unit may be unfolded for use.

Merits/Deficiencies: Minimizes work area; has mobility.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.4.4.1

Title: Serving Cart Counter Top

Applicable Mission Numbers

007-012

Function Reference: Provide For Preparation

031-036

Drawing Reference: D-3.4.4

055-060

Physical Description: An all aluminum cart with a recessed floor guide and rollers; partitioned sections for storage of hot and cold food to be transported to serving area.

Functional Description: Totally enclosed cart whose top surface will be used for food preparation prior to being transported to dining area for serving.

Detail Data

Reliability:	MTBF=909,000 hrs OP Hrs = 5,475	10 Year Resupply Volume:	12.0 cu ft
Maintainability:	MTTR = 25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	12.0 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	3.0 M-Hr/Day
10 Year Resupply Weight:	12.0 lbs	Total Cost:	$175,000
Installed Volume:	12.0 cu ft	Development Risk:	7
Resupply Volume:	0		

Rationale: This cart would perform a dual task -- both preparation and serving.

Merits/Deficiencies: Dual usage will reduce the amount of components needed.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.4.4.2

Title: Serving Cart Counter Top

Applicable Mission Numbers

013-018

037-042

061-066

Function Reference: Provide For Preparation

Drawing Reference: D-3.4.4

Physical Description: An all aluminum cart with a recessed floor guide and rollers; partitioned sections for storage of hot and cold food to be transported to serving area.

Functional Description: Totally enclosed cart whose top surface will be used for food preparation prior to being transported to dining area for serving.

Detail Data

Reliability:	MTBF=417,000hrsOP Hrs = 5,475	**10 Year Resupply Volume:**	24.0 cu ft
Maintainability:	MTTR = .25 hrs	**Peak Power:**	0
Safety:	0	**Energy:**	0
Crew Acceptance:	7	**Water (155°F):**	0
Installed Weight:	24.0 lbs	**Water (50°F):**	0
Resupply Weight:	0	**Crew Operating Time:**	6.0 M-Hr/Day
10 Year Resupply Weight:	24.0 lbs	**Total Cost:**	$250,000
Installed Volume:	24.0 cu ft	**Development Risk:**	7
Resupply Volume:	0		

Rationale: This cart would perform a dual task -- both preparation and serving.

Merits/Deficiencies: Dual usage will reduce the amount of components needed.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.4.5.1

Title: Combination Preparation and Serving Counter

Applicable Mission Numbers

Function Reference: Provide For Preparation

001-012
025-036
049-060

Drawing Reference: D-3.4.5

Physical Description: A four-sided grouping of preparation devices with built-in counters on all four sides. Disappearing seats for eating at counter with body restraints. Maximum seating = 12.

Functional Description: 6 to 12 men may, in shifts, prepare their meals and sit at built-in counters and consume food. Crewman has option to sit or stand while eating.

Detail Data

Reliability:	MTBF= 222,000hrs OP Hrs = 5,475	10 Year Resupply Volume:	166.5 cu.ft.
Maintainability:	MTTR= .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	175 pounds	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	1.5 M-Hrs/Day
10 Year Resupply Weight:	175 pounds	Total Cost:	$100,000
Installed Volume:	166.5 cu.ft.	Development Risk:	0
Resupply Volume:	0		

Rationale: For small crews it may be advisable to limit size of galley and dining area.

Merits/Deficiencies: Allows crewman to eat at his convenience.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.5.1.1

Title: Snack Bar

Applicable Mission Numbers

001-012
025-036
049-060

Function Reference: Provide For Preparation

Drawing Reference: D-3.5.1

Physical Description: A suitable structure to envelop and support food to be dispensed from a vending machine type cabinet.

Functional Description: A vending type machine to dispense preprepared hot sandwiches, hamburgers, hot dogs, etc. for snack time eating.

Detail Data

Reliability:	MTBF = 71,000 hrs OPHrs = 10,950	**10 Year Resupply Volume:**	1.3 cu ft
Maintainability:	MTTR = .25 hrs	**Peak Power:**	300 watts
Safety:	0	**Energy:**	450 watt-hrs/day
Crew Acceptance:	7	**Water (155°F):**	0
Installed Weight:	13 lb	**Water (50°F):**	0
Resupply Weight:	0	**Crew Operating Time:**	3 M-Hrs/Day
10 Year Resupply Weight:	13 lb	**Total Cost:**	$1,000,000
Installed Volume:	1.3 cu ft	**Development Risk:**	4
Resupply Volume:	0		

Rationale: Needed for the man or men who do not feel they want a large meal.

Merits/Deficiencies: Allows a man to eat a quick-type meal without preparation.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.5.1.2

Title: Snack Bar

Applicable Mission Numbers

Function Reference: Provide For Preparation

013-024
037-048
061-072

Drawing Reference: D-3.5.1

Physical Description: A suitable structure to envelop and support food to be dispensed from a vending machine type cabinet.

Functional Description: A vending type machine to dispense preprepared hot sandwiches, hamburgers, hot dogs, etc. for snack time eating.

Detail Data

Reliability:	MTBF=71,000 hrs OP Hr= ~~10,950~~	**10 Year Resupply Volume:**	2.6 cu ft
Maintainability:	MTTR = .26 hrs	**Peak Power:**	300 watts
Safety:	0	**Energy:**	0
Crew Acceptance:	7	**Water (155°F):**	0
Installed Weight:	26 lb	**Water (50°F):**	0
Resupply Weight:	0	**Crew Operating Time:**	6.0 M-Hr/Day
10 Year Resupply Weight:	26 lb	**Total Cost:**	$1,500,000
Installed Volume:	2.6 cu ft	**Development Risk:**	4
Resupply Volume:	0		

Rationale: Needed for the man or men who do not feel they want a large meal.

Merits/Deficiencies: Allows a man to eat a quick-type meal without preparation.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.6.1.1

Title: Food Dispensing Cabinet

Function Reference: Provide For Preparation

Drawing Reference: D-3.6.1

Applicable Mission Numbers

001-006
025-030
049-054

Physical Description: A counter top or wall-mounted cabinet, made of aluminum or similar material, containing compartments, retaining devices and access doors.

Functional Description: A food holding or dispensing cabinet will be loaded with trays or dishes as they have been prepared, to be removed by either crewman or steward.

Detail Data

Reliability:	MTBF = ∞ OP Hrs = 10,950	10 Year Resupply Volume:	1.75 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	5.2 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.1 M-Hrs/Day
10 Year Resupply Weight:	5.2 lb	Total Cost:	$100,000
Installed Volume:	1.75 cu ft	Development Risk:	6
Resupply Volume:	0		

Rationale: As food is prepared, it has to be held or contained until served.

Merits/Deficiencies: Reduces congestion; may be self-service or steward service.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.6.1.2

Title: Food Dispensing Cabinet

Applicable Mission Numbers

007-012

Function Reference: Provide For Preparation

031-036

Drawing Reference: D-3.6.1

055-060

Physical Description: A counter top or wall-mounted cabinet, made of aluminum or similar material, containing compartments, retaining devices and access doors.

Functional Description: A food holding or dispensing cabinet will be loaded with trays or dishes as they have been prepared, to be removed by either crewman or steward.

Detail Data

Reliability:	MTBF=∞ OP Hr = 10,950	10 Year Resupply Volume:	3.5 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	10.4 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-Hr/Day
10 Year Resupply Weight:	10.4 lb	Total Cost:	$175,000
Installed Volume:	3.5 cu ft	Development Risk:	6
Resupply Volume:	0		

Rationale: As food is prepared, it has to be held or contained until served.

Merits/Deficiencies: Reduces congestion; may be self-service or steward service.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.6.1.3

Title: Food Dispensing Cabinet

Applicable Mission Numbers

013-018
037-042
061-066

Function Reference: Provide For Preparation

Drawing Reference: D-3.6.1

Physical Description: A counter top or wall-mounted cabinet, made of aluminum or similar material, containing compartments, retaining devices and access doors.

Functional Description: A food holding or dispensing cabinet will be loaded with trays or dishes as they have been prepared, to be removed by either crewman or steward.

Detail Data

Reliability:	MTBF = ∞, OP Hr = 10,950	**10 Year Resupply Volume:**	7.0 cu ft
Maintainability:	MTTR = .25hrs	**Peak Power:**	0
Safety:	0	**Energy:**	0
Crew Acceptance:	6	**Water (155°F):**	0
Installed Weight:	20.8 lb	**Water (50°F):**	0
Resupply Weight:	0	**Crew Operating Time:**	.4 M-Hr/Day
10 Year Resupply Weight:	20.8 lb	**Total Cost:**	$250,000
Installed Volume:	7.0 cu ft	**Development Risk:**	6
Resupply Volume:	0		

Rationale: As food is prepared, it has to be held or contained until served.

Merits/Deficiencies: Reduces congestion; may be self-service or steward service.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.7.1.1

Title: Food Storage Cabinet

Applicable Mission Numbers

001-006

025-030

049-054

Function Reference: Provide For Preparation

Drawing Reference: D-3.7.1

Physical Description: An overcounter food storage or holding module designed to accept a wire form type food cartridge.

Functional Description: A modular cabinet for the storage of non-frozen food which will be mounted above the preparation area. It will hold food cartridges that will allow a crewman to extract food using only one hand. Cabinet will hold one day's supply of food.

Detail Data

Reliability:	MTBF=$^{\infty}$, OP Hrs = 87,600	10 Year Resupply Volume:	1.0 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	5.5 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.1 M-Hrs/Day
10 Year Resupply Weight:	5.5 lbs	Total Cost:	$100,000
Installed Volume:	1.0 cu ft	Development Risk:	7
Resupply Volume:	0		

Rationale: Food to be prepared has to be stored within reaching distance of the preparation counter.

Merits/Deficiencies: Will allow a crewman to perform more than one function through the use of one-hand operation.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.7.1.2

Title: Food Storage Cabinet

Applicable Mission Numbers

007-012
031-036
055-060

Function Reference: Provide For Preparation

Drawing Reference:

Physical Description: An overcounter food storage or holding module designed to accept a wire form type food cartridge.

Functional Description: A modular cabinet for the storage of non-frozen food which will be mounted above the preparation area. It will hold food cartridges that will allow a crewman to extract food using only one hand. Cabinet will hold one day's supply of food.

Detail Data

Reliability:	MTBF = ∞ OP Hr = 87,600	**10 Year Resupply Volume:**	2.0 cu ft
Maintainability:	MTTR = .25 hrs	**Peak Power:**	0
Safety:	0	**Energy:**	0
Crew Acceptance:	8	**Water (155°F):**	0
Installed Weight:	11.0 lbs	**Water (50°F):**	0
Resupply Weight:	0	**Crew Operating Time:**	.2 M-Hr/Day
10 Year Resupply Weight:	11.0 lbs	**Total Cost:**	$175,000
Installed Volume:	2.0 cu ft	**Development Risk:**	7
Resupply Volume:	0		

Rationale: Food to be prepared has to be stored within reaching distance of the preparation counter.

Merits/Deficiencies: Will allow a crewman to perform more than one function through the use of one-hand operation.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.7.1.3

Title: Food Storage Cabinet

Applicable Mission Numbers

Function Reference: Provide For Preparation

013-018
037-042
061-066

Drawing Reference: D-3.7.1

Physical Description: An overcounter food storage or holding module designed to accept a wire form type food cartridge.

Functional Description: A modular cabinet for the storage of non-frozen food which will be mounted above the preparation area. It will hold food cartridges that will allow a crewman to extract food using only one hand. Cabinet will hold one day's supply of food.

Detail Data

Reliability:	MTBF =∞, OP.Hr=87,600	10 Year Resupply Volume:	4.0 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	22.0 lbs	Water (50°F):	.4 M-Hr/Day
Resupply Weight:	0	Crew Operating Time:	$175,000
10 Year Resupply Weight:	22.0 lbs	Total Cost:	7
Installed Volume:	4.0 cu ft	Development Risk:	
Resupply Volume:	0		

Rationale: Food to be prepared has to be stored within reaching distance of the preparation counter.

Merits/Deficiencies: Will allow a crewman to perform more than one function through the use of one-hand operation.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.7.2.1

Title: Self-Storing Food Containers

Applicable Mission Numbers

001-006
025-030
049-054

Function Reference: Provide For Preparation

Drawing Reference: D-3.7.2

Physical Description: Metallic or non-metallic food containers (from dry storage) with built-in interlocking features for stacking together and having doors or covers for removal of food.

Functional Description: Food containers which come from the dry storage locker will be stacked together with interlocking fasteners. These containers will take the place of storage cabinets.

Detail Data

Reliability:	MTBF = ∞ OP Hrs= 10,950	10 Year Resupply Volume:	1.0 cu ft
Maintainability:	MTTR = 0	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	.5 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.1 m-Hr/Day
10 Year Resupply Weight:	1.0 lb	Total Cost:	$75,000
Installed Volume:	.509 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: Container serves dual purpose -- storage in ambient closet, and storage in preparation area.

Merits/Deficiencies: Storage volume reduced.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.7.2.2

Title: Self-Storing Food Containers

Applicable Mission Numbers: 007-012, 031-036, 055-060

Function Reference: Provide For Preparation

Drawing Reference: D-3.7.2

Physical Description: Metallic or non-metallic food containers (from dry storage) with built-in interlocking features for stacking together and having doors or covers for removal of food.

Functional Description: Food containers which come from the dry storage locker will be stacked together with interlocking fasteners. These containers will take the place of storage cabinets.

Detail Data

Reliability:	MTBF = ∞, OP Hrs = 10,950	10 Year Resupply Volume:	2.0 cu ft
Maintainability:	MTTR = 0	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	1.0 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-Hr/Day
10 Year Resupply Weight:	2.0 lbs	Total Cost:	$140,000
Installed Volume:	1.0 cu ft	Development Risk:	7
Resupply Volume:	0		

Rationale: Container serves dual purpose -- storage in ambient closet, and storage in preparation area.

Merits/Deficiencies: Storage volume reduced.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.7.2.3

Title: Self-Storing Food Containers

Applicable Mission Numbers

013-018
037-042
061-066

Function Reference: Provide For Preparation

Drawing Reference: D-3.7.2

Physical Description: Metallic or non-metallic food containers (from dry storage) with built-in interlocking features for stacking together and having doors or covers for removal of food.

Functional Description: Food containers which come from the dry storage locker will be stacked together with interlocking fasteners. These containers will take the place of storage cabinets.

Detail Data

Reliability:	MTBF=∞, OP.Hr=10,950	10 Year Resupply Volume:	4.0 cu ft
Maintainability:	MTTR = 0	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	2.0 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.4 M-Hr/Day
10 Year Resupply Weight:	4.0 lbs	Total Cost:	$200,000
Installed Volume:	2.0 cu ft	Development Risk:	7
Resupply Volume:	0		

Rationale: Container serves dual purpose -- storage in ambient closet, and storage in preparation area.

Merits/Deficiencies: Storage volume reduced.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.7.3.1

Title: Automatic Food Storage Cabinet

Function Reference: Provide For Preparation

Drawing Reference: D-3.7.3

Applicable Mission Numbers

001-006
025-030
049-054

Physical Description: A mechanical, hand-actuated cabinet of aluminum construction to dispense and unpackage food into preparation devices.

Functional Description: Food (contained in cartridges) will, when actuated, be dispensed, minus its covering, into a preparation device. Cabinet sized to hold a full day's supply of ambient food.

Detail Data

Reliability:	MTBF = 20,000 hrs OP Hrs= 10,050	10 Year Resupply Volume:	1.0 cu ft
Maintainability:	MTTR = .33 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	6.0 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	1M-Hr/Day
10 Year Resupply Weight:	6.0 lbs	Total Cost:	$250,000
Installed Volume:	1.0 cu ft	Development Risk:	6
Resupply Volume:	0		

Rationale: More automated operations will mean less spillage; minimize crew time.

Merits/Deficiencies: One-hand operation.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.7.3.2

Title: Automatic Food Storage Cabinet

Applicable Mission Numbers

007-012
031-036
055-060

Function Reference: Provide For Preparation

Drawing Reference: D-3.7.3

Physical Description: A mechanical, hand-actuated cabinet of aluminum construction to dispense and unpackage food into preparation devices.

Functional Description: Food (contained in cartridges) will, when actuated, be dispensed, minus its covering, into a preparation device. Cabinet sized to hold a full day's supply of ambient food.

Detail Data

Reliability:	MTBF= 20,000 hrs OP. Hrs. = 10,950	10 Year Resupply Volume:	2.0 cu ft
Maintainability:	MTTR = .33 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	12.0 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-Hr/Day
10 Year Resupply Weight:	12.0 lbs	Total Cost:	$375,000
Installed Volume:	2.0 cu ft	Development Risk:	6
Resupply Volume:	0		

Rationale: More automated operations will mean less spillage; minimize crew time.

Merits/Deficiencies: One-hand operation.

Data Sources: Best engineering judgment.

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ELEMENT CONCEPT DATA SHEET # 3.7.3.3

Title: Automatic Food Storage Cabinet

Applicable Mission Numbers

013-018
037-042
061-066

Function Reference: Provide For Preparation

Drawing Reference: D-3.7.3

Physical Description: A mechanical, hand-actuated cabinet of aluminum construction to dispense and unpackage food into preparation devices.

Functional Description: Food (contained in cartridges) will, when actuated, be dispensed, minus its covering, into a preparation device. Cabinet sized to hold a full day's supply of ambient food.

Detail Data

Reliability:	MTBF=20,000 hrs OP. Hrs = 10,950	10 Year Resupply Volume:	4.0 cu ft
Maintainability:	MTTR=3.3 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	24.0 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.4 M-Hr/Day
10 Year Resupply Weight:	24.0 lbs	Total Cost:	$500,000
Installed Volume:	4.0 cu ft	Development Risk:	6
Resupply Volume:	0		

Rationale: More automated operations will mean less spillage; minimize crew time.

Merits/Deficiencies: One-hand operation.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.1.1

Title: Kneader - Mechanical

Applicable Mission Numbers

007-012
031-036
055-060

Function Reference: Provide for Preparation

Drawing Reference: D-3.8.1

Physical Description: A mechanical, hand-operated device to contain and mechanically knead plastic type food packages. Kneading may be done by passing package between a series of rollers.

Functional Description: Dry food packages which have been reconstituted with water have to be kneaded to mix contents thoroughly.

Detail Data

Reliability:	$M_{TBF}^{1}=\infty$, OP Hrs = 365	10 Year Resupply Volume:	.208 ft^3
Maintainability:	$\bar{M}_{TTR}=.1$ hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	1.2 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.1 M-Hrs/Day
10 Year Resupply Weight:	2.4 lbs	Total Cost:	$25,000
Installed Volume:	.01 ft^3	Development Risk:	5
Resupply Volume:	0		

Rationale: For crews larger than 6 men, a mechanical means is required for kneading.

Merits/Deficiencies: Will reduce crew time and be more crew acceptable.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.1.2

Title: Kneader - Mechanical

Function Reference: Provide for Preparation

Drawing Reference: D-3.8.1

Applicable Mission Numbers
013-018
037-043
061-066

Physical Description: A mechanical, hand-operated device to contain and mechanically knead plastic type food packages. Kneading may be done by passing package between a series of rollers.

Functional Description: Dry food packages which have been reconstituted with water have to be kneaded to mix contents thoroughly.

Detail Data

Reliability:	MTBF = ∞, OP. Hrs = 730	10 Year Resupply Volume:	.417 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:		Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	2.4 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-Hr/Day
10 Year Resupply Weight:	4.8 lbs	Total Cost:	$40,000
Installed Volume:	.208 ft^3	Development Risk:	5
Resupply Volume:	0		

Rationale: For crews larger than 6 men, a mechanical means is required for kneading.

Merits/Deficiencies: Will reduce crew time and be more crew acceptable.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.2.1

Title: Hand Kneading

Applicable Mission Numbers

001-006
025-030
049-054

Function Reference: Provide For Preparation

Drawing Reference:

Physical Description: Method of mixing liquid with dry foods in bags. By squeezing with fingers, food will mix with water.

Functional Description:

Detail Data

Reliability:	MTBB= ∞ , OP.Hrs= 5,750	10 Year Resupply Volume:	0
Maintainability:	$\overline{MTTR}$ = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-Hr/Day
10 Year Resupply Weight:	0	Total Cost:	0
Installed Volume:	0	Development Risk:	0
Resupply Volume:	0		

Rationale: Applicable for small crew feeding.

Merits/Deficiencies: Time consuming for crews larger than six men.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.3.1

Title: Hot Food Handling Tongs

Applicable Mission Numbers

001-012

025-036

049-060

Function Reference: Provide For Preparation

Drawing Reference: D-3.8.3

Physical Description: Hand-held, hand-operated tongs with either mechanical or manual gripping action. Permits solid lock-up of tong to dish or tray; self-adjusting.

Functional Description: For inserting into or removing from ovens, food packages, dishes or trays which have been heated. Two tongs per set.

Detail Data

Reliability:	MTBF=∞ . OP. Hrs = 365	10 Year Resupply Volume:	.035 ft^3
Maintainability:	MTTR= .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	.625 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.1 M-Hr/Day
10 Year Resupply Weight:	1.3 lb	Total Cost:	$1000
Installed Volume:	.017 ft^3	Development Risk:	8
Resupply Volume:	0		

Rationale: Hot food handling devices such as tongs are required in partial- through zero-g.

Merits/Deficiencies: Tongs for handling hot foods will prevent accidents and injury.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.3.2

Title: Hot Food Handling Tongs

Applicable Mission Numbers

013-018
037-042
061-066

Function Reference: Provide For Preparation

Drawing Reference: D-3.8.3

Physical Description: Hand-held, hand-operated tongs with either mechanical or manual gripping action. Permits solid lock-up of tong to dish or tray; self-adjusting.

Functional Description: For inserting into or removing from ovens, food packages, dishes or trays which have been heated. Two tongs per set.

Detail Data

Reliability:	MTBF = 6, OP. Hrs=730	10 Year Resupply Volume:	.069 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	1.3 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-Hr/Day
10 Year Resupply Weight:	2.6 lbs	Total Cost:	$1800
Installed Volume:	.035 ft^3	Development Risk:	8
Resupply Volume:	0		

Rationale: Hot food handling devices such as tongs are required in partial- through zero-g.

Merits/Deficiencies: Tongs for handling hot foods will prevent accidents and injury.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.4.1

Title: Clam Shell Type Handling Device

Applicable Mission Numbers: 001-012, 025-036, 049-060

Function Reference: Provide For Preparation

Drawing Reference: D-3.8.4

Physical Description: Hand-held, hand-operated clam shell type scoop and claw food retention and transfer mechanism; squeeze-type gripping action.

Functional Description: To be used to scoop up and transfer food without spilling from preparation area to serving area, etc.

Detail Data

Reliability:	MTBF = ∞, OP. Hrs = 365	10 Year Resupply Volume:	.010 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	.313 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.1 M-Hr/Day
10 Year Resupply Weight:	.625 lbs	Total Cost:	$1000
Installed Volume:	.005 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: For ease of handling in a zero-g condition, this concept is valid.

Merits/Deficiencies: Prevents escape of food; may be bulky in handling.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.4.2

Title: Clam Shell Type Handling Device

Applicable Mission Numbers

013-018
037-042
061-066

Function Reference: Provide For Preparation

Drawing Reference: D-3.8.4

Physical Description: Hand-held, hand-operated clam shell type scoop and claw food retention and transfer mechanism; squeeze-type gripping action.

Functional Description: To be used to scoop up and transfer food without spilling from preparation area to serving area, etc.

Detail Data

Reliability:	MTBF =9, OP.Hrs=730	10 Year Resupply Volume:	.019 ft^3
Maintainability:	MTTR = 1/2 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	0
Installed Weight:	.625 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-Hr/Day
10 Year Resupply Weight:	1.3 lb	Total Cost:	$1800
Installed Volume:	.010 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: For ease of handling in a zero-g condition, this concept is valid.

Merits/Deficiencies: Prevents escape of food; may be bulky in handling.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.7.1

Title: Scoop - Ice Cream Type

Function Reference: Provide For Preparation

Drawing Reference: D-3.8.7

Applicable Mission Numbers
001-006
025-030
049-054

Physical Description: Mechanically actuated, hand-operated scoop type device made of lightweight materials such as aluminum.

Functional Description: A scoop similar to an ice cream scoop to be used to transfer food such as mashed potatoes, turnips, etc.

Detail Data

Reliability:	MTBF=$_{\infty}$ OP Hrs = 365	10 Year Resupply Volume:	.044 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:		Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	.219 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	1 M-Hrs/Day
10 Year Resupply Weight:	.659 lbs	Total Cost:	$1000
Installed Volume:	.015 ft^3	Development Risk:	8
Resupply Volume:	0		

Rationale: Wiping action of mechanical actuation device may have more uses in space.

Merits/Deficiencies: Will contain food for transfer.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.7.2

Title: Scoop - Ice Cream Type

Applicable Mission Numbers
007-012
031-036
055-060

Function Reference: Provide For Preparation

Drawing Reference: D-3.8.7

Physical Description: Mechanically actuated, hand-operated scoop type device made of lightweight materials such as aluminum.

Functional Description: A scoop similar to an ice cream scoop to be used to transfer food such as mashed potatoes, turnips, etc.

Detail Data

Reliability:	MTBF = ∞, OP.Hr = 730	10 Year Resupply Volume:	.089 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	.438 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-Hr/Day
10 Year Resupply Weight:	1.4 lb	Total Cost:	$1800
Installed Volume:	.030 ft^3	Development Risk:	8
Resupply Volume:	0		

Rationale: Wiping action of mechanical actuation device may have more uses in space.

Merits/Deficiencies: Will contain food for transfer.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.7.3

Title: Scoop - Ice Cream Type

Applicable Mission Numbers

013-018
037-042
061-066

Function Reference: Provide For Preparation

Drawing Reference: D-3.8.7

Physical Description: Mechanically actuated, hand-operated scoop type device made of lightweight materials such as aluminum.

Functional Description: A scoop similar to an ice cream scoop to be used to transfer food such as mashed potatoes, turnips, etc.

Detail Data

Reliability:	MTBF=∞, OP.Hrs= 1460	10 Year Resupply Volume:	.133 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	.656 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.4 M-Hr/Day
10 Year Resupply Weight:	2.0 lbs	Total Cost:	$2600
Installed Volume:	.044 ft^3	Development Risk:	8
Resupply Volume:	0		

Rationale: Wiping action of mechanical actuation device may have more uses in space.

Merits/Deficiencies: Will contain food for transfer.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.9.1

Title: Kitchen Utility Shears

Applicable Mission Numbers

001-012
~~029~~-036
049-060

Function Reference: Provide For Preparation

Drawing Reference: D-3.8.9

Physical Description: Normal configuration shears (scissors) 5 inches long x 2 inches wide x one-quarter inch high.

Functional Description: Shears to be used for opening food packages which have no special opening device or packages whose device is inoperable.

Detail Data

Reliability:	MTBF = ∞, OP.Hrs=365	**10 Year Resupply Volume:**	.002 ft^3
Maintainability:	MTTR = [illegible] hrs	**Peak Power:**	0
Safety:	0	**Energy:**	0
Crew Acceptance:	8	**Water (155°F):**	0
Installed Weight:	.25 lb	**Water (50°F):**	0
Resupply Weight:	0	**Crew Operating Time:**	.1 M-Hr/Day
10 Year Resupply Weight:	.5 lb	**Total Cost:**	$1000
Installed Volume:	.001 ft^3	**Development Risk:**	8
Resupply Volume:	0		

Rationale: Opening of dry food packaging and other packaging may need the services of a pair of shears.

Merits/Deficiencies: Can be used many times during preparation of food.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.9.2

Title: Kitchen Utility Shears

Applicable Mission Numbers

013-018
038-042
061-066

Function Reference: Provide For Preparation

Drawing Reference: D-3.8.9

Physical Description: Normal configuration shears (scissors) 5 inches long x 2 inches wide x one-quarter inch high.

Functional Description: Shears to be used for opening food packages which have no special opening device or packages whose device is inoperable.

Detail Data

Reliability:	MTBF=◀, OP.Hrs = 720	10 Year Resupply Volume:	.004 ft^3
Maintainability:	MTTR = .1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	.5 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-Hr/Day
10 Year Resupply Weight:	1.0 lb	Total Cost:	$1800
Installed Volume:	.002 ft^3	Development Risk:	8
Resupply Volume:	0		

Rationale: Opening of dry food packaging and other packaging may need the services of a pair of shears.

Merits/Deficiencies: Can be used many times during preparation of food.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.10.1

Title: Hand-Operated Mixer/Blender

Applicable Mission Numbers

001-006
025-030
049-054

Function Reference: Provide For Preparation

Drawing Reference: D-3.8.10

Physical Description: A cylindrically shaped container with a trigger mechanism which performs an oscillating type action to mix or blend.

Functional Description: A container with food or liquid to be mixed will be inserted into the trigger actuated housing which will, by a latching device, hold and oscillate the food container.

Detail Data

Reliability:	MTBF = ∞, OP.Hrs=365	10 Year Resupply Volume:	.094 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	.313 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.1 M-Hr/Day
10 Year Resupply Weight:	1.5 lb	Total Cost:	$25,000
Installed Volume:	.019 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: For small crews of 6 to 12 men, a hand-operated, mechanical mixer is needed.

Merits/Deficiencies: Preparation time reduced; no power source needed.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.10.2

Title: Hand-Operated Mixer/Blender

Applicable Mission Numbers: 007-012, 031-036, 055-060

Function Reference: Provide For Preparation

Drawing Reference: D-3,8,10

Physical Description: A cylindrically shaped container with a trigger mechanism which performs an oscillating type action to mix or blend.

Functional Description: A container with food or liquid to be mixed will be inserted into the trigger actuated housing which will, by a latching device, hold and oscillate the food container.

Detail Data

Reliability:	MTBF = ∞, OP.Hrs=730	10 Year Resupply Volume:	.376 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	.625 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-Hr/Day
10 Year Resupply Weight:	3.0 lb	Total Cost:	$39,000
Installed Volume:	.038 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: For small crews of 6 to 12 men, a hand-operated, mechanical mixer is needed.

Merits/Deficiencies: Preparation time reduced; no power source needed.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.10.3

Title: Hand-Operated Mixer/Blender

Applicable Mission Numbers

013-018
037-042
061-066

Function Reference: Provide For Preparation

Drawing Reference: D-3.8.10

Physical Description: A cylindrically shaped container with a trigger mechanism which performs an oscillating type action to mix or blend.

Functional Description: A container with food or liquid to be mixed will be inserted into the trigger actuated housing which will, by a latching device, hold and oscillate the food container.

Detail Data

Reliability:	MTBF = #, OP.Hrs = 1460	10 Year Resupply Volume:	.564 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	.938 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.4 M-Hr/Day
10 Year Resupply Weight:	4.5 lb	Total Cost:	$53,000
Installed Volume:	.056 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: For small crews of 6 to 12 men, a hand-operated, mechanical mixer is needed.

Merits/Deficiencies: Preparation time reduced; no power source needed.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.11.1

Title: Spatula

Applicable Mission Numbers

001-006

Function Reference: Provide For Preparation

025-030

Drawing Reference: D-3.8.11

049-054

Physical Description: A hard rubber or plastic type material with a wedge-shaped blade and handle for scraping.

Functional Description: A scraping device to be used for mixing and scraping of preparation devices and mixing bowls.

Detail Data

Reliability:	MTBF = ∞, Op. Hrs = 365	10 Year Resupply Volume:	.010 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	.094 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	.938 lb	Total Cost:	$1000
Installed Volume:	.001 ft^3	Development Risk:	8
Resupply Volume:	0		

Rationale: Foods which tend to stick to surfaces will have to be scraped from mixing bowls.

Merits/Deficiencies: Preparation devices can be scraped, but not scratched.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.11.2

Title: Spatula

Applicable Mission Numbers: 007-012, 031-036, 055-060

Function Reference: Provide For Preparation

Drawing Reference: D-3.8.11

Physical Description: A hard rubber or plastic type material with a wedge-shaped blade and handle for scraping.

Functional Description: A scraping device to be used for mixing and scraping of preparation devices and mixing bowls.

Detail Data

Reliability:	[redacted], OP. HRS = 730	10 Year Resupply Volume:	.021 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	.188 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-Hr/Day
10 Year Resupply Weight:	1.9 lb	Total Cost:	$1800
Installed Volume:	.002 ft^3	Development Risk:	8
Resupply Volume:	0		

Rationale: Foods which tend to stick to surfaces will have to be scraped from mixing bowls.

Merits/Deficiencies: Preparation devices can be scraped, but not scratched.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET #3.8.11.3

Title: Spatula

Applicable Mission Numbers

Function Reference: Provide For Preparation

013-018
037-042
061-066

Drawing Reference: D-3.8.11

Physical Description: A hard rubber or plastic type material with a wedge-shaped blade and handle for scraping.

Functional Description: A scraping device to be used for mixing and scraping of preparation devices and mixing bowls.

Detail Data

Reliability:	MTBF = ?, OP Hrs = 1460	10 Year Resupply Volume:	.031 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	.281 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.4 M-Hrs/Day
10 Year Resupply Weight:	2.7 lb	Total Cost:	$2600
Installed Volume:	.003 ft3	Development Risk:	8
Resupply Volume:	0		

Rationale: Foods which tend to stick to surfaces will have to be scraped from mixing bowls.

Merits/Deficiencies: Preparation devices can be scraped, but not scratched.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.12.1

Title: Food Chopper

Applicable Mission Numbers: 001-006, 025-030, 049-054

Function Reference: Provide For Preparation

Drawing Reference: D-3.8.12

Physical Description: A spring-loaded, hand-actuated four-bladed chopper totally enclosed in a see-through housing.

Functional Description: The spring-mechanism assisted hand-actuated device gives an assist in breaking and chopping of foods.

Detail Data

Reliability:	MTBF=∞, OP HRS = 365	10 Year Resupply Volume:	.115 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	.313 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.1 M-Hr/Day
10 Year Resupply Weight:	.938 lb	Total Cost:	$1000
Installed Volume:	.038 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: A hand-operated mechanical device will cut down crew time.

Merits/Deficiencies:

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.12.2

Title: Food Chopper

Applicable Mission Numbers
007-012
031-036
055-060

Function Reference: Provide For Preparation

Drawing Reference: D-3.8.12

Physical Description: A spring-loaded, hand-actuated four-bladed chopper totally enclosed in a see-through housing.

Functional Description: The spring-mechanism assisted hand-actuated device gives an assist in breaking and chopping of foods.

Detail Data

Reliability:	MTBF =∞, OP. Hrs = 730	10 Year Resupply Volume:	.229 ft^3
Maintainability:	MTTR =.1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	.625 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-Hr/Day
10 Year Resupply Weight:	1.8 lb	Total Cost:	$1800
Installed Volume:	.076 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: A hand-operated mechanical device will cut down crew time.

Merits/Deficiencies:

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.12.3

Title: Food Chopper

Applicable Mission Numbers
013-018
037-042
061-066

Function Reference: Provide For Preparation

Drawing Reference: D-3.8.12

Physical Description: A spring-loaded, hand-actuated four-bladed chopper totally enclosed in a see-through housing.

Functional Description: The spring-mechanism assisted hand-actuated device gives an assist in breaking and chopping of foods.

Detail Data

Reliability:	~~MTBF = ∞~~, OP. HRS = 1460	10 Year Resupply Volume:	.344 ft^3
Maintainability:	MTTR = .1 Hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	.938 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.4 M-Hr/Day
10 Year Resupply Weight:	2.8 lb	Total Cost:	$2600
Installed Volume:	.115 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: A hand-operated mechanical device will cut down crew time.

Merits/Deficiencies:

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.9.1.1

Title: Controlled Spillage Module

Applicable Mission Numbers

001-006

Function Reference: Provide for Preparation

025-030

Drawing Reference: D-3.9.1

049-054

Physical Description: A plenum chamber containing a controlled spillage duct using a low velocity induced directional airflow to ingest spilled particles through a series of orifices.

Functional Description: A wall-mounted, ducted device to control, contain, and prevent spilled food from contaminating the galley air.

Detail Data

Reliability: MTBF=323,000 lbs OP Hrs=10,950

Maintainability: MTTR= .4 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 8.4 lb

Resupply Weight: 0

10 Year Resupply Weight: 8.4 lb

Installed Volume: .556 ft^3

Resupply Volume: 0

10 Year Resupply Volume: .556 ft^3

Peak Power: 155 watts

Energy: 465 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: 3 hrs/day

Total Cost: $500,000

Development Risk: 5

Rationale: From a health and safety standpoint, the control of food spillage requires further study.

Merits/Deficiencies: Containment of loose particles.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.9.1.2

Title: Controlled Spillage Module

Applicable Mission Numbers

007-012
031-036
055-060

Function Reference: Provide for Preparation

Drawing Reference: D-3.9.1

Physical Description: A plenum chamber containing a controlled spillage duct using a low velocity induced directional airflow to ingest spilled particles through a series of orifices.

Functional Description: A wall-mounted, ducted device to control, contain, and prevent spilled food from contaminating the galley air.

Detail Data

Reliability:	MTBF= 164,000 lbs OP Hrs = 10,950	**10 Year Resupply Volume:**	1.1 cu ft
Maintainability:	MTTR = .4 hrs	**Peak Power:**	310 watts
Safety:	0	**Energy:**	930 watt-hr/day
Crew Acceptance:	8	**Water (155°F):**	0
Installed Weight:	16.8 lb	**Water (50°F):**	0
Resupply Weight:	0	**Crew Operating Time:**	6 M-Hr/Day
10 Year Resupply Weight:	16.8 lb	**Total Cost:**	$750,000
Installed Volume:	1.1 cu ft	**Development Risk:**	5
Resupply Volume:	0		

Rationale: From a health and safety standpoint, the control of food spillage requires further study.

Merits/Deficiencies: Containment of loose particles.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.9.1.3

Title: Controlled Spillage Module

Applicable Mission Numbers

013-018

037-042

061-066

Function Reference: Provide for Preparation

Drawing Reference: D-3.9.1

Physical Description: A plenum chamber containing a controlled spillage duct using a low velocity induced directional airflow to ingest spilled particles through a series of orifices.

Functional Description: A wall-mounted, ducted device to control, contain, and prevent spilled food from contaminating the galley air.

Detail Data

Reliability:	MTBF= 81,000 hrs OP. Hrs= 10,950	10 Year Resupply Volume:	2.0 cu ft
Maintainability:	MTTR = .4 hrs	Peak Power:	350 watts
Safety:	0	Energy:	1020 watt-hr/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	20.5 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	12 M-Hr/Day
10 Year Resupply Weight:	20.5 lb	Total Cost:	$1,000,000
Installed Volume:	2.0 cu ft	Development Risk:	5
Resupply Volume:	0		

Rationale: From a health and safety standpoint, the control of food spillage requires further study.

Merits/Deficiencies: Containment of loose particles.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.10.3.1

Title: Waist Restraint

Applicable Mission Numbers: 001-006, 025-030, 049-054

Function Reference: Provide For Preparation

Drawing Reference: D-3.10.3

Physical Description: A cloth-type belt with hip mounted telescoping fittings which allow the crewman to attach himself to a restraint rail at the preparation counter.

Functional Description: A waist belt with fittings attached on both sides to allow the crewman to attach himself to the preparation counter and keep his hands free for working operations.

Detail Data

Reliability:	MTBF=333,000hrs OP Hrs=5,475	10 Year Resupply Volume:	.103 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	9.0 lb	Water (50°F):	0
Resupply Weight:	1.5 lb	Crew Operating Time:	1.5 M-Hrs/Day
10 Year Resupply Weight:	9.0 lb	Total Cost:	$25,000
Installed Volume:	.103 ft^3	Development Risk:	7
Resupply Volume:	.017 ft^3		

Rationale: A body restraint is needed to allow crewman to perform duties during zero-g conditions.

Merits/Deficiencies: Can work freely during zero-g, but may increase crew time in moving about.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.10.3.2

Title: Waist Restraint

Applicable Mission Numbers: 007-012, 031-036, 055-060

Function Reference: Provide For Preparation

Drawing Reference: D-3.10.3

Physical Description: A cloth-type belt with hip mounted telescoping fittings which allow the crewman to attach himself to a restraint rail at the preparation counter.

Functional Description: A waist belt with fittings attached on both sides to allow the crewman to attach himself to the preparation counter and keep his hands free for working operations.

Detail Data

Reliability:	MTBF = 333,000 hrs OP Hrs = 5,475	10 Year Resupply Volume:	.207 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	18.0 lb	Water (50°F):	0
Resupply Weight:	1.5 lb	Crew Operating Time:	3.0 M-Hr/Day
10 Year Resupply Weight:	18.0 lb	Total Cost:	$40,000
Installed Volume:	.207 ft^3	Development Risk:	7
Resupply Volume:	.017 ft^3		

Rationale: A body restraint is needed to allow crewman to perform duties during zero-g conditions.

Merits/Deficiencies: Can work freely during zero-g, but may increase crew time in moving about.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.10.3.3

Title: Waist Restraint

Applicable Mission Numbers

013-018
037-042
061-066

Function Reference: Provide For Preparation

Drawing Reference: D-3.10.3

Physical Description: A cloth-type belt with hip mounted telescoping fittings which allow the crewman to attach himself to a restraint rail at the preparation counter.

Functional Description: A waist belt with fittings attached on both sides to allow the crewman to attach himself to the preparation counter and keep his hands free for working operations.

Detail Data

Reliability:	MTBF=333,000hrs OP HRS= 5,475	**10 Year Resupply Volume:**	.431 ft^3
Maintainability:	MTTR = .1 hrs	**Peak Power:**	0
Safety:	0	**Energy:**	0
Crew Acceptance:	8	**Water (155°F):**	0
Installed Weight:	37.5 lb	**Water (50°F):**	0
Resupply Weight:	1.5 lb	**Crew Operating Time:**	6.0 M-Hr/Day
10 Year Resupply Weight:	37.5 lb	**Total Cost:**	$52,000
Installed Volume:	.431 ft^3	**Development Risk:**	7
Resupply Volume:	.017 ft^3		

Rationale: A body restraint is needed to allow crewman to perform duties during zero-g conditions.

Merits/Deficiencies: Can work freely during zero-g, but may increase crew time in moving about.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.1.1

Title: Food Transport Conveyor Belt

Applicable Mission Numbers
007-024
031-048
055-072

Function Reference: Provide For Preparation

Drawing Reference: D-3.11.1

Physical Description: A continuous belt, motor driven to transport food to the preparation area. may be located overhead or recessed in floor.

Functional Description: A continuous belt, to which food package handling devices are attached for transfer from storage to preparation.

Detail Data

Reliability:	MTBF = 196,000hrsOP. HRS =	10 Year Resupply Volume:	1.0 cu.ft.
Maintainability:	MTTR = .16 hrs 365	Peak Power:	300 watts
Safety:	0	Energy:	30 watt - hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	15 pounds	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.1 M-Hr/Day
10 Year Resupply Weight:	15 pounds	Total Cost:	$200,000
Installed Volume:	1.0 cu.ft.	Development Risk:	6
Resupply Volume:	0		

Rationale: In handling of large bulky food packages, it may be safer and more efficient by conveyor system.

Merits/Deficiencies: Not practical for crew sizes below twelve, or small stations

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.2.1

Title: Magnetic Conveyor System

Applicable Mission Numbers
007-024
031-048
055-072

Function Reference: Provide For Preparation

Drawing Reference: D-3.11.2

Physical Description: A totally enclosed magnetic cable contained in a non-metallic tubing -- motor driven. A non-metallic food transport container will have embedded metal inserts.

Functional Description: Magnets attached to a cable in an enclosed non-metallic housing will convey food containers to the preparation area.

Detail Data

Reliability:	MTBF= 196,000 hrsOP HRS = 365	10 Year Resupply Volume:	1.0 cu.ft.
Maintainability:	MTTR = .25 hrs.	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	15.0 pounds	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.1 M-Hr/Day
10 Year Resupply Weight:	15.0 pounds	Total Cost:	$150,000
Installed Volume:	1.0 cu.ft.	Development Risk:	6
Resupply Volume:	0		

Rationale: A totally enclosed cable is a simplified method of transfer.

Merits/Deficiencies: Reduces bacterial collection; increases crew safety.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.3.1

Title: Mechanical Rail Transport System

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Function Reference: Provide For Preparation

Drawing Reference: D-3 11-3

Physical Description: An overhead rail used to restrain crewman and provide mobility, to be used to attach roller propelling food containment brackets.

Functional Description: Food containers to be transported to galley will be attached to roller brackets. Rails may have "sidings" to store food containers in preparation area.

Detail Data

Reliability:	MTBF =0, OP HRS = 365	10 Year Resupply Volume:	0.104 ft^3
Maintainability:	MTTR = .33 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	7.0 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.1M -Hrs/Day
10 Year Resupply Weight:	7.0 lb	Total Cost:	$90,000
Installed Volume:	0.104 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: Overhead rail has dual purpose: to provide mobility and as a conveyance for food.

Merits/Deficiencies: Allows for ease of handling.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.3.2

Title: Mechanical Rail Transport System

Applicable Mission Numbers

Function Reference: Provide For Preparation

007 - 012
031 - 036
055 - 060

Drawing Reference: D-3.11.3

Physical Description: An overhead rail used to restrain crewman and provide mobility, to be used to attach roller propelling food containment brackets.

Functional Description: Food containers to be transported to galley will be attached to roller brackets. Rails may have "sidings" to store food containers in preparation area.

Detail Data

Reliability:	MTBF = 6, OP.HRS = 730	10 Year Resupply Volume:	.153 ft^3
Maintainability:	MTTR = .33 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	10.0 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-Hr/Day
10 Year Resupply Weight:	10.0 lb	Total Cost:	$150,000
Installed Volume:	.153 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: Overhead rail has dual purpose: to provide mobility and as a conveyance for food.

Merits/Deficiencies: Allows for ease of handling.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.3.3

Title: Mechanical Rail Transport System

Applicable Mission Numbers

013 - 018
037 - 042
061 - 066

Function Reference: Provide For Preparation

Drawing Reference: D-3.11.3

Physical Description: An overhead rail used to restrain crewman and provide mobility, to be used to attach roller propelling food containment brackets.

Functional Description: Food containers to be transported to galley will be attached to roller brackets. Rails may have "sidings" to store food containers in preparation area.

Detail Data

Reliability:	MTBF = ∞, OP HRS = 1460	10 Year Resupply Volume:	.307 ft^3
Maintainability:	MTTR = .33 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	20.0 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.4M - Hr/Day
10 Year Resupply Weight:	20.0 lb	Total Cost:	$205,000
Installed Volume:	.307 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: Overhead rail has dual purpose: to provide mobility and as a conveyance for food.

Merits/Deficiencies: Allows for ease of handling.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.4.1

Title: Dolly Type Guided Cart

Applicable Mission Numbers

007 - 012
031 - 036
055 - 060

Function Reference: Provide For Preparation

Drawing Reference: D-3.11.4

Physical Description: An all aluminum cart with a recessed floor guide and rollers with partitions for both frozen and ambient. Same cart as per concept 3.4.4.

Functional Description: Totally enclosed cart to transport frozen and ambient food from storage to preparation.

Detail Data

Reliability:	MTBF=909,000hrsOP HRS = 730	10 Year Resupply Volume:	12.0 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	12.0 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-Hr/Day
10 Year Resupply Weight:	12.0 lb	Total Cost:	$175,000
Installed Volume:	12.0 cu ft	Development Risk:	6
Resupply Volume:	0		

Rationale: This cart would perform a dual task -- both transport and preparation of food.

Merits/Deficiencies: Minimizes number of components.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.4.2

Title: Dolly Type Guided Cart

Applicable Mission Numbers

013 - 018
037 - 042
061 - 066

Function Reference: Provide For Preparation

Drawing Reference: D-3.11.4

Physical Description: An all aluminum cart with a recessed floor guide and rollers with partitions for both frozen and ambient. Same cart as per concept 3.4.4.

Functional Description: Totally enclosed cart to transport frozen and ambient food from storage to preparation.

Detail Data

Reliability:	MTBF=417,000 hrs OP HRS = 1460	10 Year Resupply Volume:	24.0 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	24.0 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.4 M-Hr/Day
10 Year Resupply Weight:	24.0 lb	Total Cost:	$260,000
Installed Volume:	24.0 cu ft	Development Risk:	6
Resupply Volume:	0		

Rationale: This cart would perform a dual task -- both transport and preparation of food.

Merits/Deficiencies: Minimizes number of components.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.5.1

Title: Net Type Bag

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Function Reference: Provide For Preparation

Drawing Reference: D-3.11.5

Physical Description: A bag made of a net-type webbing which will hold food packages and be transportable.

Functional Description: A bag which will allow the crewman to easily carry a number of food packages.

Detail Data

Reliability:	MTBF = 9, OP. HRS =10,950	**10 Year Resupply Volume:**	.042 ft^3
Maintainability:	MTTR = .1 hrs	**Peak Power:**	0
Safety:	0	**Energy:**	0
Crew Acceptance:	6	**Water (155°F):**	0
Installed Weight:	.313 lb	**Water (50°F):**	0
Resupply Weight:	0	**Crew Operating Time:**	.1 M-Hr/Day
10 Year Resupply Weight:	.313 lb	**Total Cost:**	$2500
Installed Volume:	.042 ft^3	**Development Risk:**	7
Resupply Volume:	0		

Rationale: Packages cannot be carried without a restraint. A net-type bag will be lightweight.

Merits/Deficiencies:

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.5.2

Title: Net Type Bag

Function Reference: Provide For Preparation

Drawing Reference: D-3.11.5

Applicable Mission Numbers

007 - 012
031 - 036
055 - 060

Physical Description: A bag made of a net-type webbing which will hold food packages and be transportable.

Functional Description: A bag which will allow the crewman to easily carry a number of food packages.

Detail Data

Reliability:	MTBF = ∞, OP HRS = 10,950	10 Year Resupply Volume:	.083 ft^3
Maintainability:	$MTTR_m$ = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	.625 ft^3	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-HR/DAY
10 Year Resupply Weight:	.625 lb	Total Cost:	$3800
Installed Volume:	.083 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: Packages cannot be carried without a restraint. A net-type bag will be lightweight.

Merits/Deficiencies:

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.5.3

Title: Net Type Bag

Applicable Mission Numbers
013 - 018
037 - 042
061 - 066

Function Reference: Provide For Preparation

Drawing Reference: D-3.11.5

Physical Description: A bag made of a net-type webbing which will hold food packages and be transportable.

Functional Description: A bag which will allow the crewman to easily carry a number of food packages.

Detail Data

Reliability:	MTBF = ∞. OP. HRS = 10,950	10 Year Resupply Volume:	.167 ft^3
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	1.25 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.4 M-HR/Day
10 Year Resupply Weight:	1.25 lbs	Total Cost:	$5000
Installed Volume:	.167 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: Packages cannot be carried without a restraint. A net-type bag will be lightweight.

Merits/Deficiencies:

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.7.1

Title: Food Handling Tongs

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Function Reference: Provide For Preparation

Drawing Reference: D-3.11.7

Physical Description: A hand-held gripping device fabricated from welded wire. May be in the form of "ice tongs", but preferably it should be latched to prevent spillage.

Functional Description: Food handling tongs for removal and transportation of containers and packages from the freezer or ambient storage closet to the preparation area.

Detail Data

Reliability:	MTBF = 6, OP HRS = 365	**10 Year Resupply Volume:**	.5 cu ft
Maintainability:	MTTR = .1 hrs.	**Peak Power:**	0
Safety:	0	**Energy:**	0
Crew Acceptance:	8	**Water (155°F):**	0
Installed Weight:	.5 lb	**Water (50°F):**	0
Resupply Weight:	0	**Crew Operating Time:**	1 M-HR/Day
10 Year Resupply Weight:	.5 lb	**Total Cost:**	$1000
Installed Volume:	.5 cu ft	**Development Risk:**	8
Resupply Volume:	0		

Rationale: This is a valid concept for removing and carrying of small quantities of food in partial- to zero-g.

Merits/Deficiencies: Lightweight construction; easy to handle.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.7.2

Title: Food Handling Tongs

Applicable Mission Numbers

Function Reference: Provide For Preparation

007-012
031-036
055-060

Drawing Reference: D-3.11.7

Physical Description: A hand-held gripping device fabricated from welded wire. May be in the form of "ice tongs", but preferably it should be latched to prevent spillage.

Functional Description: Food handling tongs for removal and transportation of containers and packages from the freezer or ambient storage closet to the preparation area.

Detail Data

Reliability:	MTBF = ∞, OP HRS = 730	10 Year Resupply Volume:	1.0 cu ft
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	1 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.2 M-HR/Day
10 Year Resupply Weight:	1 lb	Total Cost:	$1800
Installed Volume:	1.0 cu ft	Development Risk:	8
Resupply Volume:	0		

Rationale: This is a valid concept for removing and carrying of small quantities of food in partial- to zero-g.

Merits/Deficiencies: Lightweight construction; easy to handle.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.7.3

Title: Food Handling Tongs

Applicable Mission Numbers
013-018
037-042
061-066

Function Reference: Provide For Preparation

Drawing Reference: D-3.11.7

Physical Description: A hand-held gripping device fabricated from welded wire. May be in the form of "ice tongs", but preferably it should be latched to prevent spillage.

Functional Description: Food handling tongs for removal and transportation of containers and packages from the freezer or ambient storage closet to the preparation area.

Detail Data

Reliability:	MTBF = , OP HR = 1460	10 Year Resupply Volume:	2 cu ft
Maintainability:	MTTR = .1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	2.0 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.4 M-HR/Day
10 Year Resupply Weight:	2.0 lbs	Total Cost:	$2600
Installed Volume:	2 cu ft	Development Risk:	8
Resupply Volume:	0		

Rationale: This is a valid concept for removing and carrying of small quantities of food in partial- to zero-g.

Merits/Deficiencies: Lightweight construction; easy to handle.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 4.1.1.1

Title: Self-Service

Applicable Mission Numbers

001 - 072

Function Reference: Provide For Serving

Drawing Reference:

Physical Description: This concept for food serving utilizes the crewman as the server without any special handling equipment.

Functional Description: The meal is assembled in the galley area, as required, and transported to the dining area by the crewman.

Detail Data

Reliability:	MTBF = ∞, OP HRS = 0	10 Year Resupply Volume:	0
Maintainability:	MTTR = 0	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	0
10 Year Resupply Weight:	0	Total Cost:	0
Installed Volume:	0	Development Risk:	0
Resupply Volume:	0		

Rationale: On the smaller crew size missions this concept has considerable merit.

Merits/Deficiencies: Simplified galley dining area designs and equipment requirements/ requires special dining area adequately sized for traffic flow.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 4.1.2.1

Title: Steward Service

Applicable Mission Numbers

001 - 072

Function Reference: Provide For Serving

Drawing Reference: D-4.1 & D-4.1.2

Physical Description: This technique utilizes the services of the galley crew to deliver the prepared meal/tray to the seated crewman. A tray/rail concept (4.1.3) or tray rack rail system (4.1.7) may be used in conjunction with this technique.

Functional Description: The crewman designated for steward duty will prepare the meal as necessary and then either physically carry it to the seated crewman in the dining area or will utilize a conveyor (4.1.3 or 4.1.7) for delivery.

Detail Data

Reliability:	MTBF = ∞, OP HRS = 0	10 Year Resupply Volume:	0
Maintainability:	MTTR = 0	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	1.5 M-Hrs/Day
10 Year Resupply Weight:	0	Total Cost:	0
Installed Volume:	0	Development Risk:	8
Resupply Volume:	0		

Rationale: If no conveyor is used, this technique would reduce the congestion between the galley and dining area.

Merits/Deficiencies: The steward would allow the dining crewman to set his retention devices without having to manage a tray simultaneously.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 4.1.3.1

Title: Tray/Rail Conveyor

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Function Reference: Provide For Serving

Drawing Reference: D-4.1.3

Physical Description: This concept employs a T-shaped track which engages a similarly shaped groove in the tray for retention in zero-g. The track runs from the galley to the dining area. An electrically powered mechanical drive provides the transportation power.

Functional Description: This prepared tray is inserted onto the track and the propulsion device slides the tray along the track to the dining area at which point it is removed by the seated crewman and set into the eating position.

Detail Data

MTBF = 313,000 hrs

Reliability:	OP HRS = 5,475	10 Year Resupply Volume:	0
Maintainability:	MTTR = .33 hrs	Peak Power:	100 watts
Safety:	0	Energy:	1.25 watt hrs/day
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	5.0 pounds	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.05 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$75,000
Installed Volume:	.5 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: A positive control system such as this is felt to be necessary in order to avoid free-floating-loaded trays.

Merits/Deficiencies: This device would also be used for the return of soiled trays to the galley.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 4.1.3.2

Title: Tray/Rail Conveyor

Applicable Mission Numbers

Function Reference: Provide For Serving

007 - 012
031 - 036
055 - 060

Drawing Reference: D-4.1.3

Physical Description: This concept employs a T-shaped track which engages a similarly shaped groove in the tray for retention in zero-g. The track runs from the galley to the dining area. An electrically powered mechanical drive provides the transportation power.

Functional Description: This prepared tray is inserted onto the track and the propulsion device slides the tray along the track to the dining area at which point it is removed by the seated crewman and set into the eating position.

Detail Data

MTBF = 313,000 hrs

Reliability:	OP HRS = 10,950	10 Year Resupply Volume:	0
Maintainability:	MTTR = .33 hrs	Peak Power:	125 watts
Safety:	0	Energy:	1.55 watt hrs/day
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	6.0 pounds	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.10 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$93,500
Installed Volume:	.6 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: A positive control system such as this is felt to be necessary in order to avoid free-floating-loaded trays.

Merits/Deficiencies: This device would also be used for the return of soiled trays to the galley.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 4.1.3.3

Title: Tray/Rail Conveyor

Applicable Mission Numbers

013 - 018

037 - 042

061 - 066

Function Reference: Provide For Serving

Drawing Reference: D-4.1.3

Physical Description: This concept employs a T-shaped track which engages a similarly shaped groove in the tray for retention in zero-g. The track runs from the galley to the dining area. An electrically powered mechanical drive provides the transportation power.

Functional Description: This prepared tray is inserted onto the track and the propulsion device slides the tray along the track to the dining area at which point it is removed by the seated crewman and set into the eating position.

Detail Data

Reliability:	MTBF = 313,000 hrs OP HRS = 10,950	10 Year Resupply Volume:	0
Maintainability:	MTTR = .33 hrs	Peak Power:	175 watts
Safety:	0	Energy:	2.15 watt hrs/day
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	7.0 pounds	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.20 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$130,500
Installed Volume:	.7 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: A positive control system such as this is felt to be necessary in order to avoid free-floating-loaded trays.

Merits/Deficiencies: This device would also be used for the return of soiled trays to the galley.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 4.1.6.1

Title: None (Eat In Galley)

Applicable Mission Numbers

Function Reference: Provide For Serving — 001 - 006, 025-030

Drawing Reference: D-4.1.6 — 049-054

Physical Description: This is a technique whereby the crewman consumes the meal in the galley itself and, as such, no formal serving would be employed.

Functional Description: The crewman would prepare/assemble his own meal in the galley and consume it in that area, utilizing the same man restraints and spacecraft volume.

Detail Data

Reliability:	MTBF= ∞ OP HRS = 10,500	10 Year Resupply Volume:	0
Maintainability:	MTTR = 0	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	18 M-Hrs/Day
10 Year Resupply Weight:	0	Total Cost:	0
Installed Volume:	0	Development Risk:	8
Resupply Volume:	0		

Rationale: This concept is felt to have merit in small spacecraft where volume becomes critical.

Merits/Deficiencies: Not well-suited to large crews due to limited space in the galley.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 4.1.7.1

Title: Tray Rack/Rail Conveyor

Applicable Mission Numbers

001 - 006 _____
025 - 030 _____
049 - 054 _____

Function Reference: Provide For Serving

Drawing Reference: D-4.1.7

Physical Description: This concept employs a storage rack for proper retention of trays. The rack itself is mated to a conveyor system such as 4.1.3 for use during transport between the dining and galley areas.

Functional Description: The rack is used to hold clean trays, prepared trays, or soiled trays. For serving, the loaded rack is powered along the track to the dining area where the crewmen withdraw their meals. It is also used to return soiled trays during clean-up and to store clean trays.

Detail Data

Reliability:	MTBF = 294,000 hrs OP HRS = 10,950	10 Year Resupply Volume:	0
Maintainability:	MTTR = .33 hrs.	Peak Power:	200 watts
Safety:	0	Energy:	2.5 watt hrs/day
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	10.0 pounds	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.05 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$100,000
Installed Volume:	1.5 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: This device serves three specific functions with only a small weight/power penalty over other approaches.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 4.1.7.2

Title: Tray Rack/Rail Conveyor

Function Reference: Provide For Serving

Drawing Reference: D-4.1.7

Applicable Mission Numbers

007 - 012
031 - 036
055 - 060

Physical Description: This concept employs a storage rack for proper retention of trays. The rack itself is mated to a conveyor system such as 4.1.3 for use during transport between the dining and galley areas.

Functional Description: The rack is used to hold clean trays, prepared trays, or soiled trays. For serving, the loaded rack is powered along the track to the dining area where the crewmen withdraw their meals. It is also used to return soiled trays during clean-up and to store clean trays.

Detail Data

Reliability:	MTBF = 294,000 hrs OP HRS = .10,950	10 Year Resupply Volume:	0
Maintainability:	MTTR .33 hrs	Peak Power:	250 watts
Safety:	0	Energy:	3.13 watt-hrs/day
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	14.0 pounds	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.10 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$125,000
Installed Volume:	2.5 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: This device serves three specific functions with only a small weight/power penalty over other approaches.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 4.1.7.3

Title: Tray Rack/Rail Conveyor

Applicable Mission Numbers

013 - 018
037 - 042
061 - 066

Function Reference: Provide For Serving

Drawing Reference: D-4.1.7

Physical Description: This concept employs a storage rack for proper retention of trays. The rack itself is mated to a conveyor system such as 4.1.3 for use during transport between the dining and galley areas.

Functional Description: The rack is used to hold clean trays, prepared trays, or soiled trays. For serving, the loaded rack is powered along the track to the dining area where the crewmen withdraw their meals. It is also used to return soiled trays during clean-up and to store clean trays.

Detail Data

Reliability:	MTBF = 294,000 hrs OP HRS = 10,550	10 Year Resupply Volume:	0
Maintainability:	MTTR = .33 hrs	Peak Power:	350 watts
Safety:	1	Energy:	4.37 watt-hrs/day
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	22.0 pounds	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.20 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$175,000
Installed Volume:	4.5 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: This device serves three specific functions with only a small weight/power penalty over other approaches.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 4.2.1.1

Title: Storage Rack

Function Reference: Provide for Serving

Drawing Reference: D-4.2.1

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Physical Description: This device is a fixed rack similar to 4.1.7 with appropriate zero-g retention for meal tray storage. It must be used in conjunction with some other serving technique.

Functional Description: Each meal tray is pushed into its own holding slot in the rack where it remains until needed. The rack would be used for temporary storage of prepared meals, storage of soiled trays awaiting clean-up, and the storage of clean trays.

Detail Data

Reliability:	MTBF = ∞ OP HRS = 76, 650	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	5.0 pounds	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.025 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$10,000.
Installed Volume:	1.0 ft^3	Development Risk:	8
Resupply Volume:	0		

Rationale: A tray holding device for positive retention of trays when not in use in zero-g is an essential.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 4.2.1.2

Title: Storage Rack

Applicable Mission Numbers

007 - 012
031 - 036
055 - 060

Function Reference: Provide for Serving

Drawing Reference: D-4.2.1

Physical Description: This device is a fixed rack similar to 4.1.7 with appropriate zero-g retention for meal tray storage. It must be used in conjunction with some other serving technique.

Functional Description: Each meal tray is pushed into its own holding slot in the rack where it remains until needed. The rack would be used for temporary storage of prepared meals, storage of soiled trays awaiting clean-up, and the storage of clean trays.

Detail Data

Reliability:	MTBF = ∞ OP. HRS = 76,650	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	9.0 pounds	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.05 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$17,500
Installed Volume:	2.0 ft^3	Development Risk:	8
Resupply Volume:	0		

Rationale: A tray holding device for positive retention of trays when not in use in zero-g is an essential.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 4.2.1.3

Title: Storage Rack

Applicable Mission Numbers

013 - 018
037 - 042
061 - 066

Function Reference: Provide for Serving

Drawing Reference: D-4.2.1

Physical Description: This device is a fixed rack similar to 4.1.7 with appropriate zero-g retention for meal tray storage. It must be used in conjunction with some other serving technique.

Functional Description: Each meal tray is pushed into its own holding slot in the rack where it remains until needed. The rack would be used for temporary storage of prepared meals, storage of soiled trays awaiting clean-up, and the storage of clean trays.

Detail Data

MTBF = ∞

Reliability:	OF HRS = 76,650	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	17.0 pounds	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.10 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$32,500
Installed Volume:	4.0 ft^3	Development Risk:	8
Resupply Volume:	0		

Rationale: A tray holding device for positive retention of trays when not in use in zero-g is an essential.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.3.1.1

Title: Active Consumption Menu Diet

Applicable Mission Numbers

All

Function Reference: Provide for Consumption

Drawing Reference:

Physical Description: Consumption of a menu diet dictates that the individual be provided nutrition by self-feeding one or more of the following food types: Dry food, processed frozen food, shelf stable thermo stabilized food, and/or a mixture of these food types.

Functional Description: Each of the food types listed will impact the spacecraft feeding system and each type by itself might be applicable to a particular set of mission constraints. A mixture of the food types into a menu diet will allow for providing, aboard the spacecraft, an earth-like dining environment with familiar food and familiar utensils.

Detail Data

Reliability:	NA	10 Year Resupply Volume:	*
Maintainability:	NA	Peak Power:	0
Safety:	NA	Energy:	0
Crew Acceptance:	*	Water (155°F):	*
Installed Weight:	0	Water (50°F):	*
Resupply Weight:	*	Crew Operating Time:	0
10 Year Resupply Weight:	*	Total Cost:	± 0
Installed Volume:	0	Development Risk:	*
Resupply Volume:	*		

Rationale: * Detail data of weight, volume, and water requirements are provided in Final Report, Vol. I, Sect III, Functional Area 1.0 Provide for Food

± Cost analysis for resupply is presented in Data Book, Book II, Section II.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.4.1.1

Title: Tray With Recesses

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Function Reference: Provide For Consumption

Drawing Reference: D 5.4.1

Physical Description: Rectangular trays 14" x 14" x 1.5" with smooth surface recesses sized to retain menu items unpackaged. The interfacial tension between the moist food items and the smooth surface recess will account for restraint. Material: Formed SP-1 Polyimide.

Functional Description: The smooth recesses will contain moist or wet menu items such that the consumer can remove them to his mouth at will.

Detail Data

Reliability: MTBF → ∞	10 Year Resupply Volume: .521 ft^3
Maintainability: MTTR = 0.1 hr	Peak Power: 0
Safety: 0	Energy: 0
Crew Acceptance: 6	Water (155°F): * 697 lb/day
Installed Weight: 5.10 lbs	Water (50°F): 0
Resupply Weight: 0	Crew Operating Time: 2.0 hr/day
10 Year Resupply Weight: 5.67 lbs	Total Cost: $1,780
Installed Volume: .521 ft^3	Development Risk: 6
Resupply Volume: 0	

Rationale: * Dishwasher requirement

Merits/Deficiencies: Dry menu items will require additional restraint.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.4.1.2

Title: Tray With Recesses

Applicable Mission Numbers

007 - 012
031 - 036
055 - 060

Function Reference: Provide For Consumption

Drawing Reference: D.5.4.1

Physical Description: Rectangular trays 14" x 14" x 1.5" with smooth surface recesses sized to retain menu items unpackaged. The interfacial tension between the moist food items and the smooth surface recess will account for restraint. Material: Formed SP-1 Polyimide.

Functional Description: The smooth recesses will contain moist or wet menu items such that the consumer can remove them to his mouth at will.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	.715 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	* 1,157 lb/day
Installed Weight:	10.20 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	11.33 lbs	Total Cost:	$1,910
Installed Volume:	.715 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: *Dishwasher requirement

Merits/Deficiencies: Dry menu items will require additional restraint

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.4.1.3

Title: Tray With Recesses

Function Reference: Provide For Consumption

Drawing Reference: D 5.4.1

Applicable Mission Numbers

013 - 018

037 - 042

061 - 066

Physical Description: Rectangular trays 14" x 14" x 1.5" with smooth surface recesses sized to retain menu items unpackaged. The interfacial tension between the moist food items and the smooth surface recess will account for restraint. Material: Formed SP-1 Polyimide.

Functional Description: The smooth recesses will contain moist or wet menu items such that the consumer can remove them to his mouth at will.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	630 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	* 2137 lb/day
Installed Weight:	21.25 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	23.61 lbs	Total Cost:	$2,040
Installed Volume:	1.30 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: *Dishwasher requirement

Merits/Deficiencies: Dry menu items will require additional restraint.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.4.3.1

Title: Tray With Spiked or Riobed Surfaces

Function Reference: Provide For Consumption

Drawing Reference: D 5.4.3

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Physical Description: Rectangular tray, 14" x 14" x 1.5" with rough surfaced recesses sized to retain menu items unpackaged. Material: Formed SP-1 Polyimide.

Functional Description: This configuration of the recesses would allow for application of tangential forces to food normally imparted by cutting and tearing.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.521 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	* 697 lb/day
Installed Weight:	5.10 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	5.67 lbs	Total Cost:	$2,055
Installed Volume:	0.521 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: * Dishwasher requirement

Merits/Deficiencies: Cleaning food from between ridges or spikes will require special attention.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.4.3.2

Title: Tray With Spiked or Ribbed Surfaces

Applicable Mission Numbers

007 - 012
031 - 036
055 - 060

Function Reference: Provide For Consumption

Drawing Reference: D 5.4.3

Physical Description: Rectangular tray, 14" x 14" x 1.5" with rough surfaced recesses sized to retain menu items unpackaged. Material: Formed SP-1 Polyimide.

Functional Description: This configuration of the recesses would allow for application of tangential forces to food normally imparted by cutting and tearing.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	.715 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:		Energy:	0
Crew Acceptance:	6	Water (155°F):	* 1157 lb/day
Installed Weight:	10.20 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	11.33 lbs	Total Cost:	$2,185
Installed Volume:	.715 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: *Dishwasher requirement

Merits/Deficiencies: Cleaning food from between ridges or spikes will require special attention.

Data Sources:

7

ELEMENT CONCEPT DATA SHEET # 5.4.3.3

Title: Tray With Spiked or Ribbed Surfaces

Function Reference: Provide For Consumption

Drawing Reference: D 5.4.3

Applicable Mission Numbers

013 - 018

037 - 042

061 - 066

Physical Description: Rectangular tray, 14" x 14" x 1.5" with rough surfaced recesses sized to retain menu items unpackaged. Material: Formed SP-1 Polyimide.

Functional Description: This configuration of the recesses would allow for application of tangential forces to food normally imparted by cutting and tearing.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	1.30 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	* 2137 lb/day
Installed Weight:	21.25 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	23.61 lbs	Total Cost:	$2,315
Installed Volume:	1.30 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: *Dishwasher requirement

Merits/Deficiencies: Cleaning food from between ridges or spikes will require special attention.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.4.4.1

Title: Cohesive Menu Components

Applicable Mission Numbers

001 - 072

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Each menu component is manufactured with a synthetic thin layer coating on all sides. Coatings will add no appreciable weight to the food since they will contain equivalent nutrient of the menu item.

Functional Description: Menu components would adhere to the tray or container surface.

Detail Data

Reliability:	NA	10 Year Resupply Volume:	*0
Maintainability:	NA	Peak Power:	0
Safety:		Energy:	0
Crew Acceptance:	5	Water (155°F):	* 0
Installed Weight:	0	Water (50°F):	* 0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	* 0	Total Cost:	0
Installed Volume:	0	Development Risk:	4
Resupply Volume:	* 4		

Rationale: * Detail Data of Weight, Volume, Volume, and Water Requirements are provided in Final Report Vol I Sec. III, Functional Area 1.0 Provide for Food

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.4.5.1

Title: Precut Bite-Sized Menu Items

Applicable Mission Numbers

001 - 072

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: All menu items are prepared precut to bite-size. This concept need not apply to normally viscous or cohesive menu items.

Functional Description: Precut bite-sized menu items allow for dining with only the use of a fork and spoon combination eliminating the need for a knife to cut.

Detail Data

Reliability:	NA	10 Year Resupply Volume:	* 0
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	
Crew Acceptance:	4	Water (155°F):	*
Installed Weight:	0	Water (50°F):	*
Resupply Weight:	* 0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	* 0	Total Cost:	0
Installed Volume:	0	Development Risk:	4
Resupply Volume:	* 0		

Rationale: '* See Functional Area **1.0 Provide** for Food in Final Report, Vol. I, Sec III

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.4.6.1

Title: Package Containment of Menu Items

Applicable Mission Numbers: 001 - 006

Function Reference: Provide For Consumption

Drawing Reference: 5.4.6

Physical Description: Package is laminated construction of polyethylene film and soluble, edible inner film. A section of the front top portion of the polyethylene is fabricated to tear when pulled.

Functional Description: Upon reconstitution, the soluble portion of the package disolves into the food or forms a gelatenous coating over the food. This process can be as a result of O_2 or water contact.

Detail Data

Reliability:	NA	10 Year Resupply Volume:	* 0
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	* 0
Installed Weight:	0	Water (50°F):	* 0
Resupply Weight:	* 0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	* 0	Total Cost:	0
Installed Volume:	* 0	Development Risk:	5
Resupply Volume:	* 0		

Rationale: *See Functional Area 1.0 Provide for Food in Final Report Vol I, Sec. III

Merits/Deficiencies: The concept does not apply to beverage reconstitution.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.4.7.1

Title: Meal Tray With Cover

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Function Reference: Provide For Consumption

Drawing Reference: D 5.4.7

Physical Description: Cylindrical tray 9 inches in diameter by 3 inches deep with formed four-section partition (partition molded into tray). Each tray is equipped with a circular top which is solid except for a one-quarter section which is equipped with a Mylar flap.

Functional Description: Tray allows for total containment of menu items during transfer. Food retention during consumption is virtually guaranteed.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.81 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	* 697 lb/day
Installed Weight:	5.50 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	9.21 lbs	Total Cost:	$15,330
Installed Volume:	0.81 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: * Dishwasher requirement

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.4.7.2

Title: Meal Tray With Cover

Function Reference: Provide For Consumption

Drawing Reference: D 5,4,7

Applicable Mission Numbers

007 - 012

031 - 036

055 - 060

Physical Description: Cylindrical tray 9 inches in diameter by 3 inches deep with formed four-section partition (partition molded into tray). Each tray is equipped with a circular top which is solid except for a one-quarter section which is equipped with a Mylar flap.

Functional Description: Tray allows for total containment of menu items during transfer. Food retention during consumption is virtually guaranteed.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	1.56 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	*1157 lb/day
Installed Weight:	11.00 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	12.22 lbs	Total Cost:	$15,460
Installed Volume:	1.56 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: * Dishwasher requirement

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.4.7.3

Title: Meal Tray With Cover

Applicable Mission Numbers

Function Reference: Provide For Consumption

013 - 018
037 - 042
061 - 066

Drawing Reference: D 5.4.7

Physical Description: Cylindrical tray 9 inches in diameter by 3 inches deep with formed four-section partition (partition molded into tray). Each tray is equipped with a circular top which is solid except for a one-quarter section which is equipped with a Mylar flap.

Functional Description: Tray allows for total containment of menu items during transfer. Food retention during consumption is virtually guaranteed.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	3.18 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	2137 lb/day
Installed Weight:	22.92 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	25.46 lbs	Total Cost:	$15,590
Installed Volume:	3.18 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: * Dishwasher requirement

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.4.11.1

Title: Edible Membranous Coating on Menu Items

Applicable Mission Numbers

All

Function Reference: Provide For Consumption

Drawing Reference: D 5.4.11 A, B

Physical Description: Edible membranous coating is applied onto menu items after they are on the tray.

Functional Description: The coating acts as nutrient and a cover restraint for menu items on the tray.

Detail Data

Reliability:	NA	10 Year Resupply Volume:	*0
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	*0
Installed Weight:	0	Water (50°F):	*0
Resupply Weight:	*0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	*0	Total Cost:	0
Installed Volume:	0	Development Risk:	5
Resupply Volume:	*0		

Rationale: * See Functional Area 1.0 Provide for Food in Final Report Vol I, Sec III

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.5.2.1

Positive Manual
Title: Displacement Drinking Device

Applicable Mission Numbers

Function Reference: Provide For Consumption

Drawing Reference: D5.5.2.A

001 - 006
025 - 030
049 - 054

Physical Description: Collapsible concentric shells enclose a flexible liner. A plug top with duckbill mouthpiece and valve for water admission closes the container and seals the liner. Volume capacity = 12.2 ounces.

Functional Description: Hand pressure dispenses liquid through the duckbill valve. Liquids can be beverage or soup with particles. The system allows for slow sipping of hot liquids.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	.105 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	*
Installed Weight:	1.36 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1.36 lb	Total Cost:	$97,300
Installed Volume:	.105 ft^3	Development Risk:	5
Resupply Volume:	0		

Rationale: * Dishwasher requirement

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.5.2.2

Title: Positive Manual Displacement Drinking Device

Applicable Mission Numbers: 007 - 012; 031 - 036; 055 - 060

Function Reference: Provide For Consumption

Drawing Reference: D 5.5.2A

Physical Description: Collapsible concentric shells enclose a flexible liner. A plug top with duckbill mouthpiece and valve for water admission closes the container and seals the liner. Volume capacity = 12.2 ounces.

Functional Description: Hand pressure dispenses liquid through the duckbill valve. Liquids can be beverage or soup with particles. The system allows for slow sipping of hot liquids.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	.196 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	*
Installed Weight:	2.73 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	2.73 lbs	Total Cost:	$98,600
Installed Volume:	.196 ft^3	Development Risk:	5
Resupply Volume:	0		

Rationale: * Dishwasher requirement

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.5.2.3

Title: Positive Manual Displacement Drinking Device

Applicable Mission Numbers
013 - 018
037 - 042
061 - 066

Function Reference: Provide For Consumption

Drawing Reference: D 5.5.2A

Physical Description: Collapsible concentric shells enclose a flexible liner. A plug top with duckbill mouthpiece and valve for water admission closes the container and seals the liner. Volume capacity = 12.2 ounces.

Functional Description: Hand pressure dispenses liquid through the duckbill valve. Liquids can be beverage or soup with particles. The system allows for slow sipping of hot liquids.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	.408 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	*
Installed Weight:	5.69 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	5.69 lbs	Total Cost:	$99,900
Installed Volume:	.408 ft^3	Development Risk:	5
Resupply Volume:	0		

Rationale: * Dishwasher requirement

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.5.2.5

Title: Drinking Cup (Negative Pressure Operated)

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Function Reference: Provide For Consumption

Drawing Reference: D 5.5.2 C

Physical Description: Collapsible bladder is contained within a vented rigid cylinder equipped with a screw-on cap containing provision for a screw-in mouthpiece or straw and a filler valve. Volume capacity = 12.2 ounces.

Functional Description: Fluid is injected into the bladder through the filling valve. Vented cylinder allows the bladder to expand and conform to the cylinder dimensions while the mouthpiece is closed. Astronaut creates a negative by drawing on the mouthpiece, the bag collapses and forces the fluid through the mouthpiece.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.141 ft^3
Maintainability:	MTRR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	*
Installed Weight:	.756 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hrs/day
10 Year Resupply Weight:	.763 lb	Total Cost:	$57,300
Installed Volume:	0.126 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: *Dishwasher requirement

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.5.2.6

Title: Drinking Cup (Negative Pressure Operated)

Function Reference: Provide For Consumption

Drawing Reference: D 5.5.2C

Applicable Mission Numbers

007 - 012

031 - 036

055 - 060

Physical Description: Collapsible bladder is contained within a vented rigid cylinder equipped with a screw-on cap containing provision for a screw-in mouthpiece or straw and a filler valve. Volume capacity = 12.2 ounces.

Functional Description: Fluid is injected into the bladder through the filling valve. Vented cylinder allows the bladder to expand and conform to the cylinder dimensions while the mouthpiece is closed. Astronaut creates a negative by drawing on the mouthpiece, the bag collapses and forces the fluid through the mouthpiece.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.282 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	*
Installed Weight:	1.512 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1.527 lb	Total Cost:	$58,600
Installed Volume:	0.253 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: * Dishwasher requirement

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.5.2.7

Title: Drinking Cup (Negative Pressure Operated)

Applicable Mission Numbers
013 - 018
037 - 042
061 - 066

Function Reference: Provide For Consumption

Drawing Reference: D 5.5.2 C

Physical Description: Collapsible bladder is contained within a vented rigid cylinder equipped with a screw-on cap containing provision for a screw-in mouthpiece or straw and a filler valve. Volume capacity = 12.2 ounces.

Functional Description: Fluid is injected into the bladder through the filling valve. Vented cylinder allows the bladder to expand and conform to the cylinder dimensions while the mouthpiece is closed. Astronaut creates a negative by drawing on the mouthpiece, the bag collapses and forces the fluid through the mouthpiece.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.625 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:		Energy:	0
Crew Acceptance:	6	Water (155°F):	*
Installed Weight:	3.150 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	3.181 lb	Total Cost:	$59,900
Installed Volume:	0.594 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: * Dishwasher requirement

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET #5.5.3.1

Title: In-Package Liquid Restraint

Applicable Mission Numbers: All

Function Reference: Provide For Consumption

Drawing Reference: D 5.5.3

Physical Description: Polyethylene bag containing powdered beverage mix is equipped with reconstitution and withdrawal valves.

Functional Description: Permits individual reconstitution and no spill transfer of fluid to the mouth.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	*
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	*
Installed Weight:	0	Water (50°F):	*
Resupply Weight:	*	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	*	Total Cost:	0
Installed Volume:	0	Development Risk:	6
Resupply Volume:	*		

Rationale: *See Functional Area 1.0 Provide for Food in Final Report Vol I, Sec. III

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.2.1

Title: Knife

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.2

Physical Description: Conventional-type stainless steel, reusable table knife with shortened blade having partially serrated cutting edge.

Functional Description: Cutting of served meats, vegetables, etc. into bite-size morsels and application of spread-type foods.

Detail Data

Reliability:	MTBF $\rightarrow \infty$	10 Year Resupply Volume:	0.004 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	*697 lb/day
Installed Weight:	0.636 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	7.0 hr/day
10 Year Resupply Weight:	0.707 lbs	Total Cost:	$4,930
Installed Volume:	0.004 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

*Dishwasher requirement

Merits/Deficiencies: Negligible effect on logistics of resupply. Requires onboard cleansing provisions.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.2.2

Title: Knife

Applicable Mission Numbers
007 - 012
031 - 036
055 - 060

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.2

Physical Description: Conventional-type stainless steel, reusable table knife with shortened blade having partially serrated cutting edge.

Functional Description: Cutting of served meats, vegetables, etc. into bite-size morsels and application of spread-type foods.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.008 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	* 1157 lb/day
Installed Weight:	1.272 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1.414 lbs	Total Cost:	$5,060
Installed Volume:	0.008 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

*Dishwasher requirement

Merits/Deficiencies: Negligible effect on logistics of resupply. Requires onboard cleansing provisions.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.2.3

Title: Knife

Applicable Mission Numbers

013 - 018
037 - 042
061 - 066

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.2

Physical Description: Conventional-type stainless steel, reusable table knife with shortened blade having partially serrated cutting edge.

Functional Description: Cutting of served meats, vegetables, etc. into bite-size morsels and application of spread-type foods.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.019 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	* 2137 lb/day
Installed Weight:	2.650 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	2.944 lbs	Total Cost:	$5,190
Installed Volume:	0.017 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

*Dishwasher requirement

Merits/Deficiencies: Negligible effect on logistics of resupply. Requires onboard cleansing provisions.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.2.5

Title: Spoon

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.2

Physical Description: Conventional-type stainless-steel reusable spoon.

Functional Description: Scooping and transfer of low viscosity or semi-solid foods to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.023 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	* 697 lb/day
Installed Weight:	0.30 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	0.33 lb	Total Cost:	$4,930
Installed Volume:	0.021 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

*Dishwasher requirement

Merits/Deficiencies: Negligible effect on logistics of resupply. Requires onboard cleansing provisions.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.2.6

Title: Spoon

Applicable Mission Numbers

Function Reference: Provide For Consumption

007 - 012
031 - 036
055 - 060

Drawing Reference: D 5.6.2

Physical Description: Conventional-type stainless-steel reusable spoon.

Functional Description: Scooping and transfer of low viscosity or semi-solid foods to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.045 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	* 1157 lb/day
Installed Weight:	0.60 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	0.67 lb	Total Cost:	$5,060
Installed Volume:	0.042 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

*Dishwasher requirement

Merits/Deficiencies: Negligible effect on logistics of resupply. Requires onboard cleansing provisions.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.2.7

Title: Spoon

Applicable Mission Numbers

013 - 018
037 - 042
061 - 066

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.2

Physical Description: Conventional-type stainless-steel reusable spoon.

Functional Description: Scooping and transfer of low viscosity or semi-solid foods to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.097 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	* 2137 lb/day
Installed Weight:	1.25 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1.39 lb	Total Cost:	$5,190
Installed Volume:	0.088 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

*Dishwasher requirement

Merits/Deficiencies: Negligible effect on logistics of resupply. Requires onboard cleansing provisions.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.2.9

Title: Fork

Applicable Mission Numbers

001 - 006 _____

Function Reference: Provide For Consumption — 025 - 030 _____

Drawing Reference: D 5.6.2 — 049 - 054 _____

Physical Description: Conventional-type stainless-steel reusable fork with four shortened tines.

Functional Description: Holding of foods while cutting, spearing, and transfer of bite-size morsels to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.023 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	*697 lb/day
Installed Weight:	0.420 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	0.467 lb	Total Cost:	$4,930
Installed Volume:	0.021 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

*Dishwasher requirement

Merits/Deficiencies: Negligible effect on logistics of resupply. Requires onboard cleansing provisions.

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 5.6.2.10

Title: Fork

Applicable Mission Numbers

007 - 012
031 - 036
055 - 060

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.2

Physical Description: Conventional-type stainless-steel reusable fork with four shortened tines.

Functional Description: Holding of foods while cutting, spearing, and transfer of bite-size morsels to mouth for consumption.

Detail Data

Reliability:	MTBF $\rightarrow \infty$	10 Year Resupply Volume:	0.045 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	*1157 lb/day
Installed Weight:	0.840 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	0.933 lb	Total Cost:	$5,060
Installed Volume:	0.042 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

*Dishwasher requirement

Merits/Deficiencies: Negligible effect on logistics of resupply. Requires onboard cleansing provisions.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.2.11

Title: Fork

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.2

Applicable Mission Numbers

013 - 018
037 - 042
061 - 066

Physical Description: Conventional-type stainless-steel reusable fork with four shortened tines.

Functional Description: Holding of foods while cutting, spearing, and transfer of bite-size morsels to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.097 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	* 2137 lb/day
Installed Weight:	1.750 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1.944 lb	Total Cost:	$5.190
Installed Volume:	0.088 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

*Dishwasher requirement

Merits/Deficiencies: Negligible effect on logistics of resupply. Requires onboard cleansing provisions.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.3.1

Title: Combination Spoon/Fork ("Spork")

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.3A

Physical Description: Stainless-steel, reusable, special eating device combining the characteristics of a spoon and that of a fork by the inclusion of four tines at the end of a spoon-like depression.

Functional Description: Holding of foods while cutting, spearing of bite-size solid morsels, scooping of low viscosity or semi-solid foods, and transferring to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.023 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	* 697 lb/day
Installed Weight:	0.277 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	0.308 lb	Total Cost:	$22,395
Installed Volume:	0.021 ft^3	Development Risk:	5
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

* Dishwasher requirement

Merits/Deficiencies: Permits use of one utensil in lieu of two with inherent benefits in such respect. Negligible effect on logistics of resupply. Requires onboard cleansing.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.3.2

Title: Combination Spoon/Fork ("Spork")

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.3 A

Applicable Mission Numbers

007 - 012
031 - 036
055 - 060

Physical Description: Stainless-steel, reusable, special eating device combining the characteristics of a spoon and that of a fork by the inclusion of four tines at the end of a spoon-like depression.

Functional Description: Holding of foods while cutting, spearing of bite-size solid morsels, scooping of low viscosity or semi-solid foods, and transferring to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.045 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	* 1157 lb/day
Installed Weight:	0.553 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	0.592 lb	Total Cost:	$22,525
Installed Volume:	0.042 ft^3	Development Risk:	5
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

* Dishwasher requirement

Merits/Deficiencies: Permits use of one utensil in lieu of two with inherent benefits in such respect. Negligible effect on logistics of resupply. Requires onboard cleansing.

Data Sources:

ELEMENT CONCEPT DATA SHEET #5.6.3.3

Title: Combination Spoon/Fork ("Spork")

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.3 A

Applicable Mission Numbers

013 - 018

037 - 042

061 - 066

Physical Description: Stainless-steel, reusable, special eating device combining the characteristics of a spoon and that of a fork by the inclusion of four tines at the end of a spoon-like depression.

Functional Description: Holding of foods while cutting, spearing of bite-size solid morsels, scooping of low viscosity or semi-solid foods, and transferring to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.097 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	* 2137 lb/day
Installed Weight:	1.152 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1.280 lb	Total Cost:	$22,720
Installed Volume:	0.088 ft^3	Development Risk:	5
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

* Dishwasher requirement

Merits/Deficiencies: Permits use of one utensil in lieu of two with inherent benefits in such respect. Negligible effect on logistics of resupply. Requires onboard cleansing.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.3.5

Title: Combination Knife/Fork/Tong

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.3

Physical Description: A hand-held, hand-operated pair of tongs integrating one knife edge, one flat edge, and opposing pronged ends. 8.5"L x 1"W x 1.25"H

Functional Description: Acting independently its functional uses are holding in place, scraping or pushing, pinching, transfer and spreading. Used in conjunction with another holding device its functional capabilities are extended to cutting and tearing.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.040 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	* 697 lb/day
Installed Weight:	0.612 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	0.680 lb	Total Cost:	$32, 395
Installed Volume:	0.036 ft^3	Development Risk:	5
Resupply Volume:	0		

Rationale: * Dishwasher Requirement

Merits/Deficiencies: Requires crew training.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.3.6

Title: Combination Knife/Fork/Tong

Applicable Mission Numbers

C07 - 012 _____
031 - 036 _____
055 - 060 _____

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.3

Physical Description: A hand-held, hand-operated pair of tongs integrating one knife edge, one flat edge, and opposing pronged ends. 8.5"L x 1"W x 1.25"H

Functional Description: Acting independently its functional uses are holding in place, scraping or pushing, pinching, transfer and spreading. Used in conjunction with another holding device its functional capabilities are extended to cutting and tearing.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.080 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	*1157 lb/day
Installed Weight:	1.224 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1.360 lb	Total Cost:	$32,525
Installed Volume:	0.072 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: * Dishwasher Requirement

Merits/Deficiencies: Requires crew training.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.3.7

Title: Combination Knife/Fork/Tong

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.3

Applicable Mission Numbers

013 - 018
037 - 042
061 - 066

Physical Description: A hand-held, hand-operated pair of tongs integrating one knife edge, one flat edge, and opposing pronged ends. 8.5"L x 1"W x 1.25"H

Functional Description: Acting independently its functional uses are holding in place, scraping or pushing, pinching, transfer and spreading. Used in conjunction with another holding device its functional capabilities are extended to cutting and tearing.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.166 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	* 2137 lb/day
Installed Weight:	2.55 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	2.833 lbs	Total Cost:	$32.720
Installed Volume:	0.150 ft^3	Development Risk:	5
Resupply Volume:	0		

Rationale: * Dishwasher Requirement

Merits/Deficiencies: Requires crew training.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.1

Title: Knife (Disposable)

Applicable Mission Numbers: 001 through 006

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable knife with shortened blade having partially serrated cutting edge.

Functional Description: Cutting of served meat, vegetables, etc. into bite sized morsels and application of spread-type foods.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	65.5 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	1.66 lb	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	432 lb	Total Cost:	$11,930
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0.25 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Some form of bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.2

Title: Knife (Disposable)

Applicable Mission Numbers: 025 through 030

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable knife with shortened blade having partially serrated cutting edge.

Functional Description: Cutting of served meat, vegetables, etc. into bite sized morsels and application of spread-type foods.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	64.8 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	10.69 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	427 lbs	Total Cost:	$12,775
Installed Volume:	0	Development Risk:	7
Resupply Volume:	1.62 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Some form of bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.3

Title: Knife (Disposable)

Applicable Mission Numbers
007 through 012

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable knife with shortened blade having partially serrated cutting edge.

Functional Description: Cutting of served meats, vegetables, etc. into bite sized morsels and application of spread-type foods.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	131 ft^3
Maintainability:	NA	Peak Power:	0
Safety:		Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	3.33 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	866 lbs	Total Cost:	$12,060
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0.5 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Some form of bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.4

Title: Knife (Disposable)

Applicable Mission Numbers: 031 through 036

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable knife with shortened blade having partially serrated cutting edge.

Functional Description: Cutting of served meats, vegetables, etc. into bite sized morsels and application of spread-type foods.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	129 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	21.4 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	855 lbs	Total Cost:	$13,750
Installed Volume:	0	Development Risk:	7
Resupply Volume:	3.24 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Some form of bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.5

Title: Knife (Disposable)

Applicable Mission Numbers
013 through 018

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable knife with shortened blade having partially serrated cutting edge.

Functional Description: Cutting of served meats, vegetables, etc. into bite sized morsels and application of spread-type foods.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	273 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	6.93 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1801 lbs	Total Cost:	$12,190
Installed Volume:	0	Development Risk:	7
Resupply Volume:	1.05 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Some form of bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.6

Title: Knife (Disposable)

Applicable Mission Numbers
037 through 042

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable knife with shortened blade having partially serrated cutting edge.

Functional Description: Cutting of served meats, vegetables, etc. into bite sized morsels and application of spread-type foods.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	270 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	44.6 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1782 lbs	Total Cost:	$14,725
Installed Volume:	0	Development Risk:	7
Resupply Volume:	6.75 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Some form of bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.7

Title: Fork (Disposable)

Applicable Mission Numbers

001 through 006

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable fork with four shortened tines (approximately three-quarters size).

Functional Description: Holding of foods while cutting, spearing. Transfer of bite-size morsels to the mouth for consumption.

Detail Data

Reliability: MTBF $\longrightarrow \infty$	10 Year Resupply Volume: 65.5 ft^3
Maintainability: NA	Peak Power: 0
Safety: 0	Energy: 0
Crew Acceptance: 7	Water (155°F): 0
Installed Weight: 0	Water (50°F): 0
Resupply Weight: 1.39 lbs.	Crew Operating Time: 2.0 hr/day
10 Year Resupply Weight: 361 lbs.	Total Cost: $11930
Installed Volume: 0	Development Risk: 7
Resupply Volume: 0.25 ft^3	

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.8

Title: Fork (Disposable)

Applicable Mission Numbers: 025 through 030

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable fork with four shortened tines (approximately three-quarters size).

Functional Description: Holding of foods while cutting, spearing. Transfer of bite-size morsels to the mouth for consumption.

Detail Data

Reliability: MTBF $\longrightarrow \infty$	10 Year Resupply Volume: 64.8 ft^3
Maintainability: NA	Peak Power: 0
Safety: 0	Energy: 0
Crew Acceptance: 7	Water (155°F): 0
Installed Weight: 0	Water (50°F): 0
Resupply Weight: 8.91 lbs.	Crew Operating Time: 2.0 hr/day
10 Year Resupply Weight: 356 lbs.	Total Cost: $12775
Installed Volume: 0	Development Risk: 7
Resupply Volume: 1.62 ft^3	

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.9

Title: Fork (Disposable)

Applicable Mission Numbers: 007 through 012

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable fork with four shortened tines (approximately three-quarters size).

Functional Description: Holding of foods while cutting, spearing. Transfer of bite-size morsels to the mouth for consumption.

Detail Data

Reliability: MTBF $\longrightarrow \infty$	10 Year Resupply Volume: 131 ft^3
Maintainability: NA	Peak Power: 0
Safety: 0	Energy: 0
Crew Acceptance: 7	Water (155°F): 0
Installed Weight: 0	Water (50°F): 0
Resupply Weight: 2.77 lbs.	Crew Operating Time: 2.0 hr/day
10 Year Resupply Weight: 720 lbs.	Total Cost: $12060
Installed Volume: 0	Development Risk: 7
Resupply Volume: 0.5 ft^3	

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.10

Title: Fork (Disposable)

Applicable Mission Numbers: 031 through 036

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable fork with four shortened tines (approximately three-quarters size).

Functional Description: Holding of foods while cutting, spearing. Transfer of bite-size morsels to the mouth for consumption.

Detail Data

Reliability:	MTBF $\longrightarrow \infty$	10 Year Resupply Volume:	129 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	17.8 lbs.	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	713 lbs.	Total Cost:	$13750
Installed Volume:	0	Development Risk:	7
Resupply Volume:	3.24 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.11

Title: Fork (Disposable)

Applicable Mission Numbers: 013 through 018

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable fork with four shortened tines (approximately three-quarters size).

Functional Description: Holding of foods while cutting, spearing. Transfer of bite-size morsels to the mouth for consumption.

Detail Data

Reliability: MTBF ⟶ ∞	10 Year Resupply Volume: 273 ft^3
Maintainability: NA	Peak Power: 0
Safety: 0	Energy: 0
Crew Acceptance: 7	Water (155°F): 0
Installed Weight: 0	Water (50°F): 0
Resupply Weight: 5.78 lbs.	Crew Operating Time: 2.0 hr/day
10 Year Resupply Weight: 1502 lbs.	Total Cost: $12190
Installed Volume: 0	Development Risk: 7
Resupply Volume: 1.05 ft^3	

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.12

Title: Fork (Disposable)

Applicable Mission Numbers: 037 through 042

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable fork with four shortened tines (approximately three-quarters size).

Functional Description: Holding of foods while cutting, spearing. Transfer of bite-size morsels to the mouth for consumption.

Detail Data

Reliability:	MTBF $\longrightarrow \infty$	10 Year Resupply Volume:	270 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	37.1 lbs.	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1485 lbs.	Total Cost:	$14725
Installed Volume:	0	Development Risk:	7
Resupply Volume:	6.75 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.13

Title: Spoon (Disposable)

Applicable Mission Numbers: 001 - 006

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable spoon (approximately three-quarters size).

Functional Description: Scooping and transfer of low viscosity or semi-solid foods to mouth for consumption.

Detail Data

Reliability:	MTBF $\longrightarrow \infty$	10 Year Resupply Volume:	65.5 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	1.49 lbs.	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	387 lbs.	Total Cost:	$11930
Installed Volume:	0	Development Risk:	7
Resupply Volume:	2.52 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.14

Title: Spoon (Disposable)

Applicable Mission Numbers: 025 through 030

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable spoon (approximately three-quarters size).

Functional Description: Scooping and transfer of low viscosity or semi-solid foods to mouth for consumption.

Detail Data

Reliability:	MTBF ⟶ ∞	10 Year Resupply Volume:	64.8 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	9.56 lbs.	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	382. lbs.	Total Cost:	$12775
Installed Volume:	0	Development Risk:	7
Resupply Volume:	1.62 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.15

Title: Spoon (Disposable)

Applicable Mission Numbers: 007 through 012

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable spoon (approximately three-quarters size).

Functional Description: Scooping and transfer of low viscosity or semi-solid foods to mouth for consumption.

Detail Data

Reliability:	MTBF $\longrightarrow \infty$	10 Year Resupply Volume:	131 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	2.97 lbs.	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	772 lbs.	Total Cost:	$12060
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0.5 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.16

Title: Spoon (Disposable)

Applicable Mission Numbers: 031 through 036

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable spoon (approximately three-quarters size).

Functional Description: Scooping and transfer of low viscosity or semi-solid foods to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	129 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	19.1 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	765 lbs	Total Cost:	$13750
Installed Volume:	0	Development Risk:	7
Resupply Volume:	3.24 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.17

Title: Spoon (Disposable)

Applicable Mission Numbers: 013 through 018

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable spoon (approximately three-quarters size).

Functional Description: Scooping and transfer of low viscosity or semi-solid foods to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	273 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	6.20 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1612 lbs	Total Cost:	$12190
Installed Volume:	0	Development Risk:	7
Resupply Volume:	1.05 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.4.18

Title: Spoon (Disposable)

Applicable Mission Numbers: 037 through 042

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.4

Physical Description: Conventional-type plastic disposable spoon (approximately three-quarters size).

Functional Description: Scooping and transfer of low viscosity or semi-solid foods to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	270 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	39.8 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1593 lbs	Total Cost:	$14725
Installed Volume:	0	Development Risk:	7
Resupply Volume:	6.75 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.5.1

Title: "SPORK" (Disposable)

Applicable Mission Numbers: 001 through 006

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.5 A

Physical Description: Plastic, disposable, special eating device combining the characteristics of a spoon and that of a fork by the inclusion of four tines at the end of a spoon-like depression.

Functional Description: Holding of foods while cutting, spearing of bite-sized solid morsels, scooping of low viscosity or semi-solid foods and transferring to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	65.5 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	1.44 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	374 lbs	Total Cost:	$22395
Installed Volume:	0	Development Risk:	5
Resupply Volume:	0.25 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate this type of dining utensil can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if utensils are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.5.2

Title: "SPORK" (Disposable)

Applicable Mission Numbers: 025 through 030

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.5 A

Physical Description: Plastic, disposable, special eating device combining the characteristics of a spoon and that of a fork by the inclusion of four tines at the end of a spoon-like depression.

Functional Description: Holding of foods while cutting, spearing of bite-sized solid morsels, scooping of low viscosity or semi-solid foods and transferring to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	64.8 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	9.23 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	369 lbs	Total Cost:	$23662
Installed Volume:	0	Development Risk:	5
Resupply Volume:	1.62 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate this type of dining utensil can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if utensils are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.5.3

Title: "SPORK" (Disposable)

Applicable Mission Numbers: 007 through 012

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.5 A

Physical Description: Plastic, disposable, special eating device combining the characteristics of a spoon and that of a fork by the inclusion of four tines at the end of a spoon-like depression.

Functional Description: Holding of foods while cutting, spearing of bite-sized solid morsels, scooping of low viscosity or semi-solid foods and transferring to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	131 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	2.87 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	746 lbs	Total Cost:	$22525
Installed Volume:	0	Development Risk:	5
Resupply Volume:	0.5 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate this type of dining utensil can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if utensils are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.5.4

Title: "SPORK" (Disposable)

Applicable Mission Numbers: 031 through 036

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.5 A

Physical Description: Plastic, disposable, special eating device combining the characteristics of a spoon and that of a fork by the inclusion of four tines at the end of a spoon-like depression.

Functional Description: Holding of foods while cutting, spearing of bite-sized solid morsels, scooping of low viscosity or semi-solid foods and transferring to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	129 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	18.47 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	739 lbs	Total Cost:	$24637
Installed Volume:	0	Development Risk:	5
Resupply Volume:	3.24 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate this type of dining utensil can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if utensils are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.5.5

Title: "SPORK" (Disposable)

Applicable Mission Numbers: 013 through 018

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.5 A

Physical Description: Plastic, disposable, special eating device combining the characteristics of a spoon and that of a fork by the inclusion of four tines at the end of a spoon-like depression.

Functional Description: Holding of foods while cutting, spearing of bite-sized solid morsels, scooping of low viscosity or semi-solid foods and transferring to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	273 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	5.98 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1554 lbs	Total Cost:	$22720
Installed Volume:	0	Development Risk:	5
Resupply Volume:	1.05 ft^3		

Rationale: Zero-g flight evaluation of space dining techniques indicate this type of dining utensil can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if utensils are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.5.6

Title: "SPORK" (Disposable)

Applicable Mission Numbers: 037 through 042

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.5 A

Physical Description: Plastic, disposable, special eating device combining the characteristics of a spoon and that of a fork by the inclusion of four tines at the end of a spoon-like depression.

Functional Description: Holding of foods while cutting, spearing of bite-sized solid morsels, scooping of low viscosity or semi-solid foods and transferring to mouth for consumption.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	270 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	38.5 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1539 lbs	Total Cost:	$26100
Installed Volume:	6.75 ft^3	Development Risk:	5
Resupply Volume:			

Rationale: Zero-g flight evaluation of space dining techniques indicate this type of dining utensil can be employed for food consumption.

Merits/Deficiencies: No onboard cleansing required. Bacterial deactivation will be required if utensils are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.5.7

Title: Combination Knife/Fork/Tong (Disposable)

Applicable Mission Numbers: 001 through 006

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.5

Physical Description: A hand-held, hand-operated pair of tongs integrating one knife edge, one flat edge, and opposing pronged ends (8.5 inches (length), 1 inch (width), 1.25 inches (height)).

Functional Description: Acting independently, its functional uses are holding in place, scraping or pushing, pinching, transfer, and spreading. Used in conjunction with another holding device, its functional capabilities are extended to cutting and tearing.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	131 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	2.22 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	577 lbs	Total Cost:	$33662
Installed Volume:	0	Development Risk:	5
Resupply Volume:	0.5 ft^3		

Rationale:

Merits/Deficiencies: Requires crew training. No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.5.8

Title: Combination Knife/Fork/Tong (Disposable)

Applicable Mission Numbers: 025 through 030

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.5

Physical Description: A hand-held, hand-operated pair of tongs integrating one knife edge, one flat edge, and opposing pronged ends (8.5 inches (length), 1 inch (width), 1.25 inches (height)).

Functional Description: Acting independently, its functional uses are holding in place, scraping or pushing, pinching, transfer, and spreading. Used in conjunction with another holding device, its functional capabilities are extended to cutting and tearing.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	129 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	14.3 lbs.	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	570 lbs.	Total Cost:	$32395
Installed Volume:	0	Development Risk:	5
Resupply Volume:	3.24 ft^3		

Rationale: Requires crew training. No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Merits/Deficiencies: Requires crew training. No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.5.9

Title: Combination Knife/Fork/Tong (Disposable)

Applicable Mission Numbers: 007 through 012

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.5

Physical Description: A hand-held, hand-operated pair of tongs integrating one knife edge, one flat edge, and opposing pronged ends (8.5 inches (length), 1 inch (width), 1.25 inches (height)).

Functional Description: Acting independently, its functional uses are holding in place, scraping or pushing, pinching, transfer, and spreading. Used in conjunction with another holding device, its functional capabilities are extended to cutting and tearing.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	262 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	4.43 lbs.	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1151 lbs.	Total Cost:	$34637
Installed Volume:	0	Development Risk:	5
Resupply Volume:	1.02 ft^3		

Rationale: Requires crew training. No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Merits/Deficiencies: Requires crew training. No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.5.10

Title: Combination Knife/Fork/Tong (Disposable)

Applicable Mission Numbers: 031 through 036

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.5

Physical Description: A hand-held, hand-operated pair of tongs integrating one knife edge, one flat edge, and opposing pronged ends (8.5 inches (length), 1 inch (width), 1.25 inches (height)).

Functional Description: Acting independently, its functional uses are holding in place, scraping or pushing, pinching, transfer, and spreading. Used in conjunction with another holding device, its functional capabilities are extended to cutting and tearing.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	258 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	28.5 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1140 lbs	Total Cost:	$32525
Installed Volume:	0	Development Risk:	5
Resupply Volume:	6.48 ft^3		

Rationale: Requires crew training. No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Merits/Deficiencies: Requires crew training. No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.5.11

Title: Combination Knife/Fork/Tong (Disposable)

Applicable Mission Numbers: 013 through 018

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.5

Physical Description: A hand-held, hand-operated pair of tongs integrating one knife edge, one flat edge, and opposing pronged ends (8.5 inches (length), 1 inch (width), 1.25 inches (height)).

Functional Description: Acting independently, its functional uses are holding in place, scraping or pushing, pinching, transfer, and spreading. Used in conjunction with another holding device, its functional capabilities are extended to cutting and tearing.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	546 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	9.24 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	2402 lbs	Total Cost:	$36100
Installed Volume:	0	Development Risk:	5
Resupply Volume:	2.10 ft^3		

Rationale: Requires crew training. No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Merits/Deficiencies: Requires crew training. No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.5.12

Title: Combination Knife/Fork/Tong (Disposable)

Applicable Mission Numbers: 037 through 042

Function Reference: Provide For Consumption

Drawing Reference: D 5.6.5

Physical Description: A hand-held, hand-operated pair of tongs integrating one knife edge, one flat edge, and opposing pronged ends (8.5 inches (length), 1 inch (width), 1.25 inches (height)).

Functional Description: Acting independently, its functional uses are holding in place, scraping or pushing, pinching, transfer, and spreading. Used in conjunction with another holding device, its functional capabilities are extended to cutting and tearing.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	540 ft^3
Maintainability:	NA	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	59.4 lbs	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	2376 lbs	Total Cost:	$32720
Installed Volume:	0	Development Risk:	5
Resupply Volume:	13.5 ft^3		

Rationale: Requires crew training. No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Merits/Deficiencies: Requires crew training. No onboard cleansing required. Bacterial deactivation will be required if items are to be stored after use.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.8.1.1

Title: Magnetized Utensils (Knife)

Applicable Mission Numbers

001 through 006
025 through 030
049 through 054

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Conventional-type stainless steel, reusable table knife with shortened blade. The utensil handle is equipped with an enclosed magnetic strip.

Functional Description: Reference 5.6.2.1. The utensil will magnetically couple with magnetic strips imbedded in the surfaces of the dining table and trays.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	.004 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	* 697 lb/day
Installed Weight:	.700 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	.777 lbs	Total Cost:	$5,423
Installed Volume:	.004 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: *Dishwasher Requirement

Merits/Deficiencies: Possible station attitude interference constraints.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.8.1.2

Title: Magnetized Utensils (Knife)

Function Reference: Provide For Consumption

Drawing Reference:

Applicable Mission Numbers

007 through 012
031 through 036
055 through 060

Physical Description: Conventional-type stainless steel, reusable table knife with shortened blade. The utensil handle is equipped with an enclosed magnetic strip.

Functional Description: Reference 5.6.2.1. The utensil will magnetically couple with magnetic strips imbedded in the surfaces of the dining table and trays.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.008 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	* 1157 lb/day
Installed Weight:	1.399 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1.555 lbs	Total Cost:	$5,566
Installed Volume:	0.008 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: *Dishwasher Requirement

Merits/Deficiencies: Possible station attitude interference constraints.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.8.1.3

Title: Magnetized Utensils (Knife)

Function Reference: Provide For Consumption

Drawing Reference:

Applicable Mission Numbers

031 through 018

037 through 042

061 through 066

Physical Description: Conventional-type stainless steel, reusable table knife with shortened blade. The utensil handle is equipped with an enclosed magnetic strip.

Functional Description: Reference 5.6.2.1. The utensil will magnetically couple with magnetic strips imbedded in the surfaces of the dining table and trays.

Detail Data

Reliability:	MTBF - ∞	10 Year Resupply Volume:	0.019 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	* 2137 lb/day
Installed Weight:	2.915 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	3.238 lbs	Total Cost:	$5,709
Installed Volume:	0.017 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: *Dishwasher Requirement

Merits/Deficiencies: Possible station attitude interference constraints.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.8.1.4

Title: Magnetized Utensils (Spoon)

Applicable Mission Numbers

001 through 006
025 through 030
049 through 054

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Conventional-type stainless steel spoon three-quarters size. The utensil handle end is equipped with an enclosed magnetic strip.

Functional Description: Reference 5.6.2.5. The utensil will magnetically couple with magnetic strips imbedded in the surfaces of the dining table and trays.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.023 ft^3
Maintainability:	MTTR = 0.1 hr.	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	* 697 lb/day
Installed Weight:	0.33 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0hr/day
10 Year Resupply Weight:	0.36 lbs	Total Cost:	$5,423
Installed Volume:	0.021 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: * Dishwasher Requirement

Merits/Deficiencies: Possible station attitude interference constraints.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.8.1.5

Title: Magnetized Utensils (Spoon)

Function Reference: Provide For Consumption

Drawing Reference:

Applicable Mission Numbers

007 through 012
031 through 036
055 through 060

Physical Description: Conventional-type stainless steel spoon three-quarters size. The utensil handle end is equipped with an enclosed magnetic strip.

Functional Description: Reference 5.6.2.5. The utensil will magnetically couple with magnetic strips imbedded in the surfaces of the dining table and trays.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.045 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	* 1157 lb/day
Installed Weight:	0.660 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	0.732 lbs	Total Cost:	$5.566
Installed Volume:	0.042 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: * Dishwasher Requirement

Merits/Deficiencies: Possible station attitude interference constraints.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.8.1.6

Title: Magnetized Utensils (Spoon)

Applicable Mission Numbers

013 through 018
037 through 042
061 through 066

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Conventional-type stainless steel spoon three-quarters size. The utensil handle end is equipped with an enclosed magnetic strip.

Functional Description: Reference 5.6.2.5. The utensil will magnetically couple with magnetic strips imbedded in the surfaces of the dining table and trays.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.097 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	*2137 lb/day
Installed Weight:	1.37 lbs.	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1.53 lbs	Total Cost:	$5709
Installed Volume:	0.088 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: * Dishwasher requirement

Merits/Deficiencies: Possible station attitude interference constraints.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.8.1.7

Title: Magnetized Utensils (Fork)

Applicable Mission Numbers

001 through 006

025 through 030

049 through 054

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Conventional-type stainless steel reusable fork with four shortened tines. Overall size approximately three-quarters of conventional. The utensil handle end is equipped with an enclosed magnetic strip.

Functional Description: Reference 5.6.2.9. The utensil will magnetically couple with magnetic strips imbedded in the surfaces of the dining table and trays.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.023 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	* 697 lb/day
Installed Weight:	0.462 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	0.514 lbs	Total Cost:	$5,423
Installed Volume:	0.021 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: *Dishwasher requirement

Merits/Deficiencies: Possible station attitude interference constraints.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.8.1.8

Title: Magnetized Utensils (Fork)

Applicable Mission Numbers

007 through 012

031 through 036

055 through 060

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Conventional-type stainless steel reusable fork with four shortened tines. Overall size approximately three-quarters of conventional. The utensil handle end is equipped with an enclosed magnetic strip.

Functional Description: Reference 5.6.2.9. The utensil will magnetically couple with magnetic strips imbedded in the surfaces of the dining table and trays.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.045 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	* 1157 lb/day
Installed Weight:	0.924 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1.026 lbs	Total Cost:	$5,561
Installed Volume:	0.042 lbs	Development Risk:	6
Resupply Volume:	0		

Rationale: *Dishwasher requirement

Merits/Deficiencies: Possible station attitude interference constraints.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.8.1.9

Title: Magnetized Utensils (Fork)

Applicable Mission Numbers

013 through 018
037 through 042
061 through 066

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Conventional-type stainless steel reusable fork with four shortened tines. Overall size approximately three-quarters of conventional. The utensil handle end is equipped with an enclosed magnetic strip.

Functional Description: Reference 5.6.2.9. The utensil will magnetically couple with magnetic strips imbedded in the surfaces of the dining table and trays.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.097 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	*2137 lb/day
Installed Weight:	1.925 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	2.138 lbs	Total Cost:	$5709
Installed Volume:	0.088 ft^3	Development Risk:	6
Resupply Volume:	0		

Rationale: * Dishwasher requirement

Merits/Deficiencies: Possible station attitude interference constraints.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.8.1.10

Title: Magnetized Utensils (Knife/Fork/Tong)

Applicable Mission Numbers

001 through 006
025 through 030
049 through 054

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Hand-held, hand-operated pair of tongs integrating one knife edge, one flat edge, and opposing pronged ends. The utensil handle is equipped on one side with an enclosed magnetic strip.

Functional Description: Reference 5.6.3.5. The utensil will magnetically couple with magnetic strips imbedded in the surfaces of the dining table and trays.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.040 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	*697 lb/day
Installed Weight:	0.673 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	0.748	Total Cost:	$35,634
Installed Volume:	0.036 ft^3	Development Risk:	5
Resupply Volume:	0		

Rationale: *Dishwasher Requirement

Merits/Deficiencies: Possible station attitude interface constraints.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.8.1.11

Title: Magnetized Utensils (Knife/Fork/Tong)

Applicable Mission Numbers

007 through 012
031 through 036
055 through 060

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Hand-held, hand-operated pair of tongs integrating one knife edge, one flat edge, and opposing pronged ends. The utensil handle is equipped on one side with an enclosed magnetic strip.

Functional Description: Reference 5.6.3.5. The utensil will magnetically couple with magnetic strips imbedded in the surfaces of the dining table and trays.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.080 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	* 1157 lb/day
Installed Weight:	1.346 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1.496 lbs	Total Cost:	$35,777
Installed Volume:	0.072 ft^3	Development Risk:	5
Resupply Volume:	0		

Rationale: *Dishwasher Requirement

Merits/Deficiencies: Possible station attitude interface constraints.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.8.1.12

Title: Magnetized Utensils (Knife/Fork/Tong)

Applicable Mission Numbers

013 through 018
037 through 042
061 through 066

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Hand-held, hand-operated pair of tongs integrating one knife edge, one flat edge, and opposing pronged ends. The utensil handle is equipped on one side with an enclosed magnetic strip.

Functional Description: Reference 5.6.3.5. The utensil will magnetically couple with magnetic strips imbedded in the surfaces of the dining table and trays.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.166 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	* 2137 lb/day
Installed Weight:	2.805 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	3.171 lbs	Total Cost:	$35,992
Installed Volume:	0.150 ft^3	Development Risk:	5
Resupply Volume:	0		

Rationale: *Dishwasher Requirement

Merits/Deficiencies: Possible station attitude interface constraints.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.8.1.13

Title: Magnetized Utensils ("SPORK")

Function Reference: Provide For Consumption

Drawing Reference:

Applicable Mission Numbers

001 through 006
025 through 030
049 through 054

Physical Description: Stainless steel, reusable, special eating device combining the characteristics of a spoon and that of a fork by the inclusion of four tines at the end of a spoon-like depression. The utensil handle is equipped with an enclosed magnetic strip.

Functional Description: Reference 5.6.3.1. The utensil will magnetically couple with magnetic strips imbedded in the surfaces of the dining table and trays.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.023 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	* 697 lb/day
Installed Weight:	0.305 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	0.339lbs	Total Cost:	$24,790
Installed Volume:	0.021 ft^3	Development Risk:	4
Resupply Volume:	0		

Rationale: *Dishwasher Requirement

Merits/Deficiencies: Possible station attitude interface constraints.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.8.1.14

Title: Magnetized Utensils ("SPORK")

Applicable Mission Numbers
007 through 012
031 through 036
055 through 060

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Stainless steel, reusable, special eating device combining the characteristics of a spoon and that of a fork by the inclusion of four tines at the end of a spoon-like depression. The utensil handle is equipped with an enclosed magnetic strip.

Functional Description: Reference 5.6.3.1. The utensil will magnetically couple with magnetic strips imbedded in the surfaces of the dining table and trays.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.045 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	* 1157 lb/day
Installed Weight:	0.608 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	0.651 lbs	Total Cost:	$24,777
Installed Volume:	0.042 ft^3	Development Risk:	4
Resupply Volume:	0		

Rationale: *Dishwasher Requirement

Merits/Deficiencies: Possible station attitude interface constraints.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.8.1.15

Title: Magnetized Utensils ("SPORK")

Applicable Mission Numbers

013 through 018
037 through 042
061 through 066

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Stainless steel, reusable, special eating device combining the characteristics of a spoon and that of a fork by the inclusion of four tines at the end of a spoon-like depression. The utensil handle is equipped with an enclosed magnetic strip.

Functional Description: Reference 5.6.3.1. The utensil will magnetically couple with magnetic strips imbedded in the surfaces of the dining table and trays.

Detail Data

Reliability:	MTBF → ∞	10 Year Resupply Volume:	0.097 ft^3
Maintainability:	MTTR = 0.1 hr	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	* 2137 lb/day
Installed Weight:	1.267 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1.408 lbs	Total Cost:	$24,992
Installed Volume:	0.088 ft^3	Development Risk:	4
Resupply Volume:	0		

Rationale: *Dishwasher Requirement

Merits/Deficiencies: Possible station attitude interface constraints.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.9.3.1

Title: Stomach Support Restraint

Applicable Mission Numbers
001 through 006
025 through 030

Function Reference: Provide For Consumption

Drawing Reference: D 5.9.3 A

Physical Description: The restraint device is a contoured (semi-circular) strap 3.0 inches wide by 18 inches long which is attached to the abdominal rest portion of the chair. The point of attachment is hinged and provided with a simple locking device for positive positioning and quick release.

Functional Description: To retain the crewmember in the seated position while dining in the zero-g environment.

Detail Data

Reliability:	MTBF = 439000 Hrs.	10 Year Resupply Volume:	*
Maintainability:	MTTR = 0.1 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	1.962 lb.	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	1.962	Total Cost:	$11,260
Installed Volume:	*	Development Risk:	5
Resupply Volume:	0		

Rationale: *Volume of restraint system is included as part of the chair.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.9.3.2

Title: Stomach Support Restraint

Applicable Mission Numbers

007 through 012
031 through 036

Function Reference: Provide For Consumption

Drawing Reference: D 5.9.3A

Physical Description: The restraint device is a contoured (semi-circular) strap 3.0 inches wide by 18 inches long which is attached to the abdominal rest portion of the chair. The point of attachment is hinged and provided with a simple locking device for positive positioning and quick release.

Functional Description: To retain the crewmember in the seated position while dining in the zero-g environment.

Detail Data

Reliability:	MTBF = 439000 Hrs.	10 Year Resupply Volume:	*
Maintainability:	MTTR = 0.1 hrs.	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	3.924 lb.	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	3.924 lb.	Total Cost:	$11,520
Installed Volume:	*	Development Risk:	5
Resupply Volume:	0		

Rationale: *Volume of restraint system is included as part of the chair.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.9.3.3

Title: Stomach Support Restraint

Applicable Mission Numbers
013 through 018
037 through 042

Function Reference: Provide For Consumption

Drawing Reference: D 5.9.3A

Physical Description: The restraint device is a contoured (semi-circular) strap 3.0 inches wide by 18 inches long which is attached to the abdominal rest portion of the chair. The point of attachment is hinged and provided with a simple locking device for positive positioning and quick release.

Functional Description: To retain the crewmember in the seated position while dining in the zero-g environment.

Detail Data

Reliability:	MTBF = 439000 Hrs.	10 Year Resupply Volume:	*
Maintainability:	MTTR = 0.1 hrs.	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	8.175 lb.	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	8.175 lb	Total Cost:	$11,780
Installed Volume:	*	Development Risk:	5
Resupply Volume:	0		

Rationale: * Volume of restraint system is included as part of the chair.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.9.3.4

Title: Lap Strap Restraint

Applicable Mission Numbers

001 through 006
025 through 030

Function Reference: Provide For Consumption

Drawing Reference: D 5.9.3

Physical Description: The restraint device is a pair of contoured (semi-circular) straps 3.0 inches wide by 9.0 inches long which are attached to the seat portion of the dining chair, one on each side. The point of attachment is hinged and provided with a simple locking device for positive positioning and quick release.

Functional Description: To retain the crewmember in the seated position while dining in the zero-g environment.

Detail Data

Reliability:	MTBF = 439000 Hrs.	10 Year Resupply Volume:	*
Maintainability:	MTTR = 0.1 hrs.	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	2.976 lb.	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	2.976 lb.	Total Cost:	#26,520
Installed Volume:	*	Development Risk:	5
Resupply Volume:	0		

Rationale: *Volume of restraint system is included as part of chair volume.

Merits/Deficiencies: Chair with this restraint must be provided either without a back section or with a fold-down back to allow ingress and egress.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.9.3.5

Title: Lap Strap Restraint

Applicable Mission Numbers

007 through 012
031 through 036

Function Reference: Provide For Consumption

Drawing Reference: D 5.9.3

Physical Description: The restraint device is a pair of contoured (semi-circular) straps 3.0 inches wide by 9.0 inches long which are attached to the seat portion of the dining chair, one on each side. The point of attachment is hinged and provided with a simple locking device for positive positioning and quick release.

Functional Description: To retain the crewmember in the seated position while dining in the zero-g environment.

Detail Data

Reliability:	MTBF = 439000 Hrs.	10 Year Resupply Volume:	*
Maintainability:	MTTR = 0.1 hrs.	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	5.952 lb.	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	5,952 lb.	Total Cost:	$27,040
Installed Volume:	*	Development Risk:	5
Resupply Volume:	0		

Rationale: *Volume of restraint system is included as part of chair volume.

Merits/Deficiencies: Chair with this restraint must be provided either without a back section or with a fold-down back to allow ingress and egress.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.9.3.6

Title: Lap Strap Restraint

Applicable Mission Numbers
013 through 018
037 through 042

Function Reference: Provide For Consumption

Drawing Reference: D 5.9.3

Physical Description: The restraint device is a pair of contoured (semi-circular) straps 3.0 inches wide by 9.0 inches long which are attached to the seat portion of the dining chair, one on each side. The point of attachment is hinged and provided with a simple locking device for positive positioning and quick release.

Functional Description: To retain the crewmember in the seated position while dining in the zero-g environment.

Detail Data

Reliability:	MTBF = 439000 Hrs.	10 Year Resupply Volume:	*
Maintainability:	MTTR = 0.1 hrs.	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	12.40 lb	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	2.0 hr/day
10 Year Resupply Weight:	12.40 lb.	Total Cost:	$27,560
Installed Volume:	*	Development Risk:	5
Resupply Volume:	0		

Rationale: *Volume of restraint system is included as part of chair volume.

Merits/Deficiencies: Chair with this restraint must be provided either without a back section or with a fold-down back to allow ingress and egress.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.2.1

Title: Hand-Held Vacuum Cleaner Unit

Applicable Mission Numbers: 001 - 006

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.2

Physical Description: Self-contained vacuum cleaning device, with disposable internal collector bags. Aluminum housing has integral handle, coupling ring for access to collector bag, and bayonet-type inlet for positive attachment of various pick-up nozzles the shapes of which are to be determined. The size of the basic unit is approximately 12 x 7 x 4 inches without accessory nozzles, and weight of unit is approximately 4.5 pounds. Weight of three (3) accessory nozzles is approximately 1.0 pound additional. Operating power is .08 Kw. Collector bags are approximately 20 cubic inch capacity, weigh approximately 0.05 pounds, and are approximately 3.0 x 3.0 x .30 inches in flat storage form.

Functional Description: For small or immediate clean-up operation requiring the retrieval of food particles and other debris particulates.

Detail Data

Reliability:	MTBF=304000; OP Hrs = 1095	10 Year Resupply Volume:	8.518 cu ft
Maintainability:	MTTR .3 hrs	Peak Power:	80 watts
Safety:	0	Energy:	12 watt-hr/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	5.5 lbs	Water (50°F):	0
Resupply Weight:	* 1.05 lbs	Crew Operating Time:	.30 hr/day
10 Year Resupply Weight:	273 lbs	Total Cost:	▲ $430,000.
Installed Volume:	.2604 cu ft	Development Risk:	6
Resupply Volume:	* .033 cu ft		

Rationale: * Assume 1 collector bag per day with additional 50% of supply to cover contingencies. ▲ Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.2.2

Title: Hand-Held Vacuum Cleaner Unit

Applicable Mission Numbers

007 - 012

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.2

Physical Description: Self-contained vacuum cleaning device, with disposable internal collector bags. Aluminum housing has integral handle, coupling ring for access to collector bag, and bayonet-type inlet for positive attachment of various pick-up nozzles the shapes of which are to be determined. The size of the basic unit is approximately 12 x 7 x 4 inches without accessory nozzles, and weight of unit is approximately 4.5 pounds. Weight of three (3) accessory nozzles is approximately 1.0 pound additional. Operating power is .08 Kw. Collector bags are approximately 20 cubic inch capacity, weigh approximately 0.05 pounds, and are approximately 3.0 x 3.0 x .30 inches in flat storage form.

Functional Description: For small or immediate clean-up operation requiring the retrieval of food particles and other debris particulates.

Detail Data

Reliability:	MTBF=304,000; OP. Hrs=1643	10 Year Resupply Volume:	8.516 cu ft
Maintainability:	MTTR = .3 hrs	Peak Power:	80 watts
Safety:	0	Energy:	18 watt - hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	5.5 lbs	Water (50°F):	0
Resupply Weight:	* 1.05 lbs	Crew Operating Time:	.45 hrs/day
10 Year Resupply Weight:	273 lbs	Total Cost:	▲ $430000.
Installed Volume:	.26 cu ft	Development Risk:	6
Resupply Volume:	* .033 cu ft.		

Rationale: * Assume 1 collector bag per day with additional 50% of supply to cover contingencies. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.2.3

Title: Hand-Held Vacuum Cleaner Unit

Applicable Mission Numbers: 013 - 018

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.2

Physical Description: Self-contained vacuum cleaning device, with disposable internal collector bags. Aluminum housing has integral handle, coupling ring for access to collector bag, and bayonet-type inlet for positive attachment of various pick-up nozzles the shapes of which are to be determined. The size of the basic unit is approximately 12 x 7 x 4 inches without accessory nozzles, and weight of unit is approximately 4.5 pounds. Weight of three (3) accessory nozzles is approximately 1.0 pound additional. Operating power is .08 Kw. Collector bags are approximately 20 cubic inch capacity, weigh approximately 0.05 pounds, and are approximately 3.0 x 3.0 x .30 inches in flat storage form.

Functional Description: For small or immediate clean-up operation requiring the retrieval of food particles and other debris particulates.

Detail Data

Reliability:	MTBF=304,000; OP Hrs=2190	10 Year Resupply Volume:	17.035 cu ft
Maintainability:	MTTR = .3 hrs	Peak Power:	80 watts
Safety:	0	Energy:	24 watt-hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	5.5 lbs	Water (50°F):	0
Resupply Weight:	* 2.10 lbs	Crew Operating Time:	.60 hr/day
10 Year Resupply Weight:	546 lbs	Total Cost:	▲ $430000.
Installed Volume:	.2604 cu ft	Development Risk:	6
Resupply Volume:	* .066 cu ft		

Rationale: * Assume 2 collector bags per day with additional 50% of supply to cover contingencies. ▲ Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.2.5

Title: Hand-Held Vacuum Cleaner Unit

Applicable Mission Numbers: 025 - 030

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.2

Physical Description: Self-contained vacuum cleaning device, with disposable internal collector bags. Aluminum housing has integral handle, coupling ring for access to collector bag, and bayonet-type inlet for positive attachment of various pick-up nozzles the shapes of which are to be determined. The size of the basic unit is approximately 12 x 7 x 4 inches without accessory nozzles, and weight of unit is approximately 4.5 pounds. Weight of three (3) accessory nozzles is approximately 1.0 pound additional. Operating power is .08 Kw. Collector bags are approximately 20 cubic inch capacity, weigh approximately 0.05 pounds, and are approximately 3.0 x 3.0 x .30 inches in flat storage form.

Functional Description: For small or immediate clean-up operation requiring the retrieval of food particles and other debris particulates.

Detail Data

Reliability:	MTBF=304,000; OP Hrs=1095	10 Year Resupply Volume:	8.424 cu ft
Maintainability:	MTTR = .3 hrs	Peak Power:	80 watts
Safety:	0	Energy:	12 watt-hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	5.5 lbs	Water (50°F):	0
Resupply Weight:	* 6.75 lbs	Crew Operating Time:	.30 hr/day
10 Year Resupply Weight:	273 lbs	Total Cost:	▲ $430000.
Installed Volume:	.2604 cu.ft.	Development Risk:	6
Resupply Volume:	*.211 cu.ft.		

Rationale: * Assume 1 collector bag per day with additional 50% of supply to cover contingencies. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.2.6

Title: Hand-Held Vacuum Cleaner Unit

Applicable Mission Numbers: 031 - 036

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.2

Physical Description: Self-contained vacuum cleaning device, with disposable internal collector bags. Aluminum housing has integral handle, coupling ring for access to collector bag, and bayonet-type inlet for positive attachment of various pick-up nozzles the shapes of which are to be determined. The size of the basic unit is approximately 12 x 7 x 4 inches without accessory nozzles, and weight of unit is approximately 4.5 pounds. Weight of three (3) accessory nozzles is approximately 1.0 pound additional. Operating power is .08 Kw. Collector bags are approximately 20 cubic inch capacity, weigh approximately 0.05 pounds, and are approximately 3.0 x 3.0 x .30 inches in flat storage form.

Functional Description: For small or immediate clean-up operation requiring the retrieval of food particles and other debris particulates.

Detail Data

Reliability:	MTBF=304000; OP.Hrs=1643	10 Year Resupply Volume:	8.424 cu ft
Maintainability:	MTTR .3 hrs	Peak Power:	80 watts
Safety:	0	Energy:	18 watt-hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	5.5 lbs	Water (50°F):	0
Resupply Weight:	* 6.75 lbs	Crew Operating Time:	.45 hr/day
10 Year Resupply Weight:	273 lbs	Total Cost:	▲ $430000.
Installed Volume:	.2604 cu. ft	Development Risk:	6
Resupply Volume:	*.211 cu. ft		

Rationale: * Assume 1 collector bag per day with additional 50% of supply to cover contingencies. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.2.7

Title: Hand-Held Vacuum Cleaner Unit

Applicable Mission Numbers

037 - 042

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.2

Physical Description: Self-contained vacuum cleaning device, with disposable internal collector bags. Aluminum housing has integral handle, coupling ring for access to collector bag, and bayonet-type inlet for positive attachment of various pick-up nozzles the shapes of which are to be determined. The size of the basic unit is approximately 12 x 7 x 4 inches without accessory nozzles, and weight of unit is approximately 4.5 pounds. Weight of three (3) accessory nozzles is approximately 1.0 pound additional. Operating power is .08 Kw. Collector bags are approximately 20 cubic inch capacity, weigh approximately 0.05 pounds, and are approximately 3.0 x 3.0 x .30 inches in flat storage form.

Functional Description: For small or immediate clean-up operation requiring the retrieval of food particles and other debris particulates.

Detail Data

Reliability:	MTBF=304000; OP. Hrs=2190	10 Year Resupply Volume:	16.848 cu. ft.
Maintainability:	MTTR .3 hrs	Peak Power:	80 watts
Safety:	0	Energy:	24 watt-hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	5.5 lbs	Water (50°F):	0
Resupply Weight:	* 13.5 lbs	Crew Operating Time:	.60 hr/day
10 Year Resupply Weight:	540 lbs	Total Cost:	▲ $430000.
Installed Volume:	.2604 cu ft	Development Risk:	6
Resupply Volume:	*.421 cu ft		

Rationale: * Assume 2 collector bags per day with additional 50% of supply to cover contingencies. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.3.1 (Page 1 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Applicable Mission Numbers

001 - 006

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.3

Physical Description: Self-contained vacuum cleaning device with a disposable internal collector bag for wet or dry debris. Rectangular aluminum housing has integral stowage provisions for accessory pick-up nozzles, extension tubes and flexible hose; handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit employs an impeller fan as a vacuum source. This fan is located after but on the same shaft as a centrifugal phase separator. The centrifugal phase separator separates any fluids which may be driven through the filter bag during maximum loading. The debris collector filter bag is constructed of two laminates, the inner layer is similar to common vacuum cleaner bags, but is capable of maintaining its integrity while wet, the outer layer is phase separator filter material. This combination will hold all debris and most fluids under normal circumstances. The centrifugal phase separator is provided as backup in the event that 90% or more of the phase separator filter material becomes wet and fluids begin to come through (especially fluids with low surface tension). This fluid will be removed by a ram pitot effect and delivered to a reusable removable expandable plastic bag. Initial debris entrapment is effected by a variety of wand accessories attachable to the end of the hose. Bayonet-type fittings are employed for positive attachment of the accessories. A removable cover, containing the inlet collar, provides access to debris collector bag. A hinged door provides access to the liquid collector bag. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit is approximately 35.0 pounds including integrally stowed accessories. Operating power is 1.5 Kw. The disposable debris collector bags are approximately 250 cubic inch capacity, weigh approximately .10 pounds, and are approximately 7.0 x 7.0 x .30 inches in flat storage form.

Functional Description: For general clean-up operation requiring the retrieval of food particles (dry or wet) and other small-size debris within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.3.1 (Page 2 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Detail Data

Reliability:	MTBF=264000; OP.Hrs=3285	10 Year Resupply Volume:	43.298 cu ft
Maintainability:	MTTR = .35 hrs	Peak Power:	1500 watts
Safety:	0	Energy:	675 watt-hrs/day
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	35.0 lbs	Water (50°F):	0
Resupply Weight:	* 2.1 lbs	Crew Operating Time:	.90 hr/day
10 Year Resupply Weight:	546 lbs	Total Cost:	▲ $1240000.
Installed Volume:	2.604 cu ft	Development Risk:	6
Resupply Volume:	*.167 cu ft		

Rationale: *Assume one (1) debris collector bag per day with additional 50% of supply to cover contingencies. ▲Cost of expendables are not applicable to initial launch; however the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.1.3.2 (Page 1 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Applicable Mission Numbers

007 - 012

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.3

Physical Description: Self-contained vacuum cleaning device with a disposable internal collector bag for wet or dry debris. Rectangular aluminum housing has integral stowage provisions for accessory pick-up nozzles, extension tubes and flexible hose; handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit employs an impeller fan as a vacuum source. This fan is located after but on the same shaft as a centrifugal phase separator. The centrifugal phase separator separates any fluids which may be driven through the filter bag during maximum loading. The debris collector filter bag is constructed of two laminates, the inner layer is similar to common vacuum cleaner bags, but is capable of maintaining its integrity while wet, the outer layer is phase separator filter material. This combination will hold all debris and most fluids under normal circumstances. The centrifugal phase separator is provided as backup in the event that 90% or more of the phase separator filter material becomes wet and fluids begin to come through (especially fluids with low surface tension). This fluid will be removed by a ram pitot effect and delivered to a reusable removable expandable plastic bag. Initial debris entrapment is effected by a variety of wand accessories attachable to the end of the hose. Bayonet-type fittings are employed for positive attachment of the accessories. A removable cover, containing the inlet collar, provides access to debris collector bag. A hinged door provides access to the liquid collector bag. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit is approximately 35.0 pounds including integrally stowed accessories. Operating power is 1.5 Kw. The disposable debris collector bags are approximately 250 cubic inch capacity, weigh approximately .10 pounds, and are approximately 7.0 x 7.0 x .30 inches in flat storage form.

Functional Description: For general clean-up operation requiring the retrieval of food particles (dry or wet) and other small-size debris within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.3.2 (Page 2 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Detail Data

Reliability:	MTBF=264000;OP.Hrs=4928	10 Year Resupply Volume:	43.298 cu ft.
Maintainability:	MTTR = .35 hrs	Peak Power:	1500 watts
Safety:	0	Energy:	1013 watt-hrs/day
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	35.0 lbs	Water (50°F):	0
Resupply Weight:	* 2.1 lbs	Crew Operating Time:	1.35 hr/day
10 Year Resupply Weight:	546 lbs	Total Cost:	▲ $1240000.
Installed Volume:	2.604 cu ft.	Development Risk:	6
Resupply Volume:	*.167 cu. ft.		

Rationale: *Assume one (1) debris collector bag per day with additional 50% of supply to cover contingencies. ▲Cost of expendables are not applicable to initial launch; however the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.1.3.3 (Page 1 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Applicable Mission Numbers

Function Reference: Provide For Clean-Up — 013 - 018

Drawing Reference: D-6.1.3

Physical Description: Self-contained vacuum cleaning device with a disposable internal collector bag for wet or dry debris. Rectangular aluminum housing has integral stowage provisions for accessory pick-up nozzles, extension tubes and flexible hose; handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit employs an impeller fan as a vacuum source. This fan is located after but on the same shaft as a centrifugal phase separator. The centrifugal phase separator separates any fluids which may be driven through the filter bag during maximum loading. The debris collector filter bag is constructed of two laminates, the inner layer is similar to common vacuum cleaner bags, but is capable of maintaining its integrity while wet, the outer layer is phase separator filter material. This combination will hold all debris and most fluids under normal circumstances. The centrifugal phase separator is provided as backup in the event that 90% or more of the phase separator filter material becomes wet and fluids begin to come through (especially fluids with low surface tension). This fluid will be removed by a ram pitot effect and delivered to a reusable removable expandable plastic bag. Initial debris entrapment is effected by a variety of wand accessories attachable to the end of the hose. Bayonet-type fittings are employed for positive attachment of the accessories. A removable cover, containing the inlet collar, provides access to debris collector bag. A hinged door provides access to the liquid collector bag. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit is approximately 35.0 pounds including integrally stowed accessories. Operating power is 1.5 Kw. The disposable debris collector bags are approximately 250 cubic inch capacity, weigh approximately .10 pounds, and are approximately 7.0 x 7.0 x .30 inches in flat storage form.

Functional Description: For general clean-up operation requiring the retrieval of food particles (dry or wet) and other small-size debris within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.3.3 (Page 2 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Detail Data

Reliability:	MTBF=264000; OP Hrs=6570	10 Year Resupply Volume:	43.298 cu ft.
Maintainability:	MTTR = .35 hrs	Peak Power:	1500 watts
Safety:	0	Energy:	1350 watt-hrs/day
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	35.0 lbs	Water (50°F):	0
Resupply Weight:	* 2.1 lbs	Crew Operating Time:	1.80 hr/day
10 Year Resupply Weight:	546 lbs	Total Cost:	▲ $1240000.
Installed Volume:	2.604 cu. ft.	Development Risk:	6
Resupply Volume:	*.167 cu ft.		

Rationale: *Assume one (1) debris collector bag per day with additional 50% of supply to cover contingencies. ▲Cost of expendables are not applicable to initial launch; however the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.1.3.5 (Page 1 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Applicable Mission Numbers

025 - 030

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.3

Physical Description: Self-contained vacuum cleaning device with a disposable internal collector bag for wet or dry debris. Rectangular aluminum housing has integral stowage provisions for accessory pick-up nozzles, extension tubes and flexible hose; handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit employs an impeller fan as a vacuum source. This fan is located after but on the same shaft as a centrifugal phase separator. The centrifugal phase separator separates any fluids which may be driven through the filter bag during maximum loading. The debris collector filter bag is constructed of two laminates, the inner layer is similar to common vacuum cleaner bags, but is capable of maintaining its integrity while wet, the outer layer is phase separator filter material. This combination will hold all debris and most fluids under normal circumstances. The centrifugal phase separator is provided as backup in the event that 90% or more of the phase separator filter material becomes wet and fluids begin to come through (especially fluids with low surface tension). This fluid will be removed by a ram pitot effect and delivered to a reusable removable expandable plastic bag. Initial debris entrapment is effected by a variety of wand accessories attachable to the end of the hose. Bayonet-type fittings are employed for positive attachment of the accessories. A removable cover, containing the inlet collar, provides access to debris collector bag. A hinged door provides access to the liquid collector bag. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit is approximately 35.0 pounds including integrally stowed accessories. Operating power is 1.5 Kw. The disposable debris collector bags are approximately 250 cubic inch capacity, weigh approximately .10 pounds, and are approximately 7.0 x 7.0 x .30 inches in flat storage form.

Functional Description: For general clean-up operation requiring the retrieval of food particles (dry or wet) and other small-size debris within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.3.5 (Page 2 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Detail Data

Reliability:	MTBF=264000; OP.Hrs=3285	10 Year Resupply Volume:	42.822 cu ft.
Maintainability:	MTTR = .35 hrs	Peak Power:	1500 watts
Safety:	0	Energy:	675 watt-hrs/day
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	35.0 lbs	Water (50°F):	0
Resupply Weight:	* 13.5 lbs	Crew Operating Time:	.90 hr/day
10 Year Resupply Weight:	540 lbs	Total Cost:	▲ $1240000.
Installed Volume:	2.604 cu ft.	Development Risk:	6
Resupply Volume:	*1.071 cu ft.		

Rationale: *Assume one (1) debris collector bag per day with additional 50% of supply to cover contingencies. ▲ Cost of expendables are not applicable to initial launch; however the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.1.3.6 (Page 1 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Applicable Mission Numbers

031 - 036

Function Reference: Provide For Clean-Up

Drawing Reference: D-6,1,3

Physical Description: Self-contained vacuum cleaning device with a disposable internal collector bag for wet or dry debris. Rectangular aluminum housing has integral stowage provisions for accessory pick-up nozzles, extension tubes and flexible hose; handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit employs an impeller fan as a vacuum source. This fan is located after but on the same shaft as a centrifugal phase separator. The centrifugal phase separator separates any fluids which may be driven through the filter bag during maximum loading. The debris collector filter bag is constructed of two laminates, the inner layer is similar to common vacuum cleaner bags, but is capable of maintaining its integrity while wet, the outer layer is phase separator filter material. This combination will hold all debris and most fluids under normal circumstances. The centrifugal phase separator is provided as backup in the event that 90% or more of the phase separator filter material becomes wet and fluids begin to come through (especially fluids with low surface tension). This fluid will be removed by a ram pitot effect and delivered to a reusable removable expandable plastic bag. Initial debris entrapment is effected by a variety of wand accessories attachable to the end of the hose. Bayonet-type fittings are employed for positive attachment of the accessories. A removable cover, containing the inlet collar, provides access to debris collector bag. A hinged door provides access to the liquid collector bag. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit is approximately 35.0 pounds including integrally stowed accessories. Operating power is 1.5 Kw. The disposable debris collector bags are approximately 250 cubic inch capacity, weigh approximately .10 pounds, and are approximately 7.0 x 7.0 x .30 inches in flat storage form.

Functional Description: For general clean-up operation requiring the retrieval of food particles (dry or wet) and other small-size debris within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.3.6 (Page 2 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Detail Data

Reliability:	MTBF=264000; OP. Hrs=4928	10 Year Resupply Volume:	42.822 cu ft
Maintainability:	MTTR = .35 hrs	Peak Power:	1500 watts
Safety:	0	Energy:	1013 watt-hrs/day
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	35.0 lbs	Water (50°F):	0
Resupply Weight:	* 13.5 lbs	Crew Operating Time:	1.35 hr/day
10 Year Resupply Weight:	540 lbs	Total Cost:	▲$1240000.
Installed Volume:	2.604 cu ft	Development Risk:	6
Resupply Volume:	* 1.071 cu ft		

Rationale: *Assume one (1) debris collector bag per day with additional 50% of supply to cover contingencies. ▲Cost of expendables are not applicable to initial launch; however the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET #6.1.3.7 (Page 1 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Applicable Mission Numbers

037 - 042

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.3

Physical Description: Self-contained vacuum cleaning device with a disposable internal collector bag for wet or dry debris. Rectangular aluminum housing has integral stowage provisions for accessory pick-up nozzles, extension tubes and flexible hose; handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit employs an impeller fan as a vacuum source. This fan is located after but on the same shaft as a centrifugal phase separator. The centrifugal phase separator separates any fluids which may be driven through the filter bag during maximum loading. The debris collector filter bag is constructed of two laminates, the inner layer is similar to common vacuum cleaner bags, but is capable of maintaining its integrity while wet, the outer layer is phase separator filter material. This combination will hold all debris and most fluids under normal circumstances. The centrifugal phase separator is provided as backup in the event that 90% or more of the phase separator filter material becomes wet and fluids begin to come through (especially fluids with low surface tension). This fluid will be removed by a ram pitot effect and delivered to a reusable removable expandable plastic bag. Initial debris entrapment is effected by a variety of wand accessories attachable to the end of the hose. Bayonet-type fittings are employed for positive attachment of the accessories. A removable cover, containing the inlet collar, provides access to debris collector bag. A hinged door provides access to the liquid collector bag. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit is approximately 35.0 pounds including integrally stowed accessories. Operating power is 1.5 Kw. The disposable debris collector bags are approximately 250 cubic inch capacity, weigh approximately .10 pounds, and are approximately 7.0 x 7.0 x .30 inches in flat storage form.

Functional Description: For general clean-up operation requiring the retrieval of food particles (dry or wet) and other small-size debris within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.3.7 (Page 2 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Detail Data

Reliability:	MTBF=264000; OP.Hrs=6570	10 Year Resupply Volume:	42.822 cu ft
Maintainability:	MTTR = .35 Hrs.	Peak Power:	1500 watts
Safety:	0	Energy:	1350 watt-hrs/day
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	35.0 lbs	Water (50°F):	0
Resupply Weight:	* 13.5 lbs	Crew Operating Time:	1.80 hr/day
10 Year Resupply Weight:	540 lbs	Total Cost:	▲ $1240000.
Installed Volume:	2.604 cu ft	Development Risk:	6
Resupply Volume:	* 1.071 cu ft		

Rationale: *Assume one (1) debris collector bag per day with additional 50% of supply to cover contingencies. ▲Cost of expendables are not applicable to initial launch; however the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.1.7.1

Title: Hand Cleaning With Impregnated Disposable Wipes

Applicable Mission Numbers: 001 - 006

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Disposable paper towelettes, 5.5 x 8.0 inches in size, impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated wipe is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:	N/A	10 Year Resupply Volume:	35.555 cu.ft.
Maintainability:	N/A	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	3.64 lbs.	Crew Operating Time:	1.95 hrs/day
10 Year Resupply Weight:	946.4 lbs.	Total Cost:	▲ 0
Installed Volume:	0	Development Risk:	8
Resupply Volume:	.138 cu.ft.		

Rationale: Assume that one towelette can clean and sanitize 25 square feet of surface before discarding. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is **not** included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.7.2

Title: Hand Cleaning With Impregnated Disposable Wipes

Applicable Mission Numbers

007 - 012

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Disposable paper towelettes, 5.5 x 8.0 inches in size, impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated wipe is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:	N/A	10 Year Resupply Volume:	53.334 cu.ft.
Maintainability:	N/A	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	5.46 lbs.	Crew Operating Time:	3.04 hrs/day
10 Year Resupply Weight:	1419.6 lbs.	Total Cost:	▲0
Installed Volume:	0	Development Risk:	8
Resupply Volume:	.205 cu.ft.		

Rationale: Assume that one towelette can clean and sanitize 25 square feet of surface before discarding. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.7.3

Title: Hand Cleaning With Impregnated Disposable Wipes

Applicable Mission Numbers: 013 - 018; 019 - 024

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Disposable paper towelettes, 5.5 x 8.0 inches in size, impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated wipe is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:	N/A	10 Year Resupply Volume:	71.110 cu.ft.
Maintainability:	N/A	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	7.28 lbs.	Crew Operating Time:	4.14 hrs/day
10 Year Resupply Weight:	1892.8 lbs.	Total Cost:	▲0
Installed Volume:	0	Development Risk:	8
Resupply Volume:	.274 cu.ft.		

Rationale: Assume that one towelette can clean and sanitize 25 square feet of surface before discarding. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.7.4

Title: Hand Cleaning With Impregnated Disposable Wipes

Applicable Mission Numbers: 025 - 030

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Disposable paper towelettes, 5.5 x 8.0 inches in size, impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated wipe is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:	N/A	10 Year Resupply Volume:	35.165 cu.ft.
Maintainability:	N/A	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	23.40 lbs.	Crew Operating Time:	1.95 hrs/day
10 Year Resupply Weight:	936.0 lbs.	Total Cost:	▲0
Installed Volume:	0	Development Risk:	8
Resupply Volume:	.879 cu.ft.		

Rationale: Assume that one towelette can clean and sanitize 25 square feet of surface before discarding. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.7.5

Title: Hand Cleaning With Impregnated Disposable Wipes

Applicable Mission Numbers: 031 - 036

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Disposable paper towelettes, 5.5 x 8.0 inches in size, impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated wipe is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:	N/A	10 Year Resupply Volume:	52.747 cu.ft.
Maintainability:	N/A	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	35.10 lbs.	Crew Operating Time:	3.04 hrs/day
10 Year Resupply Weight:	1404.0 lbs.	Total Cost:	▲0
Installed Volume:	0	Development Risk:	8
Resupply Volume:	1.319 cu.ft.		

Rationale: Assume that one towelette can clean and sanitize 25 square feet of surface before discarding. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.7.6

Title: Hand Cleaning With Impregnated Disposable Wipes

Applicable Mission Numbers: 037 - 042; 043 - 048

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Disposable paper towelettes, 5.5 x 8.0 inches in size, impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated wipe is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:	N/A	10 Year Resupply Volume:	70.330 cu.ft.
Maintainability:	N/A	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	46.80 lbs.	Crew Operating Time:	4.14 hrs/day
10 Year Resupply Weight:	1872.0 lbs.	Total Cost:	▲0
Installed Volume:	0	Development Risk:	8
Resupply Volume:	1.758 cu.ft.		

Rationale: Assume that one towelette can clean and sanitize 25 square feet of surface before discarding. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.8.1

Title: Hand Cleaning With Impregnated Reusable Wipes

Applicable Mission Numbers: 001 - 006

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Cotton washcloths, 12 x 12 inches in size, weighing .075 pounds each and occupying 2.88 cubic inches in 6 x 3 x .16 inches folded storage form. They will be impregnated or dampened periodically during process of use with a pre-mixed evaporative detergent/germicidal solution.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:	N/A	10 Year Resupply Volume:	118.352 cu.ft.
Maintainability:	N/A	Peak Power:	• 7500 watts
Safety:	0	Energy:	• 33.12 watt-hrs/day
Crew Acceptance:	5	Water (155°F):	• 1.10 lbs/day (Reclaim 3.31 lbs)
Installed Weight:	*1.05 lbs.	Water (50°F):	• 2.21 lbs/day
Resupply Weight:	28.39 lbs. (average)	Crew Operating Time:	• 1.95 hrs/day
10 Year Resupply Weight:	7381.50 lbs.	Total Cost:	*▲ $14.
Installed Volume:	*.023 cu.ft.	Development Risk:	8
Resupply Volume:	.455 cu.ft. (average)		

Rationale: *Initial supply of 14 wash cloths included in installed weight and volume and cost. ▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: •Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.8.2

Title: Hand Cleaning With Impregnated Reusable Wipes

Applicable Mission Numbers: 007 - 012

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Cotton washcloths, 12 x 12 inches in size, weighing .075 pounds each and occupying 2.88 cubic inches in 6 x 3 x .16 inches folded storage form. They will be impregnated or dampened periodically during process of use with a pre-mixed evaporative detergent/germicidal solution.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:	N/A	10 Year Resupply Volume:	185.008 cu.ft.
Maintainability:	N/A	Peak Power:	• 7500 watts
Safety:	0	Energy:	• 49.68 watt-hrs/day
Crew Acceptance:	5	Water (155°F):	• 1.66 lbs/day (Reclaim 4.97 lbs)
Installed Weight:	* 1.58 lbs.	Water (50°F):	• 3.31 lbs/day
Resupply Weight:	44.37 lbs. (average)	Crew Operating Time:	3.04 hrs/day
10 Year Resupply Weight:	11536.35 lbs.	Total Cost:	* ▲ $21.
Installed Volume:	* .035 cu.ft.	Development Risk:	8
Resupply Volume:	.712 cu.ft. (average)		

Rationale: *Initial supply of 21 wash cloths included in installed weight and volume and cost. ▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: • Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.8.3

Title: Hand Cleaning With Impregnated Reusable Wipes

Applicable Mission Numbers: 013 - 018; 019 - 024

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Cotton washcloths, 12 x 12 inches in size, weighing .075 pounds each and occupying 2.88 cubic inches in 6 x 3 x .16 inches folded storage form. They will be impregnated or dampened periodically during process of use with a pre-mixed evaporative detergent/germicidal solution.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:	N/A	10 Year Resupply Volume:	259.46 cu.ft.
Maintainability:	N/A	Peak Power:	• 7500 watts
Safety:	0	Energy:	• 66.24 watt-hrs/day
Crew Acceptance:	5	Water (155°F):	• 2.21 lbs/day (Reclaim 6.62 lbs)
Installed Weight:	* 2.10 lbs.	Water (50°F):	• 4.41 lbs/day
Resupply Weight:	60.36 lbs. (average)	Crew Operating Time:	4.14 hrs/day
10 Year Resupply Weight:	15694.84 lbs.	Total Cost:	*▲ $28.
Installed Volume:	*.047 cu.ft.	Development Risk:	8
Resupply Volume:	.968 cu.ft. (average)		

Rationale: *Initial supply of 28 wash cloths included in installed weight and volume and cost. ▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: • Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.8.4

Title: Hand Cleaning With Impregnated Reusable Wipes

Applicable Mission Numbers: 025 - 030

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Cotton washcloths, 12 x 12 inches in size, weighing .075 pounds each and occupying 2.88 cubic inches in 6 x 3 x .16 inches folded storage form. They will be impregnated or dampened periodically during process of use with a pre-mixed evaporative detergent/germicidal solution.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:	N/A	10 Year Resupply Volume:	117.054 cu.ft.
Maintainability:	N/A	Peak Power:	• 7500 watts
Safety:	0	Energy:	• 33.12 watt-hrs/day
Crew Acceptance:	5	Water (155°F):	• 1.10 lbs/day (Reclaim 3.31 lbs)
Installed Weight:	* 1.05 lbs.	Water (50°F):	• 2.21 lbs/day
Resupply Weight:	182.51 lbs. (average)	Crew Operating Time:	1.95 hrs/day
10 Year Resupply Weight:	7300.50 lbs.	Total Cost:	* ▲ $14.
Installed Volume:	*.023 cu.ft.	Development Risk:	8
Resupply Volume:	2.927 cu.ft.(average)		

Rationale: *Initial supply of 14 wash cloths included in installed weight and volume and cost. ▲ The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: • Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.8.5

Title: Hand Cleaning With Impregnated Reusable Wipes

Applicable Mission Numbers: 031 - 036

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Cotton washcloths, 12 x 12 inches in size, weighing .075 pounds each and occupying 2.88 cubic inches in 6 x 3 x .16 inches folded storage form. They will be impregnated or dampened periodically during process of use with a pre-mixed evaporative detergent/germicidal solution.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:	N/A	10 Year Resupply Volume:	182.979 cu.ft.
Maintainability:	N/A	Peak Power:	• 7500 watts
Safety:	0	Energy:	• 49.68 watt-hrs/day
Crew Acceptance:	5	Water (155°F):	• 1.66 lbs/day (Reclaim 4.97 lbs)
Installed Weight:	* 1.58 lbs.	Water (50°F):	• 3.31 lbs/day
Resupply Weight:	285.24 lbs. (average)	Crew Operating Time:	3.04 hrs/day
10 Year Resupply Weight:	11409.75 lbs.	Total Cost:	* ▲ $21.
Installed Volume:	*.035 cu.ft.	Development Risk:	8
Resupply Volume:	4.575 cu.ft. (average)		

Rationale: *Initial supply of 21 wash cloths included in installed weight and volume and cost. ▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: • Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.8.6

Title: Hand Cleaning With Impregnated Reusable Wipes

Applicable Mission Numbers: 037 - 042; 043 - 048

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Cotton washcloths, 12 x 12 inches in size, weighing .075 pounds each and occupying 2.88 cubic inches in 6 x 3 x .16 inches folded storage form. They will be impregnated or dampened periodically during process of use with a pre-mixed evaporative detergent/germicidal solution.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:	N/A	10 Year Resupply Volume:	248.904 cu.ft.
Maintainability:	N/A	Peak Power:	• 7500 watts
Safety:	0	Energy:	• 66.24 watt-hrs/day
Crew Acceptance:	5	Water (155°F):	• 2.21 lbs/day (Reclaim 6.62 lbs)
Installed Weight:	* 2.10 lbs.	Water (50°F):	• 4.41 lbs/day
Resupply Weight:	388.07 lbs. (average)	Crew Operating Time:	4.14 hrs/day
10 Year Resupply Weight:	15522.60 lbs.	Total Cost:	* ▲ $28.
Installed Volume:	*.047 cu.ft.	Development Risk:	8
Resupply Volume:	6.223 cu.ft. (average)		

Rationale: *Initial supply of 28 wash cloths included in installed weight and volume and cost. ▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: •Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.10.1 (Page 1 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Applicable Mission Numbers

001-006

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.10

Physical Description: Self-contained cleaning device of "ASTROVAC" type as developed by FH/RAD. Rectangular aluminum housing has integral stowage provisions for Applicator/Scrubber Head and flexible hose, handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit consists of two separate reservoirs for water and for a bactericide solution, (or, if desired, a pre-mixed water/bactericide solution may be substituted in the main reservoir), a motor driven air blower, a centrifugal liquid/air separator, an air pressure accumulator, delivery and return hoses, an applicator/scrubber device, and a liquid collector bag.

The small hand-held applicator/scrubber will dispense a controlled amount of water or solution into a sponge-layer scrubber head, and also remove the liquid from the surface to which applied by a vacuum recovery. The sponge-scrubber elements are replaceable and reusable unless deteriorated by wear or other reason. An impeller fan provides the vacuum source and means for pressurizing the liquid reservoirs for delivery purposes. This fan is located after, but on the same shaft as a centrifugal phase separator which separates the liquid from the recovered liquid/air mixture. The contaminated liquid is removed by a ram pitot effect and collected in a reusable removable plastic bag. Hinged doors provide access to the liquid containment bags for installation, filling and/or removal. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit without cleaning liquids is approximately 45 pounds, including the integrally stowed accessories. Operating power is 1.5 Kw.

Functional Description: For general clean-up operation requiring the washing and sanitizing of work counters, food preparation equipment, tables, or any surfaces within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.10.1(Page 2 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Detail Data

Reliability: MTBF=212000;OP.Hrs=5968	10 Year Resupply Volume: 27.665 cu ft
Maintainability: MTTR = .35 hrs	Peak Power: 1500 watts
Safety: 0	Energy: 2453 watt-hrs/day
Crew Acceptance: 6	Water (155°F): * 1.87 lbs/day (Reclaim 5.61 lbs)
Installed Weight: 45.0 lbs	Water (50°F): * 3.74 lbs/day
Resupply Weight: ** 6.64 lbs.	Crew Operating Time: 1.84 hr/day
10 Year Resupply Weight: 1726. 97 lbs.	Total Cost: ▲$2030000.
Installed Volume: 2.604 cu ft	Development Risk: 4
Resupply Volume: ** .106 cu ft	

Rationale: * Assume existance of reclaimable wash-water supply, independent of potable water. - ** Assume 12:1 ratio of water to expendable bactericide, and average of 1 sponge replacement for 3 days of use. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.1.10.2 (Page 1 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Applicable Mission Numbers

007-012

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.10

Physical Description: Self-contained cleaning device of "ASTROVAC" type as developed by FH/RAD. Rectangular aluminum housing has integral stowage provisions for Applicator/Scrubber Head and flexible hose, handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit consists of two separate reservoirs for water and for a bactericide solution, (or, if desired, a pre-mixed water/bactericide solution may be substituted in the main reservoir), a motor driven air blower, a centrifugal liquid/air separator, an air pressure accumulator, delivery and return hoses, an applicator/scrubber device, and a liquid collector bag.

The small hand-held applicator/scrubber will dispense a controlled amount of water or solution into a sponge-layer scrubber head, and also remove the liquid from the surface to which applied by a vacuum recovery. The sponge-scrubber elements are replaceable and reusable unless deteriorated by wear or other reason. An impeller fan provides the vacuum source and means for pressurizing the liquid reservoirs for delivery purposes. This fan is located after, but on the same shaft as a centrifugal phase separator which separates the liquid from the recovered liquid/air mixture. The contaminated liquid is removed by a ram pitot effect and collected in a reusable removable plastic bag. Hinged doors provide access to the liquid containment bags for installation, filling and/or removal. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit without cleaning liquids is approximately 45 pounds, including the integrally stowed accessories. Operating power is 1.5 Kw.

Functional Description: For general clean-up operation requiring the washing and sanitizing of work counters, food preparation equipment, tables, or any surfaces within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.10.2 (Page 2 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Detail Data

Reliability: MTBF=212000;OP.Hrs=9333	10 Year Resupply Volume: 43.187 cu ft
Maintainability: MTTR - .25 hrs	Peak Power: 1500 watts
Safety: 0	Energy: 3836 watt-hrs/day
Crew Acceptance: 6	Water (155°F): * 2.92 lbs/day (Reclaim 8.76 lbs)
Installed Weight: 45.0 lbs	Water (50°F): *5.84 lbs/day
Resupply Weight: ** 10.37 lbs.	Crew Operating Time: 2.76 hr/day
10 Year Resupply Weight: 2695.42 lbs	Total Cost: ▲$2030000.
Installed Volume: 2.604 cu ft	Development Risk: 4
Resupply Volume: ** .166 cu ft	

Rationale: * Assume existance of reclaimable wash-water supply, independent of potable water. - ** Assume 12:1 ratio of water to expendable bactericide, and average of 1 sponge replacement for 2 days of use. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.1.10.3 (Page 1 of 2)

Guided Transport
Title: "ASTROVAC" Cleaning Unit

Applicable Mission Numbers

013-018
019-024

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.10

Physical Description: Self-contained cleaning device of "ASTROVAC" type as developed by FH/RAD. Rectangular aluminum housing has integral stowage provisions for Applicator/Scrubber Head and flexible hose, handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit consists of two separate reservoirs for water and for a bactericide solution, (or, if desired, a pre-mixed water/bactericide solution may be substituted in the main reservoir), a motor driven air blower, a centrifugal liquid/air separator, an air pressure accumulator, delivery and return hoses, an applicator/scrubber device, and a liquid collector bag.

The small hand-held applicator/scrubber will dispense a controlled amount of water or solution into a sponge-layer scrubber head, and also remove the liquid from the surface to which applied by a vacuum recovery. The sponge-scrubber elements are replaceable and reusable unless deteriorated by wear or other reason. An impeller fan provides the vacuum source and means for pressurizing the liquid reservoirs for delivery purposes. This fan is located after, but on the same shaft as a centrifugal phase separator which separates the liquid from the recovered liquid/air mixture. The contaminated liquid is removed by a ram pitot effect and collected in a reusable removable plastic bag. Hinged doors provide access to the liquid containment bags for installation, filling and/or removal. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit without cleaning liquids is approximately 45 pounds, including the integrally stowed accessories. Operating power is 1.5 Kw.

Functional Description: For general clean-up operation requiring the washing and sanitizing of work counters, food preparation equipment, tables, or any surfaces within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.10.3 (Page 2 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Detail Data

Reliability:	MTBF=212000; OP.Hrs=12695	10 Year Resupply Volume:	59.110 cu ft
Maintainability:	MTTR = .35 hrs	Peak Power:	1500 watts
Safety:	0	Energy:	5217 watt-hrs/day
Crew Acceptance:	6	Water (155°F):	* 3.98 lbs/day (Reclaim 11.94 lbs)
Installed Weight:	45.0 lbs	Water (50°F):	* 7.96 lbs/day
Resupply Weight:	** 14.19 lbs	Crew Operating Time:	3.68 hr/day
10 Year Resupply Weight:	3690.23 lbs	Total Cost:	▲$2030000.
Installed Volume:	2.604 cu ft	Development Risk:	4
Resupply Volume:	** .227 cu ft		

Rationale: * Assume existence of reclaimable wash-water supply, independent of potable water. - ** Assume 12:1 ratio of water to expendable bactericide, and average of 1 sponge replacement per day of use. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

Data Sources: _____

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ELEMENT CONCEPT DATA SHEET # 6.1.10.4 (Page 1 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Applicable Mission Numbers

025 - 030

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.10

Physical Description: Self-contained cleaning device of "ASTROVAC" type as developed by FH/RAD. Rectangular aluminum housing has integral stowage provisions for Applicator/Scrubber Head and flexible hose, handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit consists of two separate reservoirs for water and for a bactericide solution, (or, if desired, a pre-mixed water/bactericide solution may be substituted in the main reservoir), a motor driven air blower, a centrifugal liquid/air separator, an air pressure accumulator, delivery and return hoses, an applicator/scrubber device, and a liquid collector bag.

The small hand-held applicator/scrubber will dispense a controlled amount of water or solution into a sponge-layer scrubber head, and also remove the liquid from the surface to which applied by a vacuum recovery. The sponge-scrubber elements are replaceable and reusable unless deteriorated by wear or other reason. An impeller fan provides the vacuum source and means for pressurizing the liquid reservoirs for delivery purposes. This fan is located after, but on the same shaft as a centrifugal phase separator which separates the liquid from the recovered liquid/air mixture. The contaminated liquid is removed by a ram pitot effect and collected in a reusable removable plastic bag. Hinged doors provide access to the liquid containment bags for installation, filling and/or removal. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit without cleaning liquids is approximately 45 pounds, including the integrally stowed accessories. Operating power is 1.5 Kw.

Functional Description: For general clean-up operation requiring the washing and sanitizing of work counters, food preparation equipment, tables, or any surfaces within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.10.4 (Page 2 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Detail Data

Reliability:	MTBF=212000;OP.Hrs =5968	10 Year Resupply Volume:	27.335 cu ft
Maintainability:	MTTR .35 hrs	Peak Power:	1500 watts
Safety:	0	Energy:	2453 watt-hrs/day
Crew Acceptance:	6	Water (155°F):	* 1.87 lbs/day (Reclaim 5.61 lbs)
Installed Weight:	45.0 lbs	Water (50°F):	* 3.74 lbs/day
Resupply Weight:	** 42.66 lbs.	Crew Operating Time:	1.84 hr/day
10 Year Resupply Weight:	1706.28 lbs	Total Cost:	▲$2030000.
Installed Volume:	2.604 cu ft	Development Risk:	4
Resupply Volume:	** .683 cu ft		

Rationale: *Assume existance of reclaimable wash-water supply, independent of potable water. - ** Assume 12:1 ratio of water to expendable bactericide, and average of 1 sponge replacement for 3 days of use. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.10.5 (Page 1 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Applicable Mission Numbers

031 - 036

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.10

Physical Description: Self-contained cleaning device of "ASTROVAC" type as developed by FH/RAD. Rectangular aluminum housing has integral stowage provisions for Applicator/Scrubber Head and flexible hose, handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit consists of two separate reservoirs for water and for a bactericide solution, (or, if desired, a pre-mixed water/bactericide solution may be substituted in the main reservoir), a motor driven air blower, a centrifugal liquid/air separator, an air pressure accumulator, delivery and return hoses, an applicator/scrubber device, and a liquid collector bag.

The small hand-held applicator/scrubber will dispense a controlled amount of water or solution into a sponge-layer scrubber head, and also remove the liquid from the surface to which applied by a vacuum recovery. The sponge-scrubber elements are replaceable and reusable unless deteriorated by wear or other reason. An impeller fan provides the vacuum source and means for pressurizing the liquid reservoirs for delivery purposes. This fan is located after, but on the same shaft as a centrifugal phase separator which separates the liquid from the recovered liquid/air mixture. The contaminated liquid is removed by a ram pitot effect and collected in a reusable removable plastic bag. Hinged doors provide access to the liquid containment bags for installation, filling and/or removal. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit without cleaning liquids is approximately 45 pounds, including the integrally stowed accessories. Operating power is 1.5 Kw.

Functional Description: For general clean-up operation requiring the washing and sanitizing of work counters, food preparation equipment, tables, or any surfaces within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.10.5 (Page 2 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Detail Data

Reliability: MTBF=212000; OP.Hrs=9333
Maintainability: MTTR = .35 hrs
Safety: 0
Crew Acceptance: 6
Installed Weight: 45.0 lbs
Resupply Weight: ** 66.65 lbs.
10 Year Resupply Weight: 2665.80 lbs
Installed Volume: 2.604 cu ft
Resupply Volume: ** 1.068 cu ft.

10 Year Resupply Volume: 42.712 cu ft
Peak Power: 1500 watts
Energy: 3836 watt-hrs/day
Water (155°F): *2.92 lbs/day (Reclaim 8.76 lbs)
Water (50°F): * 5.84 lbs/day
Crew Operating Time: 2.76 hr/day
Total Cost: ▲$2030000.
Development Risk: 4

Rationale: * Assume existance of reclaimable wash-water supply, independent of ~~potable~~ water. - ** Assume 12:1 ratio of water to expendable bactericide and average of 1 sponge replacement for 2 days of use. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is *not* included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.10.6 (Page 1 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Applicable Mission Numbers

037 - 042

043 - 048

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.1.10

Physical Description: Self-contained cleaning device of "ASTROVAC" type as developed by FH/RAD. Rectangular aluminum housing has integral stowage provisions for Applicator/Scrubber Head and flexible hose, handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit consists of two separate reservoirs for water and for a bactericide solution, (or, if desired, a pre-mixed water/bactericide solution may be substituted in the main reservoir), a motor driven air blower, a centrifugal liquid/air separator, an air pressure accumulator, delivery and return hoses, an applicator/scrubber device, and a liquid collector bag.

The small hand-held applicator/scrubber will dispense a controlled amount of water or solution into a sponge-layer scrubber head, and also remove the liquid from the surface to which applied by a vacuum recovery. The sponge-scrubber elements are replaceable and reusable unless deteriorated by wear or other reason. An impeller fan provides the vacuum source and means for pressurizing the liquid reservoirs for delivery purposes. This fan is located after, but on the same shaft as a centrifugal phase separator which separates the liquid from the recovered liquid/air mixture. The contaminated liquid is removed by a ram pitot effect and collected in a reusable removable plastic bag. Hinged doors provide access to the liquid containment bags for installation, filling and/or removal. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit without cleaning liquids is approximately 45 pounds, including the integrally stowed accessories. Operating power is 1.5 Kw.

Functional Description: For general clean-up operation requiring the washing and sanitizing of work counters, food preparation equipment, tables, or any surfaces within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.10.6 (Page 2 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Detail Data

Reliability:	MTBF=212000;OP.Hrs=12695	10 Year Resupply Volume:	58.460 cu ft
Maintainability:	MTTR = .35 hrs	Peak Power:	1500 watts
Safety:	0	Energy:	5217 watt-hrs/day
Crew Acceptance:	6	Water (155°F):	* 3.98 lbs/day (Reclaim 11.94 lbs)
Installed Weight:	45.0 lbs	Water (50°F):	* 7.96 lbs/day
Resupply Weight:	** 91.24 lbs	Crew Operating Time:	3.68 hr/day
10 Year Resupply Weight:	3649.68 lbs.	Total Cost:	▲ $2030000.
Installed Volume:	2.604 cu ft	Development Risk:	4
Resupply Volume:	** 1.462 cu ft		

Rationale: *Assume existance of reclaimable wash-water supply independent of potable water. - ** Assume 12:1 ratio of water to expendable bactericide and average of 1 sponge replacement per day of use. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.1.1 (Page 1 of 2)

Title: Dispenser For Disposable Personal Wipes

Applicable Mission Numbers

001 - 006

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.1

Physical Description: Box-type enclosure of aluminum or stainless-steel construction, having provisions for internal retention and dispensing of disposable absorbent paper napkins in individually folded form. The enclosure is divided into two hinged sections of equal size which permits opening for loading purposes. A simple latching feature is incorporated for closure. Openings are provided on opposite sides for removal of individual paper napkins. Two independently acting spring-loaded plates are included inside the container to push and maintain the napkins in position for removal through the side openings. The dispenser will accommodate 100 napkins (i.e., 50 in each side section).

The dispenser unit is approximately 4.75 x 4.25 x 6.0 inches, weighing 1.479 pounds.

A single package of 300 paper wipes, prefolded to a size compatible with the dispenser, will be 3.50 x 5.0 x 8.0 inches, weighing .8375 pounds. Each wipe is 10.0 x 12.0 inches in size unfolded, and 3.50 x 5.0 inches in size folded.

Functional Description: For personal hygienic considerations, providing means for wiping of mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.1.1 (Page 2 of 2)

Title: Dispenser For Disposable Personal Wipes

Detail Data

Reliability:	MTBF $\geq \infty$ (OP Hrs N/A)	10 Year Resupply Volume:	* 42.120 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	** 2.96 lbs	Water (50°F):	0
Resupply Weight:	* 1.68 lbs	Crew Operating Time:	N/A
10 Year Resupply Weight:	* 436.8 lbs	Total Cost:	** ▲$21500.
Installed Volume:	** .140 cu ft	Development Risk:	8
Resupply Volume:	* .162 cu ft		

Rationale: Assume wipe usage of 2 paper napkins per man per meal, plus extra 33% of total for contingency factor; grand total of 48 wipes per day. - Total supply requirements converted to equivalent commercial single packages (bulk) which have slight effect on increasing or decreasing the contingency quantity. - *2 packages (520 packages for 10 years). - **2 dispensers. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.1.2 (Page 1 of 2)

Title: Dispenser For Disposable Personal Wipes

Applicable Mission Numbers

007 - 012

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.1

Physical Description: Box-type enclosure of aluminum or stainless-steel construction, having provisions for internal retention and dispensing of disposable absorbent paper napkins in individually folded form. The enclosure is divided into two hinged sections of equal size which permits opening for loading purposes. A simple latching feature is incorporated for closure. Openings are provided on opposite sides for removal of individual paper napkins. Two independently acting spring-loaded plates are included inside the container to push and maintain the napkins in position for removal through the side openings. The dispenser will accommodate 100 napkins (i.e., 50 in each side section).

The dispenser unit is approximately 4.75 x 4.25 x 6.0 inches, weighing 1.479 pounds.

A single package of 300 paper wipes, prefolded to a size compatible with the dispenser, will be 3.50 x 5.0 x 8.0 inches, weighing .8375 pounds. Each wipe is 10.0 x 12.0 inches in size unfolded, and 3.50 x 5.0 inches in size folded.

Functional Description: For personal hygienic considerations, providing means for wiping of mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.1.2 (Page 2 of 2)

Title: Dispenser For Disposable Personal Wipes

Detail Data

Reliability:	MTBF-→∞ (OP Hrs N/A)	**10 Year Resupply Volume:**	* 84.240 cu ft
Maintainability:	MTTR = .25 hrs	**Peak Power:**	0
Safety:	0	**Energy:**	0
Crew Acceptance:	8	**Water (155°F):**	0
Installed Weight:	** 5.92 lbs	**Water (50°F):**	0
Resupply Weight:	* 3.36 lbs	**Crew Operating Time:**	N/A
10 Year Resupply Weight:	* 873.60 lbs	**Total Cost:**	** ▲$22500.
Installed Volume:	** .280 cu ft	**Development Risk:**	8
Resupply Volume:	* .324 cu ft		

Rationale: Assume wipe usage of 2 paper napkins per man per meal, plus extra 33% of total for contingency factor; grand total of 96 wipes per day. - Total supply requirements converted to equivalent commercial single packages (bulk) which have slight effect on increasing or decreasing the contingency quantity. *4 packages (1040 packages for 10 years). - ** 4 dispensers. ▲ Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.1.3 (Page 1 of 2)

Title: Dispenser For Disposable Personal Wipes

Applicable Mission Numbers

013 - 018

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.1

Physical Description: Box-type enclosure of aluminum or stainless-steel construction, having provisions for internal retention and dispensing of disposable absorbent paper napkins in individually folded form. The enclosure is divided into two hinged sections of equal size which permits opening for loading purposes. A simple latching feature is incorporated for closure. Openings are provided on opposite sides for removal of individual paper napkins. Two independently acting spring-loaded plates are included inside the container to push and maintain the napkins in position for removal through the side openings. The dispenser will accommodate 100 napkins (i.e., 50 in each side section).

The dispenser unit is approximately 4.75 x 4.25 x 6.0 inches, weighing 1.479 pounds.

A single package of 300 paper wipes, prefolded to a size compatible with the dispenser, will be 3.50 x 5.0 x 8.0 inches, weighing .8375 pounds. Each wipe is 10.0 x 12.0 inches in size unfolded, and 3.50 x 5.0 inches in size folded.

Functional Description: For personal hygienic considerations, providing means for wiping of mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.1.3 (Page 2 of 2)

Title: Dispenser For Disposable Personal Wipes

Detail Data

Reliability: MTBF ->∞ (OP.Hrs N/A)	**10 Year Resupply Volume:** *189.540 cu ft
Maintainability: MTTR = .25 hrs	**Peak Power:** 0
Safety: 0	**Energy:** 0
Crew Acceptance: 8	**Water (155°F):** 0
Installed Weight: ** 13.32 lbs	**Water (50°F):** 0
Resupply Weight: * 7.56 lbs	**Crew Operating Time:** N/A
10 Year Resupply Weight: * 1965.60 lbs	**Total Cost:** ** ▲$25000.
Installed Volume: ** .630 cu ft	**Development Risk:** 8
Resupply Volume: * .729 cu ft	

Rationale: Assume wipe usage of 2 paper napkins per man per meal, plus extra 33% of total for contingency factor; grand total of 200 wipes per day. - Total supply requirements converted to equivalent commercial single packages (bulk) which have slight effect on increasing or decreasing the contingency quantity - * 9 packages (2340 packages for 10 years). - ** 9 Dispensers" ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.1.5 (Page 1 of 2)

Title: Dispenser For Disposable Personal Wipes

Applicable Mission Numbers

025 - 030

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.1

Physical Description: Box-type enclosure of aluminum or stainless-steel construction, having provisions for internal retention and dispensing of disposable absorbent paper napkins in individually folded form. The enclosure is divided into two hinged sections of equal size which permits opening for loading purposes. A simple latching feature is incorporated for closure. Openings are provided on opposite sides for removal of individual paper napkins. Two independently acting spring-loaded plates are included inside the container to push and maintain the napkins in position for removal through the side openings. The dispenser will accommodate 100 napkins (i.e., 50 in each side section).

The dispenser unit is approximately 4.75 x 4.25 x 6.0 inches, weighing 1.479 pounds.

A single package of 300 paper wipes, prefolded to a size compatible with the dispenser, will be 3.50 x 5.0 x 8.0 inches, weighing .8375 pounds. Each wipe is 10.0 x 12.0 inches in size unfolded, and 3.50 x 5.0 inches in size folded.

Functional Description: For personal hygienic considerations, providing means for wiping of mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.1.5 (Page 2 of 2)

Title: Dispenser For Disposable Personal Wipes

Detail Data

Reliability:	MTBF→∞ (OP Hrs N/A)	**10 Year Resupply Volume:**	* 45.360 cu ft
Maintainability:	MTTR = .25 hrs	**Peak Power:**	0
Safety:	0	**Energy:**	0
Crew Acceptance:	8	**Water (155°F):**	0
Installed Weight:	** 2.96 lbs	**Water (50°F):**	0
Resupply Weight:	* 11.76 lbs	**Crew Operating Time:**	N/A
10 Year Resupply Weight:	* 470.4 lbs	**Total Cost:**	** ▲$21500.
Installed Volume:	** .140 cu ft	**Development Risk:**	8
Resupply Volume:	* 1.134 cu ft		

Rationale: Assume wipe usage of 2 paper napkins per man per meal, plus extra 33% of total for contingency factor; grand total of 48 wipe per day. - Total supply requirements converted to equivalent commercial single packages (bulk) which have slight effect on increasing or decreasing the contingency quantity. - * 14 packages (560 packages for 10 years). - ** 2 dispensers. ▲ Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.1.6 (Page 1 of 2)

Title: Dispenser For Disposable Personal Wipes

Applicable Mission Numbers

031 - 036

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.1

Physical Description: Box-type enclosure of aluminum or stainless-steel construction, having provisions for internal retention and dispensing of disposable absorbent paper napkins in individually folded form. The enclosure is divided into two hinged sections of equal size which permits opening for loading purposes. A simple latching feature is incorporated for closure. Openings are provided on opposite sides for removal of individual paper napkins. Two independently acting spring-loaded plates are included inside the container to push and maintain the napkins in position for removal through the side openings. The dispenser will accommodate 100 napkins (i.e., 50 in each side section).

The dispenser unit is approximately 4.75 x 4.25 x 6.0 inches, weighing 1.479 pounds.

A single package of 300 paper wipes, prefolded to a size compatible with the dispenser, will be 3.50 x 5.0 x 8.0 inches, weighing .8375 pounds. Each wipe is 10.0 x 12.0 inches in size unfolded, and 3.50 x 5.0 inches in size folded.

Functional Description: For personal hygienic considerations, providing means for wiping of mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.1.6 (Page 2 of 2)

Title: Dispenser For Disposable Personal Wipes

Detail Data

Reliability:	MTBF→∞ (OP Hrs. N/A)	**10 Year Resupply Volume:**	* 93.960 cu ft
Maintainability:	MTTR = .25 hrs	**Peak Power:**	0
Safety:	0	**Energy:**	0
Crew Acceptance:	8	**Water (155°F):**	0
Installed Weight:	** 5.92 lbs	**Water (50°F):**	0
Resupply Weight:	* 24.36 lbs	**Crew Operating Time:**	N/A
10 Year Resupply Weight:	* 974.40 lbs	**Total Cost:**	** ▲$22500.
Installed Volume:	** .280 cu ft	**Development Risk:**	8
Resupply Volume:	* 2.349 cu ft		

Rationale Assume wipe usage of 2 paper napkins per man per meal, plus 33% of total contingency factor; grand total of 96 wipes per day. - Total supply requirements converted to equivalent commercial single packages (bulk) which have slight effect on increasing or decreasing the contingency quantity. - * 29 packages (1160 packages for 10 years). - ** 4 dispensers. ▲ Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.1.7 (Page 1 of 2)

Title: Dispenser For Disposable Personal Wipes

Applicable Mission Numbers

037 - 042

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.1

Physical Description: Box-type enclosure of aluminum or stainless-steel construction, having provisions for internal retention and dispensing of disposable absorbent paper napkins in individually folded form. The enclosure is divided into two hinged sections of equal size which permits opening for loading purposes. A simple latching feature is incorporated for closure. Openings are provided on opposite sides for removal of individual paper napkins. Two independently acting spring-loaded plates are included inside the container to push and maintain the napkins in position for removal through the side openings. The dispenser will accommodate 100 napkins (i.e., 50 in each side section).

The dispenser unit is approximately 4.75 x 4.25 x 6.0 inches, weighing 1.479 pounds.

A single package of 300 paper wipes, prefolded to a size compatible with the dispenser, will be 3.50 x 5.0 x 8.0 inches, weighing .8375 pounds. Each wipe is 10.0 x 12.0 inches in size unfolded, and 3.50 x 5.0 inches in size folded.

Functional Description: For personal hygienic considerations, providing means for wiping of mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.1.7 (Page 2 of 2)

Title: Dispenser For Disposable Personal Wipes

Detail Data

Reliability:	MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume:	* 194.400 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	** 13.32 lbs	Water (50°F):	0
Resupply Weight:	* 50.40 lbs	Crew Operating Time:	N/A
10 Year Resupply Weight:	* 2016.00 lbs	Total Cost:	** ▲ $25000.
Installed Volume:	** .630 cu ft	Development Risk:	8
Resupply Volume:	* 4.860 cu ft		

Rationale: Assume wipe usage of 2 paper napkins per man per meal, plus extra 33% of total for contingency factor; grand total of 200 wipes per day. - Total supply requirements converted to equivalent commercial single packages (bulk which have slight effect on increasing or decreasing the contingency quantity. -*6 packages(2400 packages for 10 years) **9 dispensers. Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.2.1 (Page 1 of 2)

Title: Dispenser For Reusable Personal Wipes

Applicable Mission Numbers

001-006

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.2

Physical Description: Drawer-like enclosure of aluminum construction for attachment to underside of dining table. Drawer has two separate sections, each of which has an over-center spring-loaded retainer to hold folded cloth napkins against the bottom of the drawer section; the over-center spring will maintain the retainer in its up position for convenience in removal of the napkins. The front of the drawer will have a flush-type finger actuated latch device for positive retention in its closed position; the finger grips may also be used for pulling the drawer open. The dispenser or drawer is approximately 8.0 x 8.0 x 2.0 inches and weighs approximately 2.5 pounds.

The cloth napkins are 12.0 x 12.0 inches unfolded, and are reusable after laundering. The drawer will accommodate napkins folded to dimensions of 6.0 x 3.0 inches for which the thickness becomes .16 inch. Each cloth napkin weighs approximately .075 pounds.

Functional Description: For personal hygienic considerations, providing means for wiping mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.2.1 **(Page 2 of 2)**

Title: Dispenser For Reusable Personal Wipes

Detail Data

Reliability: MTBF **(OP. HRS N/A)
Maintainability: MTTR = .25 hrs
Safety: 0
Crew Acceptance: 8
Installed Weight: * 19.00 lbs.
Resupply Weight: .281 lbs (Avg)
10 Year Resupply Weight: 73.13 lbs.
Installed Volume: * .497 cu.ft
Resupply Volume: .006 cu.ft (Avg)

10 Year Resupply Volume: 1.628 cu.ft
Peak Power: • 7500 Watts
Energy: • 360 watt-hrs/day
Water (155°F): • 12.0 lbs/day (Reclaim 36.0 lbs)
Water (50°F): • 24.0 lbs/day
Crew Operating Time: N/A
Total Cost: *▲ $22620.
Development Risk: 8

Rationale: Assume wipe usage of 1 cloth napkin per man per meal, plus extra 33% of total for contingency factor; grand total of 24 napkins per day with laundering at 5 day intervals and replacement after 90 washing or 448 days due to deterioration. -*4 dispensers and initial supply of 120 napkins included in installed weight & volume and cost.

▲ The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: • Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.2.2 (Page 1 of 2)

Title: Dispenser For Reusable Personal Wipes

Applicable Mission Numbers

007-012

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.2

Physical Description: Drawer-like enclosure of aluminum construction for attachment to underside of dining table. Drawer has two separate sections, each of which has an over-center spring-loaded retainer to hold folded cloth napkins against the bottom of the drawer section; the over-center spring will maintain the retainer in its up position for convenience in removal of the napkins. The front of the drawer will have a flush-type finger actuated latch device for positive retention in its closed position; the finger grips may also be used for pulling the drawer open. The dispenser or drawer is approximately 8.0 x 8.0 x 2.0 inches and weighs approximately 2.5 pounds.

The cloth napkins are 12.0 x 12.0 inches unfolded, and are reusable after laundering. The drawer will accommodate napkins folded to dimensions of 6.0 x 3.0 inches for which the thickness becomes .16 inch. Each cloth napkin weighs approximately .075 pounds.

Functional Description: For personal hygienic considerations, providing means for wiping mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.2.2 **(Page 2 of 2)**

Title: Dispenser For Reusable Personal Wipes

Detail Data

Reliability: MTBF $\rightarrow \infty$ (OP HRS N/A)
Maintainability: MTTR = .25 hrs
Safety: 0
Crew Acceptance: 8
Installed Weight: * 38.00 lbs
Resupply Weight: .563 lbs (Avg)
10 Year Resupply Weight: 146.25 lbs
Installed Volume: * .993 cu. ft.
Resupply Volume: .013 cu. ft (Avg.)

10 Year Resupply Volume: 3.258 cu. ft
Peak Power: • 7500 watts
Energy: • 720 watt-hrs/day
Water (155°F): • 24.0 lbs/day (Reclaim 72.0 lbs)
Water (50°F): • 48.0 lbs/day
Crew Operating Time: N/A
Total Cost: * ▲ $24740.
Development Risk: 8

Rationale: Assume wipe usage of 1 cloth napkin per man per meal, plus extra 33% of total for contingency factor; grand total of 48 napkins per day with laundering at 5 day intervals and replacement after 90 washing or 448 days due to deterioration. -* 8 dispensers and initial supply of 240 napkins included in installed weight & volume and cost.

▲ The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: • Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.2.3 (Page 1 of 2)

Title: Dispenser For Reusable Personal Wipes

Applicable Mission Numbers

013-018

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.2

Physical Description: Drawer-like enclosure of aluminum construction for attachment to underside of dining table. Drawer has two separate sections, each of which has an over-center spring-loaded retainer to hold folded cloth napkins against the bottom of the drawer section; the over-center spring will maintain the retainer in its up position for convenience in removal of the napkins. The front of the drawer will have a flush-type finger actuated latch device for positive retention in its closed position; the finger grips may also be used for pulling the drawer open. The dispenser or drawer is approximately 8.0 x 8.0 x 2.0 inches and weighs approximately 2.5 pounds.

The cloth napkins are 12.0 x 12.0 inches unfolded, and are reusable after laundering. The drawer will accommodate napkins folded to dimensions of 6.0 x 3.0 inches for which the thickness becomes .16 inch. Each cloth napkin weighs approximately .075 pounds.

Functional Description: For personal hygienic considerations, providing means for wiping mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.2.3 (Page 2 of 2)

Title: Dispenser For Reusable Personal Wipes

Detail Data

Reliability: MTBF $\rightarrow^{\infty}$ (OP HRS N/A)	10 Year Resupply Volume: 6.791 cu.ft.
Maintainability: MTTR = .25 hrs	Peak Power: • 7500 watts
Safety: 0	Energy: • 1500 watt-hrs/day
Crew Acceptance: 8	Water (155°F): • 50.0 lbs/day (Reclaim 150.0 lbs)
Installed Weight: * 77.50 lbs	Water (50°F): • 100.00 lbs/day
Resupply Weight: 1.172 lbs(Avg)	Crew Operating Time: N/A
10 Year Resupply Weight: 304.69 lbs	Total Cost: * ▲ $29,000
Installed Volume: * 2.020 cu.ft.	Development Risk: 8
Resupply Volume: .026 cu.ft.(Avg.)	

Rationale: Assume wipe usage of 1 cloth napkin per man per meal, plus extra 33% of total for contingency factor; grand total of 100 napkins per day with laundering at 5 day intervals and replacement after 90 washing or 448 days due to deterioration. -* 16 dispensers and initial supply of 500 napkins included in installed weight & volume and cost.

▲ The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: • Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.2.5 (Page 1 of 2)

Title: Dispenser For Reusable Personal Wipes

Applicable Mission Numbers

025-030

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.2

Physical Description: Drawer-like enclosure of aluminum construction for attachment to underside of dining table. Drawer has two separate sections, each of which has an over-center spring-loaded retainer to hold folded cloth napkins against the bottom of the drawer section; the over-center spring will maintain the retainer in its up position for convenience in removal of the napkins. The front of the drawer will have a flush-type finger actuated latch device for positive retention in its closed position; the finger grips may also be used for pulling the drawer open. The dispenser or drawer is approximately 8.0 x 8.0 x 2.0 inches and weighs approximately 2.5 pounds.

The cloth napkins are 12.0 x 12.0 inches unfolded, and are reusable after laundering. The drawer will accommodate napkins folded to dimensions of 6.0 x 3.0 inches for which the thickness becomes .16 inch. Each cloth napkin weighs approximately .075 pounds.

Functional Description: For personal hygienic considerations, providing means for wiping mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.2.5 **(Page 2 of 2)**

Title: Dispenser For Reusable Personal Wipes

Detail Data

Reliability: MTBF $\rightarrow \infty$ (OP HRS N/A)
Maintainability: MTTR = .25 hrs
Safety: 0
Crew Acceptance: 8
Installed Weight: * 19.00 lbs.
Resupply Weight: 1.80 lbs. (Avg.)
10 Year Resupply Weight: 72.00 lbs
Installed Volume: * .497 cu. ft. (Avg.)
Resupply Volume: .040 cu. ft.

10 Year Resupply Volume: 1.605 cu. ft.
Peak Power: • 7500 watts
Energy: • 360 watt-hrs/day
Water (155°F): • 12.0 lbs/day (Reclaim 36.0 lbs)
Water (50°F): • 24.0 lbs/day
Crew Operating Time: N/A
Total Cost: * ▲ $22620.
Development Risk: 8

Rationale: Assume wipe usage of 1 cloth napkin per man per meal, plus extra 33% of total for contingency factor; grand total of 24 napkins per day with laundering at 5 day intervals and replacement after 90 washing or 450 days due to deterioration. -¼ dispensers and initial supply of 120 napkins included in installed weight & volume and cost.

▲ The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: • Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.2.6 (Page 1 of 2)

Title: Dispenser For Reusable Personal Wipes

Applicable Mission Numbers

031-036

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.2

Physical Description: Drawer-like enclosure of aluminum construction for attachment to underside of dining table. Drawer has two separate sections, each of which has an over-center spring-loaded retainer to hold folded cloth napkins against the bottom of the drawer section; the over-center spring will maintain the retainer in its up position for convenience in removal of the napkins. The front of the drawer will have a flush-type finger actuated latch device for positive retention in its closed position; the finger grips may also be used for pulling the drawer open. The dispenser or drawer is approximately 8.0 x 8.0 x 2.0 inches and weighs approximately 2.5 pounds.

The cloth napkins are 12.0 x 12.0 inches unfolded, and are reusable after laundering. The drawer will accommodate napkins folded to dimensions of 6.0 x 3.0 inches for which the thickness becomes .16 inch. Each cloth napkin weighs approximately .075 pounds.

Functional Description: For personal hygienic considerations, providing means for wiping mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.2.6 **(Page 2 of 2)**

Title: Dispenser For Reusable Personal Wipes

Detail Data

Reliability: MTBF → ∞ (OP HRS N/A)
Maintainability: MTTR = .25 hrs
Safety: 0
Crew Acceptance: 8
Installed Weight: * 38.00 lbs.
Resupply Weight: 3.60 lbs. (Avg.)
10 Year Resupply Weight: 144.00 lbs.
Installed Volume: * .993 cu. ft.
Resupply Volume: .080 cu. ft. (Avg.)

10 Year Resupply Volume: 3.210 cu. ft.
Peak Power: • 7500 watts
Energy: • 720 watt-hrs/day
Water (155°F): • 24.0 lbs/day (Reclaim 72.0 lbs.)
Water (50°F): • 48.0 lbs/day
Crew Operating Time: N/A
Total Cost: * ▲ $24740.
Development Risk: 8

Rationale: Assume wipe usage of 1 cloth napkin per man per meal, plus extra 33% of total for contingency factor; grand total of 48 napkins per day with laundering at 5 day intervals and replacement after 90 washing or 450 days due to deterioration. -*8 dispensers and initial supply of 240 napkins included in installed weight & volume and cost.
▲ The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: • Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.2.7 (Page 1 of 2)

Title: Dispenser For Reusable Personal Wipes

Applicable Mission Numbers

037-042

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.2

Physical Description: Drawer-like enclosure of aluminum construction for attachment to underside of dining table. Drawer has two separate sections, each of which has an over-center spring-loaded retainer to hold folded cloth napkins against the bottom of the drawer section; the over-center spring will maintain the retainer in its up position for convenience in removal of the napkins. The front of the drawer will have a flush-type finger actuated latch device for positive retention in its closed position; the finger grips may also be used for pulling the drawer open. The dispenser or drawer is approximately 8.0 x 8.0 x 2.0 inches and weighs approximately 2.5 pounds.

The cloth napkins are 12.0 x 12.0 inches unfolded, and are reusable after laundering. The drawer will accommodate napkins folded to dimensions of 6.0 x 3.0 inches for which the thickness becomes .16 inch. Each cloth napkin weighs approximately .075 pounds.

Functional Description: For personal hygienic considerations, providing means for wiping mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.2.7 **(Page 2 of 2)**

Title: Dispenser For Reusable Personal Wipes

Detail Data

Reliability: MTBF→∞(OP HRS N/A)
Maintainability: MTTR=.25 hrs
Safety: 0
Crew Acceptance: 8
Installed Weight: * 77.50 lbs.
Resupply Weight: 7.50 lbs. (Avg.)
10 Year Resupply Weight: 300.00 lbs.
Installed Volume: * 2.020 cu. ft.
Resupply Volume: .167 cu. ft. (Avg.)

10 Year Resupply Volume: 6.688 cu. ft.
Peak Power: • 7500 watts
Energy: • 1500 watt-hrs/day
Water (155°F): • 50.0 lbs/day (Reclaim
Water (50°F): • 100.0 lbs/day 150.0 lbs)
Crew Operating Time: N/A
Total Cost: * ▲ $ 29000.
Development Risk: 8

Rationale: Assume wipe usage of 1 cloth napkin per man per meal, plus extra 33% of total for contingency factor; grand total of 100 napkins per day with laundering at 5 day intervals and replacement after 90 washing or 450 days due to deterioration. -*16 dispensers and initial supply of 500 napkins included in installed weight & volume and cost.
▲ The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: • Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.3.1 (Page 1 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Applicable Mission Numbers

001 - 006

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.3

Physical Description: Box type enclosure of aluminum or stainless-steel construction having provisions for internal retention and dispensing of disposable impregnated cleansing towelettes in individual packet form. The enclosure is divided into two separate compartments of equal size and has a single cover with suitable latching provisions. The opposite ends of each compartment, and matching portion of the cover, are cut-away to provide openings for removal of individual towelette packets. Each compartment contains a spring-loaded plate to push and maintain the packets in position for removal through the side openings. The dispenser will accommodate 48 packets (i.e., 24 in each compartment), the loading of which is accomplished by removal of the cover. The dispenser is approximately 4.25 x 4.25 x 3.25 inches, weighing approximately .80 pounds.

Each cleansing wipe or towelette is 5.5 x 8.0 inches unfolded and is impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated towelette is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Physical Description:

Functional Description: For personal hygienic considerations, providing a means for superficial cleansing of hands and face immediately after completion of eating, minimizing crew time at lavatories and water reclamation demands.

ELEMENT CONCEPT DATA SHEET # 6.2.3.1 (Page 2 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Detail Data

Reliability: MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume: * 31.98 cu ft
Maintainability: MTTR = .25 hrs	Peak Power: 0
Safety: 0	Energy: 0
Crew Acceptance: 8	Water (155°F): 0
Installed Weight: ** 1.60 lbs	Water (50°F): 0
Resupply Weight: * 3.28 lbs	Crew Operating Time: N/A
10 Year Resupply Weight: * 851.76 lbs	Total Cost: ** ▲$19000.
Installed Volume: ** .068 cu ft	Development Risk: 8
Resupply Volume: * .123 cu ft	

Rationale: * Assume use of 1 cleansing wipe (towelette) per man per meal.
**2 dispensers - ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.3.2 (Page 1 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Applicable Mission Numbers

007 - 012

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.3

Physical Description: Box type enclosure of aluminum or stainless-steel construction having provisions for internal retention and dispensing of disposable impregnated cleansing towelettes in individual packet form. The enclosure is divided into two separate compartments of equal size and has a single cover with suitable latching provisions. The opposite ends of each compartment, and matching portion of the cover, are cut-away to provide openings for removal of individual towelette packets. Each compartment contains a spring-loaded plate to push and maintain the packets in position for removal through the side openings. The dispenser will accommodate 48 packets (i.e., 24 in each compartment), the loading of which is accomplished by removal of the cover. The dispenser is approximately 4.25 x 4.25 x 3.25 inches, weighing approximately .80 pounds.

Each cleansing wipe or towelette is 5.5 x 8.0 inches unfolded and is impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated towelette is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Physical Description:

Functional Description: For personal hygienic considerations, providing a means for superficial cleansing of hands and face immediately after completion of eating, minimizing crew time at lavatories and water reclamation demands.

ELEMENT CONCEPT DATA SHEET # 6.2.3.2 **(Page 2 of 2)**

Title: Dispenser For Impregnated Personal Cleansing Wipes

Detail Data

Reliability: MTBF→∞ (OP Hrs N/A)	**10 Year Resupply Volume:** * 63.96 cu ft
Maintainability: MTTR = .25 hrs	**Peak Power:** 0
Safety: 0	**Energy:** 0
Crew Acceptance: 8	**Water (155°F):** 0
Installed Weight: ** 3.20 lbs	**Water (50°F):** 0
Resupply Weight: * 6.55 lbs	**Crew Operating Time:** N/A
10 Year Resupply Weight: * 1703.52 lbs	**Total Cost:** ** ▲$20000.
Installed Volume: ** .136 cu ft	**Development Risk:** 8
Resupply Volume: * .246 cu ft	

Rationale: * Assume use of 1 cleansing wipe (towelette) per man per meal.
** 4 dispensers. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.3.3 (Page 1 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Applicable Mission Numbers

013 - 018

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.3

Physical Description: Box type enclosure of aluminum or stainless-steel construction having provisions for internal retention and dispensing of disposable impregnated cleansing towelettes in individual packet form. The enclosure is divided into two separate compartments of equal size and has a single cover with suitable latching provisions. The opposite ends of each compartment, and matching portion of the cover, are cut-away to provide openings for removal of individual towelette packets. Each compartment contains a spring-loaded plate to push and maintain the packets in position for removal through the side openings. The dispenser will accommodate 48 packets (i.e., 24 in each compartment), the loading of which is accomplished by removal of the cover. The dispenser is approximately 4.25 x 4.25 x 3.25 inches, weighing approximately .80 pounds.

Each cleansing wipe or towelette is 5.5 x 8.0 inches unfolded and is impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated towelette is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Physical Description:

Functional Description: For personal hygienic considerations, providing a means for superficial cleansing of hands and face immediately after completion of eating, minimizing crew time at lavatories and water reclamation demands.

ELEMENT CONCEPT DATA SHEET # 6.2.3.3 **(Page 2 of 2)**

Title: Dispenser For Impregnated Personal Cleansing Wipes

Detail Data

Reliability: MTBF→∞ (OP Hrs N/A)	**10 Year Resupply Volume:** * 133.38 cu ft
Maintainability: MTTR = .25 hrs	**Peak Power:** 0
Safety: 0	**Energy:** 0
Crew Acceptance: 8	**Water (155°F):** 0
Installed Weight: ** 7.20 lbs	**Water (50°F):** 0
Resupply Weight: * 13.65 lbs	**Crew Operating Time:** N/A
10 Year Resupply Weight: * 3549.0 lbs	**Total Cost:** ** ▲$22500.
Installed Volume: ** .306 cu ft	**Development Risk:** 8
Resupply Volume: * .513 cu ft	

Rationale: * Assume use of 1 cleansing wipe (towelette) per man per meal.

** 9 Dispensers. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.3.5 (Page 1 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Applicable Mission Numbers

025 - 030

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.3

Physical Description: Box type enclosure of aluminum or stainless-steel construction having provisions for internal retention and dispensing of disposable impregnated cleansing towelettes in individual packet form. The enclosure is divided into two separate compartments of equal size and has a single cover with suitable latching provisions. The opposite ends of each compartment, and matching portion of the cover, are cut-away to provide openings for removal of individual towelette packets. Each compartment contains a spring-loaded plate to push and maintain the packets in position for removal through the side openings. The dispenser will accommodate 48 packets (i.e., 24 in each compartment), the loading of which is accomplished by removal of the cover. The dispenser is approximately 4.25 x 4.25 x 3.25 inches, weighing approximately .80 pounds.

Each cleansing wipe or towelette is 5.5 x 8.0 inches unfolded and is impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated towelette is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Physical Description:

Functional Description: For personal hygienic considerations, providing a means for superficial cleansing of hands and face immediately after completion of eating, minimizing crew time at lavatories and water reclamation demands.

ELEMENT CONCEPT DATA SHEET # 6.2.3.5 **(Page 2 of 2)**

Title: Dispenser For Impregnated Personal Cleansing Wipes

Detail Data

Reliability: MTBF→∞ (OP Hrs N/A)	**10 Year Resupply Volume:** * 31.64 cu ft
Maintainability: MTTR = .25 hrs	**Peak Power:** 0
Safety: 0	**Energy:** 0
Crew Acceptance: 8	**Water (155°F):** 0
Installed Weight: ** 1.60 lbs	**Water (50°F):** 0
Resupply Weight: * 21.06 lbs	**Crew Operating Time:** N/A
10 Year Resupply Weight: * 842.4 lbs	**Total Cost:** ** ▲$19000.
Installed Volume: ** .068 cu ft	**Development Risk:** 8
Resupply Volume: * .791 cu ft	

Rationale: * Assume use of 1 cleansing wipe (towelette) per man per meal.
** 2 Dispensers - ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.3.6 (Page 1 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Applicable Mission Numbers

031 - 036

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.3

Physical Description: Box type enclosure of aluminum or stainless-steel construction having provisions for internal retention and dispensing of disposable impregnated cleansing towelettes in individual packet form. The enclosure is divided into two separate compartments of equal size and has a single cover with suitable latching provisions. The opposite ends of each compartment, and matching portion of the cover, are cut-away to provide openings for removal of individual towelette packets. Each compartment contains a spring-loaded plate to push and maintain the packets in position for removal through the side openings. The dispenser will accommodate 48 packets (i.e., 24 in each compartment), the loading of which is accomplished by removal of the cover. The dispenser is approximately 4.25 x 4.25 x 3.25 inches, weighing approximately .80 pounds.

Each cleansing wipe or towelette is 5.5 x 8.0 inches unfolded and is impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated towelette is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Physical Description:

Functional Description: For personal hygienic considerations, providing a means for superficial cleansing of hands and face immediately after completion of eating, minimizing crew time at lavatories and water reclamation demands.

ELEMENT CONCEPT DATA SHEET # 6.2.3.6 (Page 2 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Detail Data

Reliability:	MTBF→∞ (OP. Hrs N/A)	10 Year Resupply Volume:	* 63.28 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	** 3.20 lbs	Water (50°F):	0
Resupply Weight:	* 42.12 lbs	Crew Operating Time:	N/A
10 Year Resupply Weight:	* 1684.8 lbs.	Total Cost:	** ▲$20000.
Installed Volume:	** .136 cu ft	Development Risk:	8
Resupply Volume:	* 1.582 cu ft		

Rationale: * Assume use of 1 cleansing wipe (towelette) per man per meal.

** 4 Dispensers - ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.3.7 (Page 1 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Applicable Mission Numbers

037 - 042

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.3

Physical Description: Box type enclosure of aluminum or stainless-steel construction having provisions for internal retention and dispensing of disposable impregnated cleansing towelettes in individual packet form. The enclosure is divided into two separate compartments of equal size and has a single cover with suitable latching provisions. The opposite ends of each compartment, and matching portion of the cover, are cut-away to provide openings for removal of individual towelette packets. Each compartment contains a spring-loaded plate to push and maintain the packets in position for removal through the side openings. The dispenser will accommodate 48 packets (i.e., 24 in each compartment), the loading of which is accomplished by removal of the cover. The dispenser is approximately 4.25 x 4.25 x 3.25 inches, weighing approximately .80 pounds.

Each cleansing wipe or towelette is 5.5 x 8.0 inches unfolded and is impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated towelette is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Physical Description:

Functional Description: For personal hygienic considerations, providing a means for superficial cleansing of hands and face immediately after completion of eating, minimizing crew time at lavatories and water reclamation demands.

ELEMENT CONCEPT DATA SHEET # 6.2.3.7 (Page 2 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Detail Data

Reliability: MTBF→∞ (OP Hrs N/A)	**10 Year Resupply Volume:** * 131.88 cu ft
Maintainability: MTTR = .25 hrs	**Peak Power:** 0
Safety: 0	**Energy:** 0
Crew Acceptance: 8	**Water (155°F):** 0
Installed Weight: ** 7.20 lbs	**Water (50°F):** 0
Resupply Weight: * 87.75 lbs	**Crew Operating Time:** N/A
10 Year Resupply Weight: * 3510.0 lbs	**Total Cost:** ** ▲ $22500.
Installed Volume: ** .306 cu ft	**Development Risk:** 8
Resupply Volume: * 3.297 cu ft	

Rationale: * Assume use of 1 cleansing wipe (towelette) per man per meal.

** 9 Dispensers. - ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET #6.2.4.1

Title: Receptacle For Temporary Retention of Soiled Wipes

Applicable Mission Numbers: 001 - 006

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.4

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of a dining table. The removable cover would have provision for attachment of a thin film plastic bag which would be disposed of along with any contained waste material. The unit is approximately 6.0 x 6.0 x 8.0 inches in size and approximately .5 pound in weight. The disposable liner is approximately 3.0 x 3.0 x .03 inches in flat storage form, weighing approximately .001 pounds.

Functional Description: For convenient removal of soiled wipes (either disposable or reusable) during process of dining, for sociological and aesthetic reasons, and temporary retention pending more complete clean-up operations.

Detail Data

Reliability:	MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume:	** 5.111 cu ft.
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	*1.5 lbs	Water (50°F):	0
Resupply Weight:	**.126 lbs	Crew Operating Time:	.3 hr/day
10 Year Resupply Weight:	** 32.76 lbs	Total Cost:	* ▲$19500.
Installed Volume:	*.501 cu ft	Development Risk:	8
Resupply Volume:	** .020 cu ft		

Rationale: * Assume 1 receptacle between each 2 dining positions

** Assume replacement of bags after each of 3 meal periods - ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.4.2

Title: Receptacle For Temporary Retention of Soiled Wipes

Applicable Mission Numbers: 007 - 012

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.4

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of a dining table. The removable cover would have provision for attachment of a thin film plastic bag which would be disposed of along with any contained waste material. The unit is approximately 6.0 x 6.0 x 8.0 inches in size and approximately .5 pound in weight. The disposable liner is approximately 3.0 x 3.0 x .03 inches in flat storage form, weighing approximately .001 pounds.

Functional Description: For convenient removal of soiled wipes (either disposable or reusable) during process of dining, for sociological and aesthetic reasons, and temporary retention pending more complete clean-up operations.

Detail Data

Reliability:	MTBF → ∞ (OP Hrs N/A)	10 Year Resupply Volume:	** 10.221 cu ft.
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	* 3.0 lbs	Water (50°F):	0
Resupply Weight:	** .252 lbs	Crew Operating Time:	.3 hr/day
10 Year Resupply Weight:	** 65.52 lbs	Total Cost:	* ▲$21000.
Installed Volume:	* 1.002 cu ft.	Development Risk:	8
Resupply Volume:	** .039 cu ft.		

Rationale: * Assume 1 receptacle between each 2 dining positions

** Assume replacement of bags after each of 3 meal periods - ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.4.3

Title: Receptacle For Temporary Retention of Soiled Wipes

Applicable Mission Numbers: 013 - 018; 019 - 024

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.4

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of a dining table. The removable cover would have provision for attachment of a thin film plastic bag which would be disposed of along with any contained waste material. The unit is approximately 6.0 x 6.0 x 8.0 inches in size and approximately .5 pound in weight. The disposable liner is approximately 3.0 x 3.0 x .03 inches in flat storage form, weighing approximately .001 pounds.

Functional Description: For convenient removal of soiled wipes (either disposable or reusable) during process of dining, for sociological and aesthetic reasons, and temporary retention pending more complete clean-up operations.

Detail Data

Reliability: MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume: ** 22.146 cu ft.
Maintainability: MTTR = .25 hrs	Peak Power: 0
Safety: 0	Energy: 0
Crew Acceptance: 8	Water (155°F): 0
Installed Weight: * 6.5 lbs	Water (50°F): 0
Resupply Weight: ** .55 lbs	Crew Operating Time: 1.2 hr/day
10 Year Resupply Weight: ** 142 lbs	Total Cost: * ▲$24500.
Installed Volume: * 2.171 cu ft.	Development Risk: 8
Resupply Volume: ** .085 cu ft	

Rationale: * Assume 1 receptacle between each 2 dining positions

** Assume replacement of bags after each of 3 meal periods

▲ Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.4.4

Title: Receptacle For Temporary Retention of Soiled Wipes

Applicable Mission Numbers: 025 - 030

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.4

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of a dining table. The removable cover would have provision for attachment of a thin film plastic bag which would be disposed of along with any contained waste material. The unit is approximately 6.0 x 6.0 x 8.0 inches in size and approximately .5 pound in weight. The disposable liner is approximately 3.0 x 3.0 x .03 inches in flat storage form, weighing approximately .001 pounds.

Functional Description: For convenient removal of soiled wipes (either disposable or reusable) during process of dining, for sociological and aesthetic reasons, and temporary retention pending more complete clean-up operations.

Detail Data

Reliability:	MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume:	** 5.054 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	* 1.5 lbs	Water (50°F):	0
Resupply Weight:	** .81 lbs	Crew Operating Time:	.3 hr/day
10 Year Resupply Weight:	** 32.40 lbs	Total Cost:	* ▲$19500.
Installed Volume:	* .501 cu ft	Development Risk:	8
Resupply Volume:	** .126 cu ft		

Rationale: * Assume 1 receptacle between each 2 dining positions

** Assume replacement of bags after each of 3 meal periods - ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.4.5

Title: Receptacle For Temporary Retention of Soiled Wipes

Applicable Mission Numbers: 031 - 036

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.4

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of a dining table. The removable cover would have provision for attachment of a thin film plastic bag which would be disposed of along with any contained waste material. The unit is approximately 6.0 x 6.0 x 8.0 inches in size and approximately .5 pound in weight. The disposable liner is approximately 3.0 x 3.0 x .03 inches in flat storage form, weighing approximately .001 pounds.

Functional Description: For convenient removal of soiled wipes (either disposable or reusable) during process of dining, for sociological and aesthetic reasons, and temporary retention pending more complete clean-up operations.

Detail Data

Reliability:	MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume:	** 10.109 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	* 3.0 lbs	Water (50°F):	0
Resupply Weight:	** 1.62 lbs	Crew Operating Time:	.5 hr/day
10 Year Resupply Weight:	** 64.8 lbs	Total Cost:	* ▲$21000.
Installed Volume:	* 1.002 cu ft	Development Risk:	8
Resupply Volume:	** .253 cu ft		

Rationale: * Assume 1 receptacle between each 2 dining positions

** Assume replacement of bags after each of 3 meal periods - ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.4.6

Title: Receptacle For Temporary Retention of Soiled Wipes

Applicable Mission Numbers: 037 - 042; 043 - 048

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.4

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of a dining table. The removable cover would have provision for attachment of a thin film plastic bag which would be disposed of along with any contained waste material. The unit is approximately 6.0 x 6.0 x 8.0 inches in size and approximately .5 pound in weight. The disposable liner is approximately 3.0 x 3.0 x .03 inches in flat storage form, weighing approximately .001 pounds.

Functional Description: For convenient removal of soiled wipes (either disposable or reusable) during process of dining, for sociological and aesthetic reasons, and temporary retention pending more complete clean-up operations.

Detail Data

Reliability:	MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume:	** 21.902 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	* 6.5 lbs	Water (50°F):	0
Resupply Weight:	** 3.51 lbs	Crew Operating Time:	1.2 hr/day
10 Year Resupply Weight:	** 140.4 lbs	Total Cost:	* ▲$24500.
Installed Volume:	*2.171 cu. ft.	Development Risk:	8
Resupply Volume:	** .546 cu ft.		

Rationale: * Assume 1 receptacle between each 2 dining positions

** Assume replacement of bags after each of 3 meal periods. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.8.1

Title: Hand Carriage For Return of Meal Trays

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.4

Physical Description: *Rack-type depository for meal trays as use for the food serving and/or holding function described in concept data sheet 4.2.1.1.

Functional Description: For retention of returned meal trays preparatory to disposal of unconsumed food (or other waste) and cleaning of various dining utensils. Tray is inserted from dining side and withdrawn from galley side. (NOTE: May also be used for tray stowage in between meal periods if warranted.)

Detail Data

Reliability:	* N/A	10 Year Resupply Volume:	* N/A
Maintainability:	* N/A	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	0
Installed Weight:	* N/A	Water (50°F):	0
Resupply Weight:	* N/A	Crew Operating Time:	** .27 hr/day
10 Year Resupply Weight:	* N/A	Total Cost:	* N/A
Installed Volume:	* N/A	Development Risk:	* N/A
Resupply Volume:	* N/A		

Rationale: *The same equipment is employed in the delivery or holding and return of meal trays; therefore, weights, volumes, cost, etc are not applicable for this phase of clean-up function. ** Assume approximately 1 minute or .015 hr per man is expended for carrying tray from dining table, and insertion in rack, (includes time for subsequent removal therefrom).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.8.2

Title: Hand Carriage For Return of Meal Trays

Applicable Mission Numbers

007 - 012
031 - 036
055 - 060

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.4

Physical Description: *Rack-type depository for meal trays as use for the food serving and/or holding function described in concept data sheet 4.2.1.2

Functional Description: For retention of returned meal trays preparatory to disposal of unconsumed food (or other waste) and cleaning of various dining utensils. Tray is inserted from dining side and withdrawn from galley side. (NOTE: May also be used for tray stowage in between meal periods if warranted.)

Detail Data

Reliability:	* N/A	10 Year Resupply Volume:	* N/A
Maintainability:	* N/A	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	0
Installed Weight:	* N/A	Water (50°F):	0
Resupply Weight:	* N/A	Crew Operating Time:	.54 hr/day
10 Year Resupply Weight:	* N/A	Total Cost:	* N/A
Installed Volume:	* N/A	Development Risk:	* N/A
Resupply Volume:	* N/A		

Rationale: *The same equipment is employed in the delivery or holding and return of meal trays; therefore, weights, volumes, cost, etc. are not applicable for this phase of clean-up function. -** Assume approximately 1 minute or .015 hr per man is expended for carrying tray from dining table, and insertion in rack, (includes time for subsequent removal therefrom).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.8.3

Title: Hand Carriage For Return of Meal Trays

Applicable Mission Numbers

Function Reference: Provide For Clean-Up

013 - 018
037 - 042
061 - 066

Drawing Reference: D-6.2.4

Physical Description: *Rack-type depository for meal trays as use for the food serving and/or holding function described in concept data sheet 4.2.1.3.

Functional Description: For retention of returned meal trays preparatory to disposal of unconsumed food (or other waste) and cleaning of various dining utensils. Tray is inserted from dining side and withdrawn from galley side. (NOTE: May also be used for tray stowage in between meal periods if warranted.)

Detail Data

Reliability:	* N/A	10 Year Resupply Volume:	* N/A
Maintainability:	* N/A	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	4	Water (155°F):	0
Installed Weight:	* N/A	Water (50°F):	0
Resupply Weight:	* N/A	Crew Operating Time:	** 1.13 hr/day
10 Year Resupply Weight:	* N/A	Total Cost:	* N/A
Installed Volume:	* N/A	Development Risk:	* N/A
Resupply Volume:	* N/A		

Rationale: *The same equipment is employed in the delivery or holding and return of meal trays; therefore, weights, volumes, cost etc. are not applicable for this phase of clean-up function. ** Assume approximately 1 minute or .015 hr per man is expended for carrying tray from dining table, and insertion in rack, (includes time for subsequent removal therefrom).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.9.1

Title: Meal Tray Guided Return Rail System

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.9

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Physical Description: *Restrained guidance transport system as used for the food serving function described in concept data sheet 4.1.3.1.

Functional Description: For return transport of meal trays to galley, after dining completion, preparatory to disposal of unconsumed food (or other waste) and cleaning of various dining utensils.

Detail Data

Reliability: * N/A	10 Year Resupply Volume: * N/A
Maintainability: * N/A	Peak Power: * N/A
Safety: 0	Energy: 1.25 watt-hrs/day
Crew Acceptance: 7	Water (155°F): 0
Installed Weight: * N/A	Water (50°F): 0
Resupply Weight: N/A	Crew Operating Time: ** .13 hr/day
10 Year Resupply Weight: * N/A	Total Cost: * N/A
Installed Volume: * N/A	Development Risk: * N/A
Resupply Volume: * N/A	

Rationale: *The same equipment is employed in the delivery and return of meal trays; therefore, weights, volumes, cost, etc. are not applicable for this phase of clean-up function.
** Assume .4 minute or .007 hr per meal tray is expended for attachment and removal from rail.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.9.2

Title: Meal Tray Guided Return Rail System

Applicable Mission Numbers

007 - 012
031 - 036
055 - 060

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.9

Physical Description: *Restrained guidance transport system as used for the food serving function described in concept data sheet 4.1.3.2.

Functional Description: For return transport of meal trays to galley, after dining completion, preparatory to disposal of unconsumed food (or other waste) and cleaning of various dining utensils.

Detail Data

Reliability: * N/A	10 Year Resupply Volume: * N/A
Maintainability: * N/A	Peak Power: * N/A
Safety: 0	Energy: 1.55 watt-hrs/day
Crew Acceptance: 7	Water (155°F): 0
Installed Weight: * N/A	Water (50°F): 0
Resupply Weight: * N/A	Crew Operating Time: **.25 hr/day
10 Year Resupply Weight: * N/A	Total Cost: * N/A
Installed Volume: * N/A	Development Risk: * N/A
Resupply Volume: * N/A	

Rationale: *The same equipment is employed in the delivery and return of meal trays; therefore, weights, volumes, cost, etc. are ~~not~~ applicable for this phase of clean-up function.
**Assume .4 minute or .007 hr per meal tray ~~is expended~~ for attachment and removal from rail.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.9.3

Title: Meal Tray Guided Return Rail System

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.9

Applicable Mission Numbers

013 - 018 _____
037 - 042 _____
061 - 066 _____

Physical Description: *Restrained guidance transport system as used for the food serving function described in concept data sheet 4.1.3.3.

Functional Description: For return transport of meal trays to galley, after dining completion, preparatory to disposal of unconsumed food (or other waste) and cleaning of various dining utensils.

Detail Data

Reliability: * N/A	10 Year Resupply Volume: * N/A
Maintainability: * N/A	Peak Power: * N/A
Safety: 0	Energy: 2.15 watt-hrs/day
Crew Acceptance: 7	Water (155°F): 0
Installed Weight: * N/A	Water (50°F): 0
Resupply Weight: * N/A	Crew Operating Time: **.53 hr/day
10 Year Resupply Weight: * N/A	Total Cost: * N/A
Installed Volume: * N/A	Development Risk: * N/A
Resupply Volume: * N/A	

Rationale: *The same equipment is employed in the delivery and return of meal trays; therefore, weights, volumes, cost, etc are not applicable for this phase of clean-up function.
**Assume .4 minute or .007 hr per meal tray is expended for attachment and removal from rail.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.2.10.1

Title: Meal Tray Guided Return Carrier Unit

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.10A and B

Physical Description: *Restrained guidance transport system as used for the food serving function described in concept data sheet 4.1.7.1.

Functional Description: For collection and retention of meal trays after dining completion, and return transport to galley preparatory to disposal of unconsumed food (or other waste) and cleaning of various dining utensils. (NOTE: May also be used for tray stowage in between meal periods if warranted.)

Detail Data

Reliability:	* N/A	10 Year Resupply Volume:	* N/A
Maintainability:	* N/A	Peak Power:	* N/A
Safety:	0	Energy:	2.5 watt-hrs/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	* N/A	Water (50°F):	0
Resupply Weight:	* N/A	Crew Operating Time:	** .14 hr/day
10 Year Resupply Weight:	* N/A	Total Cost:	* N/A
Installed Volume:	* N/A	Development Risk:	* N/A
Resupply Volume:	* N/A		

Rationale: *The same equipment is employed in the delivery and return of meal trays; therefore, weights, volumes, cost, etc. are not applicable for this phase of clean-up function.
**Assume .5 minute or .008 hr per meal tray is expended for insertion and removal from unit.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.10.2

Title: Meal Tray Guided Return Carrier Unit

Applicable Mission Numbers

007 - 012
031 - 036
055 - 060

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.10A and B

Physical Description: *Restrained guidance transport system as used for the food serving function described in concept data sheet 4.1.7.2.

Functional Description: For collection and retention of meal trays after dining completion, and return transport to galley preparatory to disposal of unconsumed food (or other waste) and cleaning of various dining utensils. (NOTE: May also be used for tray stowage in between meal periods if warranted.)

Detail Data

Reliability: * N/A	10 Year Resupply Volume: *N/A
Maintainability: * N/A	Peak Power: * N/A
Safety: 0	Energy: 3.13 watt-hrs/day
Crew Acceptance: 6	Water (155°F): 0
Installed Weight: * N/A	Water (50°F): 0
Resupply Weight: * N/A	Crew Operating Time: ** .29 hr/day
10 Year Resupply Weight: * N/A	Total Cost: * N/A
Installed Volume: * N/A	Development Risk: * N/A
Resupply Volume: * N/A	

Rationale: *The same equipment is employed in the delivery and return of meal trays; therefore, weights, volumes, cost, etc. are not applicable for this phase of clean-up function.
** Assume .5 minute or .008 hr per meal tray is expended for insertion and removal from unit.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.10.3

Title: Meal Tray Guided Return Carrier Unit

Applicable Mission Numbers: 013 - 018; 037 - 042; 061 - 066

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.2.10A and B

Physical Description: *Restrained guidance transport system as used for the food serving function described in concept data sheet 4.1.7.3.

Functional Description: For collection and retention of meal trays after dining completion, and return transport to galley preparatory to disposal of unconsumed food (or other waste) and cleaning of various dining utensils. (NOTE: May also be used for tray stowage in between meal periods if warranted.)

Detail Data

Reliability: * N/A	10 Year Resupply Volume: * N/A
Maintainability: * N/A	Peak Power: * N/A
Safety: 0	Energy: 4.37 watt-hrs/day
Crew Acceptance: 6	Water (155°F): 0
Installed Weight: * N/A	Water (50°F): 0
Resupply Weight: * N/A	Crew Operating Time: ** .60 hr/day
10 Year Resupply Weight: * N/A	Total Cost: * N/A
Installed Volume: * N/A	Development Risk: * N/A
Resupply Volume: * N/A	

Rationale: *The same equipment is employed in the delivery and return of meal trays; therefore, weights, volumes, cost, etc. are not applicable for this phase of clean-up function.
** Assume .5 minute or .008 hr per meal tray is expended for insertion and removal from unit.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.1.1

Title: Temporary Reusable Soiled Wipes Storage Unit

Applicable Mission Numbers: 001-006

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.1

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a washable cloth bag which would be laundered along with the reusable wipes. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The cloth bag is approximately 10.0 x 5.0 x .5 inches in flat storage form weighing approximately .2 pounds.

Functional Description: For temporary collection and retention of soiled reusable wipes pending delivery to a remote laundry facility within the space vehicle.

Detail Data

Reliability: MTBF →∞ (OP Hrs N/A)	10 Year Resupply Volume: .585 cu ft.
Maintainability: MTTR = .25 hrs	Peak Power: • 7500 watts
Safety: 0	Energy: • 40 watt-hrs/day
Crew Acceptance: 7	Water (155°F): • 1.33 lbs/day (Reclaim 4.0 lbs)
Installed Weight: * 3.00 lbs	Water (50°F): • 2.67 lbs/day
Resupply Weight: .031 lbs (avg)	Crew Operating Time: • 2 hr/day
10 Year Resupply Weight: 8.13 lbs.	Total Cost: * ▲$20025.
Installed Volume: * 1.808 cu ft.	Development Risk: 8
Resupply Volume: .002 cu ft. (avg)	

Rationale: * Assume 1 bag per day usage with laundering at 5 day intervals and replacement after 90 washings or 448 days due to deterioration. Initial supply of 5 bags included in installed weight & volume & cost. ▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: • Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.1.2

Title: Temporary Reusable Soiled Wipes Storage Unit

Applicable Mission Numbers: 007-012

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.1

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a washable cloth bag which would be laundered along with the reusable wipes. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The cloth bag is approximately 10.0 x 5.0 x .5 inches in flat storage form weighing approximately .2 pounds.

Functional Description: For temporary collection and retention of soiled reusable wipes pending delivery to a remote laundry facility within the space vehicle.

Detail Data

Reliability: MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume: .585 cu ft
Maintainability: MTTR = .25 hrs	Peak Power: • 7500 watts
Safety: 0	Energy: • 40 watt-hrs/day
Crew Acceptance: 7	Water (155°F): • 1.33 lbs/day (Reclaim 4.0 lbs)
Installed Weight: * 3.00 lbs	Water (50°F): • 2.67 lbs/day
Resupply Weight: .031 lbs (avg)	Crew Operating Time: .4 hr/day
10 Year Resupply Weight: 8.13 lbs	Total Cost: * ▲$20025.
Installed Volume: * 1.808 cu ft.	Development Risk: 8
Resupply Volume: .002 cu ft (avg)	

Rationale: * Assume 1 bag per day usage with laundering at 5 day intervals and replacement after 90 washings or 448 days due to deterioration. Initial supply of 5 bags included in installed weight & volume & cost. ▲The cost of additional expendables for subsequent re supply missions is not included in this number.

Merits/Deficiencies: • Assume separate laundry facility is available with associated requirements noted.

Data Sources:

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ELEMENT CONCEPT DATA SHEET # 6.3.1.3

Title: Temporary Reusable Soiled Wipes Storage Unit

Applicable Mission Numbers: 013-018

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.1

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a washable cloth bag which would be laundered along with the reusable wipes. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The cloth bag is approximately 10.0 x 5.0 x .5 inches in flat storage form weighing approximately .2 pounds.

Functional Description: For temporary collection and retention of soiled reusable wipes pending delivery to a remote laundry facility within the space vehicle.

Detail Data

Reliability: MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume: 1.173 cu ft
Maintainability: MTTR = .25	Peak Power: • 7500 watts
Safety: 0	Energy: • 80 watt-hrs/day
Crew Acceptance: 7	Water (155°F): • 2.67 lbs/day (Reclaim 8.0 lbs)
Installed Weight: * 6.00 lbs	Water (50°F): • 5.33 lbs/day
Resupply Weight: .063 lbs (avg)	Crew Operating Time: .8 hr/day
10 Year Resupply Weight: 16.25 lbs	Total Cost: * ▲$21050.
Installed Volume: * 3.617 cu ft.	Development Risk: 8
Resupply Volume: .005 cu ft (avg)	

Rationale: * Assume use of 2 storage units. - Assume 2 bags per day usage with laundering at 5 day intervals and replacement after 90 washings or 448 days due to deterioration. Initial supply of 10 bags included in Installed Weight & Volume and cost - ▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: • Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.1.5

Title: Temporary Reusable Soiled Wipes Storage Unit

Applicable Mission Numbers: 025-030

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.1

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a washable cloth bag which would be laundered along with the reusable wipes. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The cloth bag is approximately 10.0 x 5.0 x .5 inches in flat storage form weighing approximately .2 pounds.

Functional Description: For temporary collection and retention of soiled reusable wipes pending delivery to a remote laundry facility within the space vehicle.

Detail Data

Reliability: MTBF → ∞ (OP Hrs N/A)	10 Year Resupply Volume: .578 cu ft.
Maintainability: MTTR = .25 hrs	Peak Power: • 7500 watts
Safety: 0	Energy: • 40 watt hrs/day
Crew Acceptance: 7	Water (155°F): • 1.33 lbs/day (Reclaim 4.0 lbs)
Installed Weight: * 3.00 lbs	Water (50°F): • 2.67 lbs/day
Resupply Weight: .20 lbs	Crew Operating Time: .2 hr/day
10 Year Resupply Weight: 8.00 lbs	Total Cost: * ▲$20025.
Installed Volume: *1.808 cu ft.	Development Risk: 8
Resupply Volume: .014 cu ft (avg.)	

Rationale: *Assume 1 bag per day usage with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. Initial supply of 5 bags included in installed weight & volume & cost. ▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: • Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.1.6

Title: Temporary Reusable Soiled Wipes Storage Unit

Applicable Mission Numbers: 031-036

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.1

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a washable cloth bag which would be laundered along with the reusable wipes. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The cloth bag is approximately 10.0 x 5.0 x .5 inches in flat storage form weighing approximately .2 pounds.

Functional Description: For temporary collection and retention of soiled reusable wipes pending delivery to a remote laundry facility within the space vehicle.

Detail Data

Reliability: MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume: .578 cu ft
Maintainability: MTTR = .25 hrs	Peak Power: › 7500 watts
Safety: 0	Energy: • 40 watt-hrs/day
Crew Acceptance: 7	Water (155°F): •1.33 lbs/day (Reclaim 4.0 lbs)
Installed Weight: * 3.00 lbs	Water (50°F): •2.67 lbs/day
Resupply Weight: .20 lbs (avg)	Crew Operating Time: .4 hr/day
10 Year Resupply Weight: 8.00 lbs	Total Cost: * ▲$20025.
Installed Volume: * 1.808 cu ft	Development Risk: 8
Resupply Volume: .014 cu ft (avg)	

Rationale: *Assume 1 bag per day usage with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. Initial supply of 5 bags included in installed weight & volume & cost. ▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies: • Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.1.7

Title: Temporary Reusable Soiled Wipes Storage Unit

Applicable Mission Numbers: 037-042

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.1

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a washable cloth bag which would be laundered along with the reusable wipes. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The cloth bag is approximately 10.0 x 5.0 x .5 inches in flat storage form weighing approximately .2 pounds.

Functional Description: For temporary collection and retention of soiled reusable wipes pending delivery to a remote laundry facility within the space vehicle.

Detail Data

Reliability: MTBF → ∞ (OP Hrs N/A)	10 Year Resupply Volume: 1.157 cu ft
Maintainability: MTTR = .25 hrs	Peak Power: 7500 watts
Safety: 0	Energy: 80 watt-hrs/day
Crew Acceptance: 7	Water (155°F): 2.67 lbs/day (Reclaim 8.0 lbs)
Installed Weight: *6.00 lbs.	Water (50°F): 5.33 lbs/day
Resupply Weight: .40 lbs (avg)	Crew Operating Time: 8 hr/day
10 Year Resupply Weight: 16.00 lbs	Total Cost: * ▲$21050.
Installed Volume: *3.617 cu. ft.	Development Risk: 8
Resupply Volume: .029 cu ft (avg)	

Rationale: *Assume use of 2 storage units. - Assume 2 bags per day usage with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. Initial supply of 10 bags included in installed weight & volume & cost. ▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET #6.3.2.1

Title: Temporary Debris Collection/Storage Unit

Applicable Mission Numbers: 001-006

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.2

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of debris or waste material, and retention thereof. The basic container will be of sheet metal construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a plastic bag-type liner which would be disposed of along with the contained debris. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The plastic bag is approximately 10.0 x 5.0 x .10 inches in flat storage form, weighing approximately .020 pounds.

Functional Description: For temporary collection and retention of soiled disposable wipes, food wraps or containers, unconsumed food, disposable dining aids, etc., pending further processing and delivery to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	MTBF →∞ (OP Hrs N/A)	10 Year Resupply Volume:	31.559 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	2.0 lbs	Water (50°F):	0
Resupply Weight:	* .84 lbs	Crew Operating Time:	.2 hr/day
10 Year Resupply Weight:	*218.4 lbs	Total Cost:	▲$20000.
Installed Volume:	1.736 cu ft	Development Risk:	8
Resupply Volume:	* .121 cu ft		

Rationale: * Assume replacement of bag after each of 3 meal periods/day. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.2.2

Title: Temporary Debris Collection/Storage Unit

Applicable Mission Numbers

007-012

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.2

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of debris or waste material, and retention thereof. The basic container will be of sheet metal construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a plastic bag-type liner which would be disposed of along with the contained debris. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The plastic bag is approximately 10.0 x 5.0 x .10 inches in flat storage form, weighing approximately .020 pounds.

Functional Description: For temporary collection and retention of soiled disposable wipes, food wraps or containers, unconsumed food, disposable dining aids, etc., pending further processing and delivery to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume:	31.559 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	2.0 lbs	Water (50°F):	0
Resupply Weight:	*.84 lbs	Crew Operating Time:	.4 hr/day
10 Year Resupply Weight:	* 218.4 lbs	Total Cost:	▲$20000.
Installed Volume:	1.736 cu ft	Development Risk:	8
Resupply Volume:	* .121 cu ft		

Rationale: * Assume replacement of bag after each of 3 meal periods/day. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET #6.3.2.3

Title: Temporary Debris Collection/Storage Unit

Applicable Mission Numbers: 013-018

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.2

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of debris or waste material, and retention thereof. The basic container will be of sheet metal construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a plastic bag-type liner which would be disposed of along with the contained debris. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The plastic bag is approximately 10.0 x 5.0 x .10 inches in flat storage form, weighing approximately .020 pounds.

Functional Description: For temporary collection and retention of soiled disposable wipes, food wraps or containers, unconsumed food, disposable dining aids, etc., pending further processing and delivery to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume:	63.118 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	* 4.0 lbs	Water (50°F):	0
Resupply Weight:	*1.68 lbs	Crew Operating Time:	.8 hr/day
10 Year Resupply Weight:	*436.8 lbs	Total Cost:	* ▲$21000.
Installed Volume:	* 3.472 cu ft	Development Risk:	8
Resupply Volume:	* .243 cu ft		

Rationale: * Assume use of 2 storage units. - Assume replacement of 2 bags after each of 3 meal periods/day. ▲Cost of expendables are not applicable to initial launch; however, cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.2.5

Title: Temporary Debris Collection/Storage Unit

Applicable Mission Numbers

025-030

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.2

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of debris or waste material, and retention thereof. The basic container will be of sheet metal construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a plastic bag-type liner which would be disposed of along with the contained debris. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The plastic bag is approximately 10.0 x 5.0 x .10 inches in flat storage form, weighing approximately .020 pounds.

Functional Description: For temporary collection and retention of soiled disposable wipes, food wraps or containers, unconsumed food, disposable dining aids, etc., pending further processing and delivery to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	MTBF → ∞ (OP Hrs N/A)	10 Year Resupply Volume:	* 31.212 cu ft.
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	2.0 lbs	Water (50°F):	0
Resupply Weight:	*5.4 lbs	Crew Operating Time:	.2 hr/day
10 Year Resupply Weight:	*216 lbs	Total Cost:	▲$20000.
Installed Volume:	1.736 cu ft	Development Risk:	8
Resupply Volume:	* .780 cu ft		

Rationale: * Assume replacement of bag after each of 3 meal periods/day. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.2.6

Title: Temporary Debris Collection/Storage Unit

Applicable Mission Numbers

031-036

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.2

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of debris or waste material, and retention thereof. The basic container will be of sheet metal construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a plastic bag-type liner which would be disposed of along with the contained debris. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The plastic bag is approximately 10.0 x 5.0 x .10 inches in flat storage form, weighing approximately .020 pounds.

Functional Description: For temporary collection and retention of soiled disposable wipes, food wraps or containers, unconsumed food, disposable dining aids, etc., pending further processing and delivery to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume:	* 31.212 cu ft.
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	2.0 lbs	Water (50°F):	0
Resupply Weight:	*5.4 lbs	Crew Operating Time:	.4 hr/day
10 Year Resupply Weight:	*216 lbs	Total Cost:	▲$20000.
Installed Volume:	1.736 cu ft	Development Risk:	8
Resupply Volume:	* .780 cu ft		

Rationale: * Assume replacement of bag after each of 3 meal periods/day. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.2.7

Title: Temporary Debris Collection/Storage Unit

Applicable Mission Numbers
037-042

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.2

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of debris or waste material, and retention thereof. The basic container will be of sheet metal construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a plastic bag-type liner which would be disposed of along with the contained debris. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The plastic bag is approximately 10.0 x 5.0 x .10 inches in flat storage form, weighing approximately .020 pounds.

Functional Description: For temporary collection and retention of soiled disposable wipes, food wraps or containers, unconsumed food, disposable dining aids, etc., pending further processing and delivery to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume:	* 63.424 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	* 4.0 lbs	Water (50°F):	0
Resupply Weight:	*10.8 lbs	Crew Operating Time:	.8 hr/day
10 Year Resupply Weight:	*432 lbs	Total Cost:	* ▲$21000.
Installed Volume:	* 3.472 cu ft	Development Risk:	8
Resupply Volume:	* 1.561 cu ft		

Rationale: * Assume use of 2 storage units. - Assume replacement of 2 bags after each of 3 meal periods/day. ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.6.1

Title: Hand Carriage for Transport of Debris

Applicable Mission Numbers

001-006
025-030
049-054

Function Reference: Provide for Clean-up

Drawing Reference:

Physical Description:

Functional Description: Self-explanatory

Detail Data

Reliability:	N/A	10 Year Resupply Volume:	0
Maintainability:	N/A	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	▲.13 hrs/day
10 Year Resupply Weight:	0	Total Cost:	0
Installed Volume:	0	Development Risk:	8
Resupply Volume:	0		

Rationale: There is no hardware or software involved in manual carriage of soiled wipe containments and/or galley debris containments, respectively, to remote laundery and general disposal areas within the space vehicle. ▲Crew operating time for this function is dependent upon the relative positions of the galley to the remote areas, assumed to be 100 feet with time to traverse approx. 3 feet per second, in addition to 3 minute allowance for preparatory and post-travel functions.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.6.2

Title: Hand Carriage for Transport of Debris

Applicable Mission Numbers
007-012
031-036
055-060

Function Reference: Provide for Clean-up

Drawing Reference:

Physical Description:

Functional Description: Self-Explanatory

Detail Data

Reliability:	N/A	10 Year Resupply Volume:	0
Maintainability:	N/A	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	▲.23 hr/day
10 Year Resupply Weight:	0	Total Cost:	0
Installed Volume:	0	Development Risk:	8
Resupply Volume:	0		

Rationale: There is no hardware or software involved in manual carriage of soiled wipe containments and/or galley debris containments, respectively, to remote laundery and general disposal areas within the space vehicle. ▲Crew operating time for this function is dependent upon the relative positions of the galley to the remote areas, assumed to be 200 feet, with time to traverse approx 3 feet per second, in addition to 4 minute allowance for preparatory and post-travel functions.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET #6.3.6.3

Title: Hand Carriage for Transport of Debris

Function Reference: Provide for Clean-Up

Drawing Reference:

Applicable Mission Numbers

013-018
037-042
061-066

Physical Description:

Functional Description: Self explanatory

Detail Data

Reliability:	N/A	10 Year Resupply Volume:	0
Maintainability:	N/A	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	0	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	▲.37 hr/day
10 Year Resupply Weight:	0	Total Cost:	0
Installed Volume:	0	Development Risk:	8
Resupply Volume:	0		

Rationale: There is no hardware or software involved in manual carriage of soiled wipe containments and/or galley debris containments, respectively, to remote laundery and general disposal areas within the space vheicle. ▲Crew operating time for this function is dependent upon the relative positions of the galley to the remote areas, assumed to be 300 ft, with time to traverse approx. 3 ft. per second, in addition to 8 minutes allowance for preparatory and post-travel functions.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.7.1

Title: Manual Movement of Debris Transporter

Function Reference: Provide for Clean-up

Drawing Reference: D-6.3.7A and B

Applicable Mission Numbers

001-006
025-030
049-054

Physical Description: Mobile carrier or depositor unit of aluminum framework, having handles to facilitate maneuvering, single-point restraint feature adapter to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g, but are effective in partial-g environment. The unit has open sides and open top with flexible webbing or net-type closure provisions which will confine the inserted articles. The size of the unit is approximately 15.0 x 15.0 x 30.0 inches and weighs approximately 8.0 pounds.

Functional Description: For facilitating transport of soiled wipe containments and various debris containments from the galley area to remote laundery and/or general disposal facilities within the space vehicle.

Detail Data

Reliability:	MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume:	0
Maintainability:	MTTR =.35 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	8.0 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	▲.18 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$32000.
Installed Volume:	3.906 cu ft.	Development Risk:	7
Resupply Volume:	0		

Rationale: ▲Crew operating time for this function is dependent upon the relative positions of the galley to the remote laundry and general disposal areas, assumed to be 100 feet with time to traverse approx. 3 feet per second, in addition to 6 minutes allowance for preparatory and post-travel functions.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.7.2

Title: Manual Movement of Debris Transporter

Applicable Mission Numbers

007-012
031-036
055-060

Function Reference: Provide for Clean-up

Drawing Reference: D-6.3.7A and B

Physical Description: Mobile carrier or depositor unit of aluminum framework, having handles to facilitate maneuvering, single-point restraint feature adapter to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g, but are effective in partial-g environment. The unit has open sides and open top with flexible webbing or net-type closure provisions which will confine the inserted articles. The size of the unit is approximately 15.0 x 20.0 x 30.0 inches and weighs approximately 10.0 pounds.

Functional Description: For facilitating transport of soiled wipe containments and various debris containments from the galley area to remote laundery and/or general disposal facilities within the space vehicle.

Detail Data

Reliability: MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume: 0
Maintainability: MTTR = .55 hrs	Peak Power: 0
Safety: 0	Energy: 0
Crew Acceptance: 7	Water (155°F): 0
Installed Weight: 10.0 lbs	Water (50°F): 0
Resupply Weight: 0	Crew Operating Time: ▲.30 hrs/day
10 Year Resupply Weight: 0	Total Cost: $32500.
Installed Volume: 5.208 cu ft.	Development Risk: 7
Resupply Volume: 0	

Rationale: ▲Crew operating time for this function is dependent upon the relative positions of the galley to the remote laundry and general disposal areas, assumed to be 200 feet with time to traverse approx. 3 feet per second, in addition to 8 minutes allowance for preparatory and post-travel functions.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.7.3

Title: Manual Movement of Debris Transporter

Function Reference: Provide for Clean-up

Drawing Reference: D-6.3.7A and B

Applicable Mission Numbers

013-018
037-042
061-066

Physical Description: Mobile carrier or depositor unit of aluminum framework, having handles to facilitate maneuvering, single-point restraint feature adapter to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g, but are effective in partial-g environment. The unit has open sides and open top with flexible webbing or net-type closure provisions which will confine the inserted articles. The size of the unit is approximately 15.0 x 30.0 x 30.0 inches and weighs approximately 12.5 pounds.

Functional Description: For facilitating transport of soiled wipe containments and various debris containments from the galley area to remote laundery and/or general disposal facilities within the space vehicle.

Detail Data

Reliability:	MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume:	0
Maintainability:	MTTR = .35 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	7	Water (155°F):	0
Installed Weight:	12.5 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	▲.50 hr/day
10 Year Resupply Weight:	0	Total Cost:	$33000.
Installed Volume:	7.812 cu. ft.	Development Risk:	7
Resupply Volume:	0		

Rationale: ▲Crew operating time for this function is dependent upon the relative positions of the galley to the remote laundry and general disposal areas, assumed to be 300 feet with time to traverse approx. 3 feet per second, in addition to 15 minutes allowance for preparatory and post-travel functions.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.11.1 (Page 1 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Applicable Mission Numbers: 001-006

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.11

Physical Description: The FH/RAD design for a zero-g sink employs an enclosed spherical chamber which has arm ports and a viewing port. The water flow is controlled from inside and is directed toward the drain. A blower, situated below the drain and below the air-water separator, induces streamlined air movement within the chamber causing all deflected water particles to again seek the drain. (Air drag guides and propels the fluid drops.) The air enters the chamber at the arm ports. This puts the greatest flow rate/unit area at the point which has the greatest chance of letting water escape to the environment. The spherical chamber enclosure is divided into two sections with an appropriate seal at the juncture. The lower section is fixed in position, and is of sufficient size to accommodate the largest of reusable dining utensils (trays or dishes) that will be used. The upper section, which includes the arm and viewing ports, is hinged to permit insertion and removal of utensils. Air-water separation is accomplished by a centrifugal separator. The centrifugal system uses a spinning cone to drive water to the outside of the separator structure where it is removed by a ram pitot effect. The air, however, passes right around the separator body and through the filter to be pulled through the intake of the blower.

The size of the sink is approximately 24.0 x 24.0 x 40.0 inches and weight without cleaning liquids is approximately 60 pounds. Operating power is approximately 1.5 Kw.

Functional Description: For washing of hands prior to, during, and subsequent to food preparation, also for washing reusable utensils by hand when situations so warrant.

Detail Data

Reliability: MTBF = 295000; OP Hrs=2190	10 Year Resupply Volume: ** 19.219 cu ft
Maintainability: MTTR = .5 hrs	Peak Power: 1500 watts
Safety: 0	Energy: 900 watt-hr/day
Crew Acceptance: 6	Water (155°F): * 1.64 lbs/day
Installed Weight: 60 lbs	Water (50°F): * 3.28 lbs/day (Reclaim 4.92 lbs)
Resupply Weight: ** 5.74 lbs	Crew Operating Time: .8 hr/day
10 Year Resupply Weight: **1492 lbs	Total Cost: ▲$2055000.
Installed Volume: 13.333 cu ft.	Development Risk: 4
Resupply Volume: ** .074 cu ft.	

ELEMENT CONCEPT DATA SHEET # 6.3.11.1 (Page 2 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Rationale: *Assume existence of reclaimable wash-water supply, independent of potable water. **Assume 12:1 ratio of water to expendable bactericide solution. - ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.3.11.2 (Page 1 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Applicable Mission Numbers: 007-012

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.11

Physical Description: The FH/RAD design for a zero-g sink employs an enclosed spherical chamber which has arm ports and a viewing port. The water flow is controlled from inside and is directed toward the drain. A blower, situated below the drain and below the air-water separator, induces streamlined air movement within the chamber causing all deflected water particles to again seek the drain. (Air drag guides and propels the fluid drops.) The air enters the chamber at the arm ports. This puts the greatest flow rate/unit area at the point which has the greatest chance of letting water escape to the environment. The spherical chamber enclosure is divided into two sections with an appropriate seal at the juncture. The lower section is fixed in position, and is of sufficient size to accommodate the largest of reusable dining utensils (trays or dishes) that will be used. The upper section, which includes the arm and viewing ports, is hinged to permit insertion and removal of utensils. Air-water separation is accomplished by a centrifugal separator. The centrifugal system uses a spinning cone to drive water to the outside of the separator structure where it is removed by a ram pitot effect. The air, however, passes right around the separator body and through the filter to be pulled through the intake of the blower.

The size of the sink is approximately 24.0 x 24.0 x 40.0 inches and weight without cleaning liquids is approximately 60 pounds. Operating power is approximately 1.5 Kw.

Functional Description: For washing of hands prior to, during, and subsequent to food preparation, also for washing reusable utensils by hand when situations so warrant.

Detail Data

Reliability: MTBF = 295000; OP Hrs=2920	10 Year Resupply Volume: **25.626 cu ft.
Maintainability: MTTR = .5 hrs	Peak Power: 1500 watts
Safety: 0	Energy: 1200 watt-hr/day
Crew Acceptance: 6	Water (155°F): *2.19 lbs/day
Installed Weight: 60	Water (50°F): *4.37 lbs/day (Reclaim 6.56 lbs)
Resupply Weight: ** 7.56 lbs	Crew Operating Time: 1.0 hr/day
10 Year Resupply Weight: **1966 lbs	Total Cost: ▲$2055000.
Installed Volume: 13.333 cu ft	Development Risk: 4
Resupply Volume: .099 cu ft	

ELEMENT CONCEPT DATA SHEET # 6.3.11.2 (Page 2 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Rationale: *Assume existence of reclaimable wash-water supply, independent of potable water. **Assume 12:1 ratio of water to expendable bactericide solution. -▲Cost of expendables are not applicable to initial launch, however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.11.3 (Page 1 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Applicable Mission Numbers: 013-018

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.11

Physical Description: The FH/RAD design for a zero-g sink employs an enclosed spherical chamber which has arm ports and a viewing port. The water flow is controlled from inside and is directed toward the drain. A blower, situated below the drain and below the air-water separator, induces streamlined air movement within the chamber causing all deflected water particles to again seek the drain. (Air drag guides and propels the fluid drops.) The air enters the chamber at the arm ports. This puts the greatest flow rate/unit area at the point which has the greatest chance of letting water escape to the environment. The spherical chamber enclosure is divided into two sections with an appropriate seal at the juncture. The lower section is fixed in position, and is of sufficient size to accommodate the largest of reusable dining utensils (trays or dishes) that will be used. The upper section, which includes the arm and viewing ports, is hinged to permit insertion and removal of utensils. Air-water separation is accomplished by a centrifugal separator. The centrifugal system uses a spinning cone to drive water to the outside of the separator structure where it is removed by a ram pitot effect. The air, however, passes right around the separator body and through the filter to be pulled through the intake of the blower.

The size of the sink is approximately 24.0 x 24.0 x 40.0 inches and weight without cleaning liquids is approximately 60 pounds. Operating power is approximately 1.5 Kw.

Functional Description: For washing of hands prior to, during, and subsequent to food preparation, also for washing reusable utensils by hand when situations so warrant.

Detail Data

Reliability:	MTBF = 295000; OP Hrs = 3650	10 Year Resupply Volume:	**32.032 cu ft.
Maintainability:	MTTR = .5 hrs	Peak Power:	1500 watts
Safety:	0	Energy:	1500 watt-hr/day
Crew Acceptance:	6	Water (155°F):	* 2.73 lbs/day
Installed Weight:	60 lbs	Water (50°F):	* 5.47 lbs/day (Reclaim 8.20 lbs)
Resupply Weight:	**9.52 lbs	Crew Operating Time:	1.2 hr/day
10 Year Resupply Weight:	**2475 lbs	Total Cost:	▲$2055000.
Installed Volume:	13.333 cu ft	Development Risk:	4
Resupply Volume:	** .123 cu ft		

ELEMENT CONCEPT DATA SHEET # 6.3.11.3 (Page 2 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Rationale: *Assume existence of reclaimable wash-water supply, independent of potable water. **Assume 12:1 ratio of water to expendable bactericide solution.-▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.11.5 (Page 1 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Applicable Mission Numbers: 025-030

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.11

Physical Description: The FH/RAD design for a zero-g sink employs an enclosed spherical chamber which has arm ports and a viewing port. The water flow is controlled from inside and is directed toward the drain. A blower, situated below the drain and below the air-water separator, induces streamlined air movement within the chamber causing all deflected water particles to again seek the drain. (Air drag guides and propels the fluid drops.) The air enters the chamber at the arm ports. This puts the greatest flow rate/unit area at the point which has the greatest chance of letting water escape to the environment. The spherical chamber enclosure is divided into two sections with an appropriate seal at the juncture. The lower section is fixed in position, and is of sufficient size to accommodate the largest of reusable dining utensils (trays or dishes) that will be used. The upper section, which includes the arm and viewing ports, is hinged to permit insertion and removal of utensils. Air-water separation is accomplished by a centrifugal separator. The centrifugal system uses a spinning cone to drive water to the outside of the separator structure where it is removed by a ram pitot effect. The air, however, passes right around the separator body and through the filter to be pulled through the intake of the blower.

The size of the sink is approximately 24.0 x 24.0 x 40.0 inches and weight without cleaning liquids is approximately 60 pounds. Operating power is approximately 1.5 Kw.

Functional Description: For washing of hands prior to, during, and subsequent to food preparation, also for washing reusable utensils by hand when situations so warrant.

Detail Data

Reliability:	MTBF=295000; OP Hrs=2190	10 Year Resupply Volume:	** 19.008 cu ft.
Maintainability:	MTTR = .5 hrs	Peak Power:	1500 watts
Safety:	0	Energy:	900 watt-hrs/day
Crew Acceptance:	6	Water (155°F):	* 1.64 lbs/day
Installed Weight:	60 lbs	Water (50°F):	* 2.28 lbs/day (Reclaim 4.92 lbs.)
Resupply Weight:	**36.9 lbs	Crew Operating Time:	.8 hr/day
10 Year Resupply Weight:	**1476 lbs	Total Cost:	▲$2055000.
Installed Volume:	13.333 cu ft	Development Risk:	4
Resupply Volume:	**.475 cu ft		

ELEMENT CONCEPT DATA SHEET # 6.3.11.5 (Page 2 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Rationale: *Assume existence of reclaimable wash-water supply, independent of potable water. **Assume 12:1 ratio of water to expendable bactericide solution.- ▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.11.6 (Page 1 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Applicable Mission Numbers: 031-036

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.11

Physical Description: The FH/RAD design for a zero-g sink employs an enclosed spherical chamber which has arm ports and a viewing port. The water flow is controlled from inside and is directed toward the drain. A blower, situated below the drain and below the air-water separator, induces streamlined air movement within the chamber causing all deflected water particles to again seek the drain. (Air drag guides and propels the fluid drops.) The air enters the chamber at the arm ports. This puts the greatest flow rate/unit area at the point which has the greatest chance of letting water escape to the environment. The spherical chamber enclosure is divided into two sections with an appropriate seal at the juncture. The lower section is fixed in position, and is of sufficient size to accommodate the largest of reusable dining utensils (trays or dishes) that will be used. The upper section, which includes the arm and viewing ports, is hinged to permit insertion and removal of utensils. Air-water separation is accomplished by a centrifugal separator. The centrifugal system uses a spinning cone to drive water to the outside of the separator structure where it is removed by a ram pitot effect. The air, however, passes right around the separator body and through the filter to be pulled through the intake of the blower.

The size of the sink is approximately 24.0 x 24.0 x 40.0 inches and weight without cleaning liquids is approximately 60 pounds. Operating power is approximately 1.5 Kw.

Functional Description: For washing of hands prior to, during, and subsequent to food preparation, also for washing reusable utensils by hand when situations so warrant.

Detail Data

Reliability: MTBF=295000; OP Hrs = 2920	10 Year Resupply Volume: ** 25.344 cu ft
Maintainability: MTTR = .5 hrs.	Peak Power: 1500 watts
Safety: 0	Energy: 1200 watt-hr/day
Crew Acceptance: 6	Water (155°F): * 2.16 lbs/day
Installed Weight: 60 lbs	Water (50°F): * 4.37 lbs/day(Reclaim 6.56 lbs)
Resupply Weight: ** 48.6 lbs	Crew Operating Time: 1.0 hr/day
10 Year Resupply Weight: **1944 lbs	Total Cost: ▲$2055000.
Installed Volume: 13.333 cu ft	Development Risk: 4
Resupply Volume: ** .634 cu ft.	

ELEMENT CONCEPT DATA SHEET # 6.3.11.6 (Page 2 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Rationale: *Assume existence of reclaimable wash-water supply, independent of potable water. **Assume 12:1 ratio of water to expendable bactericide solution.-▲Cost of expendables are not applicable to initial launch; however, the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.11.7 (Page 1 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Applicable Mission Numbers: 037-042

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.11

Physical Description: The FH/RAD design for a zero-g sink employs an enclosed spherical chamber which has arm ports and a viewing port. The water flow is controlled from inside and is directed toward the drain. A blower, situated below the drain and below the air-water separator, induces streamlined air movement within the chamber causing all deflected water particles to again seek the drain. (Air drag guides and propels the fluid drops.) The air enters the chamber at the arm ports. This puts the greatest flow rate/unit area at the point which has the greatest chance of letting water escape to the environment. The spherical chamber enclosure is divided into two sections with an appropriate seal at the juncture. The lower section is fixed in position, and is of sufficient size to accommodate the largest of reusable dining utensils (trays or dishes) that will be used. The upper section, which includes the arm and viewing ports, is hinged to permit insertion and removal of utensils. Air-water separation is accomplished by a centrifugal separator. The centrifugal system uses a spinning cone to drive water to the outside of the separator structure where it is removed by a ram pitot effect. The air, however, passes right around the separator body and through the filter to be pulled through the intake of the blower.

The size of the sink is approximately 24.0 x 24.0 x 40.0 inches and weight without cleaning liquids is approximately 60 pounds. Operating power is approximately 1.5 Kw.

Functional Description: For washing of hands prior to, during, and subsequent to food preparation, also for washing reusable utensils by hand when situations so warrant.

Detail Data

Reliability:	MTBF = 295000; OP Hrs = 3650	10 Year Resupply Volume:	** 31.680 cu ft
Maintainability:	MTTR = .5 hrs	Peak Power:	1500 watts
Safety:	0	Energy:	1500 watt-hr/day
Crew Acceptance:	6	Water (155°F):	* 2.73 lbs/day
Installed Weight:	60. lbs	Water (50°F):	* 5.47 lbs/day (Reclaim 8.20 lbs)
Resupply Weight:	** 61.2 lbs	Crew Operating Time:	1.2 hr/day
10 Year Resupply Weight:	**2448 lbs	Total Cost:	▲$2055000.
Installed Volume:	13.333 cu ft	Development Risk:	4
Resupply Volume:	** .792 cu ft		

ELEMENT CONCEPT DATA SHEET # 6.3.11.7 (Page 2 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Rationale: *Assume existence of reclaimable wash-water supply, independent of potable water. **Assume 12:1 ratio of water to expendable bactericide solution. ▲Cost of expendables are not applicable to initial launch; however, the cost of such materials for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.13.1 (Page 1 of 2)

Title: Combination Automatic Dishwasher/Dryer

Applicable Mission Numbers

001 - 006

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.13

Physical Description: The dishwasher/dryer is a cubical unit, one end of which contains an ultrasonic transducer and the cavity in which the items to be cleaned are placed, and the other end contains a water pump, motor, liquid-gas separator and filter unit.

The operational cycle consists of automatic washing (including ultrasonic vibration) and drying sequence suitable for zero-g and partial-g environments. The solvent system will be automatically metered and will not impose a toxic hazard. A positive method of solvent injection and recovery is included, along with a trap to collect particulate matter. Controls and operating equipment will be conveniently located. Surface coatings, particularly in the washing area are non-porous and easily cleaned. Holding racks for plates and utensils are capable of easy removal and replacement for cleaning purposes.

Soiled utensils are loaded into washing cavity, a surfactant is added, and operating power is applied for starting the cycle with operating controls adjusted to match loading. The cavity fills with water, the transducer is energized, and the washing cycle is started. The water heater will raise and hold water temperature at 170°F which also sterilizes the utensils. During the cleaning cycle, the water is circulated through the filter unit to remove extracted waste. Upon completing the 10-minute cleaning cycle (during this period the water is at 170°F for at least 5 minutes to effect sterilization), the wash water is pumped through the liquid-gas separator into the station wash water recovery system. The water spray rinse cycle is automatically actuated flushing the utensils. The flush water then follows the waste water removal cycle. The hot air drying system is automatically actuated for approximately 5 minutes which completes the washing cycle.

The unit is approximately 36.0 x 24.0 x 24.0 inches in size, weighing approximately 120 pounds. Operating power is an estimated 12000 watts.

Functional Description: For cleaning meal trays, dining utensils, and other small food preparation devices by automatic process of washing, drying, and sterilization.

ELEMENT CONCEPT DATA SHEET # 6.3.13.1 (Page 2 of 2)

Combination Automatic Dishwasher/Dryer

Detail Data

Reliability:	MTBF = 29,000 Hrs Op. Hrs. = 3650	10 Year Resupply Volume:	81.354 cu.ft.
Maintainability:	MTTR = .5 hrs	Peak Power:	12,000 watts
Safety:	0	Energy:	12000 watt-hrs/day
Crew Acceptance:	8	Water (155°F):	697.40 lbs/day (Reclaim)
Installed Weight:	120.0 lbs.	Water (50°F):	0
Resupply Weight:	19.53 lbs	Crew Operating Time:	.20 hrs/day
10 Year Resupply Weight:	5077.07 lbs	Total Cost:	$2,775,000.
Installed Volume:	12.0 cu.ft.	Development Risk:	2
Resupply Volume:	.313 cu.ft.		

Rationale: 1 unit, used after each meal period (three times per day).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.13.2 (Page 1 of 2)

Title: Combination Automatic Dishwasher/Dryer

Applicable Mission Numbers

007 - 012

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.13

Physical Description: The dishwasher/dryer is a cubical unit, one end of which contains an ultrasonic transducer and the cavity in which the items to be cleaned are placed, and the other end contains a water pump, motor, liquid-gas separator and filter unit.

The operational cycle consists of automatic washing (including ultrasonic vibration) and drying sequence suitable for zero-g and partial-g environments. The solvent system will be automatically metered and will not impose a toxic hazard. A positive method of solvent injection and recovery is included, along with a trap to collect particulate matter. Controls and operating equipment will be conveniently located. Surface coatings, particularly in the washing area are non-porous and easily cleaned. Holding racks for plates and utensils are capable of easy removal and replacement for cleaning purposes.

Soiled utensils are loaded into washing cavity, a surfactant is added, and operating power is applied for starting the cycle with operating controls adjusted to match loading. The cavity fills with water, the transducer is energized, and the washing cycle is started. The water heater will raise and hold water temperature at 170°F which also sterilizes the utensils. During the cleaning cycle, the water is circulated through the filter unit to remove extracted waste. Upon completing the 10-minute cleaning cycle (during this period the water is at 170°F for at least 5 minutes to effect sterilization), the wash water is pumped through the liquid-gas separator into the station wash water recovery system. The water spray rinse cycle is automatically actuated flushing the utensils. The flush water then follows the waste water removal cycle. The hot air drying system is automatically actuated for approximately 5 minutes which completes the washing cycle.

The unit is approximately 36.0 x 24.0 x 36.0 inches in size, weighing approximately 180 pounds. Operating power is an estimated 19500 watts.

Functional Description: For cleaning meal trays, dining utensils, and other small food preparation devices by automatic process of washing, drying, and sterilization.

ELEMENT CONCEPT DATA SHEET # 6.3.13.2 (Page 2 of 2)

Combination Automatic Dishwasher/Dryer

Detail Data

Reliability:	MTBF = 29,000 Hrs Op. Hrs. = 3650	10 Year Resupply Volume:	133.843 cu.ft.
Maintainability:	MTTR = .5 hrs	Peak Power:	19,500 watts
Safety:	0	Energy:	19,500 watt-hrs/day
Crew Acceptance:	8	Water (155°F):	1157.11 lbs/day (Reclaim)
Installed Weight:	180.0 lbs.	Water (50°F):	0
Resupply Weight:	32.40 lbs.	Crew Operating Time:	.40 hrs/day
10 Year Resupply Weight:	8423.69 lbs.	Total Cost:	$2,925,000.
Installed Volume:	18.0 cu.ft.	Development Risk:	2
Resupply Volume:	.515 cu.ft.		

Rationale: 1 unit, used after each meal period (three times per day).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.13.3 (Page 1 of 2)

Title: Combination Automatic Dishwasher/Dryer

Applicable Mission Numbers

013 - 018

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.13

Physical Description: The dishwasher/dryer is a cubical unit, one end of which contains an ultrasonic transducer and the cavity in which the items to be cleaned are placed, and the other end contains a water pump, motor, liquid-gas separator and filter unit.

The operational cycle consists of automatic washing (including ultrasonic vibration) and drying sequence suitable for zero-g and partial-g environments. The solvent system will be automatically metered and will not impose a toxic hazard. A positive method of solvent injection and recovery is included, along with a trap to collect particulate matter. Controls and operating equipment will be conveniently located. Surface coatings, particularly in the washing area are non-porous and easily cleaned. Holding racks for plates and utensils are capable of easy removal and replacement for cleaning purposes.

Soiled utensils are loaded into washing cavity, a surfactant is added, and operating power is applied for starting the cycle with operating controls adjusted to match loading. The cavity fills with water, the transducer is energized, and the washing cycle is started. The water heater will raise and hold water temperature at 170°F which also sterilizes the utensils. During the cleaning cycle, the water is circulated through the filter unit to remove extracted waste. Upon completing the 10-minute cleaning cycle (during this period the water is at 170°F for at least 5 minutes to effect sterilization), the wash water is pumped through the liquid-gas separator into the station wash water recovery system. The water spray rinse cycle is automatically actuated flushing the utensils. The flush water then follows the waste water removal cycle. The hot air drying system is automatically actuated for approximately 5 minutes which completes the washing cycle.

The unit is approximately 36.0 x 24.0 x 66.0 inches in size, weighing approximately 330 pounds. Operating power is an estimated 36000 watts.

Functional Description: For cleaning meal trays, dining utensils, and other small food preparation devices by automatic process of washing, drying, and sterilization.

ELEMENT CONCEPT DATA SHEET # 6.3.13.3 (Page 2 of 2)

Combination Automatic Dishwasher/Dryer

Detail Data

Reliability:	MTBF = 29,000 Hrs Op. Hrs. = 3650	10 Year Resupply Volume:	249.413 cu.ft.
Maintainability:	MTTR = .5 hrs	Peak Power:	36,000 watts
Safety:	0	Energy:	36,000 watt-hrs/day
Crew Acceptance:	8	Water (155°F):	2137.78 lbs/day (Reclaim)
Installed Weight:	330.0 lbs.	Water (50°F):	0
Resupply Weight:	59.86 lbs.	Crew Operating Time:	.80 hrs/day
10 Year Resupply Weight:	15563.18 lbs.	Total Cost:	$3,075,000.
Installed Volume:	33.0 cu.ft.	Development Risk:	2
Resupply Volume:	.959 cu.ft.		

Rationale: 1 unit, used after each meal period (three times per day).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.13.5 (Page 1 of 2)

Title: Combination Automatic Dishwasher/Dryer

Applicable Mission Numbers

025 - 030

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.13

Physical Description: The dishwasher/dryer is a cubical unit, one end of which contains an ultrasonic transducer and the cavity in which the items to be cleaned are placed, and the other end contains a water pump, motor, liquid-gas separator and filter unit.

The operational cycle consists of automatic washing (including ultrasonic vibration) and drying sequence suitable for zero-g and partial-g environments. The solvent system will be automatically metered and will not impose a toxic hazard. A positive method of solvent injection and recovery is included, along with a trap to collect particulate matter. Controls and operating equipment will be conveniently located. Surface coatings, particularly in the washing area are non-porous and easily cleaned. Holding racks for plates and utensils are capable of easy removal and replacement for cleaning purposes.

Soiled utensils are loaded into washing cavity, a surfactant is added, and operating power is applied for starting the cycle with operating controls adjusted to match loading. The cavity fills with water, the transducer is energized, and the washing cycle is started. The water heater will raise and hold water temperature at 170°F which also sterilizes the utensils. During the cleaning cycle, the water is circulated through the filter unit to remove extracted waste. Upon completing the 10-minute cleaning cycle (during this period the water is at 170°F for at least 5 minutes to effect sterilization), the wash water is pumped through the liquid-gas separator into the station wash water recovery system. The water spray rinse cycle is automatically actuated flushing the utensils. The flush water then follows the waste water removal cycle. The hot air drying system is automatically actuated for approximately 5 minutes which completes the washing cycle.

The unit is approximately 36.0 x 24.0 x 24.0 inches in size, weighing approximately 120 pounds. Operating power is an estimated 12000 watts.

Functional Description: For cleaning meal trays, dining utensils, and other small food preparation devices by automatic process of washing, drying, and sterilization.

ELEMENT CONCEPT DATA SHEET # 6.3.13.5 (Page 2 of 2)

Combination Automatic Dishwasher/Dryer

Detail Data

Reliability:	MTBF = 29,000 Hrs Op. Hrs. = 3650	10 Year Resupply Volume:	80.460 cu.ft.
Maintainability:	MTTR = .5 Hrs	Peak Power:	12000 watts
Safety:	0	Energy:	12000 watt-hrs/day
Crew Acceptance:	8	Water (155°F):	697.40 lbs/day (Reclaim)
Installed Weight:	120.0 lbs.	Water (50°F):	0
Resupply Weight:	125.53 lbs.	Crew Operating Time:	.20 hr/day
10 Year Resupply Weight:	5021.28 lbs.	Total Cost:	$2,775,000.
Installed Volume:	12.0 cu.ft.	Development Risk:	2
Resupply Volume:	2.012 cu.ft.		

Rationale: 1 unit, used after each meal period (three times per day).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.13.6 (Page 1 of 2)

Title: Combination Automatic Dishwasher/Dryer

Applicable Mission Numbers

031 - 036

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.13

Physical Description: The dishwasher/dryer is a cubical unit, one end of which contains an ultrasonic transducer and the cavity in which the items to be cleaned are placed, and the other end contains a water pump, motor, liquid-gas separator and filter unit.

The operational cycle consists of automatic washing (including ultrasonic vibration) and drying sequence suitable for zero-g and partial-g environments. The solvent system will be automatically metered and will not impose a toxic hazard. A positive method of solvent injection and recovery is included, along with a trap to collect particulate matter. Controls and operating equipment will be conveniently located. Surface coatings, particularly in the washing area are non-porous and easily cleaned. Holding racks for plates and utensils are capable of easy removal and replacement for cleaning purposes.

Soiled utensils are loaded into washing cavity, a surfactant is added, and operating power is applied for starting the cycle with operating controls adjusted to match loading. The cavity fills with water, the transducer is energized, and the washing cycle is started. The water heater will raise and hold water temperature at 170°F which also sterilizes the utensils. During the cleaning cycle, the water is circulated through the filter unit to remove extracted waste. Upon completing the 10-minute cleaning cycle (during this period the water is at 170°F for at least 5 minutes to effect sterilization), the wash water is pumped through the liquid-gas separator into the station wash water recovery system. The water spray rinse cycle is automatically actuated flushing the utensils. The flush water then follows the waste water removal cycle. The hot air drying system is automatically actuated for approximately 5 minutes which completes the washing cycle.

The unit is approximately 36.0 x 24.0 x 36.0 inches in size, weighing approximately 180 pounds. Operating power is an estimated 19500 watts.

Functional Description: For cleaning meal trays, dining utensils, and other small food preparation devices by automatic process of washing, drying, and sterilization.

ELEMENT CONCEPT DATA SHEET # 6.3.13.6 (Page 2 of 2)

Combination Automatic Dishwasher/Dryer

Detail Data

Reliability:	MTBF = 29,000 Hrs Op. Hrs. = 3650	10 Year Resupply Volume:	132.372 cu.ft.
Maintainability:	MTTR = .5 Hrs.	Peak Power:	19500 watts
Safety:	0	Energy:	19,500 watt-hrs/day
Crew Acceptance:	8	Water (155°F):	1157.11 lbs/day (Reclaim)
Installed Weight:	180.0 lbs.	Water (50°F):	0
Resupply Weight:	208.28 lbs.	Crew Operating Time:	.40 hrs/day
10 Year Resupply Weight:	8331.12 lbs.	Total Cost:	$2,925,000.
Installed Volume:	18.0 cu.ft.	Development Risk:	2
Resupply Volume:	3.309 cu.ft.		

Rationale: 1 unit, used after each meal period (three times per day).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.13.7 (Page 1 of 2)

Title: Combination Automatic Dishwasher/Dryer

Applicable Mission Numbers

037 - 042

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.13

Physical Description: The dishwasher/dryer is a cubical unit, one end of which contains an ultrasonic transducer and the cavity in which the items to be cleaned are placed, and the other end contains a water pump, motor, liquid-gas separator and filter unit.

The operational cycle consists of automatic washing (including ultrasonic vibration) and drying sequence suitable for zero-g and partial-g environments. The solvent system will be automatically metered and will not impose a toxic hazard. A positive method of solvent injection and recovery is included, along with a trap to collect particulate matter. Controls and operating equipment will be conveniently located. Surface coatings, particularly in the washing area are non-porous and easily cleaned. Holding racks for plates and utensils are capable of easy removal and replacement for cleaning purposes.

Soiled utensils are loaded into washing cavity, a surfactant is added, and operating power is applied for starting the cycle with operating controls adjusted to match loading. The cavity fills with water, the transducer is energized, and the washing cycle is started. The water heater will raise and hold water temperature at 170°F which also sterilizes the utensils. During the cleaning cycle, the water is circulated through the filter unit to remove extracted waste. Upon completing the 10-minute cleaning cycle (during this period the water is at 170°F for at least 5 minutes to effect sterilization), the wash water is pumped through the liquid-gas separator into the station wash water recovery system. The water spray rinse cycle is automatically actuated flushing the utensils. The flush water then follows the waste water removal cycle. The hot air drying system is automatically actuated for approximately 5 minutes which completes the washing cycle.

The unit is approximately 36.0 x 24.0 x 66.0 inches in size, weighing approximately 330 pounds. Operating power is an estimated 36000 watts.

Functional Description: For cleaning meal trays, dining utensils, and other small food preparation devices by automatic process of washing, drying, and sterilization.

ELEMENT CONCEPT DATA SHEET # 6.3.13.7 (Page 2 of 2)

Combination Automatic Dishwasher/Dryer

Detail Data

Reliability:	MTBF = 29,000 Hrs Op. Hrs. = 3650	10 Year Resupply Volume:	246.672 cu.ft.
Maintainability:	MTTR = .5 Hrs.	Peak Power:	36000 watts
Safety:	0	Energy:	36,000 watt-hrs/day
Crew Acceptance:	8	Water (155°F):	2137.78 lbs/day (Reclaim)
Installed Weight:	330.0 lbs	Water (50°F):	0
Resupply Weight:	375.80 lbs.	Crew Operating Time:	.80 hrs/day
10 Year Resupply Weight:	15032.16 lbs	Total Cost:	$3,075,000.
Installed Volume:	33.0 cu.ft.	Development Risk:	2
Resupply Volume:	6.167 cu.ft.		

Rationale: 1 unit, used after each meal period (three times per day).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.14.1 (Page 1 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Applicable Mission Numbers: 001 - 006

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.14

Physical Description: Box-type enclosure of aluminum construction, having provisions for internal retention of disposable absorbant paper wipes in continuous roll form. The enclosure is provided with a hinged door, of transparent plastic material to permit visual determination of contents supply status, in addition to access for loading. Suitable latches are provided at each end of the door for retention in its closed position. A slit-form separation between adjoining edges of the enclosure and door permits passage of the dispensed paper wipe material. The enclosure will include an internal mechanism of suitable design to automatically advance the roll of paper a discrete amount to permit grasping the edge after the preceding sheet has been pulled and separated at its perforated section.

The dispenser unit is approximately 5.0 x 5.0 x 12.0 inches, weighing approximately 3.0 pounds.

A single roll of paper wipes to fit into the unit will be 4.5 inches in diameter x 11.0 inches long, containing 77 wipes, separable at perforations spaced 11.0 inches apart (separate wipes of 11.0 x 11.0 inches), and wrapped on a cylindrical spool of 1.5 inches in diameter. The weight of a single roll of paper wipes is approximately .70 pounds.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions.

Detail Data

Reliability:	MTBF $\rightarrow\infty$; (OP Hrs. N/A)	10 Year Resupply Volume:	130.897 cu. ft.
Maintainability:	MTTR = .25 Hrs.	Peak Power:	0
Safety:		Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	** 3.0 lbs	Water (50°F):	0
Resupply Weight:	* 3.5 lbs	Crew Operating Time:	.24 hr/day
10 Year Resupply Weight:	*910 lbs	Total Cost:	** ▲ $28500.
Installed Volume:	** .405 ft^3	Development Risk:	8
Resupply Volume:	* .503 cu. ft.		

ELEMENT CONCEPT DATA SHEET # 6.3.14.1 (Page 2 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Rationale: Assume wipe usage: 1 sheet per hand wash (for drying hands - see Concept 6.3.11), 1 sheet per 3 returned meal trays for wiping food residue from rubber scraper, 1 sheet per 3 man-meals during preparation, plus extra 20% of total for contingency factor; grand total of 29 sheets per day. Total resupply requirements converted to equivalent single rolls which have slight effect on increasing or decreasing the contingency quantity. — * 5 rolls (1300 rolls for 10 years). - ** 1 dispenser. - ▲ Cost of expendables are not applicable to initial launch, however the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

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Data Sources: _____

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ELEMENT CONCEPT DATA SHEET # 6.3.14.2 (Page 1 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Applicable Mission Numbers: 007 - 012

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.14

Physical Description: Box-type enclosure of aluminum construction, having provisions for internal retention of disposable absorbant paper wipes in continuous roll form. The enclosure is provided with a hinged door, of transparent plastic material to permit visual determination of contents supply status, in addition to access for loading. Suitable latches are provided at each end of the door for retention in its closed position. A slit-form separation between adjoining edges of the enclosure and door permits passage of the dispensed paper wipe material. The enclosure will include an internal mechanism of suitable design to automatically advance the roll of paper a discrete amount to permit grasping the edge after the preceding sheet has been pulled and separated at its perforated section.

The dispenser unit is approximately 5.0 x 5.0 x 12.0 inches, weighing approximately 3.0 pounds.

A single roll of paper wipes to fit into the unit will be 4.5 inches in diameter x 11.0 inches long, containing 77 wipes, separable at perforations spaced 11.0 inches apart (separate wipes of 11.0 x 11.0 inches), and wrapped on a cylindrical spool of 1.5 inches in diameter. The weight of a single roll of paper wipes is approximately .70 pounds.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions.

Detail Data

Reliability: MTBF → ∞ (OP HRS N/A)	10 Year Resupply Volume: * 235.615 cu ft.
Maintainability: MTTR = .25 hrs	Peak Power: 0
Safety: 0	Energy: 0
Crew Acceptance: 8	Water (155°F): 0
Installed Weight: ** 6.0 lbs	Water (50°F): 0
Resupply Weight: * 6.3 lbs	Crew Operating Time: .40 hr/day
10 Year Resupply Weight: *1638 lbs	Total Cost: ** ▲ $29500.
Installed Volume: ** .810 cu ft.	Development Risk: 8
Resupply Volume: * .90 cu ft.	

ELEMENT CONCEPT DATA SHEET # 6.3.14.2 (Page 2 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Rationale: Assume wipe usage: 1 sheet per hand wash (for drying hands - see Concept 6.3.11), 1 sheet per 3 returned meal trays for wiping food residue from rubber scraper, 1 sheet per 3 man-meals during preparation, plus extra 20% of total for contingency factor; grand total of 48 sheets per day. Total resupply requirements converted to equivalent single rolls which have slight effect on increasing or decreasing the contingency quantity. — * 9 rolls (2340 rolls for 10 years). - ** 2 dispensers. ▲ Cost of expendables are not applicable to initial launch, however the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

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Data Sources: _____

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ELEMENT CONCEPT DATA SHEET # 6.3.14.3

Title: Dispenser for Disposable Galley Utility Wipes

Applicable Mission Numbers: 013 - 018

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.14

Physical Description: Box-type enclosure of aluminum construction, having provisions for internal retention of disposable absorbant paper wipes in continuous roll form. The enclosure is provided with a hinged door, of transparent plastic material to permit visual determination of contents supply status, in addition to access for loading. Suitable latches are provided at each end of the door for retention in its closed position. A slit-form separation between adjoining edges of the enclosure and door permits passage of the dispensed paper wipe material. The enclosure will include an internal mechanism of suitable design to automatically advance the roll of paper a discrete amount to permit grasping the edge after the preceding sheet has been pulled and separated at its perforated section.

The dispenser unit is approximately 5.0 x 5.0 x 12.0 inches, weighing approximately 3.0 pounds.

A single roll of paper wipes to fit into the unit will be 4.5 inches in diameter x 11.0 inches long, containing 77 wipes, separable at perforations spaced 11.0 inches apart (separate wipes of 11.0 x 11.0 inches), and wrapped on a cylindrical spool of 1.5 inches in diameter. The weight of a single roll of paper wipes is approximately .70 pounds.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions.

Detail Data

Reliability:	MTBF $\rightarrow^{\infty}$ (OP HRS N/A)	10 Year Resupply Volume:	*392.691 cu ft
Maintainability:	MTTR = .25 hrs.	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	** 12.0 lbs	Water (50°F):	0
Resupply Weight:	* 10.5 lbs	Crew Operating Time:	.70 hr/day
10 Year Resupply Weight:	*2730 lbs	Total Cost:	** ▲$31500.
Installed Volume:	** 1.620 cu ft	Development Risk:	8
Resupply Volume:	* 1.510 cu ft		

ELEMENT CONCEPT DATA SHEET # 6.3.14.3 (Page 2 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Rationale: Assume wipe usage: 1 sheet per hand wash (for drying hands - see Concept 6.3.11), 1 sheet per 3 returned meal trays for wiping food residue from rubber scraper, 1 sheet per 3 man-meals during preparation, plus extra 20% of total for contingency factor; grand total of 84 sheets per day. Total resupply requirements converted to equivalent single rolls which have slight effect on increasing or decreasing the contingency quantity. — * 15 rolls (3900 rolls for 10 years). - ** 4 dispensers. ▲Cost of expendables are not applicable to initial launch, however the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

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Data Sources: _____

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ELEMENT CONCEPT DATA SHEET # 6.3.14.5 (Page 1 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Applicable Mission Numbers: 025 - 030

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.14

Physical Description: Box-type enclosure of aluminum construction, having provisions for internal retention of disposable absorbant paper wipes in continuous roll form. The enclosure is provided with a hinged door, of transparent plastic material to permit visual determination of contents supply status, in addition to access for loading. Suitable latches are provided at each end of the door for retention in its closed position. A slit-form separation between adjoining edges of the enclosure and door permits passage of the dispensed paper wipe material. The enclosure will include an internal mechanism of suitable design to automatically advance the roll of paper a discrete amount to permit grasping the edge after the preceding sheet has been pulled and separated at its perforated section.

The dispenser unit is approximately 5.0 x 5.0 x 12.0 inches, weighing approximately 3.0 pounds.

A single roll of paper wipes to fit into the unit will be 4.5 inches in diameter x 11.0 inches long, containing 77 wipes, separable at perforations spaced 11.0 inches apart (separate wipes of 11.0 x 11.0 inches), and wrapped on a cylindrical spool of 1.5 inches in diameter. The weight of a single roll of paper wipes is approximately .70 pounds.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions.

Detail Data

Reliability:	MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume:	* 136.938 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	** 3.0 lbs.	Water (50°F):	0
Resupply Weight:	* 23.8 lbs.	Crew Operating Time:	.24 hr/day
10 Year Resupply Weight:	*952 lbs	Total Cost:	** ▲$28500.
Installed Volume:	** .405 cu ft	Development Risk:	8
Resupply Volume:	* 3.423 cu ft.		

ELEMENT CONCEPT DATA SHEET # 6.3.14.5 (Page 2 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Rationale: Assume wipe usage: 1 sheet per hand wash (for drying hands - see Concept 6.3.11), 1 sheet per 3 returned meal trays for wiping food residue from rubber scraper, 1 sheet per 3 man-meals during preparation, plus extra 20% of total for contingency factor; grand total of 29 sheets per day. Total resupply requirements converted to equivalent single rolls which have slight effect on increasing or decreasing the contingency quantity. — *34 rolls (1360 rolls for 10 years). - ** 1 dispenser. ▲Cost of expendables are not applicable to initial launch, however the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

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Data Sources: _____

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ELEMENT CONCEPT DATA SHEET # 6.3.14.6 (Page 1 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Applicable Mission Numbers: 031 - 036

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.14

Physical Description: Box-type enclosure of aluminum construction, having provisions for internal retention of disposable absorbant paper wipes in continuous roll form. The enclosure is provided with a hinged door, of transparent plastic material to permit visual determination of contents supply status, in addition to access for loading. Suitable latches are provided at each end of the door for retention in its closed position. A slit-form separation between adjoining edges of the enclosure and door permits passage of the dispensed paper wipe material. The enclosure will include an internal mechanism of suitable design to automatically advance the roll of paper a discrete amount to permit grasping the edge after the preceding sheet has been pulled and separated at its perforated section.

The dispenser unit is approximately 5.0 x 5.0 x 12.0 inches, weighing approximately 3.0 pounds.

A single roll of paper wipes to fit into the unit will be 4.5 inches in diameter x 11.0 inches long, containing 77 wipes, separable at perforations spaced 11.0 inches apart (separate wipes of 11.0 x 11.0 inches), and wrapped on a cylindrical spool of 1.5 inches in diameter. The weight of a single roll of paper wipes is approximately .70 pounds.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions.

Detail Data

Reliability:	MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume:	* 225.546 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	** 6.0 lbs	Water (50°F):	0
Resupply Weight:	* 39.2 lbs	Crew Operating Time:	.40 hr/day
10 Year Resupply Weight:	*1568 lbs	Total Cost:	** ▲$29500.
Installed Volume:	** .810 cu ft.	Development Risk:	8
Resupply Volume:	* 5.639 cu ft		

ELEMENT CONCEPT DATA SHEET # 6.3.14.6 (Page 2 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Rationale: Assume wipe usage: 1 sheet per hand wash (for drying hands - see Concept 6.3.11), 1 sheet per 3 returned meal trays for wiping food residue from rubber scraper, 1 sheet per 3 man-meals during preparation, plus extra 20% of total for contingency factor; grand total of 48 sheets per day. Total resupply requirements converted to equivalent single rolls which have slight effect on increasing or decreasing the contingency quantity. — * 56 rolls (2240 rolls for 10 years). - ** 2 dispensers ▲Cost of expendables are not applicable to initial launch, however the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

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Data Sources: _____

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ELEMENT CONCEPT DATA SHEET # 6.3.14.7 (Page 1 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Applicable Mission Numbers: 037 - 042

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.14

Physical Description: Box-type enclosure of aluminum construction, having provisions for internal retention of disposable absorbant paper wipes in continuous roll form. The enclosure is provided with a hinged door, of transparent plastic material to permit visual determination of contents supply status, in addition to access for loading. Suitable latches are provided at each end of the door for retention in its closed position. A slit-form separation between adjoining edges of the enclosure and door permits passage of the dispensed paper wipe material. The enclosure will include an internal mechanism of suitable design to automatically advance the roll of paper a discrete amount to permit grasping the edge after the preceding sheet has been pulled and separated at its perforated section.

The dispenser unit is approximately 5.0 x 5.0 x 12.0 inches, weighing approximately 3.0 pounds.

A single roll of paper wipes to fit into the unit will be 4.5 inches in diameter x 11.0 inches long, containing 77 wipes, separable at perforations spaced 11.0 inches apart (separate wipes of 11.0 x 11.0 inches), and wrapped on a cylindrical spool of 1.5 inches in diameter. The weight of a single roll of paper wipes is approximately .70 pounds.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions.

Detail Data

Reliability:	MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume:	* 394.705 cu ft
Maintainability:	MTTR = .25 Hrs.	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	** 12.0 lbs	Water (50°F):	0
Resupply Weight:	* 68.6 lbs	Crew Operating Time:	.70 hr/day
10 Year Resupply Weight:	*2744 lbs	Total Cost:	** ▲$31500.
Installed Volume:	** 1.620 cu ft	Development Risk:	8
Resupply Volume:	* 9.868 cu ft		

ELEMENT CONCEPT DATA SHEET # 6.3.14.7 (Page 2 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Rationale: Assume wipe usage: 1 sheet per hand wash (for drying hands - see Concept 6.3.11), 1 sheet per 3 returned meal trays for wiping food residue from rubber scraper, 1 sheet per 3 man-meals during preparation, plus extra 20% of total for contingency factor; grand total of 84 sheets per day. Total resupply requirements converted to equivalent single rolls which have slight effect on increasing or decreasing the contingency quantity. — * 98 rolls (3920 for 10 years). - ** 4 dispensers. ▲Cost of expendables are not applicable to initial launch, however the cost of such material for subsequent resupply missions is not included in this number.

Merits/Deficiencies: _____

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Data Sources: _____

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ELEMENT CONCEPT DATA SHEET # 6.3.15.1

Title: Dispenser for Reusable Galley Utility Wipes

Applicable Mission Numbers: 001 - 006

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.15

Physical Description: Box-type enclosure of aluminum construction having provisions for internal retention of reusable cloth wipes in flat form. The enclosure is provided with a roll-type (disappearing) cover permitting access for loading and removal of contents. The door is equipped with a latching device for maintaining its closed position. The interior of the enclosure has rods at the corners for holding the wipes in position. The unit is approximately 13.0 x 13.0 x 5.0 inches, weighing approximately 5.0 pounds.

The reusable wipes are of cotton cloth material, measuring 12.0 x 12.0 inches, with embroidery reinforced holes at each corner. The hole size and locations match the rods in the enclosure (dispenser) unit. Each wipe weighs approximately .075 pounds and is 6.0 x 6.0 x .08 inches in flat storage form.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions in galley.

Detail Data

Reliability:	MTBF →∞ (OP Hrs N/A)	10 Year Resupply Volume:	1.968 cu ft
Maintainability:	MTTR= .25 hrs	Peak Power:	• 7500 watts
Safety:	0	Energy:	• 436.0 watt-hrs/day
Crew Acceptance:	8	Water (155°F):	• 14.5 lbs/day -(Reclaim 43.6 lbs)
Installed Weight:	* 15.88 lbs	Water (50°F):	• 29.1 lbs/day
Resupply Weight:	.340 lbs (avg)	Crew Operating Time:	.24 hr/day
10 Year Resupply Weight:	88.36 lbs	Total Cost:	* ▲$31145.
Installed Volume:	* .739 cu ft.	Development Risk:	8
Resupply Volume:	.008 cu ft (avg)		

Rationale: Assume 29 wipes per day usage with laundering at 5 day intervals and replacement after 90 washings or 448 days due to deterioration. -* 1 Dispenser and initial supply of 145 wipes included in installed weight and volume and cost. -▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

• Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.15.2

Title: Dispenser for Reusable Galley Utility Wipes

Applicable Mission Numbers: 007 - 012

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.15

Physical Description: Box-type enclosure of aluminum construction having provisions for internal retention of reusable cloth wipes in flat form. The enclosure is provided with a roll-type (disappearing) cover permitting access for loading and removal of contents. The door is equipped with a latching device for maintaining its closed position. The interior of the enclosure has rods at the corners for holding the wipes in position. The unit is approximately 13.0 x 13.0 x 5.0 inches, weighing approximately 5.0 pounds.

The reusable wipes are of cotton cloth material, measuring 12.0 x 12.0 inches, with embroidery reinforced holes at each corner. The hole size and locations match the rods in the enclosure (dispenser) unit. Each wipe weighs approximately .075 pounds and is 6.0 x 6.0 x .08 inches in flat storage form.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions in galley.

Detail Data

Reliability: MTBF→∞ (OP Hrs N/A)	10 Year Resupply Volume: 3.258 cu ft
Maintainability: [redacted] = .25 hrs	Peak Power: • 7 500 watts
Safety: 0	Energy: • 720 watt-hrs/day
Crew Acceptance: 8	Water (155°F): • 24.0 lbs/day (Reclaim
Installed Weight: * 28.00 lbs	Water (50°F): • 48.0 lbs/day 72.0 lbs)
Resupply Weight: .563 lbs (avg)	Crew Operating Time: .40 hrs/day
10 Year Resupply Weight: 146.25 lbs	Total Cost: * ▲$32240.
Installed Volume: * 1.379 cu ft	Development Risk: 8
Resupply Volume: .013 cu ft (avg)	

Rationale: Assume 48 wipes per day usage with laundering at 5 day intervals and replacement after 90 washings or 448 days due to deterioration. -*2 Dispensers and initial supply of 240 wipes included in installed weight & volume and cost. -▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

• Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.15.3

Title: Dispenser for Reusable Galley Utility Wipes

Applicable Mission Numbers

013 - 018

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.15

Physical Description: Box-type enclosure of aluminum construction having provisions for internal retention of reusable cloth wipes in flat form. The enclosure is provided with a roll-type (disappearing) cover permitting access for loading and removal of contents. The door is equipped with a latching device for maintaining its closed position. The interior of the enclosure has rods at the corners for holding the wipes in position. The unit is approximately 13.0 x 13.0 x 5.0 inches, weighing approximately 5.0 pounds.

The reusable wipes are of cotton cloth material, measuring 12.0 x 12.0 inches, with embroidery reinforced holes at each corner. The hole size and locations match the rods in the enclosure (dispenser) unit. Each wipe weighs approximately .075 pounds and is 6.0 x 6.0 x .08 inches in flat storage form.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions in galley.

Detail Data

Reliability: MTBF→∞ (OP Hrs N/A)	**10 Year Resupply Volume:** 5.704 cu ft
Maintainability: MTTR = .25 hrs	**Peak Power:** •7500 watts
Safety: 0	**Energy:** •1260 watt-hrs/day
Crew Acceptance: 8	**Water (155°F):** •42.0 lbs/day (Reclaim
Installed Weight: * 51.50 lbs	**Water (50°F):** •84.0 lbs/day 126.0 lbs)
Resupply Weight: .984 lbs (avg)	**Crew Operating Time:** .70 hr/day
10 Year Resupply Weight: 255.94 lbs	**Total Cost:** * ▲$34420.
Installed Volume: * 2.658 cu ft	**Development Risk:** 8
Resupply Volume: .022 cu ft (avg)	

Rationale: Assume 84 wipes per day usage with laundering at 5 day intervals and replacement after 90 washings or 448 days due to deterioration. * 4 dispensers and initial supply of 420 wipes included in installation weight & volume & cost - ▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

• Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.15.5

Title: Dispenser for Reusable Galley Utility Wipes

Applicable Mission Numbers: 025 - 030

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.15

Physical Description: Box-type enclosure of aluminum construction having provisions for internal retention of reusable cloth wipes in flat form. The enclosure is provided with a roll-type (disappearing) cover permitting access for loading and removal of contents. The door is equipped with a latching device for maintaining its closed position. The interior of the enclosure has rods at the corners for holding the wipes in position. The unit is approximately 13.0 x 13.0 x 5.0 inches, weighing approximately 5.0 pounds.

The reusable wipes are of cotton cloth material, measuring 12.0 x 12.0 inches, with embroidery reinforced holes at each corner. The hole size and locations match the rods in the enclosure (dispenser) unit. Each wipe weighs approximately .075 pounds and is 6.0 x 6.0 x .08 inches in flat storage form.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions in galley.

Detail Data

Reliability:	MTBF → ∞ (OP Hrs N/A)	10 Year Resupply Volume:	1.939 cu ft.
Maintainability:	MTTR = .25 hrs	Peak Power:	• 7500 watts
Safety:	0	Energy:	• 436.0 watt-hrs/day
Crew Acceptance:	8	Water (155°F):	• 14.5 lbs-day(Reclaim
Installed Weight:	*15.88 lbs.	Water (50°F):	• 29.1 lbs/day 43.6 lbs)
Resupply Weight:	2.18 lbs (avg)	Crew Operating Time:	.24 hr/day
10 Year Resupply Weight:	87.00 lbs.	Total Cost:	* ▲$31145.
Installed Volume:	* .739 cu ft	Development Risk:	8
Resupply Volume:	.048 cu ft (avg)		

Rationale: Assume 29 wipes per day usage with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. -*1 Dispenser and initial supply of 145 wipes included in installed weight and volume and cost.- ▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

• Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET #6.3.15.6

Title: Dispenser for Reusable Galley Utility Wipes

Applicable Mission Numbers: 031 - 036

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.15

Physical Description: Box-type enclosure of aluminum construction having provisions for internal retention of reusable cloth wipes in flat form. The enclosure is provided with a roll-type (disappearing) cover permitting access for loading and removal of contents. The door is equipped with a latching device for maintaining its closed position. The interior of the enclosure has rods at the corners for holding the wipes in position. The unit is approximately 13.0 x 13.0 x 5.0 inches, weighing approximately 5.0 pounds.

The reusable wipes are of cotton cloth material, measuring 12.0 x 12.0 inches, with embroidery reinforced holes at each corner. The hole size and locations match the rods in the enclosure (dispenser) unit. Each wipe weighs approximately .075 pounds and is 6.0 x 6.0 x .08 inches in flat storage form.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions in galley.

Detail Data

Reliability: MTBF → ∞ (OP Hrs N/A)	10 Year Resupply Volume: 3.210 cu ft.
Maintainability: MTTR= 25 hrs.	Peak Power: • 7500 watts
Safety: 0	Energy: • 720 watt-hrs/day
Crew Acceptance: 8	Water (155°F): • 24.0 lbs/day (Reclaim 72.0 lbs)
Installed Weight: *28.00 lbs	Water (50°F): • 48.0 lbs/day
Resupply Weight: 3.60 lbs(avg)	Crew Operating Time: .40hr/day
10 Year Resupply Weight: 144.00 lbs.	Total Cost: *▲$32240.
Installed Volume: * 1.379 cu ft.	Development Risk: 8
Resupply Volume: .089 cu ft (avg)	

Rationale: Assume 48 wipes per day usage with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. -* 2 Dispensers and initial supply of 240 wipes included in installed weight & volume and cost. -▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

• Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.15.7

Title: Dispenser for Reusable Galley Utility Wipes

Applicable Mission Numbers: 037 - 042

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.15

Physical Description: Box-type enclosure of aluminum construction having provisions for internal retention of reusable cloth wipes in flat form. The enclosure is provided with a roll-type (disappearing) cover permitting access for loading and removal of contents. The door is equipped with a latching device for maintaining its closed position. The interior of the enclosure has rods at the corners for holding the wipes in position. The unit is approximately 13.0 x 13.0 x 5.0 inches, weighing approximately 5.0 pounds.

The reusable wipes are of cotton cloth material, measuring 12.0 x 12.0 inches, with embroidery reinforced holes at each corner. The hole size and locations match the rods in the enclosure (dispenser) unit. Each wipe weighs approximately .075 pounds and is 6.0 x 6.0 x .08 inches in flat storage form.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions in galley.

Detail Data

Reliability:	MTBF=∞ (OP hrs N/A)	10 Year Resupply Volume:	5.618 cu ft.
Maintainability:	MTTR = .25 hrs	Peak Power:	• 7500 watts
Safety:	0	Energy:	• 1260 watt-hrs/day
Crew Acceptance:	8	Water (155°F):	• 42.0 lbs/day (Reclaim 126.0 lbs)
Installed Weight:	* 51.50lbs	Water (50°F):	• 84.0 lbs/day
Resupply Weight:	6.30 lbs (avg)	Crew Operating Time:	.70 hr/day
10 Year Resupply Weight:	252.00 lbs.	Total Cost:	* ▲$34420.
Installed Volume:	*2.656 cu ft	Development Risk:	8
Resupply Volume:	.140 cu ft (avg)		

Rationale: Assume 84 wipes per day usage with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. -* 1 Dispenser and initial supply of 420 wipes included in installed weight and volume and cost. -▲The cost of additional expendables for subsequent resupply missions is not included in this number.

Merits/Deficiencies:

• Assume separate laundry facility is available with associated requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.16.1

Title: Stowage of Cleaning Equipment

Applicable Mission Numbers

001 - 006
025 - 030
049 - 054

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.16

Physical Description: Compartmented cabinet of aluminum construction, with partitions of sheet or wire mesh material; including suitable retention provisions compatible with form factors of items to be contained therein and six ultraviolet (15W) lamps for germicidal effect. Cabinet configuration is a space vehicle design option and therefore indeterminate.

Functional Description: For storage of cleaning devices (not of a fixed-installation type), bactericides, wipes and other expendables of reasonable quantity, readily accessible for convenience.

Detail Data

Reliability: MTBF=457000; OP Hrs =87600
Maintainability: MTTR = .25 hrs.
Safety: 0
Crew Acceptance: 6
Installed Weight: 21.38 lbs.
Resupply Weight: 0
10 Year Resupply Weight: 0
Installed Volume: 10.69 cu ft
Resupply Volume: 0

10 Year Resupply Volume: 0
Peak Power: 90 watts
Energy: 2160 watt/hr/day
Water (155°F): 0
Water (50°F): 0
Crew Operating Time: N/A
Total Cost: $75000.
Development Risk: 8

Rationale: Assume sufficient quantities for one-week usage located in galley area; weekly replenishment from remote storage facility within space vehicle.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.16.2

Title: Stowage of Cleaning Equipment

Applicable Mission Numbers

007 - 012
031 - 036
055 - 060

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.16

Physical Description: Compartmented cabinet of aluminum construction, with partitions of sheet or wire mesh material; including suitable retention provisions compatible with form factors of items to be contained therein and six ultraviolet (15W) lamps for germicidal effect. Cabinet configuration is a space vehicle design option and therefore indeterminate.

Functional Description: For storage of cleaning devices (not of a fixed-installation type), bactericides, wipes and other expendables of reasonable quantity, readily accessible for convenience.

Detail Data

Reliability: MTBF=457000; OP Hrs=87600
Maintainability: MTTR = .25 hrs
Safety: 0
Crew Acceptance: 6
Installed Weight: 25.48 lbs
Resupply Weight: 0
10 Year Resupply Weight: 0
Installed Volume: 12.74 cu ft
Resupply Volume: 0

10 Year Resupply Volume: 0
Peak Power: 90 watts
Energy: 2160 watt-hr/day
Water (155°F): 0
Water (50°F): 0
Crew Operating Time: N/A
Total Cost: $80000.
Development Risk: 8

Rationale: Assume sufficient quantities for one-week usage located in galley area; weekly replenishment from remote storage facility within space vehicle.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.16.3

Title: Stowage of Cleaning Equipment

Applicable Mission Numbers

013 - 018
037 - 042
061 - 066

Function Reference: Provide For Clean-Up

Drawing Reference: D-6.3.16

Physical Description: Compartmented cabinet of aluminum construction, with partitions of sheet or wire mesh material; including suitable retention provisions compatible with form factors of items to be contained therein and six ultraviolet (15W) lamps for germicidal effect. Cabinet configuration is a space vehicle design option and therefore indeterminate.

Functional Description: For storage of cleaning devices (not of a fixed-installation type), bactericides, wipes and other expendables of reasonable quantity, readily accessible for convenience.

Detail Data

Reliability:	MTBF=457000; OP Hrs.=87600	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	90 watts
Safety:	0	Energy:	2160 watt-hr/day
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	33.58 lbs.	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	N/A
10 Year Resupply Weight:	0	Total Cost:	$85000.
Installed Volume:	16.79 cu ft	Development Risk:	8
Resupply Volume:	0		

Rationale: Assume sufficient quantities for one-week usage located in galley area; weekly replenishment from remote storage facility within space vehicle.

Merits/Deficiencies:

Data Sources:

No data sheets were prepared for this functional subsystem area since a joint NASA/Contractor decision was to study requirements rather than equipment concepts. Detail data are presented in Final Report, Volume I, Section III, paragraph 7.0.

F. NON-APPLICABLE ELEMENT CONCEPT DATA SHEETS

The following Element Concept Data Sheets are included for information only and represent those missions either discarded at program review meetings or concepts discarded during the various study phases of the program. The data have been compiled only to the point where the concept or mission was discarded and no further study effort was expended.

ELEMENT CONCEPT DATA SHEET # 2.1.6.16

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 020

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability:	Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	12.6 ft^3
Maintainability:	a MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	225.6 lbs	Water (50°F):	0
Resupply Weight:	.34 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	68.7 lbs	Total Cost:	$70000
Installed Volume:	42.62 ft^3	Development Risk:	5
Resupply Volume:	.06 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.17

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 022

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	9.50 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	173.5 lbs	Water (50°F):	0
Resupply Weight:	.30 - lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	52.7 lbs	Total Cost:	$70000
Installed Volume:	31.72 ft^3	Development Risk:	5
Resupply Volume:	.05 ft^3		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.28

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 043, 061, 069

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 105000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	
Maintainability:	MTTR = .50 hrs	Peak Power	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	1141 lbs	Water (50°F):	0
Resupply Weight:		Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:		Total Cost:	$70000
Installed Volume:	308 ft^3	Development Risk:	5
Resupply Volume:			

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.29

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 044, 062, 070

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability: Op. hrs = 69.4×10^3

Maintainability: MTTR = .50 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 771.5 lbs

Resupply Weight:

10 Year Resupply Weight:

Installed Volume: 202.72 ft^3

Resupply Volume:

10 Year Resupply Volume:

Peak Power: 50 watts

Energy: 3.08 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616

Total Cost: $70000

Development Risk: 5

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.30

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 047, 065

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	323.8 lbs	Water (50°F):	0
Resupply Weight:		Crew Operating Time:	.0616
10 Year Resupply Weight:		Total Cost:	$70000
Installed Volume:	72 ft^3	Development Risk:	5
Resupply Volume:			

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.31

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 056

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 105000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	450 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$70000
Installed Volume:	103 ft^3	Development Risk:	5
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/ attitude control required

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.32

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 067

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	2038.0 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$70000
Installed Volume:	595.7 ft^3	Development Risk:	5
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability pendalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.33

Title: Space Radiator Freezer Concept

Applicable Mission Numbers

068

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability: Op. hrs = 69.4×10^3

Maintainability: MTTR = .50 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 1429.6 lbs

Resupply Weight: -

10 Year Resupply Weight: -

Installed Volume: 385.42 ft^3

Resupply Volume: -

10 Year Resupply Volume: -

Peak Power: 50 watts

Energy: 3.08 watt hrs/day

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $70000

Development Risk: 5

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.6.34

Title: Space Radiator Freezer Concept

Applicable Mission Numbers: 071

Function Reference: Provide For Storage

Drawing Reference: D-2.1.6

Physical Description: The space radiator freezer unit is a storage locker insulated with 4 inches of foam all around. Space radiators remove heat from a transport fluid that circulates through the interior freezer walls.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 105000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTRR = .50 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	524.9 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$70000
Installed Volume:	128.38 ft^3	Development Risk:	5
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Low power, weight, development, operability penalties/attitude control required.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.21

Title: Thermoelectric Freezer

Applicable Mission Numbers: 020

Function Reference: Provide for Storage

Drawing Reference:

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	40 ft^3
Maintainability:	MTTR = .50 hrs	Peak Power:	2780 watts
Safety:	0	Energy:	53000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	438 lbs	Water (50°F):	0
Resupply Weight:	2.0 lbs.	Crew Operating Time:	.0616
10 Year Resupply Weight:	320. lbs	Total Cost:	$90000
Installed Volume:	55 ft^3	Development Risk:	6
Resupply Volume:	.20 ft^3		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.22

Title: Thermoelectric Freezer

Applicable Mission Numbers: 022

Function Reference: Provide for Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	$26.4\ ft^3$
Maintainability:	MTTR = .50 hrs	Peak Power:	1500 watts
Safety:	0	Energy:	29000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	287 lbs	Water (50°F):	0
Resupply Weight:	1.10 lbs	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	210.2 lbs	Total Cost:	$ 90000
Installed Volume:	$36\ ft^3$	Development Risk:	6
Resupply Volume:	$.15\ ft^3$		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.29

Title: Thermoelectric Freezer

Applicable Mission Numbers: 043

Function Reference: Provide for Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .50 hrs	Peak Power:	11,130 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	1311 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:		Total Cost:	$90000
Installed Volume:	240.3 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.30

Title: Thermoelectric Freezer

Applicable Mission Numbers: 044, 062, 070

Function Reference: Provide for Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10° F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:		Peak Power:	8560 watts
Safety:	0	Energy:	159000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	1061 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$90000
Installed Volume:	195 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.31

Title: Thermoelectric Freezer

Applicable Mission Numbers: 047, 065

Function Reference: Provide for Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10° F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .50 hrs	Peak Power:	3772 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	608 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 Hrs/day
10 Year Resupply Weight:	-	Total Cost:	$90000
Installed Volume:	77 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.32

Title: Thermoelectric Freezer

Applicable Mission Numbers: 056

Function Reference: Provide for Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10° F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .50 hrs	Peak Power:	4722 watts
Safety:	0	Energy:	90000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	831 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$90000
Installed Volume:	122 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.33

Title: Thermoelectric Freezer

Applicable Mission Numbers: 067

Function Reference: Provide for Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10° F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .50 hrs	Peak Power:	21,460 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	2290 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$90000
Installed Volume:	650 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.1.7.34

Title: Thermoelectric Freezer

Applicable Mission Numbers: 071

Function Reference: Provide for Storage

Drawing Reference: D-2.1.7

Physical Description: The thermoelectric Freezer unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear of the freezer.

Functional Description: The freezer unit will maintain frozen food at temperatures of -10°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:		Peak Power:	6612 watts
Safety:	0	Energy:	12000 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	855 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$90000
Installed Volume:	160 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove heat from unit; power requirements large. Waste heat is dumped into the cabin ambient.

Data Sources: See Data Book - Book II

ELEMENT CONCEPT DATA SHEET # 2.2.4.14

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 019

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op Hrs = 69.4 x 10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	466.1 lbs	Water (50°F):	0
Resupply Weight:		Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:		Total Cost:	$80,000
Installed Volume:	45.7 ft^3	Development Risk:	4
Resupply Volume:			

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.15

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 020

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	325.8 lbs	Water (50°F):	0
Resupply Weight:		Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:		Total Cost:	$80,000
Installed Volume:	29.2 ft^3	Development Risk:	4
Resupply Volume:			

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.16

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 021

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	357.4 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$80,000
Installed Volume:	31.51 ft^3	Development Risk:	4
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.17

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 024

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4 x 10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	165.2 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$80,000
Installed Volume:	11.7 ft^3	Development Risk:	4
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.30

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 043, 061, 069

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability: MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume: -
Maintainability: MTTR = .5 hrs	Peak Power: 50 watts
Safety: 0	Energy: 3.08 watt hrs/day
Crew Acceptance: 8	Water (155°F): 0
Installed Weight: 1467.76 lbs	Water (50°F): 0
Resupply Weight: -	Crew Operating Time: .0616 hrs/day
10 Year Resupply Weight: -	Total Cost: $80,000
Installed Volume: 208.42 ft^3	Development Risk: 4
Resupply Volume: -	

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.31

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 044, 062, 070, 071

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	771.7 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$80,000
Installed Volume:	93.0 ft^3	Development Risk:	4
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.32

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers

045, 063

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	905.6 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$80,000
Installed Volume:	115.1 ft^3	Development Risk:	4
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.33

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 047, 056, 065

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^8	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	518.5 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$80,000
Installed Volume:	52.0 ft^3	Development Risk:	4
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.34

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 048, 066

Function Reference: Provide For Storage

Drawing Reference: D-2.2.5

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs.	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	346.8 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$ 80,000
Installed Volume:	33.6 ft^3	Development Risk:	4
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.35

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 055

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs 69.4 x 10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	878.2 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$80,000
Installed Volume:	109.8 ft^3	Development Risk:	4
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.36

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 067

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	2680 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$80,000
Installed Volume:	410.9 ft^3	Development Risk:	4
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.4.37

Title: Water Sublimation Refrigerator Concept

Applicable Mission Numbers: 068

Function Reference: Provide For Storage

Drawing Reference: D-2.2.4

Physical Description: The water sublimation refrigerator unit is a storage locker insulated with 4 inches of foam all around. A sublimator cools the transport fluid that circulates within the interior walls of the unit.

Functional Description: The refrigerator unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 92,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	3.08 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	1240.7 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$ 80,000
Installed Volume:	169.6 ft^3	Development Risk:	4
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Water required for sublimation process reclaimed from refrigerated and frozen foods supply.

Data Sources: Principle based on rate of sublimation per unit area described in "Sublimation of Granular Solids" by T.K. Ross and A. Rushton, International Developments in Heat Transfer, 1961, International Heat Transfer Conference, p. 707-711, Published by ASME.

ELEMENT CONCEPT DATA SHEET # 2.2.6.14

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 019

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F.

Detail Data

MTBF = 150,000 hrs.

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	Op. hrs = 69.3×10^3	Peak Power:	50 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	222 lbs	Water (50°F):	0
Resupply Weight:	.20 lbs.	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$70,000
Installed Volume:	42.76 ft^3	Development Risk:	5
Resupply Volume:	.02 ft^3		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.15

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 020

Function Reference: Provide For Storage

Drawing Reference: Dr2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	149.67 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$70000
Installed Volume:	27.30 ft^3	Development Risk:	5
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.16

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers
021

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain foods at 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	164.78 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$70000
Installed Volume:	28.89 ft^3	Development Risk:	5
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.17

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 024

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	A MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	77.85 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$70000
Installed Volume:	10.81 ft^3	Development Risk:	5
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.30

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

043, 061, 069

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability: Op. hrs = 69.4×10^3

Maintainability: MTTR = .5 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 748.89 lbs

Resupply Weight: -

10 Year Resupply Weight: -

Installed Volume: 192 ft^3

Resupply Volume: -

10 Year Resupply Volume: -

Peak Power: 50 watts

Energy: -

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $70000

Development Risk: 5

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.31

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

044, 062, 070,
071

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	375.55 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$70000
Installed Volume:	88.45 ft^3	Development Risk:	5
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.32

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

045. 063

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability: Op. hrs ± 69.4 x 10^3

Maintainability: MTTR = .5 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 447.17 lbs

Resupply Weight: -

10 Year Resupply Weight: -

Installed Volume: 109.78 ft^3

Resupply Volume: -

10 Year Resupply Volume: -

Peak Power: 50 watts

Energy: -

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $70000

Development Risk: 5

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.33

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

047, 056, 065

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	240.76 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$70000
Installed Volume:	48.84 ft^3	Development Risk:	5
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.34

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 048, 066

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	167.61 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$70000
Installed Volume:	31.41 ft^3	Development Risk:	5
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.35

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

055

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability: Op. hrs = 69.4×10^3

Maintainability: MTTR = .5 hrs

Safety: 0

Crew Acceptance: 8

Installed Weight: 435.07 lbs

Resupply Weight: -

10 Year Resupply Weight: -

Installed Volume: 104.7 ft^3

Resupply Volume: -

10 Year Resupply Volume: -

Peak Power: 50 watts

Energy: -

Water (155°F): 0

Water (50°F): 0

Crew Operating Time: .0616 hrs/day

Total Cost: $70000

Development Risk: 5

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.36

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 067

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	1290 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$70000
Installed Volume:	396.62 ft^3	Development Risk:	5
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.37

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers

068

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Ob. hrs = 69.4×10^3 hrs	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	50 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	631.37 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$70000
Installed Volume:	162.54 ft^3	Development Risk:	5
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.6.38

Title: Space Radiator Refrigerator Concept

Applicable Mission Numbers: 072

Function Reference: Provide For Storage

Drawing Reference: D-2.2.6

Physical Description: The space radiator refrigerator unit is a storage locker insulated with 4 inches of foam all around. The radiators remove heat from a transport fluid that has circulated through the interior walls of the unit.

Functional Description: The refrigerator unit will maintain loads at 40°F.

Detail Data

Reliability: MTBF = 150,000 hrs ~~Op. hrs = 69.4 x 10^3~~	10 Year Resupply Volume: -
Maintainability: MTTR = .5 hrs	Peak Power: 50 watts
Safety: 0	Energy: -
Crew Acceptance: 8	Water (155°F): 0
Installed Weight: 229.07 lbs	Water (50°F): 0
Resupply Weight: -	Crew Operating Time: .0616 hrs/day
10 Year Resupply Weight: -	Total Cost: $70000
Installed Volume: 43.78 ft^3	Development Risk: 5
Resupply Volume: -	

Rationale:

Merits/Deficiencies: Weight, power, development, operability penalties are low/attitude control required.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.14

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers

019

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op hrs. 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:		Peak Power:	245 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	168 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$85000
Installed Volume:	43.4 ft^3	Development Risk:	6
Resupply Volume:			

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.15

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers

020

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op Hrs. 69.4 x 10^3	10 Year Resupply Volume:	-
Maintainability:	.5	Peak Power:	199.5 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	121 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$85000
Installed Volume:	28.1 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.16

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 021

Function Reference: Provide For Storage

Drawing Reference: _____

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:		Peak Power:	208 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	134 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$85000
Installed Volume:	30.1 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale: _____

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 2.2.7.17

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 024

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op Hrs. 69 . 4 x 10^3	10 Year Resupply Volume:	-
Maintainability:		Peak Power:	155.5 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	59 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$85000
Installed Volume:	11.8 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.30

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers

043, 061, 069

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	582.5 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	705 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$85000
Installed Volume:	201.1 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.31

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 044, 062, 070; 071

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	316 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	335 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$85000
Installed Volume:	89.2 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.32

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 045, 063

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs λ = 1/MTBF hrs = 69.4 x 10^{-3}	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	359 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	404 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$85000
Installed Volume:	110.6 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.33

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 047, 056, 065

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	265 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	204.3 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$85000
Installed Volume:	49.5 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.34

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 048, 066

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	208 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	137 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$85000
Installed Volume:	32.2 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.35

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers

055

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs - 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	345 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	392 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$85000
Installed Volume:	105.5 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.36

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 067

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

Reliability:	MTBF = 150,000 hrs Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	1,032.5 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	1412 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$85000
Installed Volume:	398.2 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.37

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 068

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs = 69.4 x 10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	470 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	587 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$ 85000
Installed Volume:	163.4 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.2.7.38

Title: Thermoelectric Refrigeration Unit

Applicable Mission Numbers: 072

Function Reference: Provide For Storage

Drawing Reference: D-2.2.7

Physical Description: The thermoelectric refrigeration unit is a storage locker insulated with 4 inches of foam all around. A fan directs internal airflow to the thermoelectric cold junction located in the rear refrigerator bulkhead.

Functional Description: The refrigeration unit will maintain refrigerated foods at temperatures of 40°F.

Detail Data

MTBF = 150,000 hrs

Reliability:	Op. hrs = 69.4×10^3	10 Year Resupply Volume:	-
Maintainability:	MTTR = .5 hrs	Peak Power:	245 watts
Safety:	0	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	193 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	.0616 hrs/day
10 Year Resupply Weight:	-	Total Cost:	$85000
Installed Volume:	44.5 ft^3	Development Risk:	6
Resupply Volume:	-		

Rationale:

Merits/Deficiencies: No moving machinery required to remove the heat from unit; power requirements relatively large. Heat is dumped into cabin ambient.

Data Sources:

12

ELEMENT CONCEPT DATA SHEET # 2.3.1.19

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 019

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	27.40 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:		Total Cost:	$8000
Installed Volume:	20.50 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.20

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers

035

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP.Hrs = 243.	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	60.60 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.0666 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	39.52 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.21

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 021

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	34.80 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	34.32 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.22

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 022

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	51.40 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	43.85 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.23

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers

023

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	39.30 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	42.93 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.24

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 024

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	45.60 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	46.51 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.41

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 043, 061

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞:OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	176 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	131.74 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.42

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 044, 062

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞ OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	390.3 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	254.05 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.43

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 045

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞; OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	220 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	220.66 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.44

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers
046, 064

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞: OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	330 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	281.85 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.45

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 047, 065

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞: OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	253 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	265 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.46

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 048

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞: OP. Hrs	10 Year Resupply Volume:	
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	289 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	299.06 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.47

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers

050

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞: OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	89.6 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	60.97 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.48

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers

055

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞: OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	84.8 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	63.23 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.49

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 056

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞; OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	187 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	121.94 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.50

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 057

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞: OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	107 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	105.91 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.51

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 058

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞; OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	158 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	145.28 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.52

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 059

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞; OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	121 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	132.48 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.53

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 060

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞; OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	140.3 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	143.55 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.54

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 063

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞: OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	224 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	220.66 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.55

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 066

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞: OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	294 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$ 8000
Installed Volume:	299.06 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.56

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 067

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞: OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	352 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0 -	Total Cost:	$8000
Installed Volume:	263.48 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.57

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 068

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞; OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	780 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	508.12 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.58

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 069

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞: OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	447 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	441.32 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.59

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 070

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞: OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	686 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$ 8000
Installed Volume:	563.67 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.1.60

Title: Ambient Storage Locker - Rigid Concept

Applicable Mission Numbers: 071

Function Reference: Provide For Storage

Drawing Reference: D-2.3.1

Physical Description: The rigid concept for ambient food storage provides for a rigid structure and shelving that retains and holds the food packages in a systematic arrangement. The walls of the concept need not be rigid; rubber mesh or netting will define the envelope for the concept.

Functional Description: The ambient storage concept stores the dry and shelf-stable supplies.

Detail Data

Reliability:	MTBF=∞: OP. Hrs	10 Year Resupply Volume:	0
Maintainability:	MTTR =.25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	505 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	0
10 Year Resupply Weight:	0	Total Cost:	$8000
Installed Volume:	552 ft^3	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling loop could be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.19

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 019

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	2.74 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	-7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.20

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 035

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞ : OP. Hrs= 775	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	6.06 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	.213 hrs/day
10 Year Resupply Weight:	0	Total Cost:	$ 2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.21

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 021

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	3.48 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	0
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.22

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 022

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	5.14 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	0
10 Year Resupply Weight:	0	Total Cost:	$ 2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.23

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 023

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	3.93 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	0
10 Year Resupply Weight:	0	Total Cost:	$ 2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.24

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 024

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	4.56 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.41

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers

043, 061

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	17.60 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$ 2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.42

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 044, 062

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF. ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	39.03 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.43

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 045

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	22 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.44

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 046, 064

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	33 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.45

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 047, 065

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	25.3 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.46

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 048

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	
Maintainability:		Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	28.9 lbs	Water (50°F):	0
Resupply Weight:		Crew Operating Time:	
10 Year Resupply Weight:		Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:			

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.47

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 050

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF : ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	89.6 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$ 2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.48

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 055

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF. ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	8.48 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.49

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 056

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF. ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	18.70 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$ 2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.50

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 057

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	10.7 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	:
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.51

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 058

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	15.80 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.52

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 059

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	12.1 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.53

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 060

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	14 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.54

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 063

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	22.4 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.55

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 066

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	29.4 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.56

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 067

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	35.2 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.57

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 068

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs.	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	78 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.58

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 069

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	44.7 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2..59

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 070

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF : ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	68.6 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.60

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 071

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	50.5 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 2.3.2.61

Title: Ambient Storage - Flexible Concept

Applicable Mission Numbers: 072

Function Reference: Provide For Storage

Drawing Reference:

Physical Description: The flexible concept for ambient food storage provides an elastic netting or extensible membrane fastened to a convenient bulkhead or deck. Ambient food packages are retained behind the netting.

Functional Description: The extensible material gradually recedes toward the wall (or deck) as food packages are retrieved from this storage concept.

Detail Data

Reliability:	MTBF: ∞	10 Year Resupply Volume:	0
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:	0	Energy:	0
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	58.8 lbs	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	$2000
Installed Volume:	0	Development Risk:	7
Resupply Volume:	0		

Rationale: May require cooling during ambient temperature extremes. Cooling can be provided from refrigerator, freezer, or ECS/LSS.

Merits/Deficiencies: Storage of ambient food packages is haphazard. Predetermined food arrangements are difficult to maintain.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.1.4

Title: Hot Air Convective Warming Oven

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.1

Applicable Mission Numbers

019-024
043-048
067-072

Physical Description: Air is circulated over resistance heaters and warmed to approximately 375°F. The warmed air circulates rapidly about the food, raising the food temperature to predetermined levels.

Functional Description: This oven concept warms frozen foods from -10°F to 160°F in approximately 30 minutes.

Detail Data

Reliability:	10 Year Resupply Volume: -
Maintainability:	Peak Power: 11820 watts
Safety:	Energy:
Crew Acceptance: 8	Water (155°F): 0
Installed Weight: 146 lbs	Water (50°F): 0
Resupply Weight: -	Crew Operating Time:
10 Year Resupply Weight: -	Total Cost:
Installed Volume: 11.7 ft^3	Development Risk:
Resupply Volume: -	

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: Conventional, highly acceptable technique, not gravity limited.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.2.4

Title: Microwave Warming Oven

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.2.2

Applicable Mission Numbers

019-024

043-048

067-072

Physical Description: Microwave energy is directed into a food cavity where the meals are located. Molecular agitation warms the food to predetermined temperature levels.

Functional Description: This oven concept warms frozen or room temperature foods to 160°F in 10 to 20 minutes.

Detail Data

Reliability:	MTBF	10 Year Resupply Volume:	-
Maintainability:		Peak Power:	16,660 watts
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	655 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	
10 Year Resupply Weight:	-	Total Cost:	
Installed Volume:	23.8 ft^3	Development Risk:	7
Resupply Volume:	-		

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: Cooking time is rapid; power requirement is high; microwave concept cannot brown foods effectively.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.3.4

Title: Radiant Warming Oven

Applicable Mission Numbers

019-024

Function Reference: Provide For Preparation

043-048

Drawing Reference: D-3.2.3

067-072

Physical Description: Heat energy radiating from resistance heaters warms frozen foods to predetermined temperature levels.

Functional Description: This oven concept warms frozen food from -10°F to 160°F in approximately 30 minutes.

Detail Data

Reliability:	MBTF	10 Year Resupply Volume:	-
Maintainability:	-	Peak Power:	13,540 watts
Safety:	-	Energy:	
Crew Acceptance:	5	Water (155°F):	0
Installed Weight:	158 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	
10 Year Resupply Weight:	-	Total Cost:	
Installed Volume:	13.26 ft^3	Development Risk:	7
Resupply Volume:	-		

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: May require food stirring to prevent scorching.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.6.4

Title: Self-Heating Food Package Concept

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.6

Applicable Mission Numbers

019-024

043-048

067-072

Physical Description: Heating elements fabricated from aluminum foil are integral with food packaging concept. The evacuated package provides intimate contact with heated surface. A heat flux of 8 watts/in^2 is sufficient to warm the food packages.

Functional Description: The external electrical connections to the package are contained in a flip-up flap that is retained by a clipboard clamping device. The clamp provides electrical power also.

Detail Data

Reliability:	10 Year Resupply Volume: -
Maintainability:	Peak Power: 8340 watts
Safety:	Energy:
Crew Acceptance: 4	Water (155°F): 0
Installed Weight: 75 lbs	Water (50°F): 0
Resupply Weight: -	Crew Operating Time:
10 Year Resupply Weight: -	Total Cost:
Installed Volume: 26 ft^3	Development Risk: 7
Resupply Volume: -	

Rationale:

Merits/Deficiencies: Crew may be required to manipulate the package in some instances to relieve cold spots and aid reconstitution processes.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.13.4

Title: Combination Microwave/Radiant Warming Oven

Applicable Mission Numbers

019-024
043-048
067-072

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.13

Physical Description: Microwave energy is directed into a food cavity where the meals are located. Molecular agitation warms the food to predetermined temperature levels.

Functional Description: This oven concept warms food to 160°F in about 10 to 20 minutes. This oven has the capability to brown meats, etc.

Detail Data

Reliability: MTBF	10 Year Resupply Volume: -
Maintainability:	Peak Power: 16,660 watts
Safety:	Energy:
Crew Acceptance: 8	Water (155°F): 0
Installed Weight: 660 lbs	Water (50°F): 0
Resupply Weight:	Crew Operating Time:
10 Year Resupply Weight: -	Total Cost:
Installed Volume: 23.8 ft^3	Development Risk: 7
Resupply Volume:	

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies: Cooking time is rapid; power requirement is high.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.14.4

Title: Combination Hot Air Convection/Radiant Warming Oven

Applicable Mission Numbers
019-024
043-048
067-072

Function Reference: Provide For Preparation

Drawing Reference: D-3.2.14

Physical Description: Air is circulated over resistance heaters and warmed to approximately 375°F. The warmed air circulates rapidly about the food, raising the food temperature to predetermined levels.

Functional Description: This oven concept warms frozen foods from -10°F to 160°F in approximately 30 minutes. The oven has the capability to brown meats, etc.

Detail Data

Reliability:		10 Year Resupply Volume:	-
Maintainability:	-	Peak Power:	13,540 watts
Safety:	-	Energy:	-
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	150 lbs	Water (50°F):	0
Resupply Weight:	-	Crew Operating Time:	-
10 Year Resupply Weight:		Total Cost:	-
Installed Volume:	11.7 ft^3	Development Risk:	7
Resupply Volume:	-		

Rationale: Warming oven sized for largest meal of the day; assume 80% of largest meal to be warmed in oven; oven concept independent of diet percentage; oven concept utilized only when sufficient amounts of suitable meals accumulate; that is, as needed for the 20/80 diet - but every other day with the 60/40 diet; and every third day for the 85/15 diet.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.2.15.4

Title: Electrically Heated Food Tray

Applicable Mission Numbers

Function Reference: Provide For Preparation

Drawing Reference:

Physical Description: A self-contained serving tray has six cavities that are lined with electrically heated coils. The trays are plugged in at the dining area for power activation.

Functional Description: Food is placed in heating cavities and is warmed from -10°F to 160°F in 30 minutes.

Detail Data

Reliability: MTBF = 11,000 hrs Op. Hrs. = 4,380
Maintainability: MTTR = .50 hrs
Safety: 0
Crew Acceptance: 6
Installed Weight:
Resupply Weight:
10 Year Resupply Weight:
Installed Volume:
Resupply Volume:
10 Year Resupply Volume:
Peak Power:
Energy:
Water (155°F):
Water (50°F):
Crew Operating Time:
Total Cost:
Development Risk:

Rationale:

Merits/Deficiencies:

Data Sources: NASA/Manned Spacecraft Center. "Preliminary Skylab Food System Baseline Design", September 8, 1970.

ELEMENT CONCEPT DATA SHEET # 3.3.1.4

Title: Food Warming Plate

Applicable Mission Numbers

019-024 _____

Function Reference: Food Preparation

043-048 _____

Drawing Reference: D 3.3.1.2

067-072 _____

Physical Description: 12" x 20" ceramic tray with electric heating element permanently embedded and capable of submersion in water for clean-up purposes. Handles and a grid cover to be provided for transport and hold-down.

Functional Description: The tray provides capacity for twelve (12) dishes to be maintained at a temperature of 150°F. The grid cover maintains the dishes in intimate contact with the warming surface.

Detail Data

Reliability:	MTBF	10 Year Resupply Volume:	.174 ft^3
Maintainability:	MTTR = .5 hrs	Peak Power:	600 watts
Safety:	0	Energy:	505 watt hrs/day
Crew Acceptance:	8	Water (155°F):	0
Installed Weight:	16.0 pounds	Water (50°F):	0
Resupply Weight:	4.0 pounds	Crew Operating Time:	-
10 Year Resupply Weight:	4.0 pounds	Total Cost:	-
Installed Volume:	.694 ft^3	Development Risk:	7
Resupply Volume:	.174 ft^3		

Rationale: Only one (1) tray is to be held for replacement due to high reliability.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 3.3.2.4

Title: Reconstitution Machine

Applicable Mission Numbers: 019-024

Function Reference: Food Preparation

Drawing Reference: D 3.3.2

Physical Description: Table mounted cannisters fitted with toroidal air pressure cells and/or heating liner and/or mixer attachments to agitate, mix, or heat powdered/frozen foodstuffs and water to a homogenized state and dispense same.

Functional Description: Proportionately charged bags shall be placed in the cannisters and, depending on charge, shall either be agitated, mixed, or heated by the operation of the appropriate controls. Removal of prepared food shall be by actuation of pressure cells exiting through appropriate lower dispensing cover.

Detail Data

Reliability:		10 Year Resupply Volume:	342 ft^3
Maintainability:	-	Peak Power:	2200 watts
Safety:	-	Energy:	-
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	30 pounds	Water (50°F):	0
Resupply Weight:	25.2 pounds	Crew Operating Time:	-
10 Year Resupply Weight:	6570 pounds	Total Cost:	-
Installed Volume:	1.56 ft^3	Development Risk:	7
Resupply Volume:	1.30 ft^3		

Rationale: All components of device, except for disposable bags, will last for the lifetime of the laboratory. Air pressure to actuate pressure cells is only power source deemed satisfactory. Ultrasonic mixer would be satisfactory for only 20/80 liquid reconstitution. Counter-rotating centrifuge would be satisfactory for 60/40 and 85/15 mixes only, with clean-up time consuming.

Merits/Deficiencies: Requires air pressure supply.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.3.2.8

Title: Reconstitution Machine

Applicable Mission Numbers: 043-048

Function Reference: Food Preparation

Drawing Reference: D 3.3.2

Physical Description: Table mounted cannisters fitted with toroidal air pressure cells and/or heating liner and/or mixer attachments to agitate, mix, or heat powdered/frozen foodstuffs and water to a homogenized state and dispense same.

Functional Description: Proportionately charged bags shall be placed in the cannisters and, depending on charge, shall either be agitated, mixed, or heated by the operation of the appropriate controls. Removal of prepared food shall be by actuation of pressure cells exiting through appropriate lower dispensing cover.

Detail Data

Reliability:	MTBF = 6700 hrs Op Hrs = 2120	10 Year Resupply Volume:	342 ft^3
Maintainability:	-	Peak Power:	2,200 watts
Safety:	-	Energy:	-
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	30 pounds	Water (50°F):	0
Resupply Weight:	162 pounds	Crew Operating Time:	-
10 Year Resupply Weight:	6570 pounds	Total Cost:	-
Installed Volume:	1.56 ft^3	Development Risk:	7
Resupply Volume:	8.2 ft^3		

Rationale: All components of device, except for disposable bags, will last for the lifetime of the laboratory. Air pressure to actuate pressure cells is only power source deemed satisfactory. Ultrasonic mixer would be satisfactory for only 20/80 liquid reconstitution. Counter-rotating centrifuge would be satisfactory for 60/40 and 85/15 mixes only, with clean-up time consuming.

Merits/Deficiencies: Requires air pressure supply.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.3.2.9

Title: Reconstitution Machine

Applicable Mission Numbers

Function Reference: Food Preparation

Drawing Reference: D 3.3.2

Physical Description: Table mounted cannisters fitted with toroidal air pressure cells and/or heating liner and/or mixer attachments to agitate, mix, or heat powdered/frozen foodstuffs and water to a homogenized state and dispense same.

Functional Description: Proportionately charged bags shall be placed in the cannisters and, depending on charge, shall either be agitated, mixed, or heated by the operation of the appropriate controls. Removal of prepared food shall be by actuation of pressure cells exiting through appropriate lower dispensing cover.

Detail Data

MTBF = 6700 hrs

Reliability:	Op. Hrs. = 2120	10 Year Resupply Volume:	171 ft^3
Maintainability:	-	Peak Power:	1,100 watts
Safety:	-	Energy:	-
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	15 pounds	Water (50°F):	0
Resupply Weight:	162 pounds	Crew Operating Time:	-
10 Year Resupply Weight:	3285 pounds	Total Cost:	-
Installed Volume:	0.78 ft^3	Development Risk:	7
Resupply Volume:	8.4 ft^3		

Rationale: All components of device, except for disposable bags, will last for the lifetime of the laboratory. Air pressure to actuate pressure cells is only power source deemed satisfactory. Ultrasonic mixer would be satisfactory for only 20/80 liquid reconstitution. Counter-rotating centrifuge would be satisfactory for 60/40 and 85/15 mixes only, with clean-up time consuming.

Merits/Deficiencies: Requires air pressure supply.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.3.2.10

Title: Reconstitution Machine

Applicable Mission Numbers

055-060

Function Reference: Food Preparation

Drawing Reference: D 3.3.2

Physical Description: Table mounted cannisters fitted with toroidal air pressure cells and/or heating liner and/or mixer attachments to agitate, mix, or heat powdered/frozen foodstuffs and water to a homogenized state and dispense same.

Functional Description: Proportionately charged bags shall be placed in the cannisters and, depending on charge, shall either be agitated, mixed, or heated by the operation of the appropriate controls. Removal of prepared food shall be by actuation of pressure cells exiting through appropriate lower dispensing cover.

Detail Data

Reliability:	MTBF = 6700 hrs ~~Op Hrs = 2120~~	10 Year Resupply Volume:	171 ft^3
Maintainability:	-	Peak Power:	1,100 watts
Safety:	-	Energy:	-
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	15 pounds	Water (50°F):	0
Resupply Weight:	162 pounds	Crew Operating Time:	
10 Year Resupply Weight:	3285 pounds	Total Cost:	-
Installed Volume:	0.78 ft^3	Development Risk:	7
Resupply Volume:	8.4 ft^3		

Rationale: All components of device, except for disposable bags, will last for the lifetime of the laboratory. Air pressure to actuate pressure cells is only power source deemed satisfactory. Ultrasonic mixer would be satisfactory for only 20/80 liquid reconstitution. Counter-rotating centrifuge would be satisfactory for 60/40 and 85/15 mixes only, with clean-up time consuming.

Merits/Deficiencies: Requires air pressure supply.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.3.2.11

Title: Reconstitution Machine

Applicable Mission Numbers: 061-066

Function Reference: Food Preparation

Drawing Reference: D 3.3.2

Physical Description: Table mounted cannisters fitted with toroidal air pressure cells and/or heating liner and/or mixer attachments to agitate, mix, or heat powdered/frozen foodstuffs and water to a homogenized state and dispense same.

Functional Description: Proportionately charged bags shall be placed in the cannisters and, depending on charge, shall either be agitated, mixed, or heated by the operation of the appropriate controls. Removal of prepared food shall be by actuation of pressure cells exiting through appropriate lower dispensing cover.

Detail Data

Reliability:	MTBF = 6700 hrs Op Hrs = 2120	10 Year Resupply Volume:	171 ft^3
Maintainability:	-	Peak Power:	1,100 watts
Safety:	-	Energy:	-
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	15 pounds	Water (50°F):	0
Resupply Weight:	162 pounds	Crew Operating Time:	-
10 Year Resupply Weight:	3285 pounds	Total Cost:	-
Installed Volume:	0.78 ft^3	Development Risk:	7
Resupply Volume:	8.4 ft^3		

Rationale: All components of device, except for disposable bags, will last for the lifetime of the laboratory. Air pressure to actuate pressure cells is only power source deemed satisfactory. Ultrasonic mixer would be satisfactory for only 20/80 liquid reconstitution. Counter-rotating centrifuge would be satisfactory for 60/40 and 85/15 mixes only, with clean-up time consuming.

Merits/Deficiencies: Requires air pressure supply.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.3.2.12

Title: Reconstitution Machine

Applicable Mission Numbers

067-072

Function Reference: Food Preparation

Drawing Reference: D 3.3.2

Physical Description: Table mounted cannisters fitted with toroidal air pressure cells and/or heating liner and/or mixer attachments to agitate, mix, or heat powdered/frozen foodstuffs and water to a homogenized state and dispense same.

Functional Description: Proportionately charged bags shall be placed in the cannisters and, depending on charge, shall either be agitated, mixed, or heated by the operation of the appropriate controls. Removal of prepared food shall be by actuation of pressure cells exiting through appropriate lower dispensing cover.

Detail Data

MTBF = 6700 hrs

Reliability:	Op Hrs = 2120	10 Year Resupply Volume:	342 ft^3
Maintainability:	-	Peak Power:	2200 watts
Safety:	-	Energy:	-
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	30 pounds	Water (50°F):	0
Resupply Weight:	162 pounds	Crew Operating Time:	-
10 Year Resupply Weight:	6570 pounds	Total Cost:	-
Installed Volume:	1.56 ft^3	Development Risk:	7
Resupply Volume:	8.2 ft^3		

Rationale: All components of device, except for disposable bags, will last for the lifetime of the laboratory. Air pressure to actuate pressure cells is only power source deemed satisfactory. Ultrasonic mixer would be satisfactory for only 20/80 liquid reconstitution. Counter-rotating centrifuge would be satisfactory for 60/40 and 85/15 mixes only, with clean-up time consuming.

Merits/Deficiencies: Requires air pressure supply.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.3.3.2

Title: Chilled Display Cabinet

Function Reference: Food Preparation

Drawing Reference: D 3.3.3

Applicable Mission Numbers

019-024

043-048

067-072

Physical Description: Metal cabinet with hinged see-through cover and four independent drawers for storage of perishables. The cabinet is maintained at 38°F by means of a heat exchanger in the environmental control system. Latches maintain cover and drawers from accidental opening.

Functional Description: Upper Level has hinged cover for access to baked goods, etc.; Middle Level has a full width drawer for access to partially prepared foods; Lower Level has three equally sized drawers for fruit storage.

Detail Data

Reliability:	MTBF=40,000HRS Op Hrs = 14,600	10 Year Resupply Volume:	0
Maintainability:	-	Peak Power:	0
Safety:	-	Energy:	-
Crew Acceptance:	6	Water (155°F):	0
Installed Weight:	60 pounds	Water (50°F):	0
Resupply Weight:	0	Crew Operating Time:	-
10 Year Resupply Weight:	0	Total Cost:	-
Installed Volume:	15.74 ft.^{3}	Development Risk:	7
Resupply Volume:	0		

Rationale:

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 3.4.1.4

Title: Preparation Counter

Applicable Mission Numbers

019-024
043-048
067-072

Function Reference: Provide For Preparation

Drawing Reference:

Physical Description: A wall-mounted preparation counter top with built-in chopping block type surface. Structure may be of honeycombed aluminum.

Functional Description: The countertop surface with a chopping block and drawers for utensils to be wall-mounted.

Detail Data

Reliability:		10 Year Resupply Volume:	16.4 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	34.0 lb	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	34.0 lb	Total Cost:	
Installed Volume:	16.4 cu ft	Development Risk:	
Resupply Volume:	0		

Rationale: The basic use of the wall-mounted counter top is preparation. Storage below is not needed.

Merits/Deficiencies: Minimizes weight of unit.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.4.2.4

Title: Counter With Electrical Power

Function Reference: Provide For Preparation

Drawing Reference:

Applicable Mission Numbers

019-024
043-048
067-072

Physical Description: Counter top with a built-in electrical power outlet. Top surfaces should consist of impervious coatings for ease of cleaning. Structure may be of honeycombed aluminum.

Functional Description: A wall-mounted food preparation counter top with a power outlet for direct plug-in electrical preparation devices. Storage below will contain utensils and preparation devices.

Detail Data

Reliability:		10 Year Resupply Volume:	38.4 cu ft
Maintainability:		Peak Power:	-
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	64.0 lbs	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	64.0 lbs	Total Cost:	
Installed Volume:	38.4 cu ft	Development Risk:	
Resupply Volume:	0		

Rationale: A power source for electrical preparation devices should be built into the counter. Further study is recommended.

Merits/Deficiencies: Minimum crew time; applicable to all crew sizes.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.4.3.4

Title: Fold-Away Preparation Counter

Applicable Mission Numbers

019-024

043-048

067-072

Function Reference: Provide For Preparation

Drawing Reference:

Physical Description: A fold counter top surface constructed of aluminum and honeycomb. The top surface should be of impervious coatings for ease of cleaning.

Functional Description: The counter top surface, when needed, will be unfolded from the wall. It may be movable from area to area as a plug-in unit.

Detail Data

Reliability:		10 Year Resupply Volume:	4.40 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	5	Water (155°F):	
Installed Weight:	34.4 lbs	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	34.4 lbs	Total Cost:	
Installed Volume:	4.40 cu ft	Development Risk:	
Resupply Volume:	0		

Rationale: When additional work surface is needed, a unit may be unfolded for use.

Merits/Deficiencies: Minimizes work area; has mobility.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.4.4.3

Title: Serving Cart Counter Top

Applicable Mission Numbers

Function Reference: Provide For Preparation

019-024
043-048
067-042

Drawing Reference:

Physical Description: An all aluminum cart with a recessed floor guide and rollers; partitioned sections for storage of hot and cold food to be transported to serving area.

Functional Description: Totally enclosed cart whose top surface will be used for food preparation prior to being transported to dining area for serving.

Detail Data

Reliability:		10 Year Resupply Volume:	48.0 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	48.0 lbs	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	48.0 lbs	Total Cost:	
Installed Volume:	48.0 cu ft	Development Risk:	
Resupply Volume:	0		

Rationale: This cart would perform a dual task -- both preparation and serving.

Merits/Deficiencies: Dual usage will reduce the amount of components needed.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.6.1.4

Title: Food Dispensing Cabinet

Applicable Mission Numbers

019-024

043-048

067-072

Function Reference: Provide For Preparation

Drawing Reference:

Physical Description: A counter top or wall-mounted cabinet, made of aluminum or similar material, containing compartments, retaining devices and access doors.

Functional Description: A food holding or dispensing cabinet will be loaded with trays or dishes as they have been prepared, to be removed by either crewman or steward.

Detail Data

Reliability:		10 Year Resupply Volume:	14.0 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	41.6 lbs	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	41.6 lbs	Total Cost:	
Installed Volume:	14.0 cu ft	Development Risk:	
Resupply Volume:	0		

Rationale: As food is prepared, it has to be held or contained until served.

Merits/Deficiencies: Reduces congestion; may be self-service or steward service.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.7.1.4

Title: Food Storage Cabinet

Applicable Mission Numbers
019-024
043-048
067-072

Function Reference: Provide For Preparation

Drawing Reference:

Physical Description: An overcounter food storage or holding module of an aluminum material using the best and newest techniques available, so designed to accept a wire form type food cartridge.

Functional Description: A modular cabinet for the storage of non-frozen food which will be mounted above the preparation area. It will hold food cartridges that will allow a crewman to extract food using only one hand. Cabinet will hold one day's supply of food.

Detail Data

Reliability:		10 Year Resupply Volume:	8.0 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	44.0 lbs	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	44.0 lbs	Total Cost:	
Installed Volume:	8.0 cu ft	Development Risk:	
Resupply Volume:	0		

Rationale: Food to be prepared has to be stored within reaching distance of the preparation counter.

Merits/Deficiencies: Will allow a crewman to perform more than one function through the use of one-hand operation.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.7.2.4

Title: Self-Storing Food Containers

Applicable Mission Numbers

Function Reference: Provide For Preparation

019-024
043-048
067-072

Drawing Reference:

Physical Description: Metallic or non-metallic food containers (from dry storage) with built-in interlocking features for stacking together and having doors or covers for removal of food.

Functional Description: Food containers which come from the dry storage locker will be stacked together with interlocking fasteners. These containers will take the place of storage cabinets.

Detail Data

Reliability:		10 Year Resupply Volume:	8.0 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	5	Water (155°F):	
Installed Weight:	4.0 lbs	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	8.0 lbs	Total Cost:	
Installed Volume:	4.0 cu ft	Development Risk:	
Resupply Volume:	0		

Rationale: Container serves dual purpose -- storage in ambient closet, and storage in preparation area.

Merits/Deficiencies: Storage volume reduced.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.7.3.4

Title: Automatic Food Storage Cabinet

Function Reference: Provide For Preparation

Drawing Reference:

Applicable Mission Numbers

019-024

043-048

067-072

Physical Description: A mechanical, hand-actuated cabinet of aluminum construction to dispense and unpackage food into preparation devices.

Functional Description: Food (contained in cartridges) will, when actuated, be dispensed, minus its covering, into a preparation device. Cabinet sized to hold a full day's supply of ambient food.

Detail Data

Reliability:		10 Year Resupply Volume:	8.0 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	48.0 lbs	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	48.0 lbs	Total Cost:	
Installed Volume:	8.0 cu ft	Development Risk:	
Resupply Volume:	0		

Rationale: More automated operations will mean less spillage; minimize crew time.

Merits/Deficiencies: One-hand operation.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.1.3

Title: Kneader - Mechanical

Function Reference: Provide for Preparation

Drawing Reference:

Applicable Mission Numbers

019-024

043-048

067-072

Physical Description: A mechanical, hand-operated device to contain and mechanically knead plastic type food packages. Kneading may be done by passing package between a series of rollers.

Functional Description: Dry food packages which have been reconstituted with water have to be kneaded to mix contents thoroughly.

Detail Data

Reliability:		10 Year Resupply Volume:	.833 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	4.8 lbs	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	9.6 lbs	Total Cost:	
Installed Volume:	.417 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: For crews larger than 6 men, a mechanical means is required for kneading.

Merits/Deficiencies: Will reduce crew time and be more crew acceptable.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.3.3

Title: Hot Food Handling Tongs

Applicable Mission Numbers

019-024
043-048
067-072

Function Reference: Provide For Preparation

Drawing Reference:

Physical Description: Hand-held, hand-operated tongs with either mechanical or manual gripping action. Permits solid lock-up of tong to dish or tray; self-adjusting.

Functional Description: For inserting into or removing from ovens, food packages, dishes or trays which have been heated. Two tongs per set.

Detail Data

Reliability:		10 Year Resupply Volume:	.139 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	2.6 lbs	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	5.2 lbs	Total Cost:	
Installed Volume:	.069 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: Hot food handling devices such as tongs are required in partial- through zero-g.

Merits/Deficiencies: Tongs for handling hot foods will prevent accidents and injury.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.4.3

Title: Clam Shell Type Handling Device

Function Reference: Provide For Preparation

Drawing Reference:

Applicable Mission Numbers

019-024
043-048
067-072

Physical Description: Hand-held, hand-operated clam shell type scoop and claw food retention and transfer mechanism; squeeze-type gripping action.

Functional Description: To be used to scoop up and transfer food without spilling from preparation area to serving area, etc.

Detail Data

Reliability:		10 Year Resupply Volume:	.038 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	4	Water (155°F):	
Installed Weight:	1.3 lb	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	2.6 lbs	Total Cost:	
Installed Volume:	.019 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: For ease of handling in a zero-g condition, this concept is valid.

Merits/Deficiencies: Prevents fly-away of food; may be bulky in handling.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.7.4

Title: Scoop - Ice Cream Type

Applicable Mission Numbers

Function Reference: Provide For Preparation

019-024
043-048
067-072

Drawing Reference:

Physical Description: Mechanically actuated, hand-operated scoop type device made of lightweight materials such as aluminum.

Functional Description: A scoop similar to an ice cream scoop to be used to transfer food such as mashed potatoes, turnips, etc.

Detail Data

Reliability:		10 Year Resupply Volume:	.177 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	.875 lb	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	2.6 lbs	Total Cost:	
Installed Volume:	.059 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: Wiping action of mechanical actuation device may have more uses in space.

Merits/Deficiencies: Will contain food for transfer.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.9.3

Title: Kitchen Utility Shears

Applicable Mission Numbers

019-024

043-048

067-072

Function Reference: Provide For Preparation

Drawing Reference:

Physical Description: Normal configuration shears (scissors) 5 inches long x 2 inches wide x one-quarter inch high.

Functional Description: Shears to be used for opening food packages which have no special opening device or packages whose device is inoperable.

Detail Data

Reliability:		10 Year Resupply Volume:	.006 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	.75 lb	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	1.5 lb	Total Cost:	
Installed Volume:	.003 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: Opening of dry food packaging and other packaging may need the services of a pair of shears.

Merits/Deficiencies: Can be used many times during preparation of food.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.10.4

Title: Hand-Operated Mixer/Blender

Function Reference: Provide For Preparation

Drawing Reference:

Applicable Mission Numbers

019-024
043-048
067-072

Physical Description: A cylindrically shaped container with a trigger mechanism which performs an oscillating type action to mix or blend.

Functional Description: A container with food or liquid to be mixed will be inserted into the trigger actuated housing which will, by a latching device, hold and oscillate the food container.

Detail Data

Reliability:		10 Year Resupply Volume:	.752 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	4	Water (155°F):	
Installed Weight:	1.3 lb	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	6.0 lb	Total Cost:	
Installed Volume:	.075 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: For small crews of 6 to 12 men, a hand-operated, mechanical mixer is needed.

Merits/Deficiencies: Preparation time reduced; no power source needed.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.11.4

Title: Spatula

Applicable Mission Numbers

Function Reference: Provide For Preparation

019-024
043-048
067-072

Drawing Reference:

Physical Description: A hard rubber or plastic type material with a wedge-shaped blade and handle for scraping.

Functional Description: A scraping device to be used for mixing and scraping of preparation devices and mixing bowls.

Detail Data

Reliability:		10 Year Resupply Volume:	.042 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	.375 lb	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	3.7 lb	Total Cost:	
Installed Volume:	.004 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: Foods which tend to stick to surfaces will have to be scraped from mixing bowls.

Merits/Deficiencies: Preparation devices can be scraped, but not scratched.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.8.12.4

Title: Food Chopper

Applicable Mission Numbers
019-024
043-048
067-072

Function Reference: Provide For Preparation

Drawing Reference:

Physical Description: A spring-loaded, hand-actuated four-bladed chopper totally enclosed in a see-through housing.

Functional Description: The spring-mechanism assisted hand-actuated device gives an assist in breaking and chopping of foods.

Detail Data

Reliability:		10 Year Resupply Volume:	.458 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	1.3 lb	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	3.9 lb	Total Cost:	
Installed Volume:	1.53 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: A hand-operated mechanical device will cut down crew time.

Merits/Deficiencies:

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.9.1.4

Title: Controlled Spillage Module

Function Reference: Provide for Preparation

Drawing Reference:

Applicable Mission Numbers

019-024	
043-048	
067-072	

Physical Description: A plenum chamber containing a controlled spillage duct using a low velocity induced directional airflow to ingest spilled particles through a series of orifices.

Functional Description: A wall-mounted, ducted device to control, contain, and prevent spilled food from contaminating the galley air.

Detail Data

Reliability:		10 Year Resupply Volume:	3.0 cu ft
Maintainability:		Peak Power:	400 watts
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	30.0 lb	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	30.0 lb	Total Cost:	
Installed Volume:	3.0 cu ft	Development Risk:	
Resupply Volume:	0		

Rationale: From a health and safety standpoint, the control of food spillage requires further study.

Merits/Deficiencies: Containment of loose particles.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.10.3.4

Title: Waist Restraint

Function Reference: Provide For Preparation

Drawing Reference:

Applicable Mission Numbers

019-024
043-048
067-072

Physical Description: A cloth-type belt with hip mounted telescoping fittings which allow the crewman to attach himself to a restraint rail at the preparation counter.

Functional Description: A waist belt with fittings attached on both sides to allow the crewman to attach himself to the preparation counter and keep his hands free for working operations.

Detail Data

Reliability:		10 Year Resupply Volume:	.86 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	75 lb	Water (50°F):	
Resupply Weight:	1.5 lb	Crew Operating Time:	
10 Year Resupply Weight:	75 lb	Total Cost:	
Installed Volume:	.86 cu ft	Development Risk:	
Resupply Volume:	$.017\ ft^3$		

Rationale: A body restraint is needed to allow crewman to perform duties during zero-g conditions.

Merits/Deficiencies: Can work freely during zero-g, but may increase crew time in moving about.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.3.4

Title: Mechanical Rail Transport System

Function Reference: Provide For Preparation

Drawing Reference:

Applicable Mission Numbers

019 - 024

043 - 048

067 - 072

Physical Description: An overhead rail used to restrain crewman and provide mobility, to be used to attach roller propelling food containment brackets.

Functional Description: Food containers to be transported to galley will be attached to roller brackets. Rails may have "sidings" to store food containers in preparation area.

Detail Data

Reliability:		10 Year Resupply Volume:	.613 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	40.0 lb	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	40.0 lb	Total Cost:	
Installed Volume:	.613 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: Overhead rail has dual purpose: to provide mobility and as a conveyance for food.

Merits/Deficiencies: Allows for ease of handling.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.4.3

Title: Dolly Type Guided Cart

Applicable Mission Numbers

019 - 024

043 - 048

067 - 072

Function Reference: Provide For Preparation

Drawing Reference:

Physical Description: An all aluminum cart with a recessed floor guide and rollers with partitions for both frozen and ambient. Same cart as per concept 3.4.4.

Functional Description: Totally enclosed cart to transport frozen and ambient food from storage to preparation.

Detail Data

Reliability:		10 Year Resupply Volume:	48.0 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	48.0 lb	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	48.0 lb	Total Cost:	
Installed Volume:	48.0 cu ft	Development Risk:	
Resupply Volume:	0		

Rationale: This cart would perform a dual task -- both transport and preparation of food.

Merits/Deficiencies: Minimizes number of components.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.5.4

Title: Net Type Bag

Function Reference: Provide For Preparation

Drawing Reference:

Applicable Mission Numbers

019 - 024
043 - 048
067 - 072

Physical Description: A bag made of a net-type webbing which will hold food packages and be transportable.

Functional Description: A bag which will allow the crewman to easily carry a number of food packages.

Detail Data

Reliability:		10 Year Resupply Volume:	.25 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	5	Water (155°F):	
Installed Weight:	1.875 lbs	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	1.875 lbs	Total Cost:	
Installed Volume:	.25 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: Packages cannot be carried without a restraint. A net-type bag will be lightweight.

Merits/Deficiencies:

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 3.11.7.4

Title: Food Handling Tongs

Applicable Mission Numbers

Function Reference: Provide For Preparation

019-024

043-048

Drawing Reference:

067-072

Physical Description: A hand-held gripping device fabricated from welded wire. May be in the form of "ice tongs", but preferably it should be latched to prevent spillage.

Functional Description: Food handling tongs for removal and transportation of containers and packages from the freezer or ambient storage closet to the preparation area.

Detail Data

Reliability:		10 Year Resupply Volume:	4 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	5	Water (155°F):	
Installed Weight:	4.0 lbs	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	4.0 lbs	Total Cost:	
Installed Volume:	4 cu ft	Development Risk:	
Resupply Volume:	0		

Rationale: This is a valid concept for removing and carrying of small quantities of food in partial- to zero-g.

Merits/Deficiencies: Lightweight construction; easy to handle.

Data Sources: Best engineering judgment.

ELEMENT CONCEPT DATA SHEET # 4.1.3.4

Title: Tray/Rail Conveyor

Function Reference: Provide For Serving

Drawing Reference:

Applicable Mission Numbers

019 - 024
043 - 048
067 - 072

Physical Description: This concept employs a T-shaped track which engages a similarly shaped groove in the tray for retention in zero-g. The track runs from the galley to the dining area. An electrically powered mechanical drive provides the transportation power.

Functional Description: This prepared tray is inserted onto the track and the propulsion device slides the tray along the track to the dining area at which point it is removed by the seated crewman and set into the eating position.

Detail Data

Reliability:		10 Year Resupply Volume:	0
Maintainability:		Peak Power:	100 watts
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	8.0 pounds	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	
Installed Volume:	.8 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: A positive control system such as this is felt to be necessary in order to avoid free-floating-loaded trays.

Merits/Deficiencies: This device would also be used for the return of soiled trays to the galley.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 4.1.7.4

Title: Tray Rack/Rail Conveyor

Function Reference: Provide For Serving

Drawing Reference:

Applicable Mission Numbers

019 - 024
045 - 048
067 - 072

Physical Description: This concept employs a storage rack for proper retention of trays. The rack itself is mated to a conveyor system such as 4.1.3 for use during transport between the dining and galley areas.

Functional Description: The rack is used to hold clean trays, prepared trays, or soiled trays. For serving, the loaded rack is powered along the track to the dining area where the crewmen withdraw their meals. It is also used to return soiled trays during clean-up and to store clean trays.

Detail Data

Reliability:		10 Year Resupply Volume:	0
Maintainability:		Peak Power:	200 watts
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	44.0 pounds	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	
Installed Volume:	9.0 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: This device serves three specific functions with only a small weight/power penalty over other approaches.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 4.2.1.4

Title: Storage Rack

Function Reference: Provide For Serving

Drawing Reference:

Applicable Mission Numbers

019 - 024

043 - 046

067 - 072

Physical Description: This device is a fixed rack similar to 4.1.7 with appropriate zero-g retention for meal tray storage. It must be used in conjunction with some other serving technique.

Functional Description: Each meal tray is pushed into its own holding slot in the rack where it remains until needed. The rack would be used for temporary storage of prepared meals, storage of soiled trays awaiting clean-up, and the storage of clean trays.

Detail Data

Reliability:		10 Year Resupply Volume:	0
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	34.0 lbs	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	
Installed Volume:	8.0 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: A tray holding device for positive retention of trays when not in use in zero-g is an essential.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 4.2.1.4

Title: Storage Rack

Applicable Mission Numbers

019 - 024
043 - 046
067 - 072

Function Reference: Provide for Serving

Drawing Reference:

Physical Description: This device is a fixed rack similar to 4.1.7 with appropriate zero-g retention for meal tray storage. It must be used in conjunction with some other serving technique.

Functional Description:

Detail Data

Reliability:	10 Year Resupply Volume: 0
Maintainability:	Peak Power: 0
Safety:	Energy:
Crew Acceptance: 7	Water (155°F):
Installed Weight: 34.0 lbs	Water (50°F):
Resupply Weight: 0	Crew Operating Time:
10 Year Resupply Weight: 0	Total Cost:
Installed Volume: 8.0 ft^3	*Development Risk:*
Resupply Volume: 0	

Rationale: A tray holding device for positive retention of trays when not in use in zero-g is an essential.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.4.1.4

Title: Tray With Recesses

Applicable Mission Numbers

019 - 024
043 - 048
067 - 072

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Rectangular trays 14" x 14" x 1.5" with smooth surface recesses sized to retain menu items unpackaged. The interfacial tension between the moist food items and the smooth surface recess will account for restraint. Material: Formed SP-Polyimide.

Functional Description: The smooth recesses will contain moist or wet menu items such that the consumer can remove them to his mouth at will.

Detail Data

Reliability:		10 Year Resupply Volume:	6.35 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	42.50 lbs	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	47.22 lbs	Total Cost:	
Installed Volume:	5.85 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale:

Merits/Deficiencies: Dry menu items will require additional restraint.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.4.3.4

Title: Tray With Spiked or Ribbed Surfaces

Applicable Mission Numbers

019 - 024
043 - 048
067 - 072

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Rectangular tray, 14" x 14" x 1.5" with rough surfaced recesses sized to retain menu items unpackaged. Material: Formed SP-1 Polyimide.

Functional Description: This configuration of the recesses would allow for application of tangential forces to food normally imparted by cutting and tearing.

Detail Data

Reliability:		10 Year Resupply Volume:	6.16 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance.	6	Water (155°F):	
Installed Weight:	42.50 lbs	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	47.22 lbs	Total Cost:	
Installed Volume:	5.85 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale:

Merits/Deficiencies: Cleaning food from between ridges or spikes will require special attention.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.4.7.4

Title: Meal Tray With Cover

Function Reference: Provide For Consumption

Drawing Reference:

Applicable Mission Numbers

019 - 024
043 - 048
067 - 072

Physical Description: Cylindrical tray 9 inches in diameter by 3 inches deep with formed four-section partition (partition molded into tray). Each tray is equipped with a circular top which is solid except for a one-quarter section which is equipped with a Mylar flap.

Functional Description: Tray allows for total containment of menu items during transfer. Food retention during consumption is virtually guaranteed.

Detail Data

Reliability:
Maintainability:
Safety:
Crew Acceptance: 6
Installed Weight: 45.85 lbs
Resupply Weight: 0
10 Year Resupply Weight: 50.94 lbs
Installed Volume: 5.07 ft^3
Resupply Volume: 0

10 Year Resupply Volume: 5.69 ft^3
Peak Power: 0
Energy:
Water (155°F):
Water (50°F):
Crew Operating Time:
Total Cost:
Development Risk:

Rationale:

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.5.2.4

Title: Positive Manual Displacement Drinking Device

Function Reference: Provide For Consumption

Drawing Reference:

Applicable Mission Numbers

019 - 024
043 - 048
067 - 072

Physical Description: Collapsible concentric shells enclose a flexible liner. A plug top with duckbill mouthpiece and valve for water admission closes the container and seals the liner. Volume capacity = 12.2 ounces.

Functional Description: Hand pressure dispenses liquid through the duckbill valve. Liquids can be beverage or soup with particles. The system allows for slow sipping of hot liquids.

Detail Data

Reliability:	10 Year Resupply Volume: 0.484 ft^3
Maintainability:	Peak Power: 0
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 9.665 lbs	Water (50°F):
Resupply Weight: 0	Crew Operating Time:
10 Year Resupply Weight: 10.73 lbs	Total Cost:
Installed Volume: 0.460 ft^3	Development Risk:
Resupply Volume: 0	

Rationale:

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.5.2.8

Title: Drinking Cup (Negative Pressure Operated)

Function Reference: Provide For Consumption

Drawing Reference: _____

Applicable Mission Numbers

019 - 024
043 - 048
067 - 072

Physical Description: Collapsible bladder is contained within a vented rigid cylinder equipped with a screw-on cap containing provision for a screw-in mouthpiece or straw and a filler valve. Volume capacity = 12.2 ounces.

Functional Description: Fluid is injected into the bladder through the filling valve. Vented cylinder allows the bladder to expand and conform to the cylinder dimensions while the mouthpiece is closed. Astronaut creates a negative by drawing on the mouthpiece, the bag collapses and forces the fluid through the mouthpiece.

Detail Data

Reliability:		10 Year Resupply Volume:	1.250 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	6.30 lb	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	6.93 lb	Total Cost:	
Installed Volume:	1.054 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: _____

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 5.6.2.4

Title: Knife

Applicable Mission Numbers

019 - 024

043 - 048

067 - 072

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Conventional-type stainless steel, reusable table knife with shortened blade having partially serrated cutting edge.

Functional Description: Cutting of served meats, vegetables, etc. into bite-size morsels and application of spread-type foods.

Detail Data

Reliability:		10 Year Resupply Volume:	0.037 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	5.30 lbs	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	5.89 lbs	Total Cost:	
Installed Volume:	0.033 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: Negligible effect on logistics of resupply. Requires onboard cleansing provisions.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.2.8

Title: Spoon

Applicable Mission Numbers

019 - 024
043 - 048
067 - 072

Function Reference: Provide For Consumption

Drawing Reference:

Physical Description: Conventional-type stainless-steel reusable spoon.

Functional Description: Scooping and transfer of low viscosity or semi-solid foods to mouth for consumption.

Detail Data

Reliability:		10 Year Resupply Volume:	0.194 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	2.50 lb	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	2.78 lb	Total Cost:	
Installed Volume:	0.175 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: Negligible effect on logistics of resupply. Requires onboard cleansing provisions.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.2.12

Title: Fork

Function Reference: Provide For Consumption

Drawing Reference:

Applicable Mission Numbers

019 - 024
043 - 048
067 - 072

Physical Description: Conventional-type stainless-steel reusable fork with four shortened tines.

Functional Description: Holding of foods while cutting, spearing, and transfer of bite-size morsels to mouth for consumption.

Detail Data

Reliability:		10 Year Resupply Volume:	0.194 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	3.50 lb	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	3.89 lb	Total Cost:	
Installed Volume:	0.175 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: Negligible effect on logistics of resupply. Requires onboard cleansing provisions.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.3.4

Title: Combination Spoon/Fork ("Spork")

Function Reference: Provide For Consumption

Drawing Reference:

Applicable Mission Numbers

019 - 024
043 - 048
067 - 072

Physical Description: Stainless-steel, reusable, special eating device combining the characteristics of a spoon and that of a fork by the inclusion of four tines at the end of a spoon-like depression.

Functional Description: Holding of foods while cutting, spearing of bite-size solid morsels, scooping of low viscosity or semi-solid foods, and transferring to mouth for consumption.

Detail Data

Reliability:		10 Year Resupply Volume:	0.194 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	2.305 lb	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	2.561 lb	Total Cost:	
Installed Volume:	0.175 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale: Zero-g flight evaluation of space dining techniques indicate conventional-type dining utensils can be employed for food consumption.

Merits/Deficiencies: Permits use of one utensil in lieu of two with inherent benefits in such respect. Negligible effect on logistics of resupply. Requires onboard cleansing.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 5.6.3.8

Title: Combination Knife/Fork/Tong

Applicable Mission Numbers

Function Reference: Provide For Consumption

019 - 024
043 - 048
067 - 072

Drawing Reference:

Physical Description: A hand-held, hand-operated pair of tongs integrating one knife edge, one flat edge, and opposing pronged ends. 8.5"L x 1"W x 1.25"H

Functional Description: Acting independently its functional uses are holding in place, scraping or pushing, pinching, transfer and spreading. Used in conjunction with another holding device its functional capabilities are extended to cutting and tearing.

Detail Data

Reliability:		10 Year Resupply Volume:	0.333 ft^3
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	4	Water (155°F):	
Installed Weight:	5.10 lb	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	5.67 lb	Total Cost:	
Installed Volume:	0.300 ft^3	Development Risk:	
Resupply Volume:	0		

Rationale:

Merits/Deficiencies: Requires crew training.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.2.4

Title: Hand-Held Vacuum Cleaner Unit

Applicable Mission Numbers

019 - 024

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained vacuum cleaning device, with disposable internal collector bags. Aluminum housing has integral handle, coupling ring for access to collector bag, and bayonet-type inlet for positive attachment of various pick-up nozzles the shapes of which are to be determined. The size of the basic unit is approximately 12 x 7 x 4 inches without accessory nozzles, and weight of unit is approximately 4.5 pounds. Weight of three (3) accessory nozzles is approximately 1.0 pound additional. Operating power is .08 Kw. Collector bags are approximately 20 cubic inch capacity, weigh approximately 0.05 pounds, and are approximately 3.0 x 3.0 x .30 inches in flat storage form.

Functional Description: For small or immediate clean-up operation requiring the retrieval of food particles and other debris particulates.

Detail Data

Reliability:		10 Year Resupply Volume:	25.553 cu ft
Maintainability:		Peak Power:	80 watts
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	5.5 lbs	Water (50°F):	
Resupply Weight:	* 3.15 lbs	Crew Operating Time:	
10 Year Resupply Weight:	819 lbs	Total Cost:	
Installed Volume:	.2604 cu.ft	Development Risk:	
Resupply Volume:	* .098 cu.ft.		

Rationale: * Assume 3 collector bags per day with additional 50% of supply to cover contingencies.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.2.8

Title: Hand-Held Vacuum Cleaner Unit

Applicable Mission Numbers

043 - 048

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained vacuum cleaning device, with disposable internal collector bags. Aluminum housing has integral handle, coupling ring for access to collector bag, and bayonet-type inlet for positive attachment of various pick-up nozzles the shapes of which are to be determined. The size of the basic unit is approximately 12 x 7 x 4 inches without accessory nozzles, and weight of unit is approximately 4.5 pounds. Weight of three (3) accessory nozzles is approximately 1.0 pound additional. Operating power is .08 Kw. Collector bags are approximately 20 cubic inch capacity, weigh approximately 0.05 pounds, and are approximately 3.0 x 3.0 x .30 inches in flat storage form.

Functional Description: For small or immediate clean-up operation requiring the retrieval of food particles and other debris particulates.

Detail Data

Reliability:		10 Year Resupply Volume:	25.272 cu ft
Maintainability:		Peak Power:	80 watts
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	5.5 lbs	Water (50°F):	
Resupply Weight:	* 20.25 lbs	Crew Operating Time:	
10 Year Resupply Weight:	810 lbs	Total Cost:	
Installed Volume:	.2604 cu ft	Development Risk:	
Resupply Volume:	*.632 cu ft		

Rationale: * Assume 3 collector bags per day with additional 50% of supply to cover contingencies.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.2.9

Title: Hand-Held Vacuum Cleaner Unit

Applicable Mission Numbers

049 - 054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained vacuum cleaning device, with disposable internal collector bags. Aluminum housing has integral handle, coupling ring for access to collector bag, and bayonet-type inlet for positive attachment of various pick-up nozzles the shapes of which are to be determined. The size of the basic unit is approximately 12 x 7 x 4 inches without accessory nozzles, and weight of unit is approximately 4.5 pounds. Weight of three (3) accessory nozzles is approximately 1.0 pound additional. Operating power is .08 Kw. Collector bags are approximately 20 cubic inch capacity, weigh approximately 0.05 pounds, and are approximately 3.0 x 3.0 x .30 inches in flat storage form.

Functional Description: For small or immediate clean-up operation requiring the retrieval of food particles and other debris particulates.

Detail Data

Reliability:		10 Year Resupply Volume:	8.424 cu ft.
Maintainability:		Peak Power:	80 watts
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	5.5 lbs	Water (50°F):	
Resupply Weight:	* 13.5 lbs	Crew Operating Time:	
10 Year Resupply Weight:	273 lbs	Total Cost:	
Installed Volume:	.2604 cu ft.	Development Risk:	
Resupply Volume:	* .421 cu ft		

Rationale: * Assume 1 collector bag per day with additional 50% of supply to cover contingencies.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.2.10

Title: Hand-Held Vacuum Cleaner Unit

Applicable Mission Numbers

055 - 060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained vacuum cleaning device, with disposable internal collector bags. Aluminum housing has integral handle, coupling ring for access to collector bag, and bayonet-type inlet for positive attachment of various pick-up nozzles the shapes of which are to be determined. The size of the basic unit is approximately 12 x 7 x 4 inches without accessory nozzles, and weight of unit is approximately 4.5 pounds. Weight of three (3) accessory nozzles is approximately 1.0 pound additional. Operating power is .08 Kw. Collector bags are approximately 20 cubic inch capacity, weigh approximately 0.05 pounds, and are approximately 3.0 x 3.0 x .30 inches in flat storage form.

Functional Description: For small or immediate clean-up operation requiring the retrieval of food particles and other debris particulates.

Detail Data

Reliability:		10 Year Resupply Volume:	8.424 cu ft
Maintainability:		Peak Power:	80 watts
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	5.5 lbs	Water (50°F):	
Resupply Weight:	* 13.5 lbs	Crew Operating Time:	
10 Year Resupply Weight:	273 lbs	Total Cost:	
Installed Volume:	.2604 cu ft	Development Risk:	
Resupply Volume:	* .421 cu ft		

Rationale: * Assume 1 collector bag per day with additional 50% of supply to cover contingencies.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.2.11

Title: Hand-Held Vacuum Cleaner Unit

Applicable Mission Numbers

061 - 066

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained vacuum cleaning device, with disposable internal collector bags. Aluminum housing has integral handle, coupling ring for access to collector bag, and bayonet-type inlet for positive attachment of various pick-up nozzles the shapes of which are to be determined. The size of the basic unit is approximately 12 x 7 x 4 inches without accessory nozzles, and weight of unit is approximately 4.5 pounds. Weight of three (3) accessory nozzles is approximately 1.0 pound additional. Operating power is .08 Kw. Collector bags are approximately 20 cubic inch capacity, weigh approximately 0.05 pounds, and are approximately 3.0 x 3.0 x .30 inches in flat storage form.

Functional Description: For small or immediate clean-up operation requiring the retrieval of food particles and other debris particulates.

Detail Data

Reliability:		10 Year Resupply Volume:	16.848 cu ft
Maintainability:		Peak Power:	80 watts
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	5.5 lbs	Water (50°F):	
Resupply Weight:	* 27.0 lbs	Crew Operating Time:	
10 Year Resupply Weight:	540 lbs	Total Cost:	
Installed Volume:	.2604 cu ft	Development Risk:	
Resupply Volume:	* .842 cu ft		

Rationale: * Assume 2 collector bags per day with additional 50% of supply to cover contingencies.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.2.12

Title: Hand-Held Vacuum Cleaner Unit

Applicable Mission Numbers

067 - 072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained vacuum cleaning device, with disposable internal collector bags. Aluminum housing has integral handle, coupling ring for access to collector bag, and bayonet-type inlet for positive attachment of various pick-up nozzles the shapes of which are to be determined. The size of the basic unit is approximately 12 x 7 x 4 inches without accessory nozzles, and weight of unit is approximately 4.5 pounds. Weight of three (3) accessory nozzles is approximately 1.0 pound additional. Operating power is .08 Kw. Collector bags are approximately 20 cubic inch capacity, weigh approximately 0.05 pounds, and are approximately 3.0 x 3.0 x .30 inches in flat storage form.

Functional Description: For small or immediate clean-up operation requiring the retrieval of food particles and other debris particulates.

Detail Data

Reliability:		10 Year Resupply Volume:	25.272 cu ft.
Maintainability:		Peak Power:	80 watts
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	5.5 lbs	Water (50°F):	
Resupply Weight:	* 40.50 lbs	Crew Operating Time:	
10 Year Resupply Weight:	810 lbs	Total Cost:	
Installed Volume:	.2604 cu ft.	Development Risk:	
Resupply Volume:	*1.264 cu ft.		

Rationale: * Assume 3 collector bags per day with additional 50% of supply to cover contingencies.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.3.4 (Page 1 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Applicable Mission Numbers

019 - 024

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained vacuum cleaning device with a disposable internal collector bag for wet or dry debris. Rectangular aluminum housing has integral stowage provisions for accessory pick-up nozzles, extension tubes and flexible hose; handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit employs an impeller fan as a vacuum source. This fan is located after but on the same shaft as a centrifugal phase separator. The centrifugal phase separator separates any fluids which may be driven through the filter bag during maximum loading. The debris collector filter bag is constructed of two laminates, the inner layer is similar to common vacuum cleaner bags, but is capable of maintaining its integrity while wet, the outer layer is phase separator filter material. This combination will hold all debris and most fluids under normal circumstances. The centrifugal phase separator is provided as backup in the event that 90% or more of the phase separator filter material becomes wet and fluids begin to come through (especially fluids with low surface tension). This fluid will be removed by a ram pitot effect and delivered to a reusable removable expandable plastic bag. Initial debris entrapment is effected by a variety of wand accessories attachable to the end of the hose. Bayonet-type fittings are employed for positive attachment of the accessories. A removable cover, containing the inlet collar, provides access to debris collector bag. A hinged door provides access to the liquid collector bag. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit is approximately 35.0 pounds including integrally stowed accessories. Operating power is 1.5 Kw. The disposable debris collector bags are approximately 375 cubic inch capacity, weigh approximately .12 pounds, and are approximately 10.0 x 7.0 x .30 inches in flat storage form.

Functional Description: For general clean-up operation requiring the retrieval of food particles (dry or wet) and other small-size debris within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.3.4 (Page 2 of 2

Title: Guided Transport Vacuum Cleaner Unit

Detail Data

Reliability:		10 Year Resupply Volume:	63.172 cu ft.
Maintainability:		Peak Power:	1500 watts
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	35.0 lbs	Water (50°F):	
Resupply Weight:	* 2.5 lbs	Crew Operating Time:	
10 Year Resupply Weight:	650 lbs	Total Cost:	
Installed Volume:	2.604 cu ft	Development Risk:	
Resupply Volume:	*.243 cu ft.		

Rationale: *Assume one (1) debris collector bag per day with additional 50% of supply to cover contingencies.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.3.8 (Page 1 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Applicable Mission Numbers

043 - 048

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained vacuum cleaning device with a disposable internal collector bag for wet or dry debris. Rectangular aluminum housing has integral stowage provisions for accessory pick-up nozzles, extension tubes and flexible hose; handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit employs an impeller fan as a vacuum source. This fan is located after but on the same shaft as a centrifugal phase separator. The centrifugal phase separator separates any fluids which may be driven through the filter bag during maximum loading. The debris collector filter bag is constructed of two laminates, the inner layer is similar to common vacuum cleaner bags, but is capable of maintaining its integrity while wet, the outer layer is phase separator filter material. This combination will hold all debris and most fluids under normal circumstances. The centrifugal phase separator is provided as backup in the event that 90% or more of the phase separator filter material becomes wet and fluids begin to come through (especially fluids with low surface tension). This fluid will be removed by a ram pitot effect and delivered to a reusable removable expandable plastic bag. Initial debris entrapment is effected by a variety of wand accessories attachable to the end of the hose. Bayonet-type fittings are employed for positive attachment of the accessories. A removable cover, containing the inlet collar, provides access to debris collector bag. A hinged door provides access to the liquid collector bag. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit is approximately 35.0 pounds including integrally stowed accessories. Operating power is 1.5 Kw. The disposable debris collector bags are approximately 375 cubic inch capacity, weigh approximately .12 pounds, and are approximately 100 x 7.0 x .30 inches in flat storage form.

Functional Description: For general clean-up operation requiring the retrieval of food particles (dry or wet) and other small-size debris within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.3.8 (Page 2 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Detail Data

Reliability:		10 Year Resupply Volume:	62.478 cu ft
Maintainability:		Peak Power:	1500 watts
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	35.0 lbs	Water (50°F):	
Resupply Weight:	* 16.2 lbs	Crew Operating Time:	
10 Year Resupply Weight:	648 lbs	Total Cost:	
Installed Volume:	2.604 cu ft.	Development Risk:	
Resupply Volume:	* 1.562 cu ft.		

Rationale: *Assume one (1) debris collector bag per day with additional 50% of supply to cover contingencies.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.3.9 (Page 1 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Applicable Mission Numbers

049 - 054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained vacuum cleaning device with a disposable internal collector bag for wet or dry debris. Rectangular aluminum housing has integral stowage provisions for accessory pick-up nozzles, extension tubes and flexible hose; handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit employs an impeller fan as a vacuum source. This fan is located after but on the same shaft as a centrifugal phase separator. The centrifugal phase separator separates any fluids which may be driven through the filter bag during maximum loading. The debris collector filter bag is constructed of two laminates, the inner layer is similar to common vacuum cleaner bags, but is capable of maintaining its integrity while wet, the outer layer is phase separator filter material. This combination will hold all debris and most fluids under normal circumstances. The centrifugal phase separator is provided as backup in the event that 90% or more of the phase separator filter material becomes wet and fluids begin to come through (especially fluids with low surface tension). This fluid will be removed by a ram pitot effect and delivered to a reusable removable expandable plastic bag. Initial debris entrapment is effected by a variety of wand accessories attachable to the end of the hose. Bayonet-type fittings are employed for positive attachment of the accessories. A removable cover, containing the inlet collar, provides access to debris collector bag. A hinged door provides access to the liquid collector bag. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit is approximately 35.0 pounds including integrally stowed accessories. Operating power is 1.5 Kw. The disposable debris collector bags are approximately 250 cubic inch capacity, weigh approximately .10 pounds, and are approximately 7.0 x 7.0 x .30 inches in flat storage form.

Functional Description: For general clean-up operation requiring the retrieval of food particles (dry or wet) and other small-size debris within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.3.9 (Page 2 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Detail Data

Reliability:		10 Year Resupply Volume:	42.822 cu ft
Maintainability:		Peak Power:	1500 watts
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	35.0 lbs	Water (50°F):	
Resupply Weight:	* 27.0 lbs	Crew Operating Time:	
10 Year Resupply Weight:	540 lbs	Total Cost:	
Installed Volume:	2.604 cu ft	Development Risk:	
Resupply Volume:	* 2.141 cu ft.		

Rationale: *Assume one (1) debris collector bag per day with additional 50% of supply to cover contingencies.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.3.10 (Page 1 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Applicable Mission Numbers

055 - 060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained vacuum cleaning device with a disposable internal collector bag for wet or dry debris. Rectangular aluminum housing has integral stowage provisions for accessory pick-up nozzles, extension tubes and flexible hose; handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit employs an impeller fan as a vacuum source. This fan is located after but on the same shaft as a centrifugal phase separator. The centrifugal phase separator separates any fluids which may be driven through the filter bag during maximum loading. The debris collector filter bag is constructed of two laminates, the inner layer is similar to common vacuum cleaner bags, but is capable of maintaining its integrity while wet, the outer layer is phase separator filter material. This combination will hold all debris and most fluids under normal circumstances. The centrifugal phase separator is provided as backup in the event that 90% or more of the phase separator filter material becomes wet and fluids begin to come through (especially fluids with low surface tension). This fluid will be removed by a ram pitot effect and delivered to a reusable removable expandable plastic bag. Initial debris entrapment is effected by a variety of wand accessories attachable to the end of the hose. Bayonet-type fittings are employed for positive attachment of the accessories. A removable cover, containing the inlet collar, provides access to debris collector bag. A hinged door provides access to the liquid collector bag. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit is approximately 35.0 pounds including integrally stowed accessories. Operating power is 1.5 Kw. The disposable debris collector bags are approximately 250 cubic inch capacity, weigh approximately .10 pounds, and are approximately 7.0 x 7.0 x .30 inches in flat storage form.

Functional Description: For general clean-up operation requiring the retrieval of food particles (dry or wet) and other small-size debris within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.3.10 (Page 2 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Detail Data

Reliability:		10 Year Resupply Volume:	42.822 cu ft.
Maintainability:		Peak Power:	1500 watts
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	35.0 lbs	Water (50°F):	
Resupply Weight:	* 27.0 lbs	Crew Operating Time:	
10 Year Resupply Weight:	540 lbs	Total Cost:	
Installed Volume:	2.604 cu ft	Development Risk:	
Resupply Volume:	* 2.141 cu ft		

Rationale: *Assume one (1) debris collector bag per day with additional 50% of supply to cover contingencies.

Merits/Deficiencies:

Data Sources:

14

ELEMENT CONCEPT DATA SHEET # 6.1.3.11 (Page 1 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Applicable Mission Numbers

061 - 066

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained vacuum cleaning device with a disposable internal collector bag for wet or dry debris. Rectangular aluminum housing has integral stowage provisions for accessory pick-up nozzles, extension tubes and flexible hose; handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit employs an impeller fan as a vacuum source. This fan is located after but on the same shaft as a centrifugal phase separator. The centrifugal phase separator separates any fluids which may be driven through the filter bag during maximum loading. The debris collector filter bag is constructed of two laminates, the inner layer is similar to common vacuum cleaner bags, but is capable of maintaining its integrity while wet, the outer layer is phase separator filter material. This combination will hold all debris and most fluids under normal circumstances. The centrifugal phase separator is provided as backup in the event that 90% or more of the phase separator filter material becomes wet and fluids begin to come through (especially fluids with low surface tension). This fluid will be removed by a ram pitot effect and delivered to a reusable removable expandable plastic bag. Initial debris entrapment is effected by a variety of wand accessories attachable to the end of the hose. Bayonet-type fittings are employed for positive attachment of the accessories. A removable cover, containing the inlet collar, provides access to debris collector bag. A hinged door provides access to the liquid collector bag. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit is approximately 35.0 pounds including integrally stowed accessories. Operating power is 1.5 Kw. The disposable debris collector bags are approximately 250 cubic inch capacity, weigh approximately .10 pounds, and are approximately 7.0 x 7.0 x .30 inches in flat storage form.

Functional Description: For general clean-up operation requiring the retrieval of food particles (dry or wet) and other small-size debris within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.3.11 (Page 2 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Detail Data

Reliability:		10 Year Resupply Volume:	42.822 cu ft
Maintainability:		Peak Power:	1500 watts
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	35.0 lbs	Water (50°F):	
Resupply Weight:	* 27.0 lbs	Crew Operating Time:	
10 Year Resupply Weight:	540 lbs	Total Cost:	
Installed Volume:	2.604 cu ft	Development Risk:	
Resupply Volume:	*2.141 cu ft.		

Rationale: *Assume one (1) debris collector bag per day with additional 50% of supply to cover contingencies.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.3.12 (Page 1 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Applicable Mission Numbers

067 - 072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained vacuum cleaning device with a disposable internal collector bag for wet or dry debris. Rectangular aluminum housing has integral stowage provisions for accessory pick-up nozzles, extension tubes and flexible hose; handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit employs an impeller fan as a vacuum source. This fan is located after but on the same shaft as a centrifugal phase separator. The centrifugal phase separator separates any fluids which may be driven through the filter bag during maximum loading. The debris collector filter bag is constructed of two laminates, the inner layer is similar to common vacuum cleaner bags, but is capable of maintaining its integrity while wet, the outer layer is phase separator filter material. This combination will hold all debris and most fluids under normal circumstances. The centrifugal phase separator is provided as backup in the event that 90% or more of the phase separator filter material becomes wet and fluids begin to come through (especially fluids with low surface tension). This fluid will be removed by a ram pitot effect and delivered to a reusable removable expandable plastic bag. Initial debris entrapment is effected by a variety of wand accessories attachable to the end of the hose. Bayonet-type fittings are employed for positive attachment of the accessories. A removable cover, containing the inlet collar, provides access to debris collector bag. A hinged door provides access to the liquid collector bag. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit is approximately 35.0 pounds including integrally stowed accessories. Operating power is 1.5 Kw. The disposable debris collector bags are approximately 375 cubic inch capacity, weigh approximately .12 pounds, and are approximately 100 x 7.0 x .30 inches in flat storage form.

Functional Description: For general clean-up operation requiring the retrieval of food particles (dry or wet) and other small-size debris within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.3.12 (Page 2 of 2)

Title: Guided Transport Vacuum Cleaner Unit

Detail Data

Reliability:		10 Year Resupply Volume:	62.478 cu ft
Maintainability:		Peak Power:	1500 watts
Safety:		Energy:	
Crew Acceptance:	7	Water (155°F):	
Installed Weight:	35.0 lbs	Water (50°F):	
Resupply Weight:	* 32.4 lbs	Crew Operating Time:	
10 Year Resupply Weight:	648 lbs	Total Cost:	
Installed Volume:	2.604 cu ft	Development Risk:	
Resupply Volume:	* 3.124 cu ft		

Rationale: *Assume one (1) debris collector bag per day with additional 50% of supply to cover contingencies.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.7.7

Title: Hand Cleaning With Impregnated Disposable Wipes

Applicable Mission Numbers: 049 - 054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Disposable paper towelettes, 5.5 x 8.0 inches in size, impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated wipe is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:		10 Year Resupply Volume:	35.165 cu.ft.
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	5	Water (155°F):	
Installed Weight:	0	Water (50°F):	
Resupply Weight:	46.80 lbs.	Crew Operating Time:	
10 Year Resupply Weight:	936.0 lbs.	Total Cost:	
Installed Volume:	0	Development Risk:	
Resupply Volume:	1.758 cu.ft.		

Rationale:

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.7.8

Title: Hand Cleaning With Impregnated Disposable Wipes

Applicable Mission Numbers: 055 - 060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Disposable paper towelettes, 5.5 x 8.0 inches in size, impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated wipe is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:		10 Year Resupply Volume:	52.747 cu.ft.
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	5	Water (155°F):	
Installed Weight:	0	Water (50°F):	
Resupply Weight:	70.20 lbs.	Crew Operating Time:	
10 Year Resupply Weight:	1404.0 lbs.	Total Cost:	
Installed Volume:	0	Development Risk:	
Resupply Volume:	2.637 cu.ft.		

Rationale:

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.7.9

Title: Hand Cleaning With Impregnated Disposable Wipes

Applicable Mission Numbers: 061 - 066; 067 - 072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Disposable paper towelettes, 5.5 x 8.0 inches in size, impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated wipe is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:		10 Year Resupply Volume:	70.330 cu.ft.
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	5	Water (155°F):	
Installed Weight:	0	Water (50°F):	
Resupply Weight:	93.60 lbs.	Crew Operating Time:	
10 Year Resupply Weight:	1872.0 lbs.	Total Cost:	
Installed Volume:	0	Development Risk:	
Resupply Volume:	3.516 cu.ft.		

Rationale:

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.8.7

Title: Hand Cleaning With Impregnated Reusable Wipes

Applicable Mission Numbers: 049 - 054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Cotton washcloths, 12 x 12 inches in size, weighing .075 pounds each and occupying 2.88 cubic inches in 6 x 3 x .16 inches folded storage form. They will be impregnated or dampened periodically during process of use with a pre-mixed evaporative, detergent/germicidal solution.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:		10 Year Resupply Volume:	117.054 cu.ft.
Maintainability:		Peak Power:	7500 watts
Safety:		Energy:	
Crew Acceptance:	5	Water (155°F):	
Installed Weight:	1.05 lbs.	Water (50°F):	
Resupply Weight:	365.02 lbs. (average)	Crew Operating Time:	
10 Year Resupply Weight:	7300.50 lbs.	Total Cost:	
Installed Volume:	.023 cu.ft.	Development Risk:	
Resupply Volume:	5.853 cu.ft.(average)		

Rationale:

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.8.8

Title: Hand Cleaning With Impregnated Reusable Wipes

Applicable Mission Numbers: 055 - 060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Cotton washcloths, 12 x 12 inches in size, weighing .075 pounds each and occupying 2.88 cubic inches in 6 x 3 x .16 inches folded storage form. They will be impregnated or dampened periodically during process of use with a pre-mixed evaporative detergent/germicidal solution.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:		10 Year Resupply Volume:	182.979 cu.ft.
Maintainability:		Peak Power:	7500 watts
Safety:		Energy:	
Crew Acceptance:	5	Water (155°F):	
Installed Weight:	1.58 lbs.	Water (50°F):	
Resupply Weight:	570.49 lbs.(average)	Crew Operating Time:	
10 Year Resupply Weight:	11409.75 lbs.	Total Cost:	
Installed Volume:	.035 cu.ft.	Development Risk:	
Resupply Volume:	9.149 cu.ft.(average)		

Rationale:

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.8.9

Title: Hand Cleaning With Impregnated Reusable Wipes

Applicable Mission Numbers
061 - 066
067 - 072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Cotton washcloths, 12 x 12 inches in size, weighing .075 pounds each and occupying 2.88 cubic inches in 6 x 3 x .16 inches folded storage form. They will be impregnated or dampened periodically during process of use with a pre-mixed evaporative detergent/germicidal solution.

Functional Description: For washing and sanitizing of work counters, food preparation equipment, tables, or general confines of galley and dining area by unassisted manual effort.

Detail Data

Reliability:	10 Year Resupply Volume: 248.904 cu.ft.
Maintainability:	Peak Power: 7500 watts
Safety:	Energy:
Crew Acceptance: 5	Water (155°F):
Installed Weight: 2.10 lbs.	Water (50°F):
Resupply Weight: 776.13 lbs. (average)	Crew Operating Time:
10 Year Resupply Weight: 15522.60 lbs.	Total Cost:
Installed Volume: .047 cu.ft.	Development Risk:
Resupply Volume: 12.445 cu.ft.(average)	

Rationale:

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.9.1

Title: Hand-Held Scrubber Cleaning Unit

Applicable Mission Numbers
001-006
025-030
049-054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Hand-held powered device imparting oscillatory or orbital motion to an integral holder for impregnated wipes. The unit is approximately 3 x 6 x 5 inches, weighing approximately 3.5 pounds, with operating power of approximately .08 Kw.

Functional Description: For facilitating the washing and sanitizing of work counters, tables, and/or other surfaces.

Detail Data

Reliability:		10 Year Resupply Volume:	* 0
Maintainability:		Peak Power:	80 watts
Safety:		Energy:	
Crew Acceptance:	2	Water (155°F):	
Installed Weight:	3.5 lbs	Water (50°F):	
Resupply Weight:	* 0	Crew Operating Time:	
10 Year Resupply Weight:	* 0	Total Cost:	
Installed Volume:	.058 cu ft	Development Risk:	
Resupply Volume:	* 0		

Rationale: *Assume adaptation for employment of wipes per concepts 6.1.7 or 6.1.8 negating peculiar requirements.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.9.2

Title: Hand-Held Scrubber Cleaning Unit

Function Reference: Provide For Clean-Up

Drawing Reference:

Applicable Mission Numbers

007-012
031-036
055-060

Physical Description: Hand-held powered device imparting oscillatory or orbital motion to an integral holder for impregnated wipes. The unit is approximately 3 x 6 x 5 inches, weighing approximately 3.5 pounds, with operating power of approximately .08 Kw.

Functional Description: For facilitating the washing and sanitizing of work counters, tables, and/or other surfaces.

Detail Data

Reliability:		10 Year Resupply Volume:	* 0
Maintainability:		Peak Power:	80 watts
Safety:		Energy:	
Crew Acceptance:	2	Water (155°F):	
Installed Weight:	3.5 lbs	Water (50°F):	
Resupply Weight:	* 0	Crew Operating Time:	
10 Year Resupply Weight:	* 0	Total Cost:	
Installed Volume:	.058 cu ft	Development Risk:	
Resupply Volume:	* 0		

Rationale: *Assume adaptation for employment of wipes per concepts 6.1.7 or 6.1.8 negating peculiar requirements.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.9.3

Title: Hand-Held Scrubber Cleaning Unit

Applicable Mission Numbers
013-024
037-048
061-072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Hand-held powered device imparting oscillatory or orbital motion to an integral holder for impregnated wipes. The unit is approximately 3 x 6 x 5 inches, weighing approximately 3.5 pounds, with operating power of approximately .08 Kw.

Functional Description: For facilitating the washing and sanitizing of work counters, tables, and/or other surfaces.

Detail Data

Reliability:	10 Year Resupply Volume: * 0
Maintainability:	Peak Power: 80 watts
Safety:	Energy:
Crew Acceptance: 2	Water (155°F):
Installed Weight: 3.5 lbs	Water (50°F):
Resupply Weight: * 0	Crew Operating Time:
10 Year Resupply Weight: * 0	Total Cost:
Installed Volume: .058 cu ft.	Development Risk:
Resupply Volume: * 0	

Rationale: *Assume adaptation for employment of wipes per concepts 6.1.7 or 6.1.8 negating peculiar requirements.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.10.7 (Page 1 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Applicable Mission Numbers

049 - 054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained cleaning device of "ASTROVAC" type as developed by FH/RAD. Rectangular aluminum housing has integral stowage provisions for Applicator/Scrubber Head and flexible hose, handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit consists of two separate reservoirs for water and for a bactericide solution, (or, if desired, a pre-mixed water/bactericide solution may be substituted in the main reservoir), a motor driven air blower, a centrifugal liquid/air separator, an air pressure accumulator, delivery and return hoses, an applicator/scrubber device, and a liquid collector bag.

The small hand-held applicator/scrubber will dispense a controlled amount of water or solution into a sponge-layer scrubber head, and also remove the liquid from the surface to which applied by a vacuum recovery. The sponge-scrubber elements are replaceable and reusable unless deteriorated by wear or other reason. An impeller fan provides the vacuum source and means for pressurizing the liquid reservoirs for delivery purposes. This fan is located after, but on the same shaft as a centrifugal phase separator which separates the liquid from the recovered liquid/air mixture. The contaminated liquid is removed by a ram pitot effect and collected in a reusable removable plastic bag. Hinged doors provide access to the liquid containment bags for installation, filling and/or removal. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit without cleaning liquids is approximately 45 pounds, including the integrally stowed accessories. Operating power is 1.5 Kw.

Functional Description: For general clean-up operation requiring the washing and sanitizing of work counters, food preparation equipment, tables, or any surfaces within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.10.7 (Page 2 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Detail Data

Reliability:		10 Year Resupply Volume:	27.335 cu ft
Maintainability:		Peak Power:	1500 watts
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	*
Installed Weight:	45.0 lbs	Water (50°F):	
Resupply Weight:	** 85.31 lbs	Crew Operating Time:	
10 Year Resupply Weight:	1706.28 lbs.	Total Cost:	
Installed Volume:	2.604 cu ft	Development Risk:	
Resupply Volume:	**1.367 cu ft		

Rationale: *Assume existance of reclaimable wash-water supply, independent of potable water. - ** Assume 12:1 ratio of water to expendable bactericide, and average of 1 sponge replacement for 3 days of use.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.10.8 (Page 1 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Applicable Mission Numbers

055 - 060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained cleaning device of "ASTROVAC" type as developed by FH/RAD. Rectangular aluminum housing has integral stowage provisions for Applicator/Scrubber Head and flexible hose, handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit consists of two separate reservoirs for water and for a bactericide solution, (or, if desired, a pre-mixed water/bactericide solution may be substituted in the main reservoir), a motor driven air blower, a centrifugal liquid/air separator, an air pressure accumulator, delivery and return hoses, an applicator/scrubber device, and a liquid collector bag.

The small hand-held applicator/scrubber will dispense a controlled amount of water or solution into a sponge-layer scrubber head, and also remove the liquid from the surface to which applied by a vacuum recovery. The sponge-scrubber elements are replaceable and reusable unless deteriorated by wear or other reason. An impeller fan provides the vacuum source and means for pressurizing the liquid reservoirs for delivery purposes. This fan is located after, but on the same shaft as a centrifugal phase separator which separates the liquid from the recovered liquid/air mixture. The contaminated liquid is removed by a ram pitot effect and collected in a reusable removable plastic bag. Hinged doors provide access to the liquid containment bags for installation, filling and/or removal. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit without cleaning liquids is approximately 45 pounds, including the integrally stowed accessories. Operating power is 1.5 Kw.

Functional Description: For general clean-up operation requiring the washing and sanitizing of work counters, food preparation equipment, tables, or any surfaces within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.10.8 (Page 2 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Detail Data

Reliability:		10 Year Resupply Volume:	47.712 cu ft.
Maintainability:		Peak Power:	1500 watts
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	*
Installed Weight:	45.0 lbs	Water (50°F):	
Resupply Weight:	** 133.29 lbs	Crew Operating Time:	
10 Year Resupply Weight:	2665.20 lbs.	Total Cost:	
Installed Volume:	2.604 cu ft.	Development Risk:	
Resupply Volume:	** 2.135 cu ft.		

Rationale: * Assume existance of reclaimable wash-water supply, independent of potable water. - ** Assume 12:1 ratio of water to expendable bactericide, and average of 1 sponge replacement for 2 days of use.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.1.10.9 (Page 1 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Applicable Mission Numbers

Function Reference: Provide For Clean-Up

061 - 066

067 - 072

Drawing Reference:

Physical Description: Self-contained cleaning device of "ASTROVAC" type as developed by FH/RAD. Rectangular aluminum housing has integral stowage provisions for Applicator/Scrubber Head and flexible hose, handles to facilitate maneuvering, single-point restraint feature adapted to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g but are effective in partial-g environment.

The unit consists of two separate reservoirs for water and for a bactericide solution, (or, if desired, a pre-mixed water/bactericide solution may be substituted in the main reservoir), a motor driven air blower, a centrifugal liquid/air separator, an air pressure accumulator, delivery and return hoses, an applicator/scrubber device, and a liquid collector bag.

The small hand-held applicator/scrubber will dispense a controlled amount of water or solution into a sponge-layer scrubber head, and also remove the liquid from the surface to which applied by a vacuum recovery. The sponge-scrubber elements are replaceable and reusable unless deteriorated by wear or other reason. An impeller fan provides the vacuum source and means for pressurizing the liquid reservoirs for delivery purposes. This fan is located after, but on the same shaft as a centrifugal phase separator which separates the liquid from the recovered liquid/air mixture. The contaminated liquid is removed by a ram pitot effect and collected in a reusable removable plastic bag. Hinged doors provide access to the liquid containment bags for installation, filling and/or removal. Operating controls and displays, with electrical overload protection, are included on the unit, conveniently located.

The size of the basic unit is approximately 30 x 15 x 10 inches and weight of unit without cleaning liquids is approximately 45 pounds, including the integrally stowed accessories. Operating power is 1.5 Kw.

Functional Description: For general clean-up operation requiring the washing and sanitizing of work counters, food preparation equipment, tables, or any surfaces within the confines of galley and dining area.

ELEMENT CONCEPT DATA SHEET # 6.1.10.9 (Page 2 of 2)

Title: Guided Transport "ASTROVAC" Cleaning Unit

Detail Data

Reliability:		10 Year Resupply Volume:	58.460 cu ft
Maintainability:		Peak Power:	1500 watts
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	*
Installed Weight:	45.0 lbs	Water (50°F):	
Resupply Weight:	** 182.48 lbs.	Crew Operating Time:	
10 Year Resupply Weight:	3649.68 lbs.	Total Cost:	
Installed Volume:	2.604 cu ft	Development Risk:	
Resupply Volume:	** 2.923 cu ft		

Rationale: * Assume existance of reclaimable wash-water supply, independent of potable water. - ** Assume 12:1 ratio of water to expendable bactericide, and average of 1 sponge replacement per day of use.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.1.4 (Page 1 of 2)

Title: Dispenser For Disposable Personal Wipes

Applicable Mission Numbers

019 - 024

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum or stainless-steel construction, having provisions for internal retention and dispensing of disposable absorbent paper napkins in individually folded form. The enclosure is divided into two hinged sections of equal size which permits opening for loading purposes. A simple latching feature is incorporated for closure. Openings are provided on opposite sides for removal of individual paper napkins. Two independently acting spring-loaded plates are included inside the container to push and maintain the napkins in position for removal through the side openings. The dispenser will accommodate 100 napkins (i.e., 50 in each side section).

The dispenser unit is approximately 4.75 x 4.25 x 6.0 inches, weighing 1.479 pounds.

A single package of 300 paper wipes, prefolded to a size compatible with the dispenser, will be 3.50 x 5.0 x 8.0 inches, weighing .8375 pounds. Each wipe is 10.0 x 12.0 inches in size unfolded, and 3.50 x 5.0 inches in size folded.

Functional Description: For personal hygienic considerations, providing means for wiping of mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.1.4 (Page 2 of 2)

Title: Dispenser For Disposable Personal Wipes

Detail Data

Reliability:	**10 Year Resupply Volume:** * 379.08 cu ft
Maintainability:	**Peak Power:** 0
Safety:	**Energy:**
Crew Acceptance: 8	**Water (155°F):**
Installed Weight: ** 13.62 lbs	**Water (50°F):**
Resupply Weight: * 15.12 lbs	**Crew Operating Time:**
10 Year Resupply Weight: * 3931.20 lbs	**Total Cost:**
Installed Volume: ** .630 cu ft	**Development Risk:**
Resupply Volume: * 1.458 cu ft	

Rationale: Assume wipe usage of 2 paper napkins per man per meal. plus extra 33% of total for contingency factor: grand total of 400 wipes per day. - Total supply requirements converted to equivalent commercial single packages (bulk) which have slight effect on increasing or decreasing the contingency quantity.- * 18 packages (4680 packages for 10 years). ** 9 dispensers.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.1.8 (Page 1 of 2)

Title: Dispenser For Disposable Personal Wipes

Applicable Mission Numbers

043-048

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum or stainless-steel construction, having provisions for internal retention and dispensing of disposable absorbent paper napkins in individually folded form. The enclosure is divided into two hinged sections of equal size which permits opening for loading purposes. A simple latching feature is incorporated for closure. Openings are provided on opposite sides for removal of individual paper napkins. Two independently acting spring-loaded plates are included inside the container to push and maintain the napkins in position for removal through the side openings. The dispenser will accommodate 100 napkins (i.e., 50 in each side section).

The dispenser unit is approximately 4.75 x 4.25 x 6.0 inches, weighing 1.479 pounds.

A single package of 300 paper wipes, prefolded to a size compatible with the dispenser, will be 3.50 x 5.0 x 8.0 inches, weighing .8375 pounds. Each wipe is 10.0 x 12.0 inches in size unfolded, and 3.50 x 5.0 inches in size folded.

Functional Description: For personal hygienic considerations, providing means for wiping of mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.1.8 (Page 2 of 2)

Title: Dispenser For Disposable Personal Wipes

Detail Data

Reliability:		10 Year Resupply Volume:	*388.800 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	** 13.62 lbs	Water (50°F):	
Resupply Weight:	* 100.80 lbs	Crew Operating Time:	
10 Year Resupply Weight:	*4032.00 lbs	Total Cost:	
Installed Volume:	** .630 cu ft	Development Risk:	
Resupply Volume:	* 9.720 cu ft		

Rationale: Assume wipe usage of 2 paper napkins per man per meal, plus extra 33% of total for contingency factor; grand total of 400 wipes per day. - Total supply requirements converted to equivalent commercial single packages (bulk) which have slight effect on increasing or decreasing the contingency quantity. -*120 packages (4800 packages for 10 years).-

Merits/Deficiencies: ** 9 dispensers

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.1.9 (Page 1 of 2)

Title: Dispenser For Disposable Personal Wipes

Applicable Mission Numbers

049-054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum or stainless-steel construction, having provisions for internal retention and dispensing of disposable absorbent paper napkins in individually folded form. The enclosure is divided into two hinged sections of equal size which permits opening for loading purposes. A simple latching feature is incorporated for closure. Openings are provided on opposite sides for removal of individual paper napkins. Two independently acting spring-loaded plates are included inside the container to push and maintain the napkins in position for removal through the side openings. The dispenser will accommodate 100 napkins (i.e., 50 in each side section).

The dispenser unit is approximately 4.75 x 4.25 x 6.0 inches, weighing 1.479 pounds.

A single package of 300 paper wipes, prefolded to a size compatible with the dispenser, will be 3.50 x 5.0 x 8.0 inches, weighing .8375 pounds. Each wipe is 10.0 x 12.0 inches in size unfolded, and 3.50 x 5.0 inches in size folded.

Functional Description: For personal hygienic considerations, providing means for wiping of mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.1.9 (Page 2 of 2)

Title: Dispenser For Disposable Personal Wipes

Detail Data

Reliability:		10 Year Resupply Volume:	*45.360 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	** 2.96 lbs	Water (50°F):	
Resupply Weight:	* 23.52 lbs	Crew Operating Time:	
10 Year Resupply Weight:	*470.4 lbs	Total Cost:	
Installed Volume:	** .140 cu ft	Development Risk:	
Resupply Volume:	* 2.268 cu ft		

Rationale: Assume wipe usage of 2 paper napkins per man per meal, plus extra 33% of total for contingency factor; grand total of 48 wipes per day. - Total supply requirements converted to equivalent commercial single packages (bulk) which have slight effect on increasing or decreasing the contingency quantity. - *28 packages (560 packages for 10 years). -

Merits/Deficiencies: **2 dispensers.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.1.10 (Page 1 of 2)

Title: Dispenser For Disposable Personal Wipes

Applicable Mission Numbers

055-060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum or stainless-steel construction, having provisions for internal retention and dispensing of disposable absorbent paper napkins in individually folded form. The enclosure is divided into two hinged sections of equal size which permits opening for loading purposes. A simple latching feature is incorporated for closure. Openings are provided on opposite sides for removal of individual paper napkins. Two independently acting spring-loaded plates are included inside the container to push and maintain the napkins in position for removal through the side openings. The dispenser will accommodate 100 napkins (i.e., 50 in each side section).

The dispenser unit is approximately 4.75 x 4.25 x 6.0 inches, weighing 1.479 pounds.

A single package of 300 paper wipes, prefolded to a size compatible with the dispenser, will be 3.50 x 5.0 x 8.0 inches, weighing .8375 pounds. Each wipe is 10.0 x 12.0 inches in size unfolded, and 3.50 x 5.0 inches in size folded.

Functional Description: For personal hygienic considerations, providing means for wiping of mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.1.10 (Page 2 of 2)

Title: Dispenser For Disposable Personal Wipes

Detail Data

Reliability:	**10 Year Resupply Volume:** *93.960 cu ft
Maintainability:	**Peak Power:** 0
Safety:	**Energy:**
Crew Acceptance: 8	**Water (155°F):**
Installed Weight: ** 5.92 lbs	**Water (50°F):**
Resupply Weight: * 42.72 lbs	**Crew Operating Time:**
10 Year Resupply Weight: *974.40 lbs	**Total Cost:**
Installed Volume: ** .280 cu ft	**Development Risk:**
Resupply Volume: * 4.698 cu ft	

Rationale: Assume wipe usage of 2 paper napkins per man per meal, plus extra 33% of total for contingency factor; grand total of 96 wipes per day. - Total supply requirements converted to equivalent commercial single packages (bulk) which have slight effect on increasing or decreasing the contingency quantity. -*58 packages (1160 packages for 10 years). -

Merits/Deficiencies: **4 dispensers.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.1.11 (Page 1 of 2)

Title: Dispenser For Disposable Personal Wipes

Applicable Mission Numbers

061-066

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum or stainless-steel construction, having provisions for internal retention and dispensing of disposable absorbent paper napkins in individually folded form. The enclosure is divided into two hinged sections of equal size which permits opening for loading purposes. A simple latching feature is incorporated for closure. Openings are provided on opposite sides for removal of individual paper napkins. Two independently acting spring-loaded plates are included inside the container to push and maintain the napkins in position for removal through the side openings. The dispenser will accommodate 100 napkins (i.e., 50 in each side section).

The dispenser unit is approximately 4.75 x 4.25 x 6.0 inches, weighing 1.479 pounds.

A single package of 300 paper wipes, prefolded to a size compatible with the dispenser, will be 3.50 x 5.0 x 8.0 inches, weighing .8375 pounds. Each wipe is 10.0 x 12.0 inches in size unfolded, and 3.50 x 5.0 inches in size folded.

Functional Description: For personal hygienic considerations, providing means for wiping of mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.1.11 (Page 2 of 2)

Title: Dispenser For Disposable Personal Wipes

Detail Data

Reliability:		10 Year Resupply Volume:	*194.400 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	** 13.32 lbs	Water (50°F):	
Resupply Weight:	* 100.80 lbs	Crew Operating Time:	
10 Year Resupply Weight:	*2016.00 lbs	Total Cost:	
Installed Volume:	** .630 cu ft	Development Risk:	
Resupply Volume:	* 9.720 cu ft		

Rationale: Assume wipe usage of 2 paper napkins per man per meal, plus extra 33% of total for contingency factor; grand total of 200 wipes per day. - Total supply requirements converted to equivalent commercial single packages (bulk) which have slight effect on increasing or decreasing the contingency quantity. - *120 packages (2400 packages for 10 years). -

Merits/Deficiencies: ** 9 dispensers.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.1.12 (Page 1 of 2)

Title: Dispenser For Disposable Personal Wipes

Applicable Mission Numbers

067-072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum or stainless-steel construction, having provisions for internal retention and dispensing of disposable absorbent paper napkins in individually folded form. The enclosure is divided into two hinged sections of equal size which permits opening for loading purposes. A simple latching feature is incorporated for closure. Openings are provided on opposite sides for removal of individual paper napkins. Two independently acting spring-loaded plates are included inside the container to push and maintain the napkins in position for removal through the side openings. The dispenser will accommodate 100 napkins (i.e., 50 in each side section).

The dispenser unit is approximately 4.75 x 4.25 x 6.0 inches, weighing 1.479 pounds.

A single package of 300 paper wipes, prefolded to a size compatible with the dispenser, will be 3.50 x 5.0 x 8.0 inches, weighing .8375 pounds. Each wipe is 10.0 x 12.0 inches in size unfolded, and 3.50 x 5.0 inches in size folded.

Functional Description: For personal hygienic considerations, providing means for wiping of mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.1.12 **(Page 2 of 2)**

Title: Dispenser For Disposable Personal Wipes

Detail Data

Reliability:		**10 Year Resupply Volume:**	*388.800 cu ft
Maintainability:		**Peak Power:**	0
Safety:		**Energy:**	
Crew Acceptance:	8	**Water (155°F):**	
Installed Weight:	** 13.62 lbs	**Water (50°F):**	
Resupply Weight:	* 201.60 lbs	**Crew Operating Time:**	
10 Year Resupply Weight:	*4032.00 lbs	**Total Cost:**	
Installed Volume:	** .630 cu ft	**Development Risk:**	
Resupply Volume:	* 19.440 cu ft		

Rationale: Assume wipe usage of 2 paper napkins per man per meal, plus extra 33% of total for contingency factor; grand total of 400 wipes per day. - Total supply requirements converted to equivalent commercial single packages (bulk) which have slight effect on increasing or decreasing the contingency quantity. - * 240 packages (4800 packages for 10 years). -

Merits/Deficiencies: ** 9 dispensers.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.2.4 (Page 1 of 2)

Title: Dispenser For Reusable Personal Wipes

Applicable Mission Numbers

019-024

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Drawer-like enclosure of aluminum construction for attachment to underside of dining table. Drawer has two separate sections, each of which has an over-center spring-loaded retainer to hold folded cloth napkins against the bottom of the drawer section; the over-center spring will maintain the retainer in its up position for convenience in removal of the napkins. The front of the drawer will have a flush-type finger actuated latch device for positive retention in its closed position; the finger grips may also be used for pulling the drawer open. The dispenser or drawer is approximately 8.0 x 8.0 x 2.0 inches and weighs approximately 2.5 pounds.

The cloth napkins are 12.0 x 12.0 inches unfolded, and are reusable after laundering. The drawer will accommodate napkins folded to dimensions of 6.0 x 3.0 inches for which the thickness becomes .16 inch. Each cloth napkin weighs approximately .075 pounds.

Functional Description: For personal hygienic considerations, providing means for wiping mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.2.4 **(Page 2 of 2)**

Title: Dispenser For Reusable Personal Wipes

Detail Data

Reliability:	**10 Year Resupply Volume:** 13.585 cu. ft.
Maintainability:	**Peak Power:** 7500 watts
Safety:	**Energy:**
Crew Acceptance: 8	**Water (155°F):**
Installed Weight: *115.00 lbs.	**Water (50°F):**
Resupply Weight: 2.344 lbs (Avg)	**Crew Operating Time:**
10 Year Resupply Weight: 609.38 lbs.	**Total Cost:**
Installed Volume: * 2.856 cu. ft.	**Development Risk:**
Resupply Volume: .052 cu. ft (Avg)	

Rationale: Assume wipe usage of 1 cloth napkin per man per meal, plus extra 33% of total for contingency factor; grand total of 200 napkins per day with laundering at 5 day intervals and replacement after 90 washing or 448 days due to deterioration. -*16 dispensers and initial supply of 1000 napkins included in installed weight & volume.

Merits/Deficiencies:
requirements noted.

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.2.8 (Page 1 of 2)

Title: Dispenser For Reusable Personal Wipes

Applicable Mission Numbers

043-048

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Drawer-like enclosure of aluminum construction for attachment to underside of dining table. Drawer has two separate sections, each of which has an over-center spring-loaded retainer to hold folded cloth napkins against the bottom of the drawer section; the over-center spring will maintain the retainer in its up position for convenience in removal of the napkins. The front of the drawer will have a flush-type finger actuated latch device for positive retention in its closed position; the finger grips may also be used for pulling the drawer open. The dispenser or drawer is approximately 8.0 x 8.0 x 2.0 inches and weighs approximately 2.5 pounds.

The cloth napkins are 12.0 x 12.0 inches unfolded, and are reusable after laundering. The drawer will accommodate napkins folded to dimensions of 6.0 x 3.0 inches for which the thickness becomes .16 inch. Each cloth napkin weighs approximately .075 pounds.

Functional Description: For personal hygienic considerations, providing means for wiping mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.2.8 (Page 2 of 2)

Title: Dispenser For Reusable Personal Wipes

Detail Data

Reliability:	10 Year Resupply Volume: 13.376 cu. ft.
Maintainability:	Peak Power: 7500 watts
Safety:	Energy:
Crew Acceptance: 8	Water (155°F):
Installed Weight: * 115.00 lbs.	Water (50°F):
Resupply Weight: 15.00 lbs. (Avg.)	Crew Operating Time:
10 Year Resupply Weight: 600.00 lbs.	Total Cost:
Installed Volume: * 2.856 cu. ft.	Development Risk:
Resupply Volume: .334 cu. ft. (Avg.)	

Rationale: Assume wipe usage of 1 cloth napkin per man per meal, plus extra 33% of total for contingency factor; grand total of 200 napkins per day with laundering at 5 day intervals and replacement after 90 washing or 450 days due to deterioration. -*16 dispensers and initial supply of 1000 napkins included in installed weight & volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.2.9 (Page 1 of 2)

Title: Dispenser For Reusable Personal Wipes

Applicable Mission Numbers

049-054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Drawer-like enclosure of aluminum construction for attachment to underside of dining table. Drawer has two separate sections, each of which has an over-center spring-loaded retainer to hold folded cloth napkins against the bottom of the drawer section; the over-center spring will maintain the retainer in its up position for convenience in removal of the napkins. The front of the drawer will have a flush-type finger actuated latch device for positive retention in its closed position; the finger grips may also be used for pulling the drawer open. The dispenser or drawer is approximately 8.0 x 8.0 x 2.0 inches and weighs approximately 2.5 pounds.

The cloth napkins are 12.0 x 12.0 inches unfolded, and are reusable after laundering. The drawer will accommodate napkins folded to dimensions of 6.0 x 3.0 inches for which the thickness becomes .16 inch. Each cloth napkin weighs approximately .075 pounds.

Functional Description: For personal hygienic considerations, providing means for wiping mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.2.9 **(Page 2 of 2)**

Title: Dispenser For Reusable Personal Wipes

Detail Data

Reliability:	**10 Year Resupply Volume:** 1.605 cu. ft.
Maintainability:	**Peak Power:** 7500 watts
Safety:	**Energy:**
Crew Acceptance: 8	**Water (155°F):**
Installed Weight: * 19.00 lbs.	**Water (50°F):**
Resupply Weight: 3.60 lbs. (Avg.)	**Crew Operating Time:**
10 Year Resupply Weight: 72.00 lbs.	**Total Cost:**
Installed Volume: * 497 cu. ft.	**Development Risk:**
Resupply Volume: .080 cu.ft. (Avg.)	

Rationale: Assume wipe usage of 1 cloth napkin per man per meal, plus extra 33% of total for contingency factor; grand total of 24 napkins per day with laundering at 5 day intervals and replacement after 90 washing or 450 days due to deterioration. - *4 dispensers and initial supply of 120 napkins included in installed weight and volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.2.10 (Page 1 of 2)

Title: Dispenser For Reusable Personal Wipes

Applicable Mission Numbers

055-060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Drawer-like enclosure of aluminum construction for attachment to underside of dining table. Drawer has two separate sections, each of which has an over-center spring-loaded retainer to hold folded cloth napkins against the bottom of the drawer section; the over-center spring will maintain the retainer in its up position for convenience in removal of the napkins. The front of the drawer will have a flush-type finger actuated latch device for positive retention in its closed position; the finger grips may also be used for pulling the drawer open. The dispenser or drawer is approximately 8.0 x 8.0 x 2.0 inches and weighs approximately 2.5 pounds.

The cloth napkins are 12.0 x 12.0 inches unfolded, and are reusable after laundering. The drawer will accommodate napkins folded to dimensions of 6.0 x 3.0 inches for which the thickness becomes .16 inch. Each cloth napkin weighs approximately .075 pounds.

Functional Description: For personal hygienic considerations, providing means for wiping mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.2.10 (Page 2 of 2)

Title: Dispenser For Reusable Personal Wipes

Detail Data

Reliability:	10 Year Resupply Volume: 3.210 cu.ft.
Maintainability:	Peak Power: 7500 watts
Safety:	Energy:
Crew Acceptance: 8	Water (155°F):
Installed Weight: * 38.00 lbs.	Water (50°F):
Resupply Weight: 7.20 lbs. (Avg.)	Crew Operating Time:
10 Year Resupply Weight: 144.00 lbs.	Total Cost:
Installed Volume: * .993 cu.ft.	Development Risk:
Resupply Volume: .160 cu.ft. (Avg.)	

Rationale: Assume wipe usage of 1 cloth napkin per man per meal, plus extra 33% of total for contingency factor; grand total of 48 napkins per day with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. - *8 dispensers and initial supply of 240 napkins included in installed weight and volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.2.11 (Page 1 of 2)

Title: Dispenser For Reusable Personal Wipes

Applicable Mission Numbers

061-066

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Drawer-like enclosure of aluminum construction for attachment to underside of dining table. Drawer has two separate sections, each of which has an over-center spring-loaded retainer to hold folded cloth napkins against the bottom of the drawer section; the over-center spring will maintain the retainer in its up position for convenience in removal of the napkins. The front of the drawer will have a flush-type finger actuated latch device for positive retention in its closed position; the finger grips may also be used for pulling the drawer open. The dispenser or drawer is approximately 8.0 x 8.0 x 2.0 inches and weighs approximately 2.5 pounds.

The cloth napkins are 12.0 x 12.0 inches unfolded, and are reusable after laundering. The drawer will accommodate napkins folded to dimensions of 6.0 x 3.0 inches for which the thickness becomes .16 inch. Each cloth napkin weighs approximately .075 pounds.

Functional Description: For personal hygienic considerations, providing means for wiping mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.2.11 **(Page 2 of 2)**

Title: Dispenser For Reusable Personal Wipes

Detail Data

Reliability:		**10 Year Resupply Volume:**	6.688 cu.ft.
Maintainability:		**Peak Power:**	7500 watts
Safety:		**Energy:**	
Crew Acceptance:	8	**Water (155°F):**	
Installed Weight:	* 77.50 lbs.	**Water (50°F):**	
Resupply Weight:	15.00 lbs. (Avg.)	**Crew Operating Time:**	
10 Year Resupply Weight:	300.00 lbs.	**Total Cost:**	
Installed Volume:	* 2.020 cu.ft.	**Development Risk:**	
Resupply Volume:	.334 cu.ft. (Avg.)		

Rationale: Assume wipe usage of 1 cloth napkin per man per meal, plus extra 33% of total for contingency factor; grand total of 100 napkins per day with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration.
*16 dispensers and initial supply of 500 napkins included in installed weight and volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.2.12 (Page 1 of 2)

Title: Dispenser For Reusable Personal Wipes

Applicable Mission Numbers

067-072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Drawer-like enclosure of aluminum construction for attachment to underside of dining table. Drawer has two separate sections, each of which has an over-center spring-loaded retainer to hold folded cloth napkins against the bottom of the drawer section; the over-center spring will maintain the retainer in its up position for convenience in removal of the napkins. The front of the drawer will have a flush-type finger actuated latch device for positive retention in its closed position; the finger grips may also be used for pulling the drawer open. The dispenser or drawer is approximately 8.0 x 8.0 x 2.0 inches and weighs approximately 2.5 pounds.

The cloth napkins are 12.0 x 12.0 inches unfolded, and are reusable after laundering. The drawer will accommodate napkins folded to dimensions of 6.0 x 3.0 inches for which the thickness becomes .16 inch. Each cloth napkin weighs approximately .075 pounds.

Functional Description: For personal hygienic considerations, providing means for wiping mouth or fingers during and subsequent to eating.

ELEMENT CONCEPT DATA SHEET # 6.2.2.12 (Page 2 of 2)

Title: Dispenser For Reusable Personal Wipes

Detail Data

Reliability:	**10 Year Resupply Volume:** 13.376 cu. ft.
Maintainability:	**Peak Power:** 7500 watts
Safety:	**Energy:**
Crew Acceptance: 8	**Water (155°F):**
Installed Weight: * 115.00 lbs.	**Water (50°F):**
Resupply Weight: 30.00 lbs. (Avg.)	**Crew Operating Time:**
10 Year Resupply Weight: 600.00 lbs.	**Total Cost:**
Installed Volume: * 2.856 cu.ft.	**Development Risk:**
Resupply Volume: .669 cu.ft. (Avg.)	

Rationale: Assume wipe usage of 1 cloth napkin per man per meal, plus extra 33% of total for contingency factor; grand total of 200 napkins per day with laundering at 5 day intervals and replacement after 90 washing or 450 days due to deterioration.
*16 dispensers and initial supply of 1000 napkins included in installed weight and volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.3.4 (Page 1 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Applicable Mission Numbers

019 - 024

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box type enclosure of aluminum or stainless-steel construction having provisions for internal retention and dispensing of disposable impregnated cleansing towelettes in individual packet form. The enclosure is divided into two separate compartments of equal size and has a single cover with suitable latching provisions. The opposite ends of each compartment, and matching portion of the cover, are cut-away to provide openings for removal of individual towelette packets. Each compartment contains a spring-loaded plate to push and maintain the packets in position for removal through the side openings. The dispenser will accommodate 48 packets (i.e., 24 in each compartment), the loading of which is accomplished by removal of the cover. The dispenser is approximately 4.25 x 4.25 x 3.25 inches, weighing approximately .80 pounds.

Each cleansing wipe or towelette is 5.5 x 8.0 inches unfolded and is impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated towelette is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Physical Description:

Functional Description: For personal hygienic considerations, providing a means for superficial cleansing of hands and face immediately after completion of eating, minimizing crew time at lavatories and water reclamation demands.

ELEMENT CONCEPT DATA SHEET # 6.2.3.4 **(Page 2 of 2)**

Title: Dispenser For Impregnated Personal Cleansing Wipes

Detail Data

Reliability:	**10 Year Resupply Volume:** * 266.76 cu ft
Maintainability: MTTR = .25 hrs	**Peak Power:** 0
Safety:	**Energy:**
Crew Acceptance: 8	**Water (155°F):**
Installed Weight: ** 7.20 lbs	**Water (50°F):**
Resupply Weight: * 27.30 lbs	**Crew Operating Time:**
10 Year Resupply Weight: * 7098.0 lbs	**Total Cost:**
Installed Volume: ** .306 cu ft	**Development Risk:**
Resupply Volume: * 1.026 cu ft	

Rationale: * Assume use of 1 cleansing wipe (towelette) per man per meal.
** 9 Dispensers.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.3.8 (Page 1 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Applicable Mission Numbers

043 - 048

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box type enclosure of aluminum or stainless-steel construction having provisions for internal retention and dispensing of disposable impregnated cleansing towelettes in individual packet form. The enclosure is divided into two separate compartments of equal size and has a single cover with suitable latching provisions. The opposite ends of each compartment, and matching portion of the cover, are cut-away to provide openings for removal of individual towelette packets. Each compartment contains a spring-loaded plate to push and maintain the packets in position for removal through the side openings. The dispenser will accommodate 48 packets (i.e., 24 in each compartment), the loading of which is accomplished by removal of the cover. The dispenser is approximately 4.25 x 4.25 x 3.25 inches, weighing approximately .80 pounds.

Each cleansing wipe or towelette is 5.5 x 8.0 inches unfolded and is impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated towelette is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Physical Description:

Functional Description: For personal hygienic considerations, providing a means for superficial cleansing of hands and face immediately after completion of eating, minimizing crew time at lavatories and water reclamation demands.

ELEMENT CONCEPT DATA SHEET # 6.2.3.8 (Page 2 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Detail Data

Reliability:	10 Year Resupply Volume: * 263.76 cu ft
Maintainability: MTTR = .25 hrs	Peak Power: 0
Safety:	Energy:
Crew Acceptance: 8	Water (155°F):
Installed Weight: ** 7.20 lbs	Water (50°F):
Resupply Weight: * 175.50 lbs	Crew Operating Time:
10 Year Resupply Weight: * 7020.0 lbs	Total Cost:
Installed Volume: ** .306 cu ft	Development Risk:
Resupply Volume: * 6.594 cu ft	

Rationale: * Assume use of 1 cleansing wipe (towelette) per man per meal.
** 9 Dispensers.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.3.9 (Page 1 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Applicable Mission Numbers

049 - 054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box type enclosure of aluminum or stainless-steel construction having provisions for internal retention and dispensing of disposable impregnated cleansing towelettes in individual packet form. The enclosure is divided into two separate compartments of equal size and has a single cover with suitable latching provisions. The opposite ends of each compartment, and matching portion of the cover, are cut-away to provide openings for removal of individual towelette packets. Each compartment contains a spring-loaded plate to push and maintain the packets in position for removal through the side openings. The dispenser will accommodate 48 packets (i.e., 24 in each compartment), the loading of which is accomplished by removal of the cover. The dispenser is approximately 4.25 x 4.25 x 3.25 inches, weighing approximately .80 pounds.

Each cleansing wipe or towelette is 5.5 x 8.0 inches unfolded and is impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated towelette is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Physical Description:

Functional Description: For personal hygienic considerations, providing a means for superficial cleansing of hands and face immediately after completion of eating, minimizing crew time at lavatories and water reclamation demands.

ELEMENT CONCEPT DATA SHEET # 6.2.3.9 (Page 2 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Detail Data

Reliability:	10 Year Resupply Volume: * 31.64 cu ft
Maintainability: MTTR = .25 hrs	Peak Power: 0
Safety:	Energy:
Crew Acceptance: 8	Water (155°F):
Installed Weight: ** 1.60 lbs	Water (50°F):
Resupply Weight: * 42.12 lbs	Crew Operating Time:
10 Year Resupply Weight: * 842.4 lbs	Total Cost:
Installed Volume: ** .068 cu ft	Development Risk:
Resupply Volume: * 1.58 cu ft	

Rationale: * Assume use of 1 cleansing wipe (towelette) per man per meal.
** 2 Dispensers

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.3.10 (Page 1 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Applicable Mission Numbers

055 - 060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box type enclosure of aluminum or stainless-steel construction having provisions for internal retention and dispensing of disposable impregnated cleansing towelettes in individual packet form. The enclosure is divided into two separate compartments of equal size and has a single cover with suitable latching provisions. The opposite ends of each compartment, and matching portion of the cover, are cut-away to provide openings for removal of individual towelette packets. Each compartment contains a spring-loaded plate to push and maintain the packets in position for removal through the side openings. The dispenser will accommodate 48 packets (i.e., 24 in each compartment), the loading of which is accomplished by removal of the cover. The dispenser is approximately 4.25 x 4.25 x 3.25 inches, weighing approximately .80 pounds.

Each cleansing wipe or towelette is 5.5 x 8.0 inches unfolded and is impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated towelette is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Physical Description:

Functional Description: For personal hygienic considerations, providing a means for superficial cleansing of hands and face immediately after completion of eating, minimizing crew time at lavatories and water reclamation demands.

ELEMENT CONCEPT DATA SHEET # 6.2.3.10 **(Page 2 of 2)**

Title: Dispenser For Impregnated Personal Cleansing Wipes

Detail Data

Reliability:	10 Year Resupply Volume: * 63.28 cu ft
Maintainability: MTTR = .25 hrs	Peak Power: 0
Safety:	Energy:
Crew Acceptance: 8	Water (155°F):
Installed Weight: ** 3.20 lbs	Water (50°F):
Resupply Weight: * 84.24 lbs	Crew Operating Time:
10 Year Resupply Weight: * 1684.8 lbs	Total Cost:
Installed Volume: ** .136 cu ft	Development Risk:
Resupply Volume: * 3.164 cu ft	

Rationale: * Assume use of 1 cleansing wipe (towelette) per man per meal.
** 4 Dispensers.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.3.11 (Page 1 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Applicable Mission Numbers

061 - 066

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box type enclosure of aluminum or stainless-steel construction having provisions for internal retention and dispensing of disposable impregnated cleansing towelettes in individual packet form. The enclosure is divided into two separate compartments of equal size and has a single cover with suitable latching provisions. The opposite ends of each compartment, and matching portion of the cover, are cut-away to provide openings for removal of individual towelette packets. Each compartment contains a spring-loaded plate to push and maintain the packets in position for removal through the side openings. The dispenser will accommodate 48 packets (i.e., 24 in each compartment), the loading of which is accomplished by removal of the cover. The dispenser is approximately 4.25 x 4.25 x 3.25 inches, weighing approximately .80 pounds.

Each cleansing wipe or towelette is 5.5 x 8.0 inches unfolded and is impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated towelette is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Physical Description:

Functional Description: For personal hygienic considerations, providing a means for superficial cleansing of hands and face immediately after completion of eating, minimizing crew time at lavatories and water reclamation demands.

ELEMENT CONCEPT DATA SHEET # 6.2.3.11 **(Page 2 of 2)**

Title: Dispenser For Impregnated Personal Cleansing Wipes

Detail Data

Reliability:	10 Year Resupply Volume: * 131.88 cu ft
Maintainability: MTTR = .25 hrs	Peak Power: 0
Safety:	Energy:
Crew Acceptance: 8	Water (155°F):
Installed Weight: ** 7.20 lbs	Water (50°F):
Resupply Weight: * 175.50 lbs	Crew Operating Time:
10 Year Resupply Weight: * 3510.0 lbs	Total Cost:
Installed Volume: ** .306 cu ft	Development Risk:
Resupply Volume: * 6.594 cu ft	

Rationale: * Assume use of 1 cleansing wipe (towelette) per man per meal.
** 9 Dispensers

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.3.12 (Page 1 of 2)

Title: Dispenser For Impregnated Personal Cleansing Wipes

Applicable Mission Numbers

067 - 072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box type enclosure of aluminum or stainless-steel construction having provisions for internal retention and dispensing of disposable impregnated cleansing towelettes in individual packet form. The enclosure is divided into two separate compartments of equal size and has a single cover with suitable latching provisions. The opposite ends of each compartment, and matching portion of the cover, are cut-away to provide openings for removal of individual towelette packets. Each compartment contains a spring-loaded plate to push and maintain the packets in position for removal through the side openings. The dispenser will accommodate 48 packets (i.e., 24 in each compartment), the loading of which is accomplished by removal of the cover. The dispenser is approximately 4.25 x 4.25 x 3.25 inches, weighing approximately .80 pounds.

Each cleansing wipe or towelette is 5.5 x 8.0 inches unfolded and is impregnated or saturated with a solution of Benzalkonium Chloride, Chlorothymol, Propylene Glycol and Alcohol 20%. The impregnated towelette is folded and sealed in a foil-type envelope or packet. The sealed packet is 2.25 x 3.0 x .125 inches and weighs approximately .013 pounds.

Physical Description:

Functional Description: For personal hygienic considerations, providing a means for superficial cleansing of hands and face immediately after completion of eating, minimizing crew time at lavatories and water reclamation demands.

ELEMENT CONCEPT DATA SHEET # 6.2.3.12 **(Page 2 of 2)**

Title: Dispenser For Impregnated Personal Cleansing Wipes

Detail Data

Reliability:	10 Year Resupply Volume: * 263.76 cu ft
Maintainability: MTTR = .25 hrs	Peak Power: 0
Safety:	Energy:
Crew Acceptance: 8	Water (155°F):
Installed Weight: ** 7.20 lbs	Water (50°F):
Resupply Weight: * 351.00 lbs	Crew Operating Time:
10 Year Resupply Weight: * 7020.0 lbs	Total Cost:
Installed Volume: ** .306 cu ft	Development Risk:
Resupply Volume: * 13.188 cu ft	

Rationale: * Assume use of 1 cleansing wipe (towelette) per man per meal.
** 9 Dispensers

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.4.7

Title: Receptacle For Temporary Retention of Soiled Wipes

Applicable Mission Numbers: 049 - 054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of a dining table. The removable cover would have provision for attachment of a thin film plastic bag which would be disposed of along with any contained waste material. The unit is approximately 6.0 x 6.0 x 8.0 inches in size and approximately .5 pound in weight. The disposable liner is approximately 3.0 x 3.0 x .03 inches in flat storage form, weighing approximately .001 pounds.

Functional Description: For convenient removal of soiled wipes (either disposable or reusable) during process of dining, for sociological and aesthetic reasons, and temporary retention pending more complete clean-up operations.

Detail Data

Reliability:		10 Year Resupply Volume:	** 5.054 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	* 1.5 lbs	Water (50°F):	
Resupply Weight:	** 1.62 lbs	Crew Operating Time:	
10 Year Resupply Weight:	** 32.40 lbs	Total Cost:	
Installed Volume:	* .501 cu ft	Development Risk:	
Resupply Volume:	** .253 cu ft.		

Rationale: * Assume 1 receptacle between each 2 dining positions
** Assume replacement of bags after each of 3 meal periods

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.4.8

Title: Receptacle For Temporary Retention of Soiled Wipes

Applicable Mission Numbers: 055 - 060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of a dining table. The removable cover would have provision for attachment of a thin film plastic bag which would be disposed of along with any contained waste material. The unit is approximately 6.0 x 6.0 x 8.0 inches in size and approximately .5 pound in weight. The disposable liner is approximately 3.0 x 3.0 x .03 inches in flat storage form, weighing approximately .001 pounds.

Functional Description: For convenient removal of soiled wipes (either disposable or reusable) during process of dining, for sociological and aesthetic reasons, and temporary retention pending more complete clean-up operations.

Detail Data

Reliability:	10 Year Resupply Volume: ** 10.109 cu ft
Maintainability: MTTR = .25 hrs	Peak Power: 0
Safety:	Energy:
Crew Acceptance: 8	Water (155°F):
Installed Weight: * 3.0 lbs	Water (50°F):
Resupply Weight: ** 3.24 lbs	Crew Operating Time:
10 Year Resupply Weight: ** 64.80 lbs	Total Cost:
Installed Volume: * 1.002 cu ft	Development Risk:
Resupply Volume: ** .505 cu ft	

Rationale: * Assume 1 receptacle between each 2 dining positions
** Assume replacement of bags after each of 3 meal periods

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.4.9

Title: Receptacle For Temporary Retention of Soiled Wipes

Applicable Mission Numbers

061 - 066

067 - 072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of a dining table. The removable cover would have provision for attachment of a thin film plastic bag which would be disposed of along with any contained waste material. The unit is approximately 6.0 x 6.0 x 8.0 inches in size and approximately .5 pound in weight. The disposable liner is approximately 3.0 x 3.0 x .03 inches in flat storage form, weighing approximately .001 pounds.

Functional Description: For convenient removal of soiled wipes (either disposable or reusable) during process of dining, for sociological and aesthetic reasons, and temporary retention pending more complete clean-up operations.

Detail Data

Reliability:	10 Year Resupply Volume: ** 21.902 cu ft.
Maintainability: MTTR = .25 hrs	Peak Power: 0
Safety:	Energy:
Crew Acceptance: 8	Water (155°F):
Installed Weight: * 6.5 lbs	Water (50°F):
Resupply Weight: ** 7.02 lbs	Crew Operating Time:
10 Year Resupply Weight: ** 140.4 lbs	Total Cost:
Installed Volume: * 2.171 cu ft	Development Risk:
Resupply Volume: ** 1.095 cu ft	

Rationale: * Assume 1 receptacle between each 2 dining positions

** Assume replacement of bags after each of 3 meal periods

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.2.8.4

Title: Hand Carriage For Return of Meal Trays

Applicable Mission Numbers

019 - 024 _____
043 - 048 _____
067 - 072 _____

Function Reference: Provide For Clean-Up

Drawing Reference: _____

Physical Description: *Rack-type depository for meal trays as use for the food serving and/or holding function described in concept data sheet 4.2.1.4.

Functional Description: For retention of returned meal trays preparatory to disposal of unconsumed food (or other waste) and cleaning of various dining utensils. Tray is inserted from dining side and withdrawn from galley side. (NOTE: May also be used for tray stowage in between meal periods if warranted.)

Detail Data

Reliability: _____	10 Year Resupply Volume: * N/A
Maintainability: _____	Peak Power: 0
Safety: _____	Energy: _____
Crew Acceptance: 4	Water (155°F): _____
Installed Weight: * N/A	Water (50°F): _____
Resupply Weight: * N/A	Crew Operating Time: _____
10 Year Resupply Weight: * N/A	Total Cost: _____
Installed Volume: * N/A	Development Risk: _____
Resupply Volume: * N/A	

Rationale: *The same equipment is employed in the delivery or holding and return of meal trays; therefore, weights and volumes are not applicable for this phase of clean-up function.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.2.9.4

Title: Meal Tray Guided Return Rail System

Applicable Mission Numbers

019 - 024 _____
043 - 048 _____
067 - 072 _____

Function Reference: Provide For Clean-Up

Drawing Reference: _____

Physical Description: *Restrained guidance transport system as used for the food serving function described in concept data sheet 4.1.3.4.

Functional Description: For return transport of meal trays to galley, after dining completion, preparatory to disposal of unconsumed food (or other waste) and cleaning of various dining utensils.

Detail Data

Reliability: _____	10 Year Resupply Volume: * N/A
Maintainability: _____	Peak Power: * N/A
Safety: _____	Energy: _____
Crew Acceptance: 7	Water (155°F): _____
Installed Weight: * N/A	Water (50°F): _____
Resupply Weight: * N/A	Crew Operating Time: _____
10 Year Resupply Weight: * N/A	Total Cost: _____
Installed Volume: * N/A	Development Risk: _____
Resupply Volume: * N/A	

Rationale: *The same equipment is employed in the delivery and return of meal trays; therefore, weights and volumes are not applicable for this phase of clean-up function.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.2.10.4

Title: Meal Tray Guided Return Carrier Unit

Applicable Mission Numbers

019 - 024
043 - 048
067 - 072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: *Restrained guidance transport system as used for the food serving function described in concept data sheet 4.1.7.4.

Functional Description: For collection and retention of meal trays after dining completion, and return transport to galley preparatory to disposal of unconsumed food (or other waste) and cleaning of various dining utensils. (NOTE: May also be used for tray stowage in between meal periods if warranted.)

Detail Data

Reliability:	10 Year Resupply Volume: * N/A
Maintainability:	Peak Power: * N/A
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: * N/A	Water (50°F):
Resupply Weight: * N/A	Crew Operating Time:
10 Year Resupply Weight: * N/A	Total Cost:
Installed Volume: * N/A	Development Risk:
Resupply Volume: * N/A	

Rationale: *The same equipment is employed in the delivery and return of meal trays; therefore, weights and volumes are not applicable for this phase of clean-up function.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.1.4

Title: Temporary Reusable Soiled Wipes Storage Unit

Applicable Mission Numbers: 019-024

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a washable cloth bag which would be laundered along with the reusable wipes. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The cloth bag is approximately 10.0 x 5.0 x .5 inches in flat storage form weighing approximately .2 pounds.

Functional Description: For temporary collection and retention of soiled reusable wipes pending delivery to a remote laundry facility within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: 2.348 cu ft
Maintainability:	Peak Power: 7500 watts
Safety:	Energy:
Crew Acceptance: 7	Water (155°F):
Installed Weight: * 12.00 lbs	Water (50°F):
Resupply Weight: .125 lbs (avg)	Crew Operating Time:
10 Year Resupply Weight: 32.50 lbs	Total Cost:
Installed Volume: *7.233 cu ft	Development Risk:
Resupply Volume: .009 cu ft (avg)	

Rationale: *Assume use of 4 storage units. - Assume 4 bags per day usage with laundering at 5 day intervals and replacement after 90 washings or 448 days due to deterioration. Initial supply of 20 bags included in installed weight & volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.1.8

Title: Temporary Reusable Soiled Wipes Storage Unit

Applicable Mission Numbers

043-048

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a washable cloth bag which would be laundered along with the reusable wipes. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The cloth bag is approximately 10.0 x 5.0 x .5 inches in flat storage form weighing approximately .2 pounds.

Functional Description: For temporary collection and retention of soiled reusable wipes pending delivery to a remote laundry facility within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: 2.314 cu ft.
Maintainability:	Peak Power: 7500 watts
Safety:	Energy:
Crew Acceptance: 7	Water (155°F):
Installed Weight: * 12.00 lbs	Water (50°F):
Resupply Weight: .80 lbs	Crew Operating Time:
10 Year Resupply Weight: 32.00 lbs.	Total Cost:
Installed Volume: * 7.233 cu ft.	Development Risk:
Resupply Volume: .058 cu ft. (avg)	

Rationale: *Assume use of 4 storage units. - Assume 4 bags per day usage with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. Initial supply of 20 bags included in installed weight & volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.1.9

Title: Temporary Reusable Soiled Wipes Storage Unit

Applicable Mission Numbers: 049-054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a washable cloth bag which would be laundered along with the reusable wipes. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The cloth bag is approximately 10.0 x 5.0 x .5 inches in flat storage form weighing approximately .2 pounds.

Functional Description: For temporary collection and retention of soiled reusable wipes pending delivery to a remote laundry facility within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: .578 cu ft
Maintainability:	Peak Power: 7500 watts
Safety:	Energy:
Crew Acceptance: 7	Water (155°F):
Installed Weight: * 3.00 lbs.	Water (50°F):
Resupply Weight: .40 lbs (avg)	Crew Operating Time:
10 Year Resupply Weight: 8.00 lbs	Total Cost:
Installed Volume: *1.808 cu ft	Development Risk:
Resupply Volume: .029 cu ft (avg)	

Rationale: *Assume 1 bag per day usage with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. Initial supply of 5 bags included in installed weight & volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.1.10

Title: Temporary Reusable Soiled Wipes Storage Unit

Applicable Mission Numbers: 055-060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a washable cloth bag which would be laundered along with the reusable wipes. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The cloth bag is approximately 10.0 x 5.0 x .5 inches in flat storage form weighing approximately .2 pounds.

Functional Description: For temporary collection and retention of soiled reusable wipes pending delivery to a remote laundry facility within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: .578 cu ft.
Maintainability:	Peak Power: 7500 watts
Safety:	Energy:
Crew Acceptance: 7	Water (155°F):
Installed Weight: * 3.00 lbs.	Water (50°F):
Resupply Weight: .40 lbs. (avg)	Crew Operating Time:
10 Year Resupply Weight: 8.00 lbs	Total Cost:
Installed Volume: *1.808 cu ft.	Development Risk:
Resupply Volume: .029 cu ft. (avg)	

Rationale: *Assume 1 bag per day usage with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. Initial supply of 5 bags included in installed weight & volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.1.11

Title: Temporary Reusable Soiled Wipes Storage Unit

Applicable Mission Numbers: 061-066

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a washable cloth bag which would be laundered along with the reusable wipes. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The cloth bag is approximately 10.0 x 5.0 x .5 inches in flat storage form weighing approximately .2 pounds.

Functional Description: For temporary collection and retention of soiled reusable wipes pending delivery to a remote laundry facility within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: 1.157 cu ft
Maintainability:	Peak Power: 7500 watts
Safety:	Energy:
Crew Acceptance: 7	Water (155°F):
Installed Weight: * 6.00 lbs	Water (50°F):
Resupply Weight: .80 lbs	Crew Operating Time:
10 Year Resupply Weight: 16.00lbs	Total Cost:
Installed Volume: *3.617 cu ft	Development Risk:
Resupply Volume: .058 cu ft (avg)	

Rationale: *Assume use of 2 storage units. - Assume 2 bags per day usage with laundering at 5 day intervals and replacement after90 washings or 450 days due to deterioration. Initial supply of10 bags included in installed weight & volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.1.12

Title: Temporary Reusable Soiled Wipes Storage Unit

Applicable Mission Numbers: 067-072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of crumpled material and retention thereof. The basic container may be of sheet metal or wire-mesh construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a washable cloth bag which would be laundered along with the reusable wipes. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The cloth bag is approximately 10.0 x 5.0 x .5 inches in flat storage form weighing approximately .2 pounds.

Functional Description: For temporary collection and retention of soiled reusable wipes pending delivery to a remote laundry facility within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: 2.314 cu ft.
Maintainability:	Peak Power: 7500 watts
Safety:	Energy:
Crew Acceptance: 7	Water (155°F):
Installed Weight: *12.00 lbs	Water (50°F):
Resupply Weight: 1.60 lbs (avg)	Crew Operating Time:
10 Year Resupply Weight: 32.00 lbs	Total Cost:
Installed Volume: * 7.233 cu ft	Development Risk:
Resupply Volume: .116 cu ft	

Rationale: *Assume use of 4 storage units. - Assume 4 bags per day usage with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. Initial supply of 20 bags included in installed weight & volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.2.4

Title: Temporary Debris Collection/Storage Unit

Applicable Mission Numbers

019-024

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of debris or waste material, and retention thereof. The basic container will be of sheet metal construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a plastic bag-type liner which would be disposed of along with the contained debris. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The plastic bag is approximately 10.0 x 5.0 x .10 inches in flat storage form, weighing approximately .020 pounds.

Functional Description: For temporary collection and retention of soiled disposable wipes, food wraps or containers, unconsumed food, disposable dining aids, etc., pending further processing and delivery to a remote general disposal area within the space vehicle.

Detail Data

Reliability:		10 Year Resupply Volume:	* 126.235 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	*8.0 lbs	Water (50°F):	
Resupply Weight:	*3.36 lbs	Crew Operating Time:	
10 Year Resupply Weight:	*873.6 lbs	Total Cost:	
Installed Volume:	*6.944 cu ft	Development Risk:	
Resupply Volume:	*.486 cu ft		

Rationale: * Assume use of 4 storage units. - Assume replacement of 4 bags after each of 3 meal periods/day.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.2.8

Title: Temporary Debris Collection/Storage Unit

Applicable Mission Numbers

043-048

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of debris or waste material, and retention thereof. The basic container will be of sheet metal construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a plastic bag-type liner which would be disposed of along with the contained debris. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The plastic bag is approximately 10.0 x 5.0 x .10 inches in flat storage form, weighing approximately .020 pounds.

Functional Description: For temporary collection and retention of soiled disposable wipes, food wraps or containers, unconsumed food, disposable dining aids, etc., pending further processing and delivery to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: 124.848 cu ft
Maintainability:	Peak Power: 0
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: *8.0 lbs	Water (50°F):
Resupply Weight: *21.6 lbs	Crew Operating Time:
10 Year Resupply Weight: *864 lbs	Total Cost:
Installed Volume: *6.944 cu ft.	Development Risk:
Resupply Volume: * 3.121 cu ft	

Rationale: * Assume use of 4 storage units. - Assume replacement of 4 bags after each of 3 meal periods/day.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.2.9

Title: Temporary Debris Collection/Storage Unit

Applicable Mission Numbers

049-054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of debris or waste material, and retention thereof. The basic container will be of sheet metal construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a plastic bag-type liner which would be disposed of along with the contained debris. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The plastic bag is approximately 10.0 x 5.0 x .10 inches in flat storage form, weighing approximately .020 pounds.

Functional Description: For temporary collection and retention of soiled disposable wipes, food wraps or containers, unconsumed food, disposable dining aids, etc., pending further processing and delivery to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 31.212 cu ft.
Maintainability:	Peak Power: 0
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 2.0 lbs	Water (50°F):
Resupply Weight: *10.8 lbs	Crew Operating Time:
10 Year Resupply Weight: *216 lbs	Total Cost:
Installed Volume: 1.736 cu ft	Development Risk:
Resupply Volume: * 1.561 cu ft	

Rationale: * Assume replacement of bag after each of 3 meal periods/day.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.2.10

Title: Temporary Debris Collection/Storage Unit

Applicable Mission Numbers

055-060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of debris or waste material, and retention thereof. The basic container will be of sheet metal construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a plastic bag-type liner which would be disposed of along with the contained debris. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The plastic bag is approximately 10.0 x 5.0 x .10 inches in flat storage form, weighing approximately .020 pounds.

Functional Description: For temporary collection and retention of soiled disposable wipes, food wraps or containers, unconsumed food, disposable dining aids, etc., pending further processing and delivery to a remote general disposal area within the space vehicle.

Detail Data

Reliability:		10 Year Resupply Volume:	* 31.212 cu ft
Maintainability:	MTTR = .25 hrs	Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	2.0 lbs	Water (50°F):	
Resupply Weight:	* 10.8 lbs	Crew Operating Time:	
10 Year Resupply Weight:	*216 lbs	Total Cost:	
Installed Volume:	1.736 cu ft	Development Risk:	
Resupply Volume:	* 1.561 cu ft		

Rationale: * Assume replacement of bag after each of 3 meal periods/day.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET #6.3.2.11

Title: Temporary Debris Collection/Storage Unit

Applicable Mission Numbers

061-066

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of debris or waste material, and retention thereof. The basic container will be of sheet metal construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a plastic bag-type liner which would be disposed of along with the contained debris. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The plastic bag is approximately 10.0 x 5.0 x .10 inches in flat storage form, weighing approximately .020 pounds.

Functional Description: For temporary collection and retention of soiled disposable wipes, food wraps or containers, unconsumed food, disposable dining aids, etc., pending further processing and delivery to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 63.424 cu ft.
Maintainability: MTTR = .25 hrs	Peak Power: 0
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: *4.0 lbs	Water (50°F):
Resupply Weight: *21.6 lbs	Crew Operating Time:
10 Year Resupply Weight: *432 lbs	Total Cost:
Installed Volume: * 3.472 cu ft	Development Risk:
Resupply Volume: * 3.121 cu ft	

Rationale: * Assume use of 2 storage units. - Assume replacement of 2 bags after each of 3 meal periods/day.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.2.12

Title: Temporary Debris Collection/Storage Unit

Applicable Mission Numbers

067-072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Rectangular aluminum container with a removable cover having flexible triangular flaps to permit insertion of debris or waste material, and retention thereof. The basic container will be of sheet metal construction, intended to be fixed in position, possibly flush with the surface of the galley work table. The removable cover would have provision for attachment of a plastic bag-type liner which would be disposed of along with the contained debris. The unit is approximately 10.0 x 10.0 x 30.0 inches in size and approximately 2.0 pounds in weight. The plastic bag is approximately 10.0 x 5.0 x .10 inches in flat storage form, weighing approximately .020 pounds.

Functional Description: For temporary collection and retention of soiled disposable wipes, food wraps or containers, unconsumed food, disposable dining aids, etc., pending further processing and delivery to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 124.848 cu ft
Maintainability: MTTR = .25 hrs	Peak Power: 0
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: *8.0 lbs	Water (50°F):
Resupply Weight: *43.2 lbs	Crew Operating Time:
10 Year Resupply Weight: *864 lbs	Total Cost:
Installed Volume: * 6.944 cu ft	Development Risk:
Resupply Volume: * 6.242 cu ft	

Rationale: Assume use of 4 storage units. - Assume replacement of 4 bags after each of 3 meal periods/day.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.3.1

Title: Combination Debris Collector/Shredder

Applicable Mission Numbers

001-006

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris shredding unit approximately 20 x 20 x 35 inches in size and approximately 45 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 20 cubic inches in flat storage form, weighing approximately .10 pounds.

Functional Description: For partial reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 42.6 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 45 lbs	Water (50°F):
Resupply Weight: * 1.4 lbs	Crew Operating Time:
10 Year Resupply Weight: *364 lbs	Total Cost:
Installed Volume: 8.02 ft^3	Development Risk:
Resupply Volume: * .164 ft^3	

Rationale: *Assume 1 debris collector bag per day usage.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.3.2

Title: Combination Debris Collector/Shredder

Applicable Mission Numbers

007-012

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris shredding unit approximately 20 x 20 x 35 inches in size and approximately 45 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 20 cubic inches in flat storage form, weighing approximately .10 pounds.

Functional Description: For partial reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 42.6 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 45 lbs	Water (50°F):
Resupply Weight: * 1.4 lbs	Crew Operating Time:
10 Year Resupply Weight: *364 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: * .164 ft^3	

Rationale: *Assume 1 debris collector bag per day usage.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.3.3

Title: Combination Debris Collector/Shredder

Applicable Mission Numbers

013-018

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris shredding unit approximately 20 x 20 x 35 inches in size and approximately 45 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 20 cubic inches in flat storage form, weighing approximately .10 pounds.

Functional Description: For partial reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:		10 Year Resupply Volume:	* 128 ft^3
Maintainability:		Peak Power:	1500 watts
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	45 lbs	Water (50°F):	
Resupply Weight:	* 4.2 lbs	Crew Operating Time:	
10 Year Resupply Weight:	*1092 lbs	Total Cost:	
Installed Volume:	8.2 ft^3	Development Risk:	
Resupply Volume:	* .493 ft^3		

Rationale: * Assume 3 debris collector bags per day usage.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.3.4

Title: Combination Debris Collector/Shredder

Applicable Mission Numbers

019-024

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris shredding unit approximately 20 x 20 x 35 inches in size and approximately 45 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 20 cubic inches in flat storage form, weighing approximately .10 pounds.

Functional Description: For partial reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 256 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 45 lbs	Water (50°F):
Resupply Weight: * 8.4 lbs	Crew Operating Time:
10 Year Resupply Weight: *2184 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: * .986 ft^3	

Rationale: * Assume 6 debris collector bags per day usage.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.3.5

Title: Combination Debris Collector/Shredder

Applic:	Mission Numbers
025-030	

Function Reference: Provide For Clean-Up

Drawing Reference: _____

Physical Description: Self-contained debris shredding unit approximately 20 x 20 x 35 inches in size and approximately 45 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 20 cubic inches in flat storage form, weighing approximately .10 pounds.

Functional Description: For partial reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability: _____	10 Year Resupply Volume: *42.2 ft^3
Maintainability: _____	Peak Power: 1500 watts
Safety: _____	Energy: _____
Crew Acceptance: 6	Water (155°F): _____
Installed Weight: 45 lbs	Water (50°F): _____
Resupply Weight: *9.0 lbs	Crew Operating Time: _____
10 Year Resupply Weight: *360 lbs	Total Cost: _____
Installed Volume: 8.2 ft^3	Development Risk: _____
Resupply Volume: *1.05 ft^3	

Rationale: * Assume 1 debris collector bag per day usage.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.3.3.6

Title: Combination Debris Collector/Shredder

Applicable Mission Numbers

031-036

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris shredding unit approximately 20 x 20 x 35 inches in size and approximately 45 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 20 cubic inches in flat storage form, weighing approximately .10 pounds.

Functional Description: For partial reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 42.2 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 45 lbs	Water (50°F):
Resupply Weight: * 9.0 lbs	Crew Operating Time:
10 Year Resupply Weight: * 360 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: * 1.05 ft^3	

Rationale: * Assume 1 debris collector bag per day usage.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.3.7

Title: Combination Debris Collector/Shredder

Applicable Mission Numbers

037-042

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris shredding unit approximately 20 x 20 x 35 inches in size and approximately 45 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 20 cubic inches in flat storage form, weighing approximately .10 pounds.

Functional Description: For partial reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:		10 Year Resupply Volume:	*127 ft^3
Maintainability:		Peak Power:	1500 ft^3
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	45 lbs	Water (50°F):	
Resupply Weight:	* 27. lbs	Crew Operating Time:	
10 Year Resupply Weight:	* 1080 lbs	Total Cost:	
Installed Volume:	8.2 ft^3	Development Risk:	
Resupply Volume:	* 3.16 ft^3		

Rationale: * Assume 3 debris collector bags per day usage.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.3.8

Title: Combination Debris Collector/Shredder

Applicable Mission Numbers: 043-048

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris shredding unit approximately 20 x 20 x 35 inches in size and approximately 45 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 20 cubic inches in flat storage form, weighing approximately .10 pounds.

Functional Description: For partial reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 254 ft^3
Maintainability:	Peak Power:
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 45 lbs	Water (50°F):
Resupply Weight: * 54 lbs	Crew Operating Time:
10 Year Resupply Weight: * 2160 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: *6.32 ft^3	

Rationale: * Assume 6 debris collector bags per day usage.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.3.9

Title: Combination Debris Collector/Shredder

Applicable Mission Numbers

049-054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris shredding unit approximately 20 x 20 x 35 inches in size and approximately 45 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 20 cubic inches in flat storage form, weighing approximately .10 pounds.

Functional Description: For partial reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 42.2 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 45 lbs	Water (50°F):
Resupply Weight: * 18.0 lbs	Crew Operating Time:
10 Year Resupply Weight: *360 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: *2.1 ft^3	

Rationale: * Assume 1 debris collector bag per day usage.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.3.10

Title: Combination Debris Collector/Shredder

Applicable Mission Numbers

055-060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris shredding unit approximately 20 x 20 x 35 inches in size and approximately 45 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 20 cubic inches in flat storage form, weighing approximately .10 pounds.

Functional Description: For partial reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 42.2 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 45 lbs	Water (50°F):
Resupply Weight: * 18.0 lbs	Crew Operating Time:
10 Year Resupply Weight: 360 lbs	Total Cost:
Installed Volume: * 8.2 ft^3	Development Risk:
Resupply Volume: * 2.1 ft^3	

Rationale: * Assume 1 debris collector bag per day usage.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.3.11

Title: Combination Debris Collector/Shredder

Applicable Mission Numbers

061-066

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris shredding unit approximately 20 x 20 x 35 inches in size and approximately 45 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 20 cubic inches in flat storage form, weighing approximately .10 pounds.

Functional Description: For partial reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 127 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 45 lbs	Water (50°F):
Resupply Weight: * 54 lbs	Crew Operating Time:
10 Year Resupply Weight: * 1080 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: * 6.34 ft^3	

Rationale: * Assume 3 debris collector bags per day usage.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.3.12

Title: Combination Debris Collector/Shredder

Applicable Mission Numbers

067-072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris shredding unit approximately 20 x 20 x 35 inches in size and approximately 45 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 20 cubic inches in flat storage form, weighing approximately .10 pounds.

Functional Description: For partial reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 254 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 45 lbs	Water (50°F):
Resupply Weight: * 108 lbs	Crew Operating Time:
10 Year Resupply Weight: * 2160 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: *12.6 ft^3	

Rationale: * Assume 6 debris collector bags per day usage.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.4.1

Title: Combination Debris Collector/Compactor

Applicable Mission Numbers

001-006

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris compaction unit approximately 20.0 x 20.0 x 35.0 inches in size, and approximately 75 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 8 cu.in. in flat storage form and weighs approximately .05 pounds.

Functional Description: For reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 17 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 75.0 lbs	Water (50°F):
Resupply Weight: * .70 lbs	Crew Operating Time:
10 Year Resupply Weight: * 182 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: * .071 ft^3	

Rationale: *Assume 1 debris collector bag per day usage -

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.4.2

Title: Combination Debris Collector/Compactor

Applicable Mission Numbers

007-012 — _____

Function Reference: Provide For Clean-Up

Drawing Reference: _____

Physical Description: Self-contained debris compaction unit approximately 20.0 x 20.0 x 35.0 inches in size, and approximately 75 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 8 cu.in. in flat storage form and weighs approximately .05 pounds.

Functional Description: For reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability: _____	10 Year Resupply Volume: * 17 ft^3
Maintainability: _____	Peak Power: 1500 watts
Safety: _____	Energy: _____
Crew Acceptance: 6	Water (155°F): _____
Installed Weight: 75.0 lbs	Water (50°F): _____
Resupply Weight: * .70 lbs.	Crew Operating Time: _____
10 Year Resupply Weight: * 182 lbs	Total Cost: _____
Installed Volume: 8.2 ft^3	Development Risk: _____
Resupply Volume: * .071 ft^3	

Rationale: *Assume 1 debris collector bag per day usage -

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.3.4.3

Title: Combination Debris Collector/Compactor

Applicable Mission Numbers: 013-018

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris compaction unit approximately 20.0 x 20.0 x 35.0 inches in size, and approximately 75 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 8 cu.in. in flat storage form and weighs approximately .05 pounds.

Functional Description: For reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 51 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 75.0 lbs	Water (50°F):
Resupply Weight: * 2.1 lbs	Crew Operating Time:
10 Year Resupply Weight: * 546 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: * .197 ft^3	

Rationale: *Assume 3 debris collector bags per day usage (1 after each meal period).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.4.4

Title: Combination Debris Collector/Compactor

Applicable Mission Numbers

019-024

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris compaction unit approximately 20.0 x 20.0 x 35.0 inches in size, and approximately 75 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 8 cu.in. in flat storage form and weighs approximately .05 pounds.

Functional Description: For reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 100.2 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 75.0 lbs	Water (50°F):
Resupply Weight: * 4.2 lbs	Crew Operating Time:
10 Year Resupply Weight: * 1092 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: * .394 ft^3	

Rationale: *Assume 6 debris collection bags per day usage (1 after each meal serving period).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.4.5

Title: Combination Debris Collector/Compactor

Applicable Mission Numbers

025-030

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris compaction unit approximately 20.0 x 20.0 x 35.0 inches in size, and approximately 75 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 8 cu.in. in flat storage form and weighs approximately .05 pounds.

Functional Description: For reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 16.67 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 75.0 lbs	Water (50°F):
Resupply Weight: * 4.5 lbs	Crew Operating Time:
10 Year Resupply Weight: * 180 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: * .417 ft^3	

Rationale: *Assume 1 debris collector bag per day usage -

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.4.6

Title: Combination Debris Collector/Compactor

Applicable Mission Numbers: 031-036

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris compaction unit approximately 20.0 x 20.0 x 35.0 inches in size, and approximately 75 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 8 cu.in. in flat storage form and weighs approximately .05 pounds.

Functional Description: For reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:		10 Year Resupply Volume:	* 16.67 ft^3
Maintainability:		Peak Power:	1500 watts
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	75.0 lbs	Water (50°F):	
Resupply Weight:	* 4.5 lbs	Crew Operating Time:	
10 Year Resupply Weight:	* 180 lbs	Total Cost:	
Installed Volume:	8.2 ft^3	Development Risk:	
Resupply Volume:	* .417 ft^3		

Rationale: *Assume 1 debris collector bag per day usage -

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.4.7

Title: Combination Debris Collector/Compactor

Applicable Mission Numbers
037-042

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris compaction unit approximately 20.0 x 20.0 x 35.0 inches in size, and approximately 75 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 8 cu.in. in flat storage form and weighs approximately .05 pounds.

Functional Description: For reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 50 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 75.0 lbs	Water (50°F):
Resupply Weight: * 13.5 lbs	Crew Operating Time:
10 Year Resupply Weight: * 540 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: * 1.25 ft^3	

Rationale: *Assume 3 debris collector bags per day usage (1 after each meal period).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.4.8

Title: Combination Debris Collector/Compactor

Applicable Mission Numbers

043-048

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris compaction unit approximately 20.0 x 20.0 x 35.0 inches in size, and approximately 75 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 8 cu.in. in flat storage form and weighs approximately .05 pounds.

Functional Description: For reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 100 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 75.0 lbs	Water (50°F):
Resupply Weight: * 27.0 lbs	Crew Operating Time:
10 Year Resupply Weight: * 1080 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: * 2.5 ft^3	

Rationale: *Assume 6 debris collection bags per day usage (1 after each meal serving period).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.4.9

Title: Combination Debris Collector/Compactor

Applicable Mission Numbers
049-054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris compaction unit approximately 20.0 x 20.0 x 35.0 inches in size, and approximately 75 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 8 cu.in. in flat storage form and weighs approximately .05 pounds.

Functional Description: For reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: * 16.67 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 75.0 lbs	Water (50°F):
Resupply Weight: * 9.0 lbs	Crew Operating Time:
10 Year Resupply Weight: * 180 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: * .83 ft^3	

Rationale: *Assume 1 debris collector bag per day usage -

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.4.10

Title: Combination Debris Collector/Compactor

Applicable Mission Numbers

055-060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris compaction unit approximately 20.0 x 20.0 x 35.0 inches in size, and approximately 75 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 8 cu.in. in flat storage form and weighs approximately .05 pounds.

Functional Description: For reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: *16.67 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 75.0 lbs	Water (50°F):
Resupply Weight: * 9.0 lbs	Crew Operating Time:
10 Year Resupply Weight: * 180 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: * .83 ft^3	

Rationale: *Assume 1 debris collector bag per day usage.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.4.11

Title: Combination Debris Collector/Compactor

Applicable Mission Numbers
061-066

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris compaction unit approximately 20.0 x 20.0 x 35.0 inches in size, and approximately 75 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 8 cu.in. in flat storage form and weighs approximately .05 pounds.

Functional Description: For reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:	10 Year Resupply Volume: 50 ft^3
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 75.0 lbs	Water (50°F):
Resupply Weight: * 27.0 lbs	Crew Operating Time:
10 Year Resupply Weight: * 540 lbs	Total Cost:
Installed Volume: 8.2 ft^3	Development Risk:
Resupply Volume: * 2.5 ft^3	

Rationale: *Assume 3 debris collector bags per day usage (1 after each meal period).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.4.12

Title: Combination Debris Collector/Compactor

Applicable Mission Numbers

067-072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Self-contained debris compaction unit approximately 20.0 x 20.0 x 35.0 inches in size, and approximately 75 pounds installed weight. Operating power is approximately 1.5 Kw. Disposable bag is approximately 8 cu.in. in flat storage form and weighs approximately .05 pounds.

Functional Description: For reduction of the bulk volume of waste material prior to transport to a remote general disposal area within the space vehicle.

Detail Data

Reliability:		10 Year Resupply Volume:	* 100 ft^3
Maintainability:		Peak Power:	1500 watts
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	75.0 lbs	Water (50°F):	
Resupply Weight:	* 54.0 lbs	Crew Operating Time:	
10 Year Resupply Weight:	* 1080 lbs	Total Cost:	
Installed Volume:	8.2 ft^3	Development Risk:	
Resupply Volume:	* 5.0 ft^3		

Rationale: *Assume 6 debris collection bags per day usage (1 after each meal serving period). -

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.6.4

Title: Hand Carriage for Transport of Debris

Function Reference: Provide for Clean-up

Drawing Reference:

Applicable Mission Numbers

019-024
043-048
067-072

Physical Description:

Functional Description: Self explanatory

Detail Data

Reliability:		10 Year Resupply Volume:	0
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	5	Water (155°F):	
Installed Weight:	0	Water (50°F):	
Resupply Weight:	0	Crew Operating Time:	
10 Year Resupply Weight:	0	Total Cost:	
Installed Volume:	0	Development Risk:	
Resupply Volume:	0		

Rationale: There is no hardware or software involved in manual carriage of soiled wipe containments and/or galley debris containments, respectively, to remote laundery and general disposal areas within the space vheicle. Crew operating time for this function is dependent upon the relative positions of the galley to the remote areas, operating time.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.7.4

Title: Manual Movement of Debris Transporter

Function Reference: Provide for Clean-Up

Drawing Reference: _____

Applicable Mission Numbers

019-024

043-048

067-072

Physical Description: Mobile carrier or depositor unit of aluminum framework, having handles to facilitate maneuvering, single-point restraint feature adapter to a floor-recessed guidance track for zero-g application, and ball-type casters which provide stability only in zero-g, but are effective in partial-g environment. The unit has open sides and open top with flexible webbing or net-type closure provisions which will confine the inserted articles. The size of the unit is approximately 15.0 x 40.0 x 30.0 inches and weighs approximately 15 pounds.

Functional Description: For facilitating transport of soiled wipe containments and various debris containments from the galley area to remote laundery and/or general disposal facilities within the space vehicle.

Detail Data

Reliability: _____
Maintainability: _____
Safety: _____
Crew Acceptance: 7
Installed Weight: 15.0 lbs
Resupply Weight: 0
10 Year Resupply Weight: 0
Installed Volume: 10.416 cu.ft.
Resupply Volume: 0

10 Year Resupply Volume: 0
Peak Power: 0
Energy: _____
Water (155°F): _____
Water (50°F): _____
Crew Operating Time: _____
Total Cost: _____
Development Risk: _____

Rationale: _____

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.3.11.4 (Page 1 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Applicable Mission Numbers: 019-024

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: The FH/RAD design for a zero-g sink employs an enclosed spherical chamber which has arm ports and a viewing port. The water flow is controlled from inside and is directed toward the drain. A blower, situated below the drain and below the air-water separator, induces streamlined air movement within the chamber causing all deflected water particles to again seek the drain. (Air drag guides and propels the fluid drops.) The air enters the chamber at the arm ports. This puts the greatest flow rate/unit area at the point which has the greatest chance of letting water escape to the environment. The spherical chamber enclosure is divided into two sections with an appropriate seal at the juncture. The lower section is fixed in position, and is of sufficient size to accommodate the largest of reusable dining utensils (trays or dishes) that will be used. The upper section, which includes the arm and viewing ports, is hinged to permit insertion and removal of utensils. Air-water separation is accomplished by a centrifugal separator. The centrifugal system uses a spinning cone to drive water to the outside of the separator structure where it is removed by a ram pitot effect. The air, however, passes right around the separator body and through the filter to be pulled through the intake of the blower.

The size of the sink is approximately 24.0 x 24.0 x 40.0 inches and weight without cleaning liquids is approximately 60 pounds. Operating power is approximately 1.5 Kw.

Functional Description: For washing of hands prior to, during, and subsequent to food preparation, also for washing reusable utensils by hand when situations so warrant.

Detail Data

Reliability:		10 Year Resupply Volume:	**44.845 cu ft
Maintainability:		Peak Power:	1500 watts
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	60 lbs	Water (50°F):	
Resupply Weight:	** 13.3 lbs	Crew Operating Time:	
10 Year Resupply Weight:	**3458 lbs	Total Cost:	
Installed Volume:	15.333 cu ft.	Development Risk:	
Resupply Volume:	**.172 cu ft.		

ELEMENT CONCEPT DATA SHEET # 6.3.11.4 (Page 2 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Rationale: *Assume existence of reclaimable wash-water supply, independent of potable water. **Assume 12:1 ratio of water to expendable bactericide solution.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.11.8 (Page 1 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Applicable Mission Numbers: 043-048

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: The FH/RAD design for a zero-g sink employs an enclosed spherical chamber which has arm ports and a viewing port. The water flow is controlled from inside and is directed toward the drain. A blower, situated below the drain and below the air-water separator, induces streamlined air movement within the chamber causing all deflected water particles to again seek the drain. (Air drag guides and propels the fluid drops.) The air enters the chamber at the arm ports. This puts the greatest flow rate/unit area at the point which has the greatest chance of letting water escape to the environment. The spherical chamber enclosure is divided into two sections with an appropriate seal at the juncture. The lower section is fixed in position, and is of sufficient size to accommodate the largest of reusable dining utensils (trays or dishes) that will be used. The upper section, which includes the arm and viewing ports, is hinged to permit insertion and removal of utensils. Air-water separation is accomplished by a centrifugal separator. The centrifugal system uses a spinning cone to drive water to the outside of the separator structure where it is removed by a ram pitot effect. The air, however, passes right around the separator body and through the filter to be pulled through the intake of the blower.

The size of the sink is approximately 24.0 x 24.0 x 40.0 inches and weight without cleaning liquids is approximately 60 pounds. Operating power is approximately 1.5 Kw.

Functional Description: For washing of hands prior to, during, and subsequent to food preparation, also for washing reusable utensils by hand when situations so warrant.

Detail Data

Reliability:	10 Year Resupply Volume: ** 44.352 cu ft.
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 60 lbs	Water (50°F):
Resupply Weight: ** 85.5 lbs	Crew Operating Time:
10 Year Resupply Weight: **3420 lbs	Total Cost:
Installed Volume: 13.333 cu ft	Development Risk:
Resupply Volume: ** 1.109 cu ft	

ELEMENT CONCEPT DATA SHEET # €.3.11.8 (Page 2 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Rationale: *Assume existence of reclaimable wash-water supply, independent of potable water. **Assume 12:1 ratio of water to expendable bactericide solution.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.11.9 (Page 1 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Applicable Mission Numbers: 049-054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: The FH/RAD design for a zero-g sink employs an enclosed spherical chamber which has arm ports and a viewing port. The water flow is controlled from inside and is directed toward the drain. A blower, situated below the drain and below the air-water separator, induces streamlined air movement within the chamber causing all deflected water particles to again seek the drain. (Air drag guides and propels the fluid drops.) The air enters the chamber at the arm ports. This puts the greatest flow rate/unit area at the point which has the greatest chance of letting water escape to the environment. The spherical chamber enclosure is divided into two sections with an appropriate seal at the juncture. The lower section is fixed in position, and is of sufficient size to accommodate the largest of reusable dining utensils (trays or dishes) that will be used. The upper section, which includes the arm and viewing ports, is hinged to permit insertion and removal of utensils. Air-water separation is accomplished by a centrifugal separator. The centrifugal system uses a spinning cone to drive water to the outside of the separator structure where it is removed by a ram pitot effect. The air, however, passes right around the separator body and through the filter to be pulled through the intake of the blower.

The size of the sink is approximately 24.0 x 24.0 x 40.0 inches and weight without cleaning liquids is approximately 60 pounds. Operating power is approximately 1.5 Kw.

Functional Description: For washing of hands prior to, during, and subsequent to food preparation, also for washing reusable utensils by hand when situations so warrant.

Detail Data

Reliability:	10 Year Resupply Volume: ** 19.008 cu ft.
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 60 lbs	Water (50°F):
Resupply Weight: ** 73.8 lbs	Crew Operating Time:
10 Year Resupply Weight: **1476 lbs	Total Cost:
Installed Volume: 13.333 cu ft	Development Risk:
Resupply Volume: ** .950 cu ft	

ELEMENT CONCEPT DATA SHEET # 6.3.11.9 (Page 2 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Rationale: *Assume existence of reclaimable wash-water supply, independent of potable water. **Assume 12:1 ratio of water to expendable bactericide solution.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.3.11.10 (Page 1 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Applicable Mission Numbers: 055-060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: The FH/RAD design for a zero-g sink employs an enclosed spherical chamber which has arm ports and a viewing port. The water flow is controlled from inside and is directed toward the drain. A blower, situated below the drain and below the air-water separator, induces streamlined air movement within the chamber causing all deflected water particles to again seek the drain. (Air drag guides and propels the fluid drops.) The air enters the chamber at the arm ports. This puts the greatest flow rate/unit area at the point which has the greatest chance of letting water escape to the environment. The spherical chamber enclosure is divided into two sections with an appropriate seal at the juncture. The lower section is fixed in position, and is of sufficient size to accommodate the largest of reusable dining utensils (trays or dishes) that will be used. The upper section, which includes the arm and viewing ports, is hinged to permit insertion and removal of utensils. Air-water separation is accomplished by a centrifugal separator. The centrifugal system uses a spinning cone to drive water to the outside of the separator structure where it is removed by a ram pitot effect. The air, however, passes right around the separator body and through the filter to be pulled through the intake of the blower.

The size of the sink is approximately 24.0 x 24.0 x 40.0 inches and weight without cleaning liquids is approximately 60 pounds. Operating power is approximately 1.5 Kw.

Functional Description: For washing of hands prior to, during, and subsequent to food preparation, also for washing reusable utensils by hand when situations so warrant.

Detail Data

Reliability:	10 Year Resupply Volume: ** 25.344 cu ft
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F): *
Installed Weight: 60 lbs	Water (50°F):
Resupply Weight: ** 97.2 lbs	Crew Operating Time:
10 Year Resupply Weight: **1944 lbs	Total Cost:
Installed Volume: 13,333 cu ft.	Development Risk:
Resupply Volume: ** 1.267 cu ft.	

ELEMENT CONCEPT DATA SHEET # 6.3.11.10 (Page 2 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Rationale: *Assume existence of reclaimable wash-water supply, independent of potable water. **Assume 12:1 ratio of water to expendable bactericide solution.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.3.11.11 (Page 1 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Applicable Mission Numbers: 061-066

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: The FH/RAD design for a zero-g sink employs an enclosed spherical chamber which has arm ports and a viewing port. The water flow is controlled from inside and is directed toward the drain. A blower, situated below the drain and below the air-water separator, induces streamlined air movement within the chamber causing all deflected water particles to again seek the drain. (Air drag guides and propels the fluid drops.) The air enters the chamber at the arm ports. This puts the greatest flow rate/unit area at the point which has the greatest chance of letting water escape to the environment. The spherical chamber enclosure is divided into two sections with an appropriate seal at the juncture. The lower section is fixed in position, and is of sufficient size to accommodate the largest of reusable dining utensils (trays or dishes) that will be used. The upper section, which includes the arm and viewing ports, is hinged to permit insertion and removal of utensils. Air-water separation is accomplished by a centrifugal separator. The centrifugal system uses a spinning cone to drive water to the outside of the separator structure where it is removed by a ram pitot effect. The air, however, passes right around the separator body and through the filter to be pulled through the intake of the blower.

The size of the sink is approximately 24.0 x 24.0 x 40.0 inches and weight without cleaning liquids is approximately 60 pounds. Operating power is approximately 1.5 Kw.

Functional Description: For washing of hands prior to, during, and subsequent to food preparation, also for washing reusable utensils by hand when situations so warrant.

Detail Data

Reliability:		10 Year Resupply Volume:	**31.680 cu ft.
Maintainability:		Peak Power:	1500 watts
Safety:		Energy:	
Crew Acceptance:	6	Water (155°F):	
Installed Weight:	60 lbs	Water (50°F):	
Resupply Weight:	** 122.4 lbs	Crew Operating Time:	
10 Year Resupply Weight:	**2448 lbs	Total Cost:	
Installed Volume:	13.333 cu ft.	Development Risk:	
Resupply Volume:	**1.584 cu ft		

ELEMENT CONCEPT DATA SHEET # 6.3.11.11 (Page 2 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Rationale: *Assume existence of reclaimable wash-water supply, independent of potable water. **Assume 12:1 ratio of water to expendable bactericide solution.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.11.12 (Page 1 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Applicable Mission Numbers: 067-072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: The FH/RAD design for a zero-g sink employs an enclosed spherical chamber which has arm ports and a viewing port. The water flow is controlled from inside and is directed toward the drain. A blower, situated below the drain and below the air-water separator, induces streamlined air movement within the chamber causing all deflected water particles to again seek the drain. (Air drag guides and propels the fluid drops.) The air enters the chamber at the arm ports. This puts the greatest flow rate/unit area at the point which has the greatest chance of letting water escape to the environment. The spherical chamber enclosure is divided into two sections with an appropriate seal at the juncture. The lower section is fixed in position, and is of sufficient size to accommodate the largest of reusable dining utensils (trays or dishes) that will be used. The upper section, which includes the arm and viewing ports, is hinged to permit insertion and removal of utensils. Air-water separation is accomplished by a centrifugal separator. The centrifugal system uses a spinning cone to drive water to the outside of the separator structure where it is removed by a ram pitot effect. The air, however, passes right around the separator body and through the filter to be pulled through the intake of the blower.

The size of the sink is approximately 24.0 x 24.0 x 40.0 inches and weight without cleaning liquids is approximately 60 pounds. Operating power is approximately 1.5 Kw.

Functional Description: For washing of hands prior to, during, and subsequent to food preparation, also for washing reusable utensils by hand when situations so warrant.

Detail Data

Reliability:	10 Year Resupply Volume: ** 44.352 cu ft
Maintainability:	Peak Power: 1500 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F): *
Installed Weight: 60 lbs	Water (50°F): *
Resupply Weight: ** 171.0 lbs	Crew Operating Time:
10 Year Resupply Weight: **3420 lbs	Total Cost:
Installed Volume: 13.333 cu ft	Development Risk:
Resupply Volume: ** 2.218 cu ft	

ELEMENT CONCEPT DATA SHEET # 6.3.11.12 (Page 2 of 2)

Title: Combination Galley Sink For Hand and Utensil Washing

Rationale: *Assume existence of reclaimable wash-water supply, independent of potable water. **Assume 12:1 ratio of water to expendable bactericide solution.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.13.4 (Page 1 of 2)

Title: Combination Automatic Dishwasher/Dryer

Applicable Mission Numbers

019 - 024

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: The dishwasher/dryer is a cubical unit, one end of which contains an ultrasonic transducer and the cavity in which the items to be cleaned are placed, and the other end contains a water pump, motor, liquid-gas separator and filter unit.

The operational cycle consists of automatic washing (including ultrasonic vibration) and drying sequence suitable for zero-g and partial-g environments. The solvent system will be automatically metered and will not impose a toxic hazard. A positive method of solvent injection and recovery is included, along with a trap to collect particulate matter. Controls and operating equipment will be conveniently located. Surface coatings, particularly in the washing area are non-porous and easily cleaned. Holding racks for plates and utensils are capable of easy removal and replacement for cleaning purposes.

Soiled utensils are loaded into washing cavity, a surfactant is added, and operating power is applied for starting the cycle with operating controls adjusted to match loading. The cavity fills with water, the transducer is energized, and the washing cycle is started. The water heater will raise and hold water temperature at 170°F which also sterilizes the utensils. During the cleaning cycle, the water is circulated through the filter unit to remove extracted waste. Upon completing the 10-minute cleaning cycle (during this period the water is at 170°F for at least 5 minutes to effect sterilization), the wash water is pumped through the liquid-gas separator into the station wash water recovery system. The water spray rinse cycle is automatically actuated flushing the utensils. The flush water then follows the waste water removal cycle. The hot air drying system is automatically actuated for approximately 5 minutes which completes the washing cycle.

The unit is approximately 36.0 x 24.0 x 66.0 inches in size, weighing approximately 330 pounds. Operating power is an estimated 36000 watts.

Functional Description: For cleaning meal trays, dining utensils, and other small food preparation devices by automatic process of washing, drying, and sterilization.

ELEMENT CONCEPT DATA SHEET # 6.3.13.4 (Page 2 of 2)

Combination Automatic Dishwasher/Dryer

Detail Data

Reliability:		10 Year Resupply Volume:	498.826 cu.ft.
Maintainability:		Peak Power:	36000 watts
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	330.0 lbs.	Water (50°F):	
Resupply Weight:	119.72 lbs.	Crew Operating Time:	
10 Year Resupply Weight:	31126.00 lbs.	Total Cost:	
Installed Volume:	33.0 cu.ft.	Development Risk:	
Resupply Volume:	1.919 cu.ft.		

Rationale: 1 unit, used after each meal-sitting period (six times per day).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.13.8 (Page 1 of 2)

Title: Combination Automatic Dishwasher/Dryer

Applicable Mission Numbers

043 - 048

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: The dishwasher/dryer is a cubical unit, one end of which contains an ultrasonic transducer and the cavity in which the items to be cleaned are placed, and the other end contains a water pump, motor, liquid-gas separator and filter unit.

The operational cycle consists of automatic washing (including ultrasonic vibration) and drying sequence suitable for zero-g and partial-g environments. The solvent system will be automatically metered and will not impose a toxic hazard. A positive method of solvent injection and recovery is included, along with a trap to collect particulate matter. Controls and operating equipment will be conveniently located. Surface coatings, particularly in the washing area are non-porous and easily cleaned. Holding racks for plates and utensils are capable of easy removal and replacement for cleaning purposes.

Soiled utensils are loaded into washing cavity, a surfactant is added, and operating power is applied for starting the cycle with operating controls adjusted to match loading. The cavity fills with water, the transducer is energized, and the washing cycle is started. The water heater will raise and hold water temperature at 170°F which also sterilizes the utensils. During the cleaning cycle, the water is circulated through the filter unit to remove extracted waste. Upon completing the 10-minute cleaning cycle (during this period the water is at 170°F for at least 5 minutes to effect sterilization), the wash water is pumped through the liquid-gas separator into the station wash water recovery system. The water spray rinse cycle is automatically actuated flushing the utensils. The flush water then follows the waste water removal cycle. The hot air drying system is automatically actuated for approximately 5 minutes which completes the washing cycle.

The unit is approximately 36.0 x 24.0 x 66.0 inches in size, weighing approximately 330 pounds. Operating power is an estimated 36000 watts.

Functional Description: For cleaning meal trays, dining utensils, and other small food preparation devices by automatic process of washing, drying, and sterilization.

ELEMENT CONCEPT DATA SHEET # 6.3.13.8 (Page 2 of 2)

Combination Automatic Dishwasher/Dryer

Detail Data

Reliability:		10 Year Resupply Volume:	493.344 cu.ft.
Maintainability:		Peak Power:	36000 watts
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	330.0 lbs.	Water (50°F):	
Resupply Weight:	769.60 lbs.	Crew Operating Time:	
10 Year Resupply Weight:	30783.96 lbs.	Total Cost:	
Installed Volume:	33.0 cu.ft.	Development Risk:	
Resupply Volume:	12.334 cu.ft.		

Rationale: 1 unit, used after each meal-sitting period (six times per day).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.13.9 (Page 1 of 2)

Title: Combination Automatic Dishwasher/Dryer

Applicable Mission Numbers

049 - 054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: The dishwasher/dryer is a cubical unit, one end of which contains an ultrasonic transducer and the cavity in which the items to be cleaned are placed, and the other end contains a water pump, motor, liquid-gas separator and filter unit.

The operational cycle consists of automatic washing (including ultrasonic vibration) and drying sequence suitable for zero-g and partial-g environments. The solvent system will be automatically metered and will not impose a toxic hazard. A positive method of solvent injection and recovery is included, along with a trap to collect particulate matter. Controls and operating equipment will be conveniently located. Surface coatings, particularly in the washing area are non-porous and easily cleaned. Holding racks for plates and utensils are capable of easy removal and replacement for cleaning purposes.

Soiled utensils are loaded into washing cavity, a surfactant is added, and operating power is applied for starting the cycle with operating controls adjusted to match loading. The cavity fills with water, the transducer is energized, and the washing cycle is started. The water heater will raise and hold water temperature at 170°F which also sterilizes the utensils. During the cleaning cycle, the water is circulated through the filter unit to remove extracted waste. Upon completing the 10-minute cleaning cycle (during this period the water is at 170°F for at least 5 minutes to effect sterilization), the wash water is pumped through the liquid-gas separator into the station wash water recovery system. The water spray rinse cycle is automatically actuated flushing the utensils. The flush water then follows the waste water removal cycle. The hot air drying system is automatically actuated for approximately 5 minutes which completes the washing cycle.

The unit is approximately 36.0 x 24.0 x 24.0 inches in size, weighing approximately 120 pounds. Operating power is an estimated 12000 watts.

Functional Description: For cleaning meal trays, dining utensils, and other small food preparation devices by automatic process of washing, drying, and sterilization.

ELEMENT CONCEPT DATA SHEET # 6.3.13.9 (Page 2 of 2)

Combination Automatic Dishwasher/Dryer

Detail Data

Reliability:		10 Year Resupply Volume:	80.460 cu.ft.
Maintainability:		Peak Power:	12000 watts
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	120.0 lbs.	Water (50°F):	
Resupply Weight:	251.06 lbs.	Crew Operating Time:	
10 Year Resupply Weight:	5021.28 lbs.	Total Cost:	
Installed Volume:	12.0 cu.ft.	Development Risk:	
Resupply Volume:	4.023 cu.ft.		

Rationale: 1 unit, used after each meal period (three times per day).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.13.10 (Page 1 of 2)

Title: Combination Automatic Dishwasher/Dryer

Applicable Mission Numbers

055 - 060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: The dishwasher/dryer is a cubical unit, one end of which contains an ultrasonic transducer and the cavity in which the items to be cleaned are placed, and the other end contains a water pump, motor, liquid-gas separator and filter unit.

The operational cycle consists of automatic washing (including ultrasonic vibration) and drying sequence suitable for zero-g and partial-g environments. The solvent system will be automatically metered and will not impose a toxic hazard. A positive method of solvent injection and recovery is included, along with a trap to collect particulate matter. Controls and operating equipment will be conveniently located. Surface coatings, particularly in the washing area are non-porous and easily cleaned. Holding racks for plates and utensils are capable of easy removal and replacement for cleaning purposes.

Soiled utensils are loaded into washing cavity, a surfactant is added, and operating power is applied for starting the cycle with operating controls adjusted to match loading. The cavity fills with water, the transducer is energized, and the washing cycle is started. The water heater will raise and hold water temperature at 170°F which also sterilizes the utensils. During the cleaning cycle, the water is circulated through the filter unit to remove extracted waste. Upon completing the 10-minute cleaning cycle (during this period the water is at 170°F for at least 5 minutes to effect sterilization), the wash water is pumped through the liquid-gas separator into the station wash water recovery system. The water spray rinse cycle is automatically actuated flushing the utensils. The flush water then follows the waste water removal cycle. The hot air drying system is automatically actuated for approximately 5 minutes which completes the washing cycle.

The unit is approximately 36.0 x 24.0 x 36.0 inches in size, weighing approximately 180 pounds. Operating power is an estimated 19500 watts.

Functional Description: For cleaning meal trays, dining utensils, and other small foor preparation devices by automatic process of washing, drying, and sterilization.

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ELEMENT CONCEPT DATA SHEET # 6.3.13.10 (Page 2 of 2)

Combination Automatic Dishwasher/Dryer

Detail Data

Reliability:		10 Year Resupply Volume:	132.372 cu.ft.
Maintainability:		Peak Power:	19500 watts
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	180.0 lbs.	Water (50°F):	
Resupply Weight:	416.56 lbs.	Crew Operating Time:	
10 Year Resupply Weight:	8331.12 lbs.	Total Cost:	
Installed Volume:	18.0 cu.ft.	Development Risk:	
Resupply Volume:	6.619 cu.ft.		

Rationale: 1 unit, used after each meal period (three times per day).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.13.11 (Page 1 of 2)

Title: Combination Automatic Dishwasher/Dryer

Applicable Mission Numbers

061 - 066

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: The dishwasher/dryer is a cubical unit, one end of which contains an ultrasonic transducer and the cavity in which the items to be cleaned are placed, and the other end contains a water pump, motor, liquid-gas separator and filter unit.

The operational cycle consists of automatic washing (including ultrasonic vibration) and drying sequence suitable for zero-g and partial-g environments. The solvent system will be automatically metered and will not impose a toxic hazard. A positive method of solvent injection and recovery is included, along with a trap to collect particulate matter. Controls and operating equipment will be conveniently located. Surface coatings, particularly in the washing area are non-porous and easily cleaned. Holding racks for plates and utensils are capable of easy removal and replacement for cleaning purposes.

Soiled utensils are loaded into washing cavity, a surfactant is added, and operating power is applied for starting the cycle with operating controls adjusted to match loading. The cavity fills with water, the transducer is energized, and the washing cycle is started. The water heater will raise and hold water temperature at 170°F which also sterilizes the utensils. During the cleaning cycle, the water is circulated through the filter unit to remove extracted waste. Upon completing the 10-minute cleaning cycle (during this period the water is at 170°F for at least 5 minutes to effect sterilization), the wash water is pumped through the liquid-gas separator into the station wash water recovery system. The water spray rinse cycle is automatically actuated flushing the utensils. The flush water then follows the waste water removal cycle. The hot air drying system is automatically actuated for approximately 5 minutes which completes the washing cycle.

The unit is approximately 36.0 x 24.0 x 66.0 inches in size, weighing approximately 330 pounds. Operating power is an estimated 36000 watts.

Functional Description: For cleaning meal trays, dining utensils, and other small food preparation devices by automatic process of washing, drying, and sterilization.

ELEMENT CONCEPT DATA SHEET # 6.3.13.11 (Page 2 of 2)

Combination Automatic Dishwasher/Dryer

Detail Data

Reliability:		10 Year Resupply Volume:	246.672 cu.ft.
Maintainability:		Peak Power:	36,000 watts
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	330.0 lbs.	Water (50°F):	
Resupply Weight:	769.608 lbs.	Crew Operating Time:	
10 Year Resupply Weight:	15032.16 lbs.	Total Cost:	
Installed Volume:	33.0 cu.ft.	Development Risk:	
Resupply Volume:	12.334 cu.ft.		

Rationale: 1 unit, used after each meal period (three times per day).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.13.12 (Page 1 of 2)

Title: Combination Automatic Dishwasher/Dryer

Applicable Mission Numbers

067 - 072

Function Reference: Provide For Clean-Up

Drawing Reference: _____

Physical Description: The dishwasher/dryer is a cubical unit, one end of which contains an ultrasonic transducer and the cavity in which the items to be cleaned are placed, and the other end contains a water pump, motor, liquid-gas separator and filter unit.

The operational cycle consists of automatic washing (including ultrasonic vibration) and drying sequence suitable for zero-g and partial-g environments. The solvent system will be automatically metered and will not impose a toxic hazard. A positive method of solvent injection and recovery is included, along with a trap to collect particulate matter. Controls and operating equipment will be conveniently located. Surface coatings, particularly in the washing area are non-porous and easily cleaned. Holding racks for plates and utensils are capable of easy removal and replacement for cleaning purposes.

Soiled utensils are loaded into washing cavity, a surfactant is added, and operating power is applied for starting the cycle with operating controls adjusted to match loading. The cavity fills with water, the transducer is energized, and the washing cycle is started. The water heater will raise and hold water temperature at 170°F which also sterilizes the utensils. During the cleaning cycle, the water is circulated through the filter unit to remove extracted waste. Upon completing the 10-minute cleaning cycle (during this period the water is at 170°F for at least 5 minutes to effect sterilization), the wash water is pumped through the liquid-gas separator into the station wash water recovery system. The water spray rinse cycle is automatically actuated flushing the utensils. The flush water then follows the waste water removal cycle. The hot air drying system is automatically actuated for approximately 5 minutes which completes the washing cycle.

The unit is approximately 36.0 x 24.0 x 66.0 inches in size, weighing approximately 330 pounds. Operating power is an estimated 36000 watts.

Functional Description: For cleaning meal trays, dining utensils, and other small food preparation devices by automatic process of washing, drying, and sterilization.

ELEMENT CONCEPT DATA SHEET # 6.3.13.12 (Page 2 of 2)

Combination Automatic Dishwasher/Dryer

Detail Data

Reliability:		10 Year Resupply Volume:	493.344 cu.ft.
Maintainability:		Peak Power:	36000 watts
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	330.0 lbs.	Water (50°F):	
Resupply Weight:	1539.20 lbs.	Crew Operating Time:	
10 Year Resupply Weight:	30783.96 lbs.	Total Cost:	
Installed Volume:	33.0 cu.ft.	Development Risk:	
Resupply Volume:	24.667 cu.ft.		

Rationale: 1 unit, used after each meal-sitting period (six times per day).

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.14.4 (Page 1 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Applicable Mission Numbers: 019 - 024

Function Reference: Provide For Clean-Up

Drawing Reference: _____

Physical Description: Box-type enclosure of aluminum construction, having provisions for internal retention of disposable absorbant paper wipes in continuous roll form. The enclosure is provided with a hinged door, of transparent plastic material to permit visual determination of contents supply status, in addition to access for loading. Suitable latches are provided at each end of the door for retention in its closed position. A slit-form separation between adjoining edges of the enclosure and door permits passage of the dispensed paper wipe material. The enclosure will include an internal mechanism of suitable design to automatically advance the roll of paper a discrete amount to permit grasping the edge after the preceding sheet has been pulled and separated at its perforated section.

The dispenser unit is approximately 5.0 x 5.0 x 12.0 inches, weighing approximately 3.0 pounds.

A single roll of paper wipes to fit into the unit will be 4.5 inches in diameter x 11.0 inches long, containing 77 wipes, separable at perforations spaced 11.0 inches apart (separate wipes of 11.0 x 11.0 inches), and wrapped on a cylindrical spool of 1.5 inches in diameter. The weight of a single roll of paper wipes is approximately .70 pounds.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions.

Detail Data

Reliability:		10 Year Resupply Volume:	*733.023 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	** 12.0 lbs	Water (50°F):	
Resupply Weight:	* 19.6 lbs	Crew Operating Time:	
10 Year Resupply Weight:	*5096 lbs	Total Cost:	
Installed Volume:	** 1.620 cu ft	Development Risk:	
Resupply Volume:	* 2.819 cu ft		

ELEMENT CONCEPT DATA SHEET # 6.3.14.4 (Page 2 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Rationale: Assume wipe usage: 1 sheet per hand wash (for drying hands - see Concept 6.3.11), 1 sheet per 3 returned meal trays for wiping food residue from rubber scraper, 1 sheet per 3 man-meals during preparation, plus extra 20% of total for contingency factor; grand total of 153 sheets per day. Total resupply requirements converted to equivalent single rolls which have slight effect on increasing or decreasing the contingency quantity. — * 28 rolls (7280 rolls for 10 years). - ** 4 dispensers.

Merits/Deficiencies: _____

_____

Data Sources: _____

_____

ELEMENT CONCEPT DATA SHEET # 6.3.14.8 (Page 1 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Applicable Mission Numbers

043 - 048

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum construction, having provisions for internal retention of disposable absorbant paper wipes in continuous roll form. The enclosure is provided with a hinged door, of transparent plastic material to permit visual determination of contents supply status, in addition to access for loading. Suitable latches are provided at each end of the door for retention in its closed position. A slit-form separation between adjoining edges of the enclosure and door permits passage of the dispensed paper wipe material. The enclosure will include an internal mechanism of suitable design to automatically advance the roll of paper a discrete amount to permit grasping the edge after the preceding sheet has been pulled and separated at its perforated section.

The dispenser unit is approximately 5.0 x 5.0 x 12.0 inches, weighing approximately 3.0 pounds.

A single roll of paper wipes to fit into the unit will be 4.5 inches in diameter x 11.0 inches long, containing 77 wipes, separable at perforations spaced 11.0 inches apart (separate wipes of 11.0 x 11.0 inches), and wrapped on a cylindrical spool of 1.5 inches in diameter. The weight of a single roll of paper wipes is approximately .70 pounds.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions.

Detail Data

Reliability:		10 Year Resupply Volume:	*720.940 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	** 12.0 lbs	Water (50°F):	
Resupply Weight:	* 125.3 lbs	Crew Operating Time:	
10 Year Resupply Weight:	*5012 lbs	Total Cost:	
Installed Volume:	** 1,620 cu ft	Development Risk:	
Resupply Volume:	* 18,024 cu ft		

ELEMENT CONCEPT DATA SHEET # 6.3.14.8 (Page 2 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Rationale: Assume wipe usage: 1 sheet per hand wash (for drying hands - see Concept 6.3.11), 1 sheet per 3 returned meal trays for wiping food residue from rubber scraper, 1 sheet per 3 man-meals during preparation, plus extra 20% of total for contingency factor; grand total of 153 sheets per day. Total resupply requirements converted to equivalent single rolls which have slight effect on increasing or decreasing the contingency quantity. — *179 rolls (7160 rolls for 10 years). - ** 4 dispensers.

Merits/Deficiencies: _____

_____

Data Sources: _____

_____

ELEMENT CONCEPT DATA SHEET # 6.3.14.9 (Page 1 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Applicable Mission Numbers

049 - 054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum construction, having provisions for internal retention of disposable absorbant paper wipes in continuous roll form. The enclosure is provided with a hinged door, of transparent plastic material to permit visual determination of contents supply status, in addition to access for loading. Suitable latches are provided at each end of the door for retention in its closed position. A slit-form separation between adjoining edges of the enclosure and door permits passage of the dispensed paper wipe material. The enclosure will include an internal mechanism of suitable design to automatically advance the roll of paper a discrete amount to permit grasping the edge after the preceding sheet has been pulled and separated at its perforated section.

The dispenser unit is approximately 5.0 x 5.0 x 12.0 inches, weighing approximately 3.0 pounds.

A single roll of paper wipes to fit into the unit will be 4.5 inches in diameter x 11.0 inches long, containing 77 wipes, separable at perforations spaced 11.0 inches apart (separate wipes of 11.0 x 11.0 inches), and wrapped on a cylindrical spool of 1.5 inches in diameter. The weight of a single roll of paper wipes is approximately .70 pounds.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions.

Detail Data

Reliability:		10 Year Resupply Volume:	* 136.938 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	** 3.0 lbs	Water (50°F):	
Resupply Weight:	* 47.6 lbs	Crew Operating Time:	
10 Year Resupply Weight:	*952 lbs	Total Cost:	
Installed Volume:	** .405 cu ft	Development Risk:	
Resupply Volume:	* 6.847 cu ft		

ELEMENT CONCEPT DATA SHEET # 6.3.14.9 (Page 2 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Rationale: Assume wipe usage: 1 sheet per hand wash (for drying hands - see Concept 6.3.11), 1 sheet per 3 returned meal trays for wiping food residue from rubber scraper, 1 sheet per 3 man-meals during preparation, plus extra 20% of total for contingency factor; grand total of 29 sheets per day. Total resupply requirements converted to equivalent single rolls which have slight effect on increasing or decreasing the contingency quantity. — * 68 rolls (1360 for 10 years). - ** 1 dispenser.

Merits/Deficiencies: _____

_____

Data Sources: _____

_____

ELEMENT CONCEPT DATA SHEET # 6.3.14.10 (Page 1 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Applicable Mission Numbers

055 - 060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum construction, having provisions for internal retention of disposable absorbant paper wipes in continuous roll form. The enclosure is provided with a hinged door, of transparent plastic material to permit visual determination of contents supply status, in addition to access for loading. Suitable latches are provided at each end of the door for retention in its closed position. A slit-form separation between adjoining edges of the enclosure and door permits passage of the dispensed paper wipe material. The enclosure will include an internal mechanism of suitable design to automatically advance the roll of paper a discrete amount to permit grasping the edge after the preceding sheet has been pulled and separated at its perforated section.

The dispenser unit is approximately 5.0 x 5.0 x 12.0 inches, weighing approximately 3.0 pounds.

A single roll of paper wipes to fit into the unit will be 4.5 inches in diameter x 11.0 inches long, containing 77 wipes, separable at perforations spaced 11.0 inches apart (separate wipes of 11.0 x 11.0 inches), and wrapped on a cylindrical spool of 1.5 inches in diameter. The weight of a single roll of paper wipes is approximately .70 pounds.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions.

Detail Data

Reliability:		10 Year Resupply Volume:	* 225.546 cu ft
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	** 6.0 lbs	Water (50°F):	
Resupply Weight:	* 78.4 lbs	Crew Operating Time:	
10 Year Resupply Weight:	*1568 lbs	Total Cost:	
Installed Volume:	** .810 cu ft	Development Risk:	
Resupply Volume:	* 11.277 cu ft		

ELEMENT CONCEPT DATA SHEET # 6.3.14.10 (Page 2 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Rationale: Assume wipe usage: 1 sheet per hand wash (for drying hands - see Concept 6.3.11), 1 sheet per 3 returned meal trays for wiping food residue from rubber scraper, 1 sheet per 3 man-meals during preparation, plus extra 20% of total for contingency factor; grand total of 48 sheets per day. Total resupply requirements converted to equivalent single rolls which have slight effect on increasing or decreasing the contingency quantity. — * 112 rolls (2240 rolls for 10 years). - ** 2 dispensers.

Merits/Deficiencies: _____

_____

Data Sources: _____

_____

ELEMENT CONCEPT DATA SHEET # 6.3.14.11 (Page 1 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Applicable Mission Numbers

061 - 066

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum construction, having provisions for internal retention of disposable absorbant paper wipes in continuous roll form. The enclosure is provided with a hinged door, of transparent plastic material to permit visual determination of contents supply status, in addition to access for loading. Suitable latches are provided at each end of the door for retention in its closed position. A slit-form separation between adjoining edges of the enclosure and door permits passage of the dispensed paper wipe material. The enclosure will include an internal mechanism of suitable design to automatically advance the roll of paper a discrete amount to permit grasping the edge after the preceding sheet has been pulled and separated at its perforated section.

The dispenser unit is approximately 5.0 x 5.0 x 12.0 inches, weighing approximately 3.0 pounds.

A single roll of paper wipes to fit into the unit will be 4.5 inches in diameter x 11.0 inches long, containing 77 wipes, separable at perforations spaced 11.0 inches apart (separate wipes of 11.0 x 11.0 inches), and wrapped on a cylindrical spool of 1.5 inches in diameter. The weight of a single roll of paper wipes is approximately .70 pounds.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions.

Detail Data

Reliability:	10 Year Resupply Volume: * 394.705 cu ft.
Maintainability:	Peak Power: 0
Safety:	Energy:
Crew Acceptance: 8	Water (155°F):
Installed Weight: ** 12.0 lbs	Water (50°F):
Resupply Weight: * 137.2 lbs	Crew Operating Time:
10 Year Resupply Weight: *2744 lbs	Total Cost:
Installed Volume: ** 1.620 cu ft	Development Risk:
Resupply Volume: * 19.735 cu ft	

ELEMENT CONCEPT DATA SHEET # 6.3.14.11 (Page 2 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Rationale: Assume wipe usage: 1 sheet per hand wash (for drying hands - see Concept 6.3.11), 1 sheet per 3 returned meal trays for wiping food residue from rubber scraper, 1 sheet per 3 man-meals during preparation, plus extra 20% of total for contingency factor; grand total of 84 sheets per day. Total resupply requirements converted to equivalent single rolls which have slight effect on increasing or decreasing the contingency quantity. — * 196 rolls (3920 for 10 years). - ** 4 dispensers.

Merits/Deficiencies: _____

_____

Data Sources: _____

_____

ELEMENT CONCEPT DATA SHEET # 6.3.14.12 (Page 1 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Applicable Mission Numbers

067 - 072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum construction, having provisions for internal retention of disposable absorbant paper wipes in continuous roll form. The enclosure is provided with a hinged door, of transparent plastic material to permit visual determination of contents supply status, in addition to access for loading. Suitable latches are provided at each end of the door for retention in its closed position. A slit-form separation between adjoining edges of the enclosure and door permits passage of the dispensed paper wipe material. The enclosure will include an internal mechanism of suitable design to automatically advance the roll of paper a discrete amount to permit grasping the edge after the preceding sheet has been pulled and separated at its perforated section.

The dispenser unit is approximately 5.0 x 5.0 x 12.0 inches, weighing approximately 3.0 pounds.

A single roll of paper wipes to fit into the unit will be 4.5 inches in diameter x 11.0 inches long, containing 77 wipes, separable at perforations spaced 11.0 inches apart (separate wipes of 11.0 x 11.0 inches), and wrapped on a cylindrical spool of 1.5 inches in diameter. The weight of a single roll of paper wipes is approximately .70 pounds.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions.

Detail Data

Reliability:		10 Year Resupply Volume:	* 720.940 cu ft.
Maintainability:		Peak Power:	0
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	** 12.0 lbs	Water (50°F):	
Resupply Weight:	* 250.6 lbs	Crew Operating Time:	
10 Year Resupply Weight:	*5012 lbs	Total Cost:	
Installed Volume:	** 1.620 cu ft	Development Risk:	
Resupply Volume:	* 36.047 cu ft		

ELEMENT CONCEPT DATA SHEET # 6.3.14.12 (Page 2 of 2)

Title: Dispenser for Disposable Galley Utility Wipes

Rationale: Assume wipe usage: 1 sheet per hand wash (for drying hands - see Concept 6.3.11), 1 sheet per 3 returned meal trays for wiping food residue from rubber scraper, 1 sheet per 3 man-meals during preparation, plus extra 20% of total for contingency factor; grand total of 153 sheets per day. Total resupply requirements converted to equivalent single rolls which have slight effect on increasing or decreasing the contingency quantity. — * 358 rolls (7160 rolls for 10 years). - ** 4 dispensers.

Merits/Deficiencies: _____

_____

Data Sources: _____

_____

ELEMENT CONCEPT DATA SHEET # 6.3.15.4

Title: Dispenser for Reusable Galley Utility Wipes

Applicable Mission Numbers: 019 - 024

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum construction having provisions for internal retention of reusable cloth wipes in flat form. The enclosure is provided with a roll-type (disappearing) cover permitting access for loading and removal of contents. The door is equipped with a latching device for maintaining its closed position. The interior of the enclosure has rods at the corners for holding the wipes in position. The unit is approximately 13.0 x 13.0 x 5.0 inches, weighing approximately 5.0 pounds.

The reusable wipes are of cotton cloth material, measuring 12.0 x 12.0 inches, with embroidery reinforced holes at each corner. The hole size and locations match the rods in the enclosure (dispenser) unit. Each wipe weighs approximately .075 pounds and is 6.0 x 6.0 x .08 inches in flat storage form.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions in galley.

Detail Data

Reliability:		10 Year Resupply Volume:	10.392 cu ft
Maintainability:		Peak Power:	7500 watts
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	*77.38 lbs	Water (50°F):	
Resupply Weight:	1.793 lbs (avg)	Crew Operating Time:	
10 Year Resupply Weight:	466.17 lbs	Total Cost:	
Installed Volume:	* 3.235 cu ft	Development Risk:	
Resupply Volume:	.040 cu ft (avg)		

Rationale: Assume 153 wipes per day usage with laundering at 5 day intervals and replacement after 90 washings or 448 days due to deterioration. -*4 dispensers and initial supply of 765 wipes included in installed weight and volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.15.8

Title: Dispenser for Reusable Galley Utility Wipes

Applicable Mission Numbers: 043 - 048

Function Reference: Provide For Clean-Up

Drawing Reference: _____

Physical Description: Box-type enclosure of aluminum construction having provisions for internal retention of reusable cloth wipes in flat form. The enclosure is provided with a roll-type (disappearing) cover permitting access for loading and removal of contents. The door is equipped with a latching device for maintaining its closed position. The interior of the enclosure has rods at the corners for holding the wipes in position. The unit is approximately 13.0 x 13.0 x 5.0 inches, weighing approximately 5.0 pounds.

The reusable wipes are of cotton cloth material, measuring 12.0 x 12.0 inches, with embroidery reinforced holes at each corner. The hole size and locations match the rods in the enclosure (dispenser) unit. Each wipe weighs approximately .075 pounds and is 6.0 x 6.0 x .08 inches in flat storage form.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions in galley.

Detail Data

Reliability:		10 Year Resupply Volume:	10.233 cuft.
Maintainability:		Peak Power:	7500-watts
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight.	* 77.38 lbs.	Water (50°F):	
Resupply Weight:	11.475 lbs (avg)	Crew Operating Time:	
10 Year Resupply Weight:	459.00 lbs.	Total Cost:	
Installed Volume:	* 3.235 cu ft	Development Risk:	
Resupply Volume:	.256 cu ft (avg.)		

Rationale: Assume 153 wipes per day usage with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. -*4 dispensers and initial supply of 765 wipes included in installed weight and volume.

Merits/Deficiencies: _____

Data Sources: _____

ELEMENT CONCEPT DATA SHEET # 6.3.15.9

Title: Dispenser for Reusable Galley Utility Wipes

Applicable Mission Numbers: 049 - 054

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum construction having provisions for internal retention of reusable cloth wipes in flat form. The enclosure is provided with a roll-type (disappearing) cover permitting access for loading and removal of contents. The door is equipped with a latching device for maintaining its closed position. The interior of the enclosure has rods at the corners for holding the wipes in position. The unit is approximately 13.0 x 13.0 x 5.0 inches, weighing approximately 5.0 pounds.

The reusable wipes are of cotton cloth material, measuring 12.0 x 12.0 inches, with embroidery reinforced holes at each corner. The hole size and locations match the rods in the enclosure (dispenser) unit. Each wipe weighs approximately .075 pounds and is 6.0 x 6.0 x .08 inches in flat storage form.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions in galley.

Detail Data

Reliability:		10 Year Resupply Volume:	1.939 cu ft
Maintainability:		Peak Power:	7500 watts
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight.	* 15.88 lbs.	Water (50°F):	
Resupply Weight:	4.35 lbs (avg)	Crew Operating Time:	
10 Year Resupply Weight:	87.00 lbs	Total Cost:	
Installed Volume:	* .739 cu ft	Development Risk:	
Resupply Volume:	.097 cu ft (avg.)		

Rationale: Assume 29 wipes per day usage with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. - * 1 dispenser and initial supply of 145 wipes included in installed weight and volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.15.10

Title: Dispenser for Reusable Galley Utility Wipes

Applicable Mission Numbers

055 - 060

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum construction having provisions for internal retention of reusable cloth wipes in flat form. The enclosure is provided with a roll-type (disappearing) cover permitting access for loading and removal of contents. The door is equipped with a latching device for maintaining its closed position. The interior of the enclosure has rods at the corners for holding the wipes in position. The unit is approximately 13.0 x 13.0 x 5.0 inches, weighing approximately 5.0 pounds.

The reusable wipes are of cotton cloth material, measuring 12.0 x 12.0 inches, with embroidery reinforced holes at each corner. The hole size and locations match the rods in the enclosure (dispenser) unit. Each wipe weighs approximately .075 pounds and is 6.0 x 6.0 x .08 inches in flat storage form.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions in galley.

Detail Data

Reliability:		10 Year Resupply Volume:	3.210 cu ft.
Maintainability:		Peak Power:	7500 watts
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	*28.00 lbs	Water (50°F):	
Resupply Weight:	7.20 lbs (avg)	Crew Operating Time:	
10 Year Resupply Weight:	144.00 lbs	Total Cost:	
Installed Volume	*1.379 cu ft.	Development Risk:	
Resupply Volume:	.160 cu ft (avg)		

Rationale: Assume 48 wipes per day usage with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. -*2 dispensers and initial supply of 240 wipes included in installed weight and volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.15.11

Title: Dispenser for Reusable Galley Utility Wipes

Applicable Mission Numbers

061 - 066

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum construction having provisions for internal retention of reusable cloth wipes in flat form. The enclosure is provided with a roll-type (disappearing) cover permitting access for loading and removal of contents. The door is equipped with a latching device for maintaining its closed position. The interior of the enclosure has rods at the corners for holding the wipes in position. The unit is approximately 13.0 x 13.0 x 5.0 inches, weighing approximately 5.0 pounds.

The reusable wipes are of cotton cloth material, measuring 12.0 x 12.0 inches, with embroidery reinforced holes at each corner. The hole size and locations match the rods in the enclosure (dispenser) unit. Each wipe weighs approximately .075 pounds and is 6.0 x 6.0 x .08 inches in flat storage form.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions in galley.

Detail Data

Reliability:		10 Year Resupply Volume:	5.618 cu ft.
Maintainability:		Peak Power:	7500 watts
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	* 51.50 lbs	Water (50°F):	
Resupply Weight:	12.60 lbs(avg)	Crew Operating Time:	
10 Year Resupply Weight:	252.00 lbs	Total Cost:	
Installed Volume:	*2.658 cu ft.	Development Risk:	
Resupply Volume:	.281 cu ft (avg)		

Rationale: Assume 84 wipes per day usage with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. - *4 dispensers and initial supply of 420 wipes included in installed weight and volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.15.12

Title: Dispenser for Reusable Galley Utility Wipes

Applicable Mission Numbers: 067 - 072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Box-type enclosure of aluminum construction having provisions for internal retention of reusable cloth wipes in flat form. The enclosure is provided with a roll-type (disappearing) cover permitting access for loading and removal of contents. The door is equipped with a latching device for maintaining its closed position. The interior of the enclosure has rods at the corners for holding the wipes in position. The unit is approximately 13.0 x 13.0 x 5.0 inches, weighing approximately 5.0 pounds.

The reusable wipes are of cotton cloth material, measuring 12.0 x 12.0 inches, with embroidery reinforced holes at each corner. The hole size and locations match the rods in the enclosure (dispenser) unit. Each wipe weighs approximately .075 pounds and is 6.0 x 6.0 x .08 inches in flat storage form.

Functional Description: For general use in drying of hands when wet, wiping spillages, wiping food residues from preparation and dining utensils prior to washing, and other miscellaneous clean-up functions in galley.

Detail Data

Reliability:		10 Year Resupply Volume:	10.233 cu ft.
Maintainability:		Peak Power:	7500 watts
Safety:		Energy:	
Crew Acceptance:	8	Water (155°F):	
Installed Weight:	*77.38 lbs	Water (50°F):	
Resupply Weight:	22.950 lbs(avg)	Crew Operating Time:	
10 Year Resupply Weight:	459.00 lbs.	Total Cost:	
Installed Volume:	*3.235 cu ft.	Development Risk:	
Resupply Volume:	.512 cu ft (avg)		

Rationale: Assume 153 wipes per day usage with laundering at 5 day intervals and replacement after 90 washings or 450 days due to deterioration. -*4 dispensers and initial supply of 765 wipes included in installed weight and volume.

Merits/Deficiencies:

Data Sources:

ELEMENT CONCEPT DATA SHEET # 6.3.16.4

Title: Stowage of Cleaning Equipment

Applicable Mission Numbers

019 - 024
043 - 048
067 - 072

Function Reference: Provide For Clean-Up

Drawing Reference:

Physical Description: Compartmented cabinet of aluminum construction, with partitions of sheet or wire mesh material; including suitable retention provisions compatible with form factors of items to be contained therein and six ultraviolet (15W) lamps for germicidal effec Cabinet configuration is a space vehicle design option and therefore indeterminate.

Functional Description: For storage of cleaning devices (not of a fixed-installation type), bactericides, wipes and other expendables of reasonable quantity, readily accessible for convenience.

Detail Data

Reliability:	10 Year Resupply Volume: 0
Maintainability:	Peak Power: 90 watts
Safety:	Energy:
Crew Acceptance: 6	Water (155°F):
Installed Weight: 44.84 lbs	Water (50°F):
Resupply Weight: 0	Crew Operating Time:
10 Year Resupply Weight: 0	Total Cost:
Installed Volume: 21.92 cu ft	Development Risk:
Resupply Volume: 0	

Rationale: Assume sufficient quantities for one-week usage located in galley area; weekly replenishment from remote storage facility within space vehicle.

Merits/Deficiencies:

Data Sources: