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BI-MONTHLY

36

WEIGHT AND BALANCE STATUS REPORT

FOR

CSM END ITEM

SPACECRAFT 012 AND 014

(U)

PARA. 8.10 EXHIBIT I

1 JULY 1965

CLASSIFICATION CHANGE

To UNCLASSIFIED

By authority of GDS - EO 11652

Changed by L. Shirley Date 12/31/72

Classified Document Master Control Station, NASA

Scientific and Technical Information Facility

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~~GROUP-4~~

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NORTH AMERICAN AVIATION, INC.

SPACE and INFORMATION SYSTEMS DIVISION

FORM M158-D-3 VELLUM REV. 2-61

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TECHNICAL REPORT INDEX/ABSTRACT

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ACCESSION NUMBER						DOCUMENT SECURITY CLASSIFICATION	
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TITLE OF DOCUMENT	LIBRARY USE ONLY
Bi-Monthly Weight and Balance Status Report for CSM End Item Spacecraft 012 and 014	
AUTHOR(S) D. D. Morgan	

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ABSTRACT

The Bi-monthly Weight and Balance Report for CSM End Item Spacecraft 012/014 presents the summary mass property data for each module in addition to the usable SPS propellant available within the injected weight contraints of the booster capability as defined in SID 63-313, CSM Technical Specification. The Command Module entry center of gravity data reflects an unballasted condition at an L/D of 0.38. The LES is ballasted to 8200 pounds which results in a center of gravity of Xa 1122.5 for the LEV at LEV burnout. The report also presents summary weight statements for each module.

FORM 131-V REV. 6-64

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INTRODUCTION

This Weight and Balance Report is submitted per paragraph 2.4.2 of NASA Requirements Document ASPO-PS5-13-12 as deviated by Attachment "A" of enclosure to NAA letter 65MA5254, dated 7 May 1965, and is representative of the CSM End Items for Spacecraft 012 and 014. The data contained in this report is based on SID 64-1237 CSM Master End Item Specification (Block I), dated 1 December 1964, and revised to incorporate the design requirements in SID 64-1080 CSM End Item Specification, Part I, Performance/Design Requirements Spacecraft 012, Apollo, revised 22 February 1965 and SID 64-1082 CSM End Item Specification, Part I, Performance/Design Requirements Spacecraft 014, Apollo, revised 22 February 1965.

This report incorporates changes to the Block I status weight previously reported in SID 62-99-40, dated 1 June 1965. The change descriptions are included in the change analysis section and reflect changes prior to June 4, 1965.

The command module entry center of gravity data reflects an unballasted condition at an L/D of 0.38. The Mission Weight, Center of Gravity and Inertia Summary Section reflects a launch weight consistent with a payload in orbit capability of 32,500 pounds per SID 63-313, CSM Technical Specification. The SPS propellant weight reported is the available propellant within the noted booster capability.

The Launch Escape Vehicle Summary presents the LEV abort configuration. The LES is ballasted to 8200 pounds which results in a center of gravity of X_a = 1122.5 for the LEV at LEV burnout.

A list of potential changes for each module is as follows:

COMMAND MODULE	(+319)	Estimated Effective Date
Increase in crew couch based on drawing calculations	+16	8-1-65
Increase in wiring based on CSM 009 actual weights	+160	8-1-65
Incorporation of RCS rapid fuel dumping system	+15	8-1-65
Add real time radio command relays	+14	9-1-65
Incorporation of addition VHF transmitter required for flight qualification data.	+7	9-1-65
Addition of ballast to maintain a Yc.g. of +0.33 ±0.1 necessary to compensate for aerodynamic roll moments induced by external protuberances	+60	8-1-65
Addition of food and lithium hydroxide based on 14 day duration in lieu of 10.6 days.	+47	10-1-65

		Estimated Effective Date
SERVICE MODULE	(+288)	
Addition of edge isolating material to the ECS radiators	+7	8-1-65
Addition of potassium hydroxide fuel cell startup wetting agent	+8	8-1-65
Addition of a flight combustion stability monitor system which would automatically shutdown the engine if divergent combustion pressure oscillation occurs during firing	+20	8-1-65
Addition of hydrogen and oxygen required for a 14 day mission duration in lieu of 10.6 days	+113	10-1-65
Addition of scientific equipment for CSM Spacecraft 014 based on current experiment requirements	+140	9-1-65
LAUNCH ESCAPE SYSTEM	(+85)	
Addition of shrouds to protect wiring during harness transition from the tower to escape motor skirt.	+5	8-1-65
Increase in boost protective cover based on a revised estimate to reflect the strengthening of the "soft" to "hard" cover joint and the stiffening of the soft panels in the area covering the windows.	+40	8-1-65
Addition of one thickness of "nomex" cloth plus adhesive on both sides to the soft portion of the boost cover to provide flexible strength.	+40	8-1-65

CSM SPACECRAFT 012 AND 014

APOLLO EARTH ORBIT MISSION

WEIGHT, CENTER OF GRAVITY AND INERTIA SUMMARY

1 JULY STATUS

ITEM	WEIGHT POUNDS	CENTER OF GRAVITY*			MOMENTS OF INERTIA (SLUG-FT.^{2})		
		X	Y	Z	ROLL (X)	PITCH (Y)	YAW (Z)
COMMAND MODULE	11080	1042.0	0.2	6.0	5407	4766	4364
SERVICE MODULE - Less Usable Propellant	10185	910.0	0.7	0.0	6444	10891	10614
SLA Attachement Ring**	62	837.1	0.0	-1.8	77	40	38
TOTAL - Less SPS Usable Propellant	21327	978.4	0.4	3.1	11970	35965	35242
SPS AVAILABLE PROPELLANT - S/M***	7730	865.8	27.3	-11.5	2574	1684	2063
TOTAL - With Usable Propellant	29057	948.4	7.6	-0.8	15688	53427	53706
SLA - Less SM Attaching Ring	3443	641.8	1.3	-2.2	8646	11453	11184
TOTAL - Injected	32500	915.9	6.9	-0.9	24362	127329	127363
LAUNCH ESCAPE SYSTEM	8200	1298.3	-0.1	-0.2	575	21280	21280
TOTAL - Spacecraft Launch	40700	993.0	5.5	-0.8	25007	355233	355337

NOTE: *Centers of gravity are in the NASA reference system except that the longitudinal axis has an origin 1000 inches below the tangency point of the Command Module substructure mold line.
**The 62 pound SLA attachment ring is retained by the CSM after separation from the Adapter.
***The propellant weight of 7730 is based on an in orbit payload capability of 32,500 pounds consistent with SID 63-313.

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CSM SPACECRAFT 012 AND 014

APOLLO LAUNCH ABORT CONFIGURATION

WEIGHT, CENTER OF GRAVITY AND INERTIA SUMMARY

1 JULY STATUS

ITEM	WEIGHT POUNDS	CENTER OF GRAVITY*			MOMENTS OF INERTIA (SLUG-FT.^{2})		
		X	Y	Z	ROLL (X)	PITCH (Y)	YAW (Z)
COMMAND MODULE	11080	1042.0	0.2	6.0	5407	4766	4364
LAUNCH ESCAPE SYSTEM	8200	1298.3	-0.1	-0.2	575	21280	21280
TOTAL - Launch Abort	19280	1151.0	0.1	3.4	6021	92901	92460
LESS - MAIN AND PITCH MOTOR PROPELLANTS	-3198	1294.3	0.0	0.0	-71	-1285	-1285
TOTAL - LES Burnout	16082	1122.5	0.0	4.0	5940	74614	74182

NOTE: *Centers of gravity are in the NASA reference system except that the longitudinal axis has an origin 1000 inches below the tangency point of the Command Module substructure mold line.

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COMMAND MODULE 012 AND 014

WEIGHT, CENTER OF GRAVITY AND INERTIA SUMMARY

LOW ALTITUDE ABORT CONDITION

1 JULY STATUS

VEHICLE MODE	WEIGHT POUNDS	CENTER OF GRAVITY			MASS INERTIA DATA (SLUG-FT.^{2})					
		X	Y	Z	Ixx	Iyy	Izz	Ixy	Ixz	Iyz
COMMAND MODULE, LAUNCH	11080	1042.0	0.2	6.0	5407	4766	4364	27	-290	-15
Less: Oxidant	-180	1022.6	14.5	63.7						
Forward Heat Shield	-395	1100.5	-0.4	1.3						
Drogue Chutes	-58	1089.1	0.0	-21.1						
PRIOR TO MAIN CHUTE DEPLOYMENT	10447	1039.9	0.0	5.4	5188	4231	3950	40	-211	-46
Less: Main Chutes (3)	-409	1090.5	-0.8	6.4						
Fuel	-90	1022.6	-45.8	45.8						
LANDING	9948	1037.9	0.4	4.9	5062	3936	3630	30	-204	-10

NOTE: Mass inertia data are shown for accumulative totals only.

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COMMAND MODULE 012 and 014

WEIGHT, CENTER OF GRAVITY AND INERTIA SUMMARY

EARTH ORBITAL MISSION

1 JULY STATUS

VEHICLE MODE	WEIGHT POUNDS	CENTER OF GRAVITY			MASS INERTIA DATA (SLUG FT.^{2})					
		X	Y	Z	Ixx	Iyy	Izz	Ixy	Ixz	Iyz
COMMAND MODULE	11080	1042.0	0.2	6.0	5407	4766	4364	27	-290	-15
Less: Boost & Mission Water	-8	1022.6	-63.4	-16.4						
Food	-59	1053.0	-28.6	37.0						
Add: Waste-Fecal	17	1039.0	47.0	12.0						
CO_2 Absorbed (22 Cart.)	51	1016.8	-4.2	27.7						
Potable Water	30	1022.6	-63.4	-16.4						
Waste Water	56	1022.5	-21.1	61.8						
PRIOR TO ENTRY	11167	1041.7	0.1	6.2	5469	4815	4399	40	-310	-16
Less: Propellant	-135	1022.6	-5.6	57.0						
Ablator Burnoff	-127	1008.8	0.0	5.0						
Entry Coolant	-6	1022.6	-63.4	-16.4						
Forward Heat Shield	-395	1100.5	-0.4	1.3						
Drogue Chutes	-58	1089.1	0.0	-21.1						
PRIOR TO MAIN CHUTE DEPLOYMENT	10446	1039.8	0.3	5.9	5193	4231	3875	38	-244	-9
Less: Main Chutes (3)	-409	1090.5	-0.8	6.4						
Propellant	-135	1022.6	-5.6	57.0						
LANDING	9902	1038.0	0.4	5.2	5037	3888	3569	41	-223	-1

NOTE: Mass inertia data are shown for accumulative totals only.

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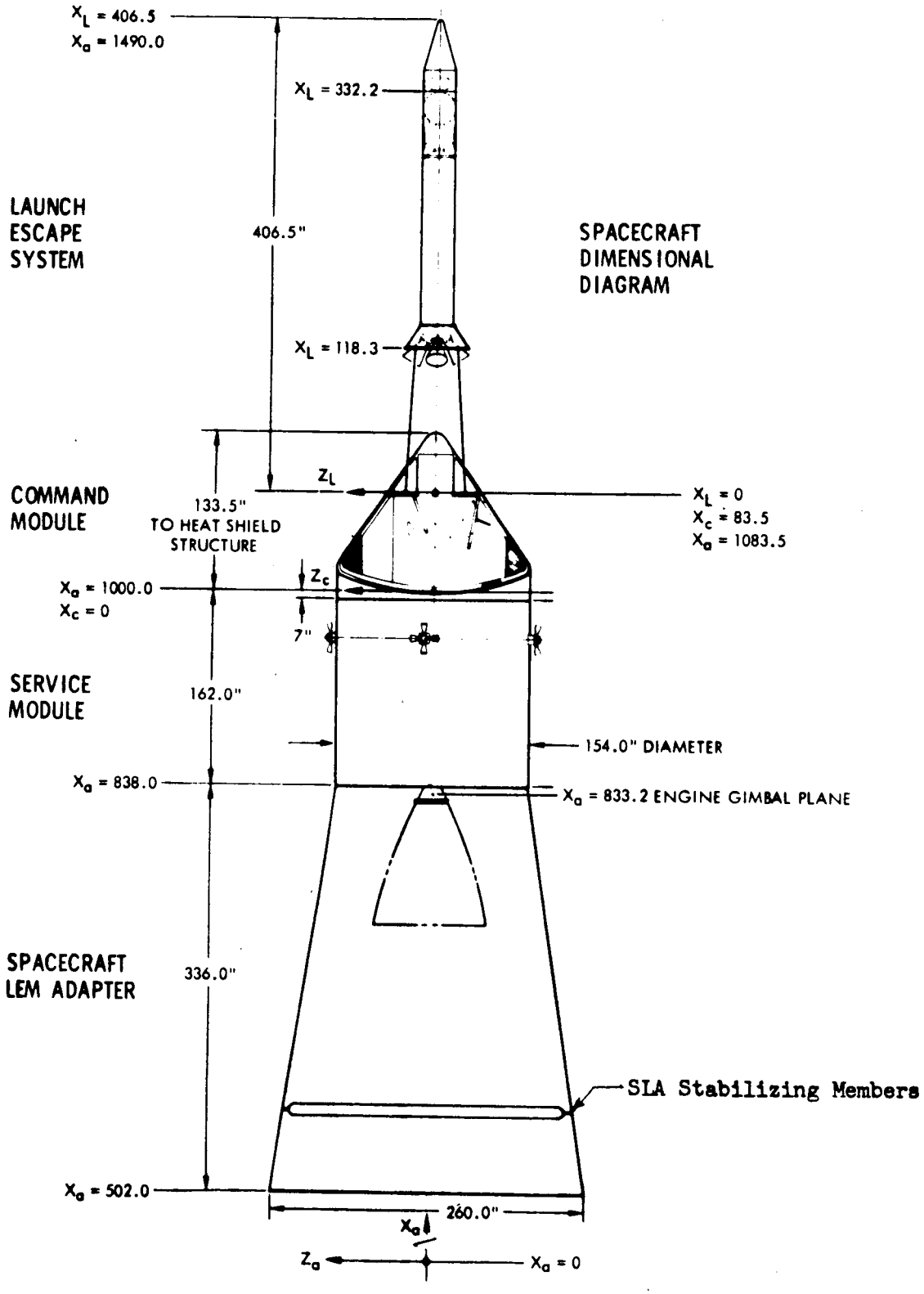
X_L = 406.5
X_a = 1490.0
X_L = 332.2
LAUNCH ESCAPE SYSTEM
406.5"
SPACECRAFT DIMENSIONAL DIAGRAM
X_L = 118.3
Z_L
COMMAND MODULE
133.5" TO HEAT SHIELD STRUCTURE
X_L = 0
X_c = 83.5
X_a = 1083.5
Z_c
X_a = 1000.0
X_c = 0
7"
SERVICE MODULE
162.0"
154.0" DIAMETER
X_a = 838.0
X_a = 833.2 ENGINE GIMBAL PLANE
SPACECRAFT LEM ADAPTER
336.0"
SLA Stabilizing Members
X_a = 502.0
260.0"
X_a
Z_a
X_a = 0

SPACECRAFT WEIGHT STATUS

CSM SPACECRAFT 012 AND 014

JULY 1965

ITEM	PREVIOUS STATUS 6-1-65	CHANGES TO CURRENT	CURRENT STATUS 7-1-65	CONTROL WEIGHT
COMMAND MODULE	11035	+45	11080	11000
SERVICE MODULE	10000	+185	10185	10200
ADAPTER	3505		3505	3900
TOTAL LESS PROPELLANT	24540	+230	24270	25100
SPS PROPELLANT AVAILABLE	7960	-230	7730	7400
TOTAL INJECTED	32500		32500	32500
LAUNCH ESCAPE SYSTEM	8200		8200	8200
TOTAL SPACECRAFT AT LAUNCH	40700		40700	40700

CSM SPACECRAFT 012 AND 014

COMMAND MODULE WEIGHT STATUS

ITEM	CONTROL WEIGHT	PREVIOUS STATUS 6-1-65	CHANGES TO CURRENT	CURRENT STATUS 7-1-65	BASIS FOR CURRENT BLOCK I STATUS		
					%EST	%CAL	%ACT
WEIGHT EMPTY	(9686)	(9725)	(+39)	(9764)	(18)	(47)	(35)
Structure	5679	5780	+55	5835	8	47	45
Stabilization & Control	200	196	+2	198	10	40	50
Guidance & Navigation	430	417	+3	420		100	
Crew Systems	94	87	+1	88	44	56	
Environmental Control	374	405	+5	410	18	30	52
Earth Landing System	617	599	-5	594	1	29	70
Instrumentation	127	123	-25	98	30	70	
Electrical Power	1215	1194	+3	1197	85	15	
Reaction Control	328	306		306	14	86	
Communication	378	388	-4	384	4	79	17
Controls & Displays	244	230	+4	234	2	96	2
USEFUL LOAD	(1314)	(1310)	(+6)	(1316)	(4)	(96)	
Scientific Equipment	80	80		80		100	
Crew Systems	834	835	+6	841	7	93	
Reaction Control	270	270		270		100	
Environmental Control	130	125		125		100	
GROSS WEIGHT	11000	11035	+45	11080	16	53	31

DETAIL WEIGHT SUMMARY

COMMAND MODULE 1 JUL 65

STRUCTURE

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
1. 1. 0.	BASIC BODY STRUCTURE - FORWARD SECT	222.4	1094.1	243333.	-0.1	-18.	-6.8	-1518.
1. 2. 0.	BASIC BODY STRUCTURE - CENTER SECT	738.0	1050.4	775167.	3.0	2212.	-7.1	-5206.
1. 3. 0.	BASIC BODY STRUCTURE - AFT SECTION	203.8	1011.3	206101.	-0.1	-10.	-0.2	-46.
1. 4. 0.	SECONDARY STRUCTURE	678.0	1037.4	703350.	0.6	432.	10.4	7044.
1. 5. 0.	HEAT SHIELD SUBSTRUCT-FORWARD SECT	187.7	1095.4	205612.	-0.4	-73.	-1.9	-352.
1. 6. 0.	HEAT SHIELD SUBSTRUCTURE-CENTER SECT	785.6	1048.5	823712.	-0.1	-107.	-13.9	-10907.
1. 7. 0.	HEAT SHIELD SUBSTRUCTURE - AFT SECT	838.4	1012.4	848817.	-0.9	-732.	5.1	4257.
1. 8. 0.	ABLATOR MATERIAL	1477.3	1033.6	1526898.	-0.2	-276.	6.9	10162.
1. 9. 0.	INSULATION	195.0	1042.4	203265.	0.	0.	0.	0.
1.10. 0.	SEPARATION PROVISIONS AND ATTACH	22.0	1026.2	22576.	0.8	18.	2.0	44.
1.17. 0.	MECHANICAL SUBSYSTEM	217.7	1040.5	226519.	-0.8	-165.	-2.6	-562.
1.18. 0.	EARTH IMPACT AND RECOVERY	269.4	1057.9	284988.	1.1	297.	4.8	1283.
1. 0. 0.	STRUCTURE	5835.3	1040.3	6070339.	0.3	1577.	0.7	4198.

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DETAIL WEIGHT SUMMARY

COMMAND MODULE 1 JUL 65

STABILIZATION AND CONTROL

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
2. 1. 0.	ELECTRONIC EQUIP-LOWER BAY	198.4	1032.9	204917.	-13.8	-2736.	43.4	8609.
2. 0. 0.	STABILIZATION AND CONTROL	198.4	1032.9	204917.	-13.8	-2736.	43.4	8609.

DETAIL WEIGHT SUMMARY

COMMAND MODULE 1 JUL 65

GUIDANCE AND NAVIGATION

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
3. 1. 0.	ELECTRONIC EQUIPMENT	264.5	1049.2	277514.	-1.3	-354.	42.7	11292
3. 2. 0.	OPTICAL EQUIPMENT	59.5	1069.3	63625.	-1.4	-82.	30.9	1840
3. 4. 0.	ELECTRICAL PROVISION	25.0	1053.1	26327.	-1.1	-27.	46.8	1170.
3. 5. 0.	LOOSE STORED ITEMS	3.1	1071.5	3322.	-11.1	-34.	13.7	42.
3. 6. 0.	DISPLAYS AND CONTROLS	67.8	1063.2	72083.	-0.4	-27.	14.4	977.
3. 0. 0.	GUIDANCE AND NAVIGATION	419.9	1054.7	442872.	-1.3	-525.	36.5	15321.

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DETAIL WEIGHT SUMMARY

COMMAND MODULE 1 JUL 65

CREW SYSTEMS

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
4. 1. 0.	CREW ACCESSORIES	3.0	1034.6	3104.	-3.7	-11.	29.9	90.
4. 2. 0.	CREW COUCH/SEATS AND RESTRAINT SYST	32.0	1043.3	33386.	-0.1	-2.	-10.6	-339.
4. 4. 0.	FOOD AND ASSOCIATED EQUIPMENT	28.1	1049.7	29498.	-20.0	-563.	41.6	1168.
4. 6. 0.	WASTE MANAGEMENT	2.7	1011.8	2732.	24.0	65.	17.0	46.
4. 8. 0.	SUPPORTS	0.2	1065.0	213.	0.	0.	-15.2	-3.
4. 9. 0.	CREW EQUIPMENT	21.0	1050.3	22055.	-8.5	-179.	-11.1	-233.
4.11. 0.	CREW OPTICS	1.0	1060.0	1060.	0.	0.	-39.0	-39.
4. 0. 0.	CREW SYSTEMS	88.0	1046.0	92048.	-7.9	-691.	7.8	688.

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DETAIL WEIGHT SUMMARY

COMMAND MODULE 1 JUL 65

ENVIRONMENTAL CONTROL SYSTEM

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
5. 1. 0.	PRESSURE SUIT CIRCUIT	168.6	1029.2	173519.	-46.0	-7756.	0.9	145.
5. 2. 0.	WATER GLYCOL CIRCUIT	102.2	1031.8	105449.	-1.5	-149.	33.6	3429.
5. 3. 0.	PRESSURE AND TEMPERATURE CONTROL	20.8	1062.9	22109.	-27.7	-577.	0.2	4.
5. 4. 0.	OXYGEN SUPPLY SYSTEM	24.7	1030.0	25442.	-43.0	-1062.	2.0	48.
5. 5. 0.	WATER SUPPLY SYSTEM	32.0	1037.4	33196.	-36.4	-1164.	21.5	689.
5. 6. 0.	COMMON ITEMS-SUBCONTRACTOR	7.6	1034.1	7859.	-42.3	-322.	9.9	75.
5. 7. 0.	COMMON ITEMS-SID	14.1	1029.0	14509.	-42.0	-592.	11.0	155.
5. 8. 0.	WASTE MANAGEMENT	20.0	1027.3	20546.	38.4	768.	22.4	447.
5.10. 0.	POST LANDING VENTILATION SYSTEM	20.0	1081.0	21620.	0.	0.	20.0	400.
5. 0. 0.	ENVIRONMENTAL CONTROL SYSTEM	410.0	1034.8	424250.	-26.5	-10852.	13.2	5392.

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DETAIL WEIGHT SUMMARY

COMMAND MODULE 1 JUL 65

EARTH LANDING SYSTEM

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
6. 1. 0.	PARACHUTE SYSTEM	531.0	1090.2	578913.	-0.5	-290.	1.8	938.
6. 2. 0.	LOCATION AIDS	7.8	1090.3	8505.	1.9	14.	2.4	18.
6. 3. 0.	FWD H.S. RELEASE AND EJECTION SYSTEM	55.2	1099.4	60689.	-1.5	-83.	-0.5	-27.
6. 0. 0.	EARTH LANDING SYSTEM	594.0	1091.1	648107.	-0.6	-358.	1.6	929.

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DETAIL WEIGHT SUMMARY

COMMAND MODULE

1 JUL 65

INSTRUMENTATION

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
7. 1. 0.	INSTRUMENTATION SENSORS	10.1	1014.5	10246.	-15.1	-152.	18.7	189.
7. 3. 0.	REMOTE EQUIPMENT	2.1	1031.7	2167.	-23.0	-48.	0.	0.
7. 7. 0.	SUPPORTS	0.8	1012.9	810.	-10.6	-8.	14.1	11.
7. 8. 0.	R AND D INSTRUMENTATION	85.0	1031.1	87643.	-23.5	-2000.	25.7	2184.
7. 0. 0.	INSTRUMENTATION	98.0	1029.2	100866.	-22.5	-2209.	24.3	2384.

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DETAIL WEIGHT SUMMARY

COMMAND MODULE 1 JUL 65

ELECTRICAL POWER SYSTEM

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
8. 1. 0.	ELECTRICAL POWER EQUIPMENT	334.4	1021.1	341470.	7.4	2477.	30.2	10086.
8. 5. 0.	WIRING+CONNECTORS-FWD COMPT	18.2	1085.0	19747.	4.0	73.	-4.0	-73.
8. 6. 0.	WIRING AND CONNECTORS-AFT COMPT	116.7	1023.4	119432.	8.9	1044.	-39.6	-4617.
8. 7. 0.	WIRING+CONNECTORS-PRESSURE COMPT	625.1	1036.0	647587.	5.1	3206.	-1.7	-1043.
8. 8. 0.	SEQUENTIAL EVENTS CONTROL SYSTEM	102.6	1025.1	105173.	45.5	4672.	-4.0	-407.
8. 0. 0.	ELECTRICAL POWER SYSTEM	1197.0	1030.4	1233409.	9.6	11471.	3.3	3946.

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DETAIL WEIGHT SUMMARY

COMMAND MODULE

1 JUL 65

REACTION CONTROL SYSTEM

[redacted]

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
10. 1. 0.	FUEL SYSTEM	47.0	1027.9	48313.	-29.4	-1383.	31.0	1455.
10. 2. 0.	OXIDIZER SYSTEM	58.9	1026.1	60436.	25.6	1508.	37.9	2232.
10. 3. 0.	PRESSURIZATION SYSTEM	56.9	1027.7	58477.	-1.3	-75.	11.9	676.
10. 4. 0.	ENGINE SYSTEM	143.2	1038.0	148636.	0.	0.	-31.9	-4574.
10. 0. 0.	REACTION CONTROL SYSTEM	306.0	1032.2	315863.	0.2	50.	-0.7	-211.

DETAIL WEIGHT SUMMARY

COMMAND MODULE 1 JUL 65

COMMUNICATIONS

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
11. 1. 0.	COMMUNICATIONS EQUIP-LWR BAY	292.5	1034.2	302506.	20.2	5911.	39.4	11537.
11. 3. 0.	REMOTE EQUIPMENT	86.5	1037.8	89769.	9.6	834.	8.3	717.
11. 5. 0.	ELECTRICAL PROVISION	0.9	1031.2	928.	53.0	48.	-14.2	-13.
11. 7. 0.	SUPPORTS	4.1	1035.4	4245.	18.1	74.	36.2	148.
11. C. 0.	COMMUNICATIONS	384.0	1035.0	397448.	17.9	6867.	32.3	12389.

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DETAIL WEIGHT SUMMARY

COMMAND MODULE 1 JUL 65

CONTROLS AND DISPLAYS

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
12. 1. 0.	MAIN DISPLAY PANEL - CONTROL STATION	38.6	1067.5	41204.	-18.2	-704.	-18.5	-712.
12. 2. 0.	MAIN DISPLAY PANEL - CENTER STATION	43.2	1067.5	46117.	1.6	71.	-25.2	-1089.
12. 3. 0.	MAIN DIS PANEL SYST MANAGEMENT STA.	35.2	1064.9	37486.	26.7	939.	-18.3	-643.
12. 4. 0.	MAIN DISPLAY PANEL - RH CONSOLE	27.1	1054.9	28588.	46.2	1252.	-11.6	-314.
12. 5. 0.	MAIN DISPLAY PANEL - LH CONSOLE	21.7	1054.8	22889.	-45.0	-976.	-11.9	-259.
12. 6. 0.	REMOTE EQUIP - LOWER EQUIP BAY	1.2	1078.3	1294.	-14.9	-18.	27.6	33.
12. 7. 0.	REMOTE EQUIP - LH FWD EQUIP BAY	3.1	1074.4	3331.	16.4	51.	25.4	79.
12. 8. 0.	REMOTE EQUIP CREW AREA CONTROLS	20.2	1058.3	21379.	-13.8	-278.	-10.3	-209.
12. 9. 0.	REMOTE EQUIP CAUTION + WARNING	15.3	1075.0	16447.	9.4	144.	-22.6	-346.
12.10. 0.	REMOTE EQUIP-RH FWD EQUIP BAY	5.5	1070.0	5885.	21.8	120.	5.0	27.
12.11. 0.	ELECTRICAL PROVISIONS	10.4	1034.3	10757.	5.5	58.	-15.7	-163.
12.12. 0.	LIGHTING	13.2	1053.0	13900.	0.	0.	-23.1	-305.
12. 0. 0.	CONTROLS AND DISPLAYS	234.7	1062.1	249277.	2.8	659.	-16.6	-3900.

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DETAIL WEIGHT SUMMARY

COMMAND MODULE 1 JUL 65

SCIENTIFIC EQUIPMENT

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
21. 1. 0.	MISCELLANEOUS EQUIPMENT	80.0	1027.2	82178.	-0.7	-57.	32.3	2580.
21. 0. 0.	SCIENTIFIC EQUIPMENT	80.0	1027.2	82178.	-0.7	-57.	32.3	2580.

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DETAIL WEIGHT SUMMARY

COMMAND MODULE 1 JUL 65

CREW SYSTEMS

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
22. 2. 0.	CREW ACCESSORIES	11.7	1033.0	12086.	-2.0	-23.	37.0	433.
22. 4. 0.	CREWMAN EQUIPMENT	1.0	1008.0	1008.	-20.5	-20.	21.5	21.
22. 5. 0.	FOOD AND ASSOCIATED EQUIPMENT	2.0	1073.3	2147.	-30.0	-60.	16.4	33.
22. 6. 0.	WASTE MANAGEMENT	7.3	1049.1	7658.	35.0	255.	29.0	212.
22. 7. 0.	PERSONAL COMMUNICATIONS	5.1	1042.8	5318.	0.	0.	-32.1	-164.
22. 8. 0.	PERSONAL HYGIENE EQUIPMENT	17.3	1048.5	18139.	47.5	822.	10.7	185.
22. 9. 0.	MEDICAL EQUIPMENT	5.5	1050.4	5777.	37.0	203.	13.0	71.
22.10. 0.	PROVISIONS - SURVIVAL	10.5	1073.2	11269.	30.3	318.	5.1	53.
22.11. 0.	GOVERMENT FURNISHED EQUIPMENT	779.0	1048.4	816741.	0.4	283.	-5.8	-4529.
22.12. 0.	SUPPORTS	1.6	1011.8	1619.	8.4	13.	16.0	26.
22. 0. 0.	CREW SYSTEMS	841.0	1048.5	881762.	2.1	1792.	-4.4	-3659.

DETAIL WEIGHT SUMMARY

COMMAND MODULE 1 JUL 65

REACTION CONTROL RESIDUALS

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
23. 1. 0.	TRAPPED	30.8	1022.6	31496.	-5.7	-176.	57.0	1757.
23. 2. 0.	MIXTURE RATIO	2.7	1022.6	2761.	-5.4	-14.	57.3	155.
23. 3. 0.	TANK EFFICIENCY	7.8	1022.6	7976.	-5.6	-44.	57.0	445.
23. 4. 0.	LOADING TOLERANCE	2.7	1022.6	2761.	-5.4	-14.	57.3	155.
23. 5. 0.	HELIUM-PRESSURIZATION	1.0	1022.6	1023.	-3.1	-3.	25.8	26.
23. 0. 0.	REACTION CONTROL RESIDUALS	45.0	1022.6	46017.	-5.6	-251.	56.4	2536.

DETAIL WEIGHT SUMMARY

COMMAND MODULE 1 JUL 65

ENVIORNMENTAL CONTROL NON EXPENDABLE

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
25. 2. 0.	OXYGEN RE-ENTRY	4.7	1028.5	4834.	-38.5	-181.	-15.1	-71.
25. 3. 0.	CARBON DIOXIDE AND ODOR ABSORPTION	104.1	1016.9	105863.	-4.9	-510.	27.6	2878.
25. 0. 0.	ENVIORNMENTAL CONTROL NON EXPENDABLE	108.8	1017.4	110697.	-6.3	-691.	25.8	2807.

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DETAIL WEIGHT SUMMARY

COMMAND MODULE 1 JUL 65

REACTION CONTROL EXPENDABLES

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MO (IN-LB
32. 1. 0.	FUEL	75.0	1022.6	76695.	-45.7	-3431.	45.7	3431
32. 2. 0.	OXIDIZER	150.0	1022.6	153390.	14.4	2167.	62.6	9397.
32. 0. 0.	REACTION CONTROL EXPENDABLES	225.0	1022.6	230085.	-5.6	-1264.	57.0	12829.

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DETAIL WEIGHT SUMMARY

COMMAND MODULE 1 JUL 65

ENVIRONMENTAL CONTROL - EXPENDABLES

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
34. 2. 0.	WATER	16.2	1022.6	16566.	-62.8	-1017.	-18.0	-292.
34. 0. 0.	ENVIRONMENTAL CONTROL - EXPENDABLES	16.2	1022.6	16566.	-62.8	-1017.	-18.0	-292.

CSM SPACECRAFT 012 AND 014

SERVICE MODULE WEIGHT STATUS

ITEM	CONTROL WEIGHT	PREVIOUS STATUS 6-1-65	CHANGES TO CURRENT	CURRENT STATUS 7-1-65	BASIS FOR CURRENT BLOCK I STATUS		
					%EST	%CAL	%ACT
WEIGHT EMPTY	(8132)	(7947)	(+71)	(8018)	(8)	(49)	(43)
Structure	4767	4597	+12	4609	3	57	40
Environmental Control	201	74	+35	109	32	68	
Instrumentation	44	59	+9	68	100		
Electrical Power	1577	1623	+7	1630	20	34	46
Main Propulsion	1181	1221	+8	1229		30	70
Reaction Control	358	369		369	13	87	
Communication	4	4		4	100		
USEFUL LOAD	(2068)	(2053)	(+114)	(2167)		(100)	
Reaction Control	838	838		838		100	
Electrical Power	503	503		503		100	
Environmental Control	157	157	+114	271		100	
Main Propulsion	570	555		555		100	
TOTAL SERVICE MODULE BURNOUT	10200	10000	+185	10185	6	60	34

ITEM	RESIDUALS	
	SPS	RCS
Helium	(99.0)	(3.0)
Propellant Residuals	(456.0)	(45.0)
Trapped System	251.8	4.0
Trapped Engine	68.6	-
Mixture Ratio	49.9	9.0
Loading Tolerance	13.1	8.0
Expulsion Efficiency	-	24.0
Restart Losses	72.6	-
Total Residuals	555.0	48.0

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DETAIL WEIGHT SUMMARY

SERVICE MODULE

STRUCTURE

1 JUL 65

[redacted]

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
1. 2. 0.	BASIC BODY STRUCTURE - CENTER SECT	1760.0	914.2	1608933.	0.5	827.	-0.1	-123.
1. 4. 0.	SECONDARY STRUCTURE	370.0	903.7	334383.	3.2	1173.	-4.2	-1551.
1. 9. 0.	INSULATION	376.0	896.1	336939.	0.3	122.	-1.3	-487.
1.10. 0.	SEPARATION PROVISIONS AND ATTACH	33.0	1012.4	33409.	9.4	309.	-45.3	-1494.
1.12. 0.	FAIRING - COMMAND MOD TO SERVICE MOD	161.0	1005.1	161814.	2.1	345.	-6.0	-962.
1.13. 0.	MISCELLANEOUS	45.0	915.9	41214.	0.	0.	0.	0.
1.19. 0.	SPS FUEL SYSTEM	471.0	913.0	430040.	0.3	123.	0.8	397.
1.20. 0.	SPS OXIDIZER SYSTEM	600.0	913.4	548014.	-0.7	-396.	-0.1	-54.
1.21. 0.	SPS PRESSURIZATION SYSTEM	793.0	946.0	750178.	0.0	21.	-0.0	-30.
1. 0. 0.	STRUCTURE	4609.0	921.0	4244925.	0.5	2524.	-0.9	-4305.

DETAIL WEIGHT SUMMARY

SERVICE MODULE 1 JUL 65

ENVIRONMENTAL CONTROL SYSTEM

[redacted]

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
5. 2. 0.	WATER GLYCOL CIRCUIT	39.8	912.0	36299.	3.4	137.	-7.1	-282.
5. 4. 0.	OXYGEN SUPPLY SYSTEM	1.0	1003.0	1003.	25.0	25.	-72.8	-73.
5. 5. 0.	WATER SUPPLY SYSTEM	36.8	925.0	34041.	-34.1	-1254.	29.1	1073.
5. 9. 0.	HEAT TRANSFER SYSTEM	31.4	962.5	30222.	5.2	164.	-4.2	-132.
5. 0. 0.	ENVIRONMENTAL CONTROL SYSTEM	109.0	931.8	101565.	-8.5	-928.	5.4	585.

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DETAIL WEIGHT SUMMARY

SERVICE MODULE

INSTRUMENTATION

1 JUL 65

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
7. 3. 0.	REMOTE EQUIPMENT	48.5	919.0	44571.	0.	0.	0.	0
7. 7. 0.	SUPPORTS	2.5	919.0	2297.	0.	0.	0.	0.
7. 8. 0.	R AND D INSTRUMENTATION	17.0	920.8	15653.	0.4	7.	-1.8	-30.
7. 0. 0.	INSTRUMENTATION	68.0	919.4	62522.	0.1	7.	-0.4	-30.

[redacted]

DETAIL WEIGHT SUMMARY

SERVICE MODULE

1 JUL 65

ELECTRICAL POWER SYSTEM

[redacted]

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
8. 2. 0.	ELECTRICAL POWER EQUIPMENT	1263.9	882.4	1115202.	-11.0	-13878.	16.7	21106.
8. 8. 0.	SEQUENTIAL EVENTS CONTROL SYSTEM	23.2	992.3	23022.	-24.5	-568.	31.1	721.
8. 9. 0.	WIRING AND CONNECTORS	342.9	937.3	321395.	-0.6	-193.	-1.1	-378.
8. 0. 0.	ELECTRICAL POWER SYSTEM	1630.0	895.5	1459619.	-9.0	-14640.	13.2	21449.

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DETAIL WEIGHT SUMMARY

SERVICE MODULE

1 JUL 65

MAIN PROPULSION SYSTEM

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
9. 1. 0.	FUEL SYSTEM	164.5	866.3	142504.	-12.5	-2056.	-17.8	-2921.
9. 2. 0.	OXIDIZER SYSTEM	194.7	861.9	167804.	24.2	4714.	12.6	2457.
9. 3. 0.	PRESSURIZATION SYSTEM	107.1	877.1	93932.	-22.9	-2453.	14.8	1581.
9. 4. 0.	ENGINE SYSTEM	762.7	829.3	632501.	0.2	149.	0.1	87.
9. 0. 0.	MAIN PROPULSION SYSTEM	1229.0	843.6	1036742.	0.3	353.	1.0	1203.

DETAIL WEIGHT SUMMARY

SERVICE MODULE 1 JUL 65

REACTION CONTROL SYSTEM

[redacted]

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
10. 1. 0.	FUEL SYSTEM	83.2	961.5	79995.	-2.0	-168.	3.1	258.
10. 2. 0.	OXIDIZER SYSTEM	89.4	960.9	85904.	-1.9	-168.	2.9	258.
10. 3. 0.	PRESSURIZATION SYSTEM	96.6	959.2	92658.	0.	0.	0.	0.
10. 4. 0.	ENGINE SYSTEM	99.8	958.9	95700.	0.	0.	0.	0.
10. 0. 0.	REACTION CONTROL SYSTEM	369.0	960.0	354257.	-0.9	-335.	1.4	516.

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DETAIL WEIGHT SUMMARY

SERVICE MODULE

COMMUNICATIONS

1 JUL 65

[redacted]

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
11. 3. 0.	REMOTE EQUIPMENT	4.0	998.8	3995.	49.3	197.	-41.0	-164.
11. 0. 0.	COMMUNICATIONS	4.0	998.8	3995.	49.3	197.	-41.0	-164.

DETAIL WEIGHT SUMMARY

SERVICE MODULE

1 JUL 65

REACTION CONTROL RESIDUALS

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
23. 1. 0.	TRAPPED	3.8	959.1	3644.	0.	0.	0.	0
23. 2. 0.	MIXTURE RATIO	8.8	959.0	8439.	0.	0.	0.	0.
23. 3. 0.	TANK EFFICIENCY	24.0	959.0	23016.	0.	0.	0.	0.
23. 4. 0.	LOADING TOLERANCE	8.4	959.0	8056.	0.	0.	0.	0.
23. 5. 0.	HELIUM-PRESSURIZATION	3.0	959.0	2877.	0.	0.	0.	0.
23. 0. 0.	REACTION CONTROL RESIDUALS	48.0	959.0	46032.	0.	0.	0.	0.

DETAIL WEIGHT SUMMARY

SERVICE MODULE 1 JUL 65

ELECTRICAL POWER NON-EXPENDABLES

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
24. 1. 0.	HYDROGEN	53.9	896.1	48301.	42.4	2285.	-42.4	-2285.
24. 2. 0.	OXYGEN	438.5	933.8	409489.	23.0	10085.	-29.7	-13023.
24. 0. 0.	ELECTRICAL POWER NON-EXPENDABLES	492.4	929.7	457790.	25.1	12371.	-31.1	-15309.

DETAIL WEIGHT SUMMARY

SERVICE MODULE 1 JUL 65

ENVIORNMENTAL CONTROL NON EXPENDABLE

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
25. 1. 0.	OXYGEN	93.0	933.8	86848.	23.0	2139.	-29.7	-2762.
25. 0. 0.	ENVIORNMENTAL CONTROL NON EXPENDABLE	93.0	933.8	86848.	23.0	2139.	-29.7	-2762.

DETAIL WEIGHT SUMMARY

SERVICE MODULE 1 JUL 65

PROPULSION RESIDUALS

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
26. 1. 0.	SPS HELIUM	99.0	946.0	93654.	0.	0.	0.	0.
26. 2. 0.	TRAPPED IN SYSTEM	251.8	860.5	216671.	18.5	4661.	-4.0	-1006.
26. 3. 0.	TRAPPED IN ENGINE	68.6	844.1	57904.	-2.8	-194.	1.1	78.
26. 4. 0.	MIXTURE RATIO TOLERANCE	49.9	836.9	41759.	16.7	833.	-20.7	-1031.
26. 5. 0.	LOADING TOLERANCE	13.1	836.8	10962.	48.3	633.	6.6	86.
26. 6. 0.	RESTART LOSSES	72.6	838.0	60841.	29.0	2106.	-10.0	-729.
26. 0. 0.	PROPULSION RESIDUALS	555.0	868.1	481791.	14.5	8038.	-4.7	-2601.

DETAIL WEIGHT SUMMARY

SERVICE MODULE 1 JUL 65

REACTION CONTROL EXPENDABLES

[redacted]

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
32. 1. 0.	FUEL	263.0	959.0	252217.	0.	0.	0.	0.
32. 2. 0.	OXIDIZER	527.0	959.0	505393.	0.	0.	0.	0.
32. 0. 0.	REACTION CONTROL EXPENDABLES	790.0	959.0	757610.	0.	0.	0.	0.

[redacted]

DETAIL WEIGHT SUMMARY

SERVICE MODULE 1 JUL 65

ELECTRICAL POWER EXPENDABLES

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
33. 1. 0.	HYDROGEN	4.6	896.0	4122.	42.4	195.	-42.4	-195.
33. 2. 0.	OXYGEN	6.0	933.8	5603.	23.0	138.	-29.7	-178.
33. 0. 0.	ELECTRICAL POWER EXPENDABLES	10.6	917.4	9725.	31.4	333.	-35.2	-373.

DETAIL WEIGHT SUMMARY

SERVICE MODULE 1 JUL 65

ENVIRONMENTAL CONTROL - EXPENDABLES

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
34. 1. 0.	OXYGEN	64.0	933.8	59766.	23.0	1472.	-29.7	-1901
34. 2. 0.	WATER	112.5	922.0	103725.	-37.0	-4162.	32.0	3600.
34. 6. 0.	ENVIRONMENTAL CONTROL - EXPENDABLES	176.5	926.3	163491.	-15.2	-2690.	9.6	1699.

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CSM SPACECRAFT 012 and 014

LAUNCH ESCAPE SYSTEM

WEIGHT STATUS

ITEM	CONTROL WEIGHT	PREVIOUS STATUS 6-1-65	CHANGES TO CURRENT	CURRENT STATUS 7-1-65	BASIS FOR CURRENT BLOCK I STATUS		
					%EST	%CAL	%ACT
Structure	1537	1536	+2	1538		25	75
Ballast Installation Prov.	29	29		29		100	
Electrical System	55	58	+15	73	33	62	5
Propulsion System							
Main Thrust	4826	4794		4794			100
Jettison	445	437		437			100
Jettison Motor Skirt	90	90		90			100
Pitch Control	49	49		49			100
Separation Provisions	15	15		15	53	47	
C/M Boost Protective Cover	539	580		580	100		
LES - NO BALLAST	7585	7588	+17	7605	8	6	86
BALLAST	615	612	-17	595		100	
TOTAL LAUNCH ESCAPE SYSTEM	8200	8200	-	8200	7	13	89

[redacted]

DETAIL WEIGHT SUMMARY

LAUNCH ESCAPE SYSTEM 1 JUL 65

STRUCTURE

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
1. 1. 0.	BASIC BODY STRUCTURE - FORWARD SECT	898.2	1442.6	1295729.	0.0	7.	0.9	788.
1. 2. 0.	BASIC BODY STRUCTURE - CENTER SECT	1.1	1271.2	1398.	0.	0.	0.	0.
1. 3. 0.	BASIC BODY STRUCTURE - AFT SECTION	517.9	1168.2	605023.	0.0	14.	-0.2	-119.
1. 4. 0.	SECONDARY STRUCTURE	624.1	1451.3	905762.	0.	0.	-0.0	-0.
1. 9. 0.	INSULATION	700.8	1084.6	760115.	-0.9	-603.	-2.1	-1482.
1.10. 0.	SEPARATION PROVISIONS AND ATTACH	15.2	1085.8	16505.	0.	0.	0.6	9.
1. 0. 0.	STRUCTURE	2757.3	1300.0	3584533.	-0.2	-581.	-0.3	-803.

DETAIL WEIGHT SUMMARY

LAUNCH ESCAPE SYSTEM 1 JUL 65

ELECTRICAL POWER SYSTEM

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
8. 4. 0.	ELECTRICAL PROVISIONS	72.5	1243.8	90172.	1.0	74.	-13.4	-974.
8. 0. 0.	ELECTRICAL POWER SYSTEM	72.5	1243.8	90172.	1.0	74.	-13.4	-974.

DETAIL WEIGHT SUMMARY

LAUNCH ESCAPE SYSTEM 1 JUL 65

MAIN PROPULSION SYSTEM

[redacted]

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
9. 4. 0.	ENGINE SYSTEM	2172.0	1303.9	2832042.	0.	0.	0.1	153
9. 0. 0.	MAIN PROPULSION SYSTEM	2172.0	1303.9	2832042.	0.	0.	0.1	153.

[redacted]

DETAIL WEIGHT SUMMARY

LAUNCH ESCAPE SYSTEM 1 JUL 65

PROPULSION EXPENDABLES

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
35. 3. 0.	PROPELLANT - SOLID	3198.2	1294.3	4139353.	0.	0.	-0.0	-21
35. 0. 0.	PROPULSION EXPENDABLES	3198.2	1294.3	4139353.	0.	0.	-0.0	-21.

CSM SPACECRAFT 012 and 014

ADAPTER WEIGHT STATUS

ITEM	CONTROL WEIGHT	PREVIOUS STATUS 6-1-65	CHANGES TO CURRENT	CURRENT STATUS 7-1-65	BASIS FOR CURRENT BLOCK I STATUS		
					%EST	%CAL	%ACT
Structure (Includes Stabilizing Members)	3470	3137		3137	5	55	40
Electrical	70	61		61	10	90	
Separation System	360	307		307	20	80	
TOTAL ADAPTER	3900	3505		3505	6	58	36

DETAIL WEIGHT SUMMARY

ADAPTER

STRUCTURE

1 JUL 65

[redacted]

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MO (IN-LB
1. 1. 0.	BASIC BODY STRUCTURE - FORWARD SECT	1936.2	700.7	1356758.	0.9	1703.	-0.3	-592
1. 3. 0.	BASIC BODY STRUCTURE - AFT SECTION	971.8	540.5	525222.	0.0	0.	0.0	20.
1. 4. 0.	SECONDARY STRUCTURE	134.0	589.9	79048.	5.1	680.	-7.2	-969.
1. 9. 0.	INSULATION	8.0	697.5	5580.	0.	0.	0.	0.
1.10. 0.	SEPARATION PROVISIONS AND ATTACH	307.0	645.9	198304.	0.4	132.	-2.2	-663.
1.13. 0.	MISCELLANEOUS	87.0	658.0	57247.	0.3	30.	-0.0	-1.
1. 0. 0.	STRUCTURE	3444.0	645.2	2222160.	0.7	2546.	-0.6	-2205.

[redacted]

DETAIL WEIGHT SUMMARY

ADAPTER 1 JUL 65

ELECTRICAL POWER SYSTEM

FUNCTION	FUNCTION DESCRIPTION	WEIGHT (LB)	X-CG (IN)	X-MOM (IN-LB)	Y-CG (IN)	Y-MOM (IN-LB)	Z-CG (IN)	Z-MOM (IN-LB)
8. 3. 0.	POWER DISTRIBUTION AND CONTROL	0.	0.	0.	0.	0.	0.	0
8. 4. 0.	ELECTRICAL PROVISIONS	61.0	649.4	39614.	32.3	1973.	-91.7	-5592.
8. 0. 0.	ELECTRICAL POWER SYSTEM	61.0	649.4	39614.	32.3	1973.	-91.7	-5592.

COMMAND MODULE

CURRENT WEIGHT EMPTY CHANGES

	Weight Pounds	Change Responsibility
STRUCTURE	(+55.0)	
Increase the inner structure forward section based on drawing changes adding bonded tees to support the uprighting system and material to the gusset doors to protect against riser loads.	+5.4	NAA
Increase the inner structure center section based on drawing changes adding hand holds to the forward longerons and external doublers to the hatch support beams due to structural requirements.	+3.5	NAA
Increase the right hand equipment bay secondary structure due to replacing rivets with screws and nutplates for ease of installation and removability.	+1.2	NAA
Increase the right hand forward equipment bay based on calculation of drawing changes adding brackets to support wire bundles.	+2.2	NAA
Increase the main display panel based on drawing changes adding support brackets for the TV camera and an increase in the number of wire support brackets.	+2.0	NAA
Increase the lower equipment bay secondary structure based on drawing calculations adding wiring supports and replacing rivets with screws and nutplates for ease of installation and removability.	+8.0	NAA
Increase the aft equipment bay secondary structure due to adding supports for the three communication helmets and the fecal cannister in the stowed and use positions.	+1.5	NAA
Increase the aft compartment area secondary structure due to redesigning the water tank supports utilizing steel in lieu of aluminum to allow capability to fill tank at liftoff and due to an increase in the number of electrical wireway retainers and doublers based on drawing changes.	+8.0	NAA

COMMAND MODULE

CURRENT WEIGHT EMPTY CHANGES

	Weight Pounds	Change Responsibility
STRUCTURE (Cont.)		
Decrease the forward heatshield substructure due to deleting fabrication allowances based on Block I actual weighings.	-9.1	NAA
Increase the aft heatshield substructure based on calculated in lieu of estimates values for the revised water impact design.	+8.9	NAA
Increase the aft heatshield to inner structure attachments due to replacing rivets with screws in the toroidal section and miscellaneous drawing changes.	+9.6	NAA
Increase the crew couches due to the addition of a fitting to secure couches during ground handling.	+0.4	NAA
Increase the crew couch attenuation based on calculated in lieu of estimated weights.	+1.2	NAA
Increase the crushable ribs based on actual weight of core in lieu of calculated weight.	+1.2	NAA
Increase the parachute attach fittings due to the addition of a ramp under the forward ring to protect parachute risers during tumbling and additional parachute tie down tees.	+5.7	NAA
Transfer the VHF recovery antenna erection mechanism from Communications due to recoding consistent with system design responsibility.	+1.8	NAA
Transfer the erection mechanism for the sea dye marker and swimmer umbilical from Earth Landing System due to recoding consistent with system design responsibility.	+3.5	NAA
STABILIZATION AND CONTROL	(+2.0)	
Increase the SCS equipment based on incorporation current Mineeapolis Honeywell status.	+2.0	NAA

COMMAND MODULE

CURRENT WEIGHT EMPTY CHANGES

	Weight Pounds	Change Responsibility
GUIDANCE AND NAVIGATION	(+3.0)	
Increase the equipment based on incorporating the latest MIT status report.	+3.0	NASA
CREW SYSTEMS	(+1.0)	
Increase the food stowage boxes based on reflecting current volume requirements.	+1.0	NAA
ENVIRONMENTAL CONTROL	(+5.0)	
Modify the evaporator control of the suit heat exchanger to an automatic back pressure control system similar to that employed in the water glycol evaporator per CCA 308.	+4.0	NASA
Increase the umbilical assembly plumbing due to replacing aluminum hardlines with steel based on umbilical separation system redesign per CCA 294.	+1.0	NASA
EARTH LANDING SYSTEM	(-5.0)	
Transfer the ejection mechanism for the sea dye marker and swimmer umbilical to Structure due to recoding consistent with system design responsibility.	-3.5	NAA
Decrease the flashing light due to a revised estimate based on current specification requirements.	-1.5	NAA
INSTRUMENTATION	(-25.0)	
Decrease the operational instrumentation based on calculation of current drawings.	-25.0	NAA
ELECTRICAL POWER	(+3.0)	
Add wiring provisions for the modification of the evaporator control of the ECS suit heat exchanger per CCA 308.	+3.0	NASA

COMMAND MODULE

CURRENT WEIGHT EMPTY CHANGES

	Weight Pounds	Change Responsibility
COMMUNICATIONS	(-4.0)	
Transfer the VHF recovery antenna erection mechanism to Structure due to recoding consistent with system design responsibility.	-1.8	NAA
Decrease the communication equipment based on current Collins information.	-2.2	NAA
CONTROLS AND DISPLAYS	(+4.0)	
Increase the main display sub panels based on revised rotary switch weights per vendor status.	+4.0	NAA
TOTAL COMMAND MODULE CURRENT WEIGHT EMPTY CHANGES	+39.0	

COMMAND MODULE

CURRENT USEFUL LOAD CHANGES

ITEM	Weight Pounds	Change Responsibility
CREW SYSTEMS	(+6.0)	
Increase the waste management provision due to refined estimates based on current design requirements.	+6.0	NAA
TOTAL COMMAND MODULE CURRENT USEFUL LOAD CHANGES	+6.0	
TOTAL COMMAND MODULE CURRENT WEIGHT EMPTY CHANGES	+39.0	
TOTAL COMMAND MODULE CURRENT WEIGHT CHANGES	+45.0	

SERVICE MODULE

CURRENT WEIGHT EMPTY CHANGES

ITEM	Weight Pounds	Change Responsibility
STRUCTURE	(+12.0)	
Add support structure for the supplemental water supply system required for extended earth orbital missions per CCA 309.	+12.0	NASA
ENVIRONMENTAL CONTROL	(+35.0)	
Add system provisions for the supplemental water supply system required for extended earth orbital missions per CCA 309.	+35.0	NASA
INSTRUMENTATION	(+9.0)	
Transfer the fuel cell instrumentation from Electrical Power due to recoding consistent with system design responsibility.	+9.0	NAA
ELECTRICAL POWER SYSTEM	(+7.0)	
Transfer the fuel cell instrumentation to Instrumentation due to recoding consistent with system design responsibility.	-9.0	NAA
Increase the RCS quad panel wiring based on revised wiring calculations.	+13.0	NAA
Add wiring provisions for the supplemental water supply system required for extended earth orbital missions per CCA 309.	+3.0	NASA
MAIN PROPULSION SYSTEM	(+8.0)	
Increase the propellant utilization and gauging system based on actual weights supplied at Simmonds.	+2.0	NAA
Increase the pressure regulators based on end item actual weights.	+4.0	NAA
Increase the main engine based on Aerojet status reflecting a revised estimate for the pneumatic valves.	+2.0	NAA
TOTAL SERVICE MODULE CURRENT WEIGHT CHANGES	+71.0	

SERVICE MODULE

CURRENT USEFUL LOAD CHANGES

ITEM	Weight Pounds	Change Responsibility
ENVIRONMENTAL CONTROL	(+114.0)	
Add water and nitrogen for the supplemental water supply system required for extended earth orbital mission per CCA 309.	+114.0	NASA
TOTAL SERVICE MODULE CURRENT USEFUL LOAD CHANGES	+114.0	
TOTAL SERVICE MODULE CURRENT WEIGHT EMPTY CHANGES	+71.0	
TOTAL SERVICE MODULE CURRENT WEIGHT CHANGES	+185.0	

LAUNCH ESCAPE SYSTEM

CURRENT WEIGHT CHANGES

ITEM	Weight Pounds	Change Responsibility
STRUCTURE	(+2.0)	
Increase the tower structure due to adding fittings to support the optical aligning fixture.	+3.0	NAA
Decrease the canard based on calculation of miscellaneous drawing changes.	-1.0	NAA
ELECTRICAL POWER	(+15.0)	
Increase the wiring based on revised estimates utilizing Airframe 009 actual weights as a basis.	+15.0	NAA
BALLAST	(-17.0)	
Decrease the ballast consistent with maintaining the LES control weight.	-17.0	NAA
TOTAL LAUNCH ESCAPE SYSTEM CURRENT WEIGHT CHANGES	-	