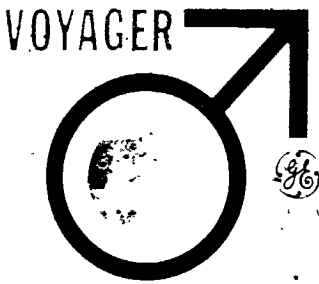
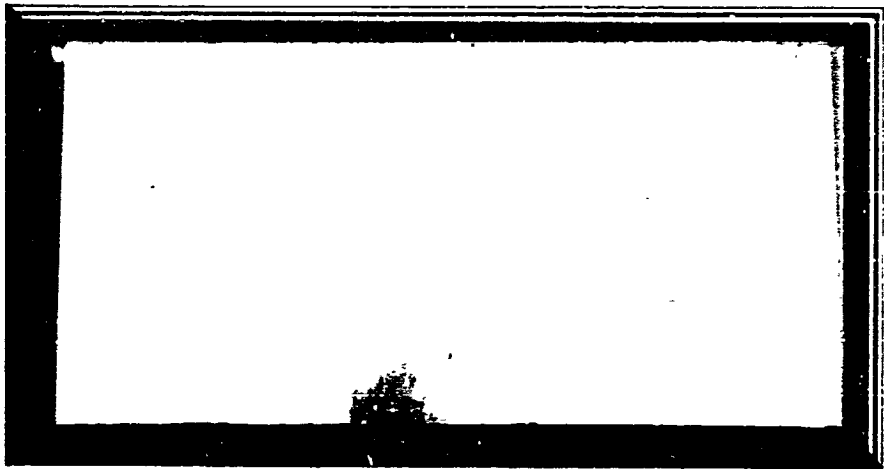


MISSILE AND SPACE
DIVISION



PHASE 1A, TASK C
FINAL REPORT

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DOCUMENT NUMBER VOY-CO-FR
28 JULY 1967

VOLUME 5
DATA MANAGEMENT STUDY

APPENDIX B
CONTRACTOR DATA PACKAGE
PLANETARY QUARANTINE (PQ)

PREPARED BY

W.E. JOHNSTON
F.S. NAYOR

ENGINEERING MANAGEMENT
VOYAGER SPACECRAFT SYSTEM PROJECT

APPROVED BY



A. FRANK, COGNIZANT ENGINEER
DATA MANAGEMENT AND CONTROL TASK
VOYAGER SPACECRAFT SYSTEM PROJECT

PREPARED FOR

JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
4800 OAK GROVE DRIVE
PASADENA, CALIFORNIA

UNDER JPL CONTRACT NO. 951112

GENERAL  ELECTRIC
MISSILE AND SPACE DIVISION
Valley Forge Space Technology Center
P. O. Box 8555 • Philadelphia, Penna. 19101

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2 DATA ITEM LIST/USER MATRIX.	2-1
3 USER FLOW DIAGRAMS	3-1
4 DATA REQUIREMENT DESCRIPTIONS (DRD'S)	4-1
5 DOCUMENTATION RELATIONSHIP TREES	5-1
6 DATA ITEM PHASING/FREQUENCY	6-1

INTRODUCTION

This appendix presents the Contractor Data Package (Data Item Matrix, Data Requirement Descriptions, User Flow Diagram, Document Relationship Tree, and Frequency and Phasing Charts) for Planetary Quarantine (PQ).

These data relate to microbiological factors; sterilization, contamination, and decontamination considerations; related assaying, assembly, and testing operations; and all other information of direct relevance to the planning, control, review, and reporting of the Voyager planetary quarantine program.

The complete list of Contractor Data Package appendixes is as follows:

- Appendix A - Technical Description and System Engineering (SE)
- Appendix B - Planetary Quarantine (PQ)
- Appendix C - Manufacturing (MG)
- Appendix D - Configuration Management (CM)
- Appendix E - Quality Assurance (QA)
- Appendix F - Test (TE) and Mission Operations (MP)
- Appendix G - Reliability Assurance (RA)
- Appendix H - Logistics and Support (LS)
- Appendix I - Overall Management (MA); Scheduling (SC); and Manning and Financial (MF)
- Appendix J - Procurement and Contracting (PC)
- Appendix K - Data Management (DM)
- Appendix L* - Facilities (FA)
- Appendix M* - Safety (SA)
- Appendix N* - Site Activation for Launch (AL)
- Appendix O* - Science (SI)
- Appendix P* - Related Project Interfaces (RP)
- Appendix Q* - Advanced Missions (AM)

*Appendixes L through Q prepared under Contract NAS7-584

DATA ITEM NUMBER	1 of 2	
	DATA ITEM	DESCRIPTION
	<u>PLANETARY QUARANTINE</u>	
	<u>GUIDELINES</u>	
PQ-001	Guidelines, System Operational Design for Planetary Quarantine	Establishes constraints on system operations
PQ-002	Guidelines, Equipment Design for Planetary Quarantine	Provides parameters for acceptable methods hardware design.
	<u>LISTS</u>	
PQ-003	List, Sterilizable Parts, General Engineering	A list of materials and components which have sterilization.
	<u>PLANS</u>	
PQ-004	Plan, Planetary Quarantine, Spacecraft	Provides the detailed overall plan for meeting design and operation of the spacecraft.
PQ-005	Plan, Planetary Quarantine, Planetary Vehicle Test	Provides a plan to maintain decontamination an acceptable value during combined spacecraft
	<u>PROCEDURES</u>	
PQ-006	Procedure, Planetary Quarantine, Operating	Provides operating procedures, constraints, manufacturing, quality assurance and test procedures for quarantine.
PQ-007	Procedure, Bio-Assay Test	Provides detailed procedures for conducting

* KEY INFORMAL DATA

DATA ITEM LIST/USER MATRIX

	APPLICABILITY TO FUNCTIONAL USERS AT CONTRACTOR LEVEL															
	SE	PQ	MG	CM	QA	TE	RA	LS	MA	SC	PC	MF	MP	DM	FA	
l modes to meet PQ requirements.	R	R	U	-	U	R	R	U	PM	-	-	-	U	-	-	
and approaches for	R	A	U	-	U	-	R	-	R	-	-	-	-	-	-	
ve been proven by test to withstand	R	A	U	U	U	-	R	U	U	-	-	-	-	-	-	
g PQ constraints in the	R	R	U	-	U	R	U	U	PM	U	U	-	-	-	U	
and sterilization levels to aft and capsule test.	R	R	U	-	U	R	U	U	PM	U	U	-	-	-	U	
and requirements for ersonnel to ensure maintenance of	U	R	R	U	R	U	U	U	PM	-	-	-	-	-	U	
biocassay tests.	U	A	-	-	-	U	U	U	-	-	-	-	-	-	-	

U - USE

R - REVIEW AUTHORITY

A - APPROVAL AUTHORITY

PM - PROJECT MANAGER APPROVAL

SA	AL	SI	RP	AM	APPLICABILITY AT SUBCONTRACTOR/VENDOR/SUPPLIER LEVELS						APPLICABILITY TO PROJECT BOARDS										
					PRINCIPAL SUB-CONTRACTORS	MAJOR SUB-CONTRACTORS	KEY SUBCON AND VENDORS	OTHER VENDORS	KEY SUPPLIERS	KEY SUBSUPPLIERS	CONFIGURATION CONTROL	CONFIGURATION MANAGEMENT	DATA REVIEW	DESIGN REVIEW	FAILURE REVIEW	INTEGRATED SAFETY	INTEGRATED TEST	MAKE OR BUY	MATERIAL REVIEW	SOURCE EVALUATION	SOURCE SELECTION
-	U	U	-	U	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-	-	-
-	-	U	-	U	(C/S)	(C/S)	(C)	NA	(C)	NA	-	-	-	-	-	-	-	-	-	-	-
-	U	U	-	U	(C/S)	(C/S)	(C)	NA	(C)	NA	-	-	-	-	-	-	U	-	-	-	-
U	U	-	-	U	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	U	-	-	-	-
U	U	-	-	U	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	U	-	-	-	-
U	U	-	-	U	(C/S)	(C/S)	(C)	NA	(C)	NA	-	-	-	-	-	-	U	-	-	-	-
U	U	-	-	-	(C/S)	(C/S)	(C)	NA	(C)	NA	-	-	-	-	-	-	U	-	-	-	-

C - PREPARED BY CONTRACTOR

S - PREPARED BY SUBCONTRACTOR/VENDOR/SUPPLIER

() - OPTIONAL APPLICATION

NA - NOT APPLICABLE

DATA ITEM NUMBER	2 of 2 DATA ITEM <u>PLANETARY QUARANTINE</u>	DESCRIPTION
	<u>REPORTS</u>	
PQ-008	Report, Bio-Assay Test	Provides the amount and extent of contamination of spacecraft hardware from bioassay test.
PQ-009	Report, Planetary Quarantine Analysis	Provides mathematical probability analysis on the probability of Mars contamination based on the spacecraft design.
PQ-010	Report, Planetary Quarantine Audit	Provides a current accounting of the contamination on the spacecraft and a log of bioassay test results.
PQ-011	Report, Planetary Quarantine, Planetary Vehicle (PV) Test	Provides the results of PV testing on the decontamination/sterilization integrity of the planetary vehicle.
	<u>SPECIFICATIONS</u>	
PQ-012	Specification, Bio-Assay Test Requirements	Defines the requirements for biological assays (e. g. or components to assay, confidence levels, number
PQ-013	Specification, Facilities Requirements, Planetary Quarantine Design	Specifies the clean room, clothing, and handling equipment requirements during all operations (manufacture, handling, testing) where control of contamination is required.
PQ-014	Specification, General Engineering, Planetary Quarantine Design	Specifies design constraints and requirements imposed by the Planetary Quarantine Plan.

* KEY INFORMAL DATA

DATA ITEM LIST/USER MATRIX

	APPLICABILITY TO FUNCTIONAL USERS AT CONTRACTOR LEVEL															
	SE	PQ	MG	CM	QA	TE	RA	LS	MA	SC	PC	MF	MP	DM	FA	SA
ilities and	U	A	-	-	U	U	U	-	-	-	-	-	-	-	U	-
tential of	R	A	-	-	U	U	U	-	-	-	-	-	-	-	-	-
ading on	U	R	U	-	U	U	U	-	PM	-	U	-	-	-	-	-
ation and	R	A	U	-	U	R	U	-	U	-	U	-	-	-	-	-
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				APPLICABILITY AT SUBCONTRACTOR/VENDOR/SUPPLIER LEVELS							APPLICABILITY TO PROJECT BOARDS											
				PRINCIPAL SUB-CONTRACTORS	MAJOR SUB-CONTRACTORS	KEY SUBCON AND VENDORS	OTHER VENDORS	KEY SUPPLIERS	KEY SUBSUPPLIERS	CONFIGURATION CONTROL	CONFIGURATION MANAGEMENT	DATA REVIEW	DESIGN REVIEW	FAILURE REVIEW	INTEGRATED SAFETY	INTEGRATED TEST	MAKE OR BUY	MATERIAL REVIEW	SOURCE EVALUATION	SOURCE SELECTION		
AL	SI	RP	AM																			
U	-	-	-	(S)	(S)	(S)	NA	(S)	NA	-	-	-	-	-	-	U	-	-	-			
-	-	-	-	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-	-			
U	-	-	-	(S)	(S)	(S)	NA	(S)	NA	-	-	-	-	-	-	U	-	-	-			
U	U	U	-	NA	NA	NA	NA	NA	NA	-	-	-	-	-	-	U	-	-	-			
U	-	-	-	(C)	(C)	(C)	NA	(C)	NA	U	U	-	-	-	-	U	-	-	-			
U	-	-	-	(C)	(C)	(C)	(C)	(C)	NA	U	U	-	-	-	-	-	-	-	-			
-	-	-	-	(C)	(C)	(C)	(C)	(C)	NA	U	U	-	-	-	-	-	-	-	-			

Planetary Quarantine (PQ) data Items have been included in the Engineering User Flow Diagrams. See Appendix A, Section 3.

Planetary Quarantine Data Requirement Descriptions

<u>DRD Number</u>	<u>Title</u>
PQ-001	Guidelines, System Operational Design For Planetary Quarantine
PQ-002	Guidelines, Equipment Design For Planetary Quarantine
PQ-003	List, Sterilizable Parts, General Engineering
PQ-004	Plan, Planetary Quarantine, Spacecraft
PQ-005	Plan, Planetary Quarantine, Planetary Vehicle Test
PQ-006	Procedure, Planetary Quarantine, Operating
PQ-007	Procedure, Bio-Assay Test
PQ-008	Report, Bio-Assay Test
PQ-009	Report, Planetary Quarantine Analysis
PQ-010	Report, Planetary Quarantine Audit
PQ-011	Report, Planetary Quarantine, Planetary Vehicle (PV) Test
PQ-012	Specification, Bio-Assay Test Requirements
PQ-013	Specification, Facilities Requirements, Planetary Quarantine Design
PQ-014	Specification, General Engineering, Planetary Quarantine Design

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GE EXHIBIT DRD PQ-001

VOYAGER DATA REQUIREMENT DESCRIPTION					DRD APPROVED BY	DATE	DATA CATEGORY	
ORGANIZATION ORIGINATING REQUIREMENT	CODE	OFFICE RESPONSIBLE FOR DRD	CODE	DRD PREPARED BY	DATE	CONTRACT NO	DRD NO.	
	PQ			F.S. Naylor	7/28/67		PQ-001	
TITLE OF DOCUMENT GUIDELINES, SYSTEM OPERATIONAL DESIGN FOR PLANETARY QUARANTINE					ORGANIZATION RESPONSIBLE FOR DOCUMENT PREPARATION	TASK OR SUBTASK	DRL ITEM NO	
					ORGANIZATION RESPONSIBLE FOR DOCUMENT REPRODUCTION	DRL NO	LEVEL NO	
					ORGANIZATION RESPONSIBLE FOR DOCUMENT DISTRIBUTION	DRL NO	FILE NO	
					TYPE OF DOCUMENT ☒ CONTROL ☐ ACTION ☐ REFERENCE ☐ INFORMATION			
USE OF DOCUMENT To provide background information and instructions to contractor system designers as to selection of operational modes and parameters that will meet the PQ constraints.					ORGANIZATION RESPONSIBLE FOR DOCUMENT STORAGE	NO OF COPIES		
					ESTIMATED MANHOURS FOR SINGLE PREPARATION	INFORMATION CUTOFF DATE OR MILESTONE		
					ESTIMATED COST (\$) FOR SINGLE PREPARATION	DATE DATA DUE TO USER		
					INTERRELATIONSHIP WITH OTHER DATA REQUIREMENTS: PQ-004 Plan, Planetary Quarantine, Spacecraft SE-008 Specification, System Performance/Design Requirements			
☐ ANNUALLY ☐ SEMI-ANNUALLY ☐ QUARTERLY ☐ BI-MONTHLY ☐ MONTHLY ☐ SEMI-MONTHLY ☐ BI-WEEKLY ☐ WEEKLY ☐ DAILY ☒ OTHERWISE, AS SPECIFIED		SDR						
		UPDATE (FREQUENCY OR MILESTONE)						
		As required through HDR						
CLASSIFICATION:					ESTIMATED EXPIRATION DATE			
☐ SECRET ☐ CONFIDENTIAL ☐ SECRET RESTRICTED DATA ☐ CONFIDENTIAL RESTRICTED DATA ☒ UNCLASSIFIED					☐ GROUP 1 ☐ GROUP 2 ☐ GROUP 3 ☐ GROUP 4 ☐ PROPRIETARY ☐ PUBLIC DOMAIN			
☐ SPECIAL HANDLING ☐ NASA DISCREET ☐ JPL DISCREET ☐ PROJECT DISCREET ☐ NOFORN					One time			
FORM OF DATA:					REFERENCE DOCUMENTS			
KIND OF DATA					APPLICABLE STANDARDS			
☒ PRINTED DOCUMENT ☐ CHART ☐ DIAGRAM ☐ DRAWING ☐ FILM (STATIC OR MOTION) ☐ ILLUSTRATION ☐ MODEL ☐ RECORDING (TAPE OR DISC) ☐ COMPUTER CARD ☐ COMPUTER TAPE ☐ MICROFILM (W/OR W/O CARD) ☐ OTHER					☐ ABSTRACT ☐ BROCHURE ☐ BULLETIN ☐ CATALOG ☐ CONTRACT ☐ DIRECTIVE ☐ DISCLOSURE ☐ ENGINEERING CHANGE ORDER ☐ REQUEST FOR ENGINEERING CHANGE PROPOSAL ☐ ENGINEERING CHANGE PROPOSAL ☐ HANDBOOK ☐ INDEX			
☐ INSTRUCTION ☐ LETTER ☐ LIST ☐ LOG ☐ MANUAL ☐ MEMORANDUM ☐ MINUTES ☐ PLAN ☐ PROCEDURE ☐ REGULATION ☐ REPORT ☐ SCHEDULE ☐ SPECIFICATION ☐ STANDARD ☐ VOUCHER ☒ Guideline								
REVIEWS AND/OR APPROVALS REQUIRED: (LIST IN ORDER OF SUBMITTAL)								
DRAFT		DATE		PREPUBLICATION PROOF		DATE		
SUBMIT FOR REVIEW TO								
		BY				BY		
SUBMIT FOR APPROVAL TO		BY				BY		
Project Manager								

VOYAGER DATA REQUIREMENT DESCRIPTION - 2ND SHEET

SPECIAL INSTRUCTIONS:

DRD NO.:

PQ-001

SPECIAL DISTRIBUTION. (IF DISTRIBUTION IS NOT COVERED BY AN EXISTING DDL WRITE IN DISTRIBUTION BELOW)

OUTLINE OF CONTENTS:

This data item shall establish system operational design constraints such as the following:

1. Restrictions on Attitude Control System operational modes.
2. Restrictions on biobarrier separation techniques and sequencing.
3. Restrictions on mechanical operations inducing vibration.

The contents will consist of:

1. Scope
2. Planetary quarantine constraints - overall
3. Planetary quarantine constraints during operational phases
 - a. Prelaunch
 - b. Launch
 - c. Near-Earth corrections
 - d. Interplanetary cruise
 - e. Near-Mars corrections/orbit insertion
 - f. Martian orbit maneuvers
4. Recommended modes of operation for maintenance of quarantine.
 - a. Information for each phase

(CONTINUE ON THIRD SHEET, IF NECESSARY, AND AFFIX TO THIS DRD.)

GE EXHIBIT DRD PQ-002

VOYAGER DATA REQUIREMENT DESCRIPTION				DRD APPROVED BY		DATE	DATA CATEGORY
ORGANIZATION ORIGINATING REQUIREMENT	CODE: PQ	OFFICE RESPONSIBLE FOR DRD	CODE	DRD PREPARED BY F. S. Naylor	DATE 7/28/67	CONTRACT NO	DRD NO. PQ-002
TITLE OF DOCUMENT GUIDELINES, EQUIPMENT DESIGN FOR PLANETARY QUARANTINE				ORGANIZATION RESPONSIBLE FOR DOCUMENT PREPARATION System Engineering		TASK OR SUBTASK	DRL ITEM NO
				ORGANIZATION RESPONSIBLE FOR DOCUMENT REPRODUCTION		DRL NO	LEVEL NO
				ORGANIZATION RESPONSIBLE FOR DOCUMENT DISTRIBUTION		DDL NO	FILE NO
TYPE OF DOCUMENT: ☒ CONTROL ☐ ACTION ☐ REFERENCE ☐ INFORMATION				ORGANIZATION RESPONSIBLE FOR DOCUMENT STOWAGE		NO OF COPIES 30	
USE OF DOCUMENT: To provide background and instructions to contractor design personnel as to methods and approach for designing to meet the planetary quarantine constraints.				ESTIMATED MANHOURS FOR SINGLE PREPARATION		INFORMATION CUTOFF DATE OR MILESTONE	
				ESTIMATED COST (\$) FOR SINGLE PREPARATION		DATE DATA DUE TO USER	
INTERRELATIONSHIP WITH OTHER DATA REQUIREMENTS. PQ-004 Plan, Planetary Quarantine PQ-013 Specification, Facilities Requirements, Planetary Quarantine Design				FREQUENCY OF ISSUE ☐ ANNUALLY ☐ SEMI-ANNUALLY ☐ QUARTERLY ☐ BI-MONTHLY ☐ MONTHLY ☐ SEMI-MONTHLY ☐ BI-WEEKLY ☐ WEEKLY ☐ DAILY ☒ OTHERWISE, AS SPECIFIED One time		PUBLICATION DATE SDR	
						UPDATE (FREQUENCY OR MILESTONE) As required through HDR ESTIMATED EXPIRATION DATE	
CLASSIFICATION ☐ SECRET ☐ CONFIDENTIAL ☐ SECRET RESTRICTED DATA ☐ CONFIDENTIAL RESTRICTED DATA ☒ UNCLASSIFIED				☐ GROUP 1 ☐ GROUP 2 ☐ GROUP 3 ☐ GROUP 4 ☐ PROPRIETARY ☐ PUBLIC DOMAIN		☐ SPECIAL HANDLING ☐ NASA DISCREET ☐ JPL DISCREET ☐ PROJECT DISCREET ☐ NOFORN	
FORM OF DATA: ☒ PRINTED DOCUMENT ☐ CHART ☐ DIAGRAM ☐ DRAWING ☐ FILM (STATIC OR MOTION) ☐ ILLUSTRATION ☐ MODEL ☐ RECORDING (TAPE OR DISC) ☐ COMPUTER CARD ☐ COMPUTER TAPE ☐ MICROFILM (W/OR W/O CARD) ☐ OTHER				KIND OF DATA: ☐ ABSTRACT ☐ BROCHURE ☐ BULLETIN ☐ CATALOG ☐ CONTRACT ☐ DIRECTIVE ☐ DISCLOSURE ☐ ENGINEERING CHANGE ORDER ☐ REQUEST FOR ENGINEERING CHANGE PROPOSAL ☐ ENGINEERING CHANGE PROPOSAL ☐ HANDBOOK ☐ INDEX ☐ INSTRUCTION ☐ LETTER ☐ LIST ☐ LOG ☐ MANUAL ☐ MEMORANDUM ☐ MINUTES ☒ PLAN ☐ PROCEDURE ☐ REGULATION ☐ REPORT ☐ SCHEDULE ☐ SPECIFICATION ☐ STANDARD ☐ VOUCHER			
				REFERENCE DOCUMENTS			
				APPLICABLE STANDARDS			
REVIEWS AND/OR APPROVALS REQUIRED: (LIST IN ORDER OF SUBMITTAL)							
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SUBMIT FOR REVIEW TO							
		BY				BY	
SUBMIT FOR APPROVAL TO:		BY				BY	
Manager,							
System Engineering							

GE EXHIBIT DRD PQ-002

VOYAGER DATA REQUIREMENT DESCRIPTION - 2ND SHEET

SPECIAL INSTRUCTIONS

DRD NO.:
PQ-002

SPECIAL DISTRIBUTION (IF DISTRIBUTION IS NOT COVERED BY AN EXISTING DDL WRITE IN DISTRIBUTION BELOW)

OUTLINE OF CONTENTS

1. Scope
2. Planetary quarantine constraints
3. Methods of fulfilling planetary constraints
 - a. General approvals
 - b. Mathematical model
 - c. Audit and analysis
4. Requirements (general)
5. Recommended approaches
 - a. Design
 - b. Material selection
 - c. Bioassay
 - d. Manufacturing
 - e. Shipping
 - f. Field operation
 - g. Quality assurance
6. Notes

(CONTINUE ON THIRD SHEET, IF NECESSARY, AND AFFIX TO THIS DRD.)

GE EXHIBIT DRD PQ-003

VOYAGER DATA REQUIREMENT DESCRIPTION				DRD APPROVED BY		DATE	DATA CATEGORY																								
ORGANIZATION ORIGINATING REQUIREMENT	CODE PQ	OFFICE RESPONSIBLE FOR DRD	CODE	DRD PREPARED BY F. S. Naylor	DATE 7/28/67	CONTRACT NO.	DRD NO. PQ-003																								
TITLE OF DOCUMENT LIST, STERILIZABLE PARTS, GENERAL ENGINEERING				ORGANIZATION RESPONSIBLE FOR DOCUMENT PREPARATION System Engineering		TASK OR SUBTASK	DRL ITEM NO.																								
				ORGANIZATION RESPONSIBLE FOR DOCUMENT REPRODUCTION		DRL NO.	LEVEL NO.																								
				ORGANIZATION RESPONSIBLE FOR DOCUMENT DISTRIBUTION		DDL NO.	FILE NO.																								
TYPE OF DOCUMENT ☐ CONTROL ☐ ACTION ☒ REFERENCE ☐ INFORMATION				ORGANIZATION RESPONSIBLE FOR DOCUMENT STOWAGE		NO OF COPIES 25																									
USE OF DOCUMENT Provides a listing of materials, components, and parts which may be subjected to the approved sterilization cycles without degradation.				ESTIMATED MANHOURS FOR SINGLE PREPARATION		INFORMATION CUTOFF DATE OR MILESTONE																									
				ESTIMATED COST (\$) FOR SINGLE PREPARATION		DATE DATA DUE TO USER																									
INTERRELATIONSHIP WITH OTHER DATA REQUIREMENTS. PQ-002 Guidelines, Equipment Design for Planetary Quarantine SE-008 Specification, System Performance/Design Requirements				FREQUENCY OF ISSUE ☐ ANNUALLY ☐ SEMI-ANNUALLY ☐ QUARTERLY ☐ BI-MONTHLY ☐ MONTHLY ☐ SEMI-MONTHLY ☐ BI-WEEKLY ☐ WEEKLY ☐ DAILY ☒ OTHERWISE, AS SPECIFIED		PUBLICATION DATE SDR																									
				One time		UPDATE (FREQUENCY OR MILESTONE) Maintain current ESTIMATED EXPIRATION DATE																									
CLASSIFICATION ☐ SECRET ☐ CONFIDENTIAL ☐ SECRET RESTRICTED DATA ☐ CONFIDENTIAL RESTRICTED DATA ☒ UNCLASSIFIED				☐ GROUP 1 ☐ GROUP 2 ☐ GROUP 3 ☐ GROUP 4 ☐ PROPRIETARY ☐ PUBLIC DOMAIN		☐ SPECIAL HANDLING ☐ NASA DISCREET ☐ JPL DISCREET ☐ PROJECT DISCREET ☐ NOFORN																									
FORM OF DATA: ☒ PRINTED DOCUMENT ☐ CHART ☐ DIAGRAM ☐ DRAWING ☐ FILM (STATIC OR MOTION) ☐ ILLUSTRATION ☐ MODEL ☐ RECORDING (TAPE OR DISC) ☐ COMPUTER CARD ☐ COMPUTER TAPE ☐ MICROFILM (W/OR W/O CARD) ☐ OTHER				KIND OF DATA ☐ ABSTRACT ☐ BROCHURE ☐ BULLETIN ☐ CATALOG ☐ CONTRACT ☐ DIRECTIVE ☐ DISCLOSURE ☐ ENGINEERING CHANGE ORDER ☐ REQUEST FOR ENGINEERING CHANGE PROPOSAL ☐ ENGINEERING CHANGE PROPOSAL ☐ HANDBOOK ☐ INDEX ☐ INSTRUCTION ☐ LETTER ☒ LIST ☐ LOG ☐ MANUAL ☐ MEMORANDUM ☐ MINUTES ☐ PLAN ☐ PROCEDURE ☐ REGULATION ☐ REPORT ☐ SCHEDULE ☐ SPECIFICATION ☐ STANDARD ☐ VOUCHER																											
REVIEWS AND/OR APPROVALS REQUIRED (LIST IN ORDER OF SUBMITTAL)				REFERENCE DOCUMENTS NASA Sterilization Specifications.																											
				APPLICABLE STANDARDS																											
<table border="0"> <tr> <td colspan="2">DRAFT</td> <td colspan="2">DATE</td> <td colspan="2">PREPUBLICATION PROOF</td> <td colspan="2">DATE</td> </tr> <tr> <td colspan="2">SUBMIT FOR REVIEW TO</td> <td colspan="2">BY</td> <td colspan="2">BY</td> <td colspan="2">BY</td> </tr> <tr> <td colspan="2">SUBMIT FOR APPROVAL TO</td> <td colspan="2">BY</td> <td colspan="2">BY</td> <td colspan="2">BY</td> </tr> </table>								DRAFT		DATE		PREPUBLICATION PROOF		DATE		SUBMIT FOR REVIEW TO		BY		BY		BY		SUBMIT FOR APPROVAL TO		BY		BY		BY	
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SUBMIT FOR APPROVAL TO		BY		BY		BY																									
Manager. System Engineering																															

GE EXHIBIT DRD PQ-003

VOYAGER DATA REQUIREMENT DESCRIPTION - 2ND SHEET

SPECIAL INSTRUCTIONS

DRD NO.:

PQ-003

Data for this data item may be obtained from government and industrial facilities where extensive sterilization work has been performed. Additional experimentation will be required to provide information on materials not previously subjected to sterilization.

SPECIAL DISTRIBUTION. (IF DISTRIBUTION IS NOT COVERED BY AN EXISTING DDL WRITE IN DISTRIBUTION BELOW)

OUTLINE OF CONTENTS:

1. Scope
2. References
 - a. NASA sterilization specifications
 - b. Material compatibility studies
3. List of sterilizable parts
 - a. Sterilizable components and parts list
(valves, regulators, explosives, seals, etc.)
 - (1) Dry heat compatible
 - (2) Steam compatible
 - (3) Chemical sterilant compatible
 - b. Sterilizable materials list
 - (1) Dry heat compatible
 - (2) Steam compatible
 - (3) Chemical sterilant compatible
4. Data sources

GE EXHIBIT DRD PQ-004

VOYAGER DATA REQUIREMENT DESCRIPTION					DRD APPROVED BY		DATE	DATA CATEGORY
ORGANIZATION ORIGINATING REQUIREMENT	CODE PQ	OFFICE RESPONSIBLE FOR DRD	CODE	DRD PREPARED BY F. S. Navor	DATE 7/28/67	CONTRACT NO.	DRD NO. PQ-004	
TITLE OF DOCUMENT: PLAN, PLANETARY QUARANTINE, SPACECRAFT					ORGANIZATION RESPONSIBLE FOR DOCUMENT PREPARATION System Engineering		TASK OR SUBTASK	DRD ITEM NO.
					ORGANIZATION RESPONSIBLE FOR DOCUMENT REPRODUCTION		DRL NO.	LEVEL NO.
					ORGANIZATION RESPONSIBLE FOR DOCUMENT DISTRIBUTION		DDL NO.	FILE NO.
TYPE OF DOCUMENT ☒ CONTROL ☐ ACTION ☐ REFERENCE ☐ INFORMATION					ORGANIZATION RESPONSIBLE FOR DOCUMENT STOWAGE		NO OF COPIES 50	
USE OF DOCUMENT: Discloses the overall plan for meeting the PQ constraints and serves as a basis for contractor detailed design and planning for the spacecraft as a separate entity.					ESTIMATED MANHOURS FOR SINGLE PREPARATION		INFORMATION CUTOFF DATE OR MILESTONE	
					ESTIMATED COST (\$) FOR SINGLE PREPARATION		DATE DATA DUE TO USER	
					FREQUENCY OF ISSUE ☐ ANNUALLY ☐ SEMI-ANNUALLY ☐ QUARTERLY ☐ BI-MONTHLY ☐ MONTHLY ☐ SEMI-MONTHLY ☐ BI-WEEKLY ☐ WEEKLY ☐ DAILY ☒ OTHERWISE, AS SPECIFIED One time		PUBLICATION DATE SDR UPDATE (FREQUENCY OR MILESTONE) As required through FACI ESTIMATED EXPIRATION DATE	
INTERRELATIONSHIP WITH OTHER DATA REQUIREMENTS: PQ-005 Plan, Planetary Quarantine, Planetary Vehicle Test SE-008 Specification, System Performance/Design Requirements					CLASSIFICATION ☐ SECRET ☐ CONFIDENTIAL ☐ SECRET RESTRICTED DATA ☐ CONFIDENTIAL RESTRICTED DATA ☒ UNCLASSIFIED		☐ GROUP 1 ☐ GROUP 2 ☐ GROUP 3 ☐ GROUP 4 ☐ PROPRIETARY ☐ PUBLIC DOMAIN ☐ SPECIAL HANDLING ☐ NASA DISCREET ☐ JPL DISCREET ☐ PROJECT DISCREET ☐ NOFORN	
					FORM OF DATA: ☒ PRINTED DOCUMENT ☐ CHART ☐ DIAGRAM ☐ DRAWING ☐ FILM (STATIC OR MOTION) ☐ ILLUSTRATION ☐ MODEL ☐ RECORDING (TAPE OR DISC) ☐ COMPUTER CARD ☐ COMPUTER TAPE ☐ MICROFILM (W/OR W/O CARD) ☐ OTHER		KIND OF DATA: ☐ ABSTRACT ☐ BROCHURE ☐ BULLETIN ☐ CATALOG ☐ CONTRACT ☐ DIRECTIVE ☐ DISCLOSURE ☐ ENGINEERING CHANGE ORDER ☐ REQUEST FOR ENGINEERING CHANGE PROPOSAL ☐ ENGINEERING CHANGE PROPOSAL ☐ HANDBOOK ☐ INDEX ☐ INSTRUCTION ☐ LETTER ☐ LIST ☐ LOG ☐ MANUAL ☐ MEMORANDUM ☐ MINUTES ☒ PLAN ☐ PROCEDURE ☐ REGULATION ☐ REPORT ☐ SCHEDULE ☐ SPECIFICATION ☐ STANDARD ☐ VOUCHER	
REVIEWS AND/OR APPROVALS REQUIRED: (LIST IN ORDER OF SUBMITTAL)								
DRAFT		DATE		PREPUBLICATION PROOF		DATE		
SUBMIT FOR REVIEW TO								
		BY				BY		
SUBMIT FOR APPROVAL TO		BY				BY		
Project Manager								

GE EXHIBIT DRD PQ-004

VOYAGER DATA REQUIREMENT DESCRIPTION - 2ND SHEET

SPECIAL INSTRUCTIONS

DRD NO.:
PQ-004

SPECIAL DISTRIBUTION. (IF DISTRIBUTION IS NOT COVERED BY AN EXISTING DDL WRITE IN DISTRIBUTION BELOW)

OUTLINE OF CONTENTS.

1. Scope
2. Objectives of plan
3. Planetary quarantine constraints - spacecraft.
4. Planetary quarantine functional organization
 - a. Organizational responsibilities
 - b. Support organizations
5. Integrated planetary quarantine plan - spacecraft
 - a. Mathematical model/probability analysis
 - (1) Format
 - (2) Computer program
 - b. Material Selection criteria/controls
 - c. Test, Manufacturing and quality control criteris
 - (1) Handling
 - (2) Shipping
 - (3) Inspection
 - (4) Disassembly/repair
 - d. Sterilization/decontamination requirements
 - e. Clean room requirements

(CONTINUE ON THIRD SHEET, IF NECESSARY, AND AFFIX TO THIS DRD.)

GE EXHIBIT DRD PQ-004

- f. Bioassay requirements
- g. Maintenance of decontamination integrity
 - (1) Post-decontamination Repair/Replacement
- 6. Planetary quarantine validation
 - a. Documentation
 - (1) Material selection reports
 - (2) Manufacturing operations reports
 - (3) Test operations reports
 - (4) Bioassay reports
 - b. Proof - Constraints met/maintained
 - (1) Planetary quarantine audits
 - (2) Planetary quarantine analysis
 - c. Approval cycles
- 7. Planetary quarantine schedule of events
- 8. References

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VOYAGER DATA REQUIREMENT DESCRIPTION				DRD APPROVED BY		DATE	DATA CATEGORY
ORGANIZATION ORIGINATING REQUIREMENT	CODE PQ	OFFICE RESPONSIBLE FOR DRD	CODE	DRD PREPARED BY F. S. Naylor	DATE 7/28/67	CONTRACT NO	DRD NO PQ-005
TITLE OF DOCUMENT PLAN, PLANETARY QUARANTINE, PLANETARY VEHICLE TEST				ORGANIZATION RESPONSIBLE FOR DOCUMENT PREPARATION System Engineering		TASK OR SUBTASK	DRD ITEM NO
				ORGANIZATION RESPONSIBLE FOR DOCUMENT REPRODUCTION		DRL NO	LEVEL NO
				ORGANIZATION RESPONSIBLE FOR DOCUMENT DISTRIBUTION		DDL NO	FILE NO
TYPE OF DOCUMENT ☒ CONTROL ☐ ACTION ☐ REFERENCE ☐ INFORMATION				ORGANIZATION RESPONSIBLE FOR DOCUMENT STORAGE		NO OF COPIES 25	
USE OF DOCUMENT To provide a plan for the maintenance of spacecraft and capsule decontamination and/or sterilization integrity during combined planetary vehicle testing.				ESTIMATED MANHOURS FOR SINGLE PREPARATION		INFORMATION CUTOFF DATE OR MILESTONE	
				ESTIMATED COST (\$) FOR SINGLE PREPARATION		DATE DATA DUE TO USER	
INTERRELATIONSHIP WITH OTHER DATA REQUIREMENTS: PQ-004 Plan, Planetary Quarantine, Spacecraft TE-112 Plan, Spacecraft Mission Operations Test				FREQUENCY OF ISSUE ☐ ANNUALLY ☐ SEMI-ANNUALLY ☐ QUARTERLY ☐ BI-MONTHLY ☐ MONTHLY ☐ SEMI-MONTHLY ☐ BI-WEEKLY ☐ WEEKLY ☐ DAILY ☒ OTHERWISE AS SPECIFIED One time		PUBLICATION DATE PDR	
						UPDATE (FREQUENCY OR MILESTONE) As required through FACI	
CLASSIFICATION: ☐ SECRET ☐ CONFIDENTIAL ☐ SECRET RESTRICTED DATA ☐ CONFIDENTIAL RESTRICTED DATA ☒ UNCLASSIFIED				☐ GROUP 1 ☐ GROUP 2 ☐ GROUP 3 ☐ GROUP 4 ☐ PROPRIETARY ☐ PUBLIC DOMAIN		☐ SPECIAL HANDLING ☐ NASA DISCREET ☐ JPL DISCREET ☐ PROJECT DISCREET ☐ NOFORN	
FORM OF DATA: ☒ PRINTED DOCUMENT ☐ CHART ☐ DIAGRAM ☐ DRAWING ☐ FILM (STATIC OR MOTION) ☐ ILLUSTRATION ☐ MODEL ☐ RECORDING (TAPE OR DISC) ☐ COMPUTER CARD ☐ COMPUTER TAPE ☐ MICROFILM (W/OR W/O CARD) ☐ OTHER				KIND OF DATA: ☐ ABSTRACT ☐ BROCHURE ☐ BULLETIN ☐ CATALOG ☐ CONTRACT ☐ DIRECTIVE ☐ DISCLOSURE ☐ ENGINEERING CHANGE ORDER ☐ REQUEST FOR ENGINEERING CHANGE PROPOSAL ☐ ENGINEERING CHANGE PROPOSAL ☐ HANDBOOK ☐ INDEX ☐ INSTRUCTION ☐ LETTER ☐ LIST ☐ LOG ☐ MANUAL ☐ MEMORANDUM ☐ MINUTES ☒ PLAN ☐ PROCEDURE ☐ REGULATION ☐ REPORT ☐ SCHEDULE ☐ SPECIFICATION ☐ STANDARD ☐ VOUCHER			
REVIEWS AND/OR APPROVALS REQUIRED: (LIST IN ORDER OF SUBMITTAL)				REFERENCE DOCUMENTS			
APPLICABLE STANDARDS							
SUBMIT FOR REVIEW TO _____				DATE _____			
BY _____				PREPUBLICATION PROOF _____			
SUBMIT FOR APPROVAL TO _____				DATE _____			
BY _____				BY _____			
Project Manager							

VOYAGER DATA REQUIREMENT DESCRIPTION - 2ND SHEET

SPECIAL INSTRUCTIONS

DRD NO.
PQ-005

SPECIAL DISTRIBUTION (IF DISTRIBUTION IS NOT COVERED BY AN EXISTING DDL WRITE IN DISTRIBUTION BELOW)

OUTLINE OF CONTENTS:

1. Scope
2. Objectives
 - a. Condition of capsule
 - b. Condition of spacecraft
3. Plan
 - a. Receiving inspection (bioassay)
 - b. Transportation and handling
 - c. Assembly precautions
 - d. Instrumentation limitations
 - e. Test restrictions
 - (1) Extent of operation
 - (2) Extent of disassembly
 - f. Aseptic Repair Requirements
4. Test flow diagrams - detailing points of bioassay, disassembly, and potential quarantine compromise.
5. Organizational responsibility

(CONTINUE ON THIRD SHEET, IF NECESSARY, AND AFFIX TO THIS DRD.)

GE EXHIBIT DRD PQ-006

VOYAGER DATA REQUIREMENT DESCRIPTION				DRD APPROVED BY		DATE	DATA CATEGORY				
ORGANIZATION ORIGINATING REQUIREMENT	CODE PQ	OFFICE RESPONSIBLE FOR DRD	CODE	DRD PREPARED BY F. S. Naylor	DATE 7/28/67	CONTRACT NO	DRD NO PQ-006				
TITLE OF DOCUMENT PROCEDURE, PLANETARY QUARANTINE, OPERATING				ORGANIZATION RESPONSIBLE FOR DOCUMENT PREPARATION System Engineering		TASK OR SUBTASK	DRL ITEM NO				
				ORGANIZATION RESPONSIBLE FOR DOCUMENT REPRODUCTION		DRL NO.	LEVEL NO				
				ORGANIZATION RESPONSIBLE FOR DOCUMENT DISTRIBUTION		DDL NO.	FILE NO				
TYPE OF DOCUMENT ☒ CONTROL ☐ ACTION ☐ REFERENCE ☐ INFORMATION				ORGANIZATION RESPONSIBLE FOR DOCUMENT STORAGE		NO OF COPIES 25					
USE OF DOCUMENT To provide contractor manufacturing, quality assurance, and test personnel with a set of operating procedures, constraints, and requirements to ensure the maintenance of the planetary quarantine.				ESTIMATED MANHOURS FOR SINGLE PREPARATION		INFORMATION CUTOFF DATE OR MILESTONE					
				ESTIMATED COST (\$) FOR SINGLE PREPARATION		DATE DATA DUE TO USER					
				FREQUENCY OF ISSUE ☐ ANNUALLY ☐ SEMI-ANNUALLY ☐ QUARTERLY ☐ BI-MONTHLY ☐ MONTHLY ☐ SEMI-MONTHLY ☐ BI-WEEKLY ☐ WEEKLY ☐ DAILY ☒ OTHERWISE, AS SPECIFIED One time		PUBLICATION DATE. UPDATE (FREQUENCY OR MILESTONE) As required through FACI ESTIMATED EXPIRATION DATE					
INTERRELATIONSHIP WITH OTHER DATA REQUIREMENTS: PQ-004 Plan, Planetary Quarantine, Spacecraft PQ-005 Plan, Planetary Quarantine, Planetary Vehicle Test				CLASSIFICATION: ☐ SECRET ☐ CONFIDENTIAL ☐ SECRET RESTRICTED DATA ☐ CONFIDENTIAL RESTRICTED DATA ☒ UNCLASSIFIED		☐ GROUP 1 ☐ GROUP 2 ☐ GROUP 3 ☐ GROUP 4 ☐ PROPRIETARY ☐ PUBLIC DOMAIN ☐ SPECIAL HANDLING ☐ NASA DISCREET ☐ JPL DISCREET ☐ PROJECT DISCREET ☐ NOFORN					
FORM OF DATA. ☒ PRINTED DOCUMENT ☐ CHART ☐ DIAGRAM ☐ DRAWING ☐ FILM (STATIC OR MOTION) ☐ ILLUSTRATION ☐ MODEL ☐ RECORDING (TAPE OR DISC) ☐ COMPUTER CARD ☐ COMPUTER TAPE ☐ MICROFILM (W/OR W/O CARD) ☐ OTHER				KIND OF DATA ☐ ABSTRACT ☐ BROCHURE ☐ BULLETIN ☐ CATALOG ☐ CONTRACT ☐ DIRECTIVE ☐ DISCLOSURE ☐ ENGINEERING CHANGE ORDER ☐ REQUEST FOR ENGINEERING CHANGE PROPOSAL ☐ ENGINEERING CHANGE PROPOSAL ☐ HANDBOOK ☐ INDEX ☐ INSTRUCTION ☐ LETTER ☐ LIST ☐ LOG ☐ MANUAL ☐ MEMORANDUM ☐ MINUTES ☐ PLAN ☒ PROCEDURE ☐ REGULATION ☐ REPORT ☐ SCHEDULE ☐ SPECIFICATION ☐ STANDARD ☐ VOUCHER				REFERENCE DOCUMENTS			
				APPLICABLE STANDARDS							
REVIEWS AND/OR APPROVALS REQUIRED: (LIST IN ORDER OF SUBMITTAL)											
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Project Manager											

CE EXHIBIT DRD PQ-006

VOYAGER DATA REQUIREMENT DESCRIPTION - 2ND SHEET

SPECIAL INSTRUCTIONS

DRD NO.:

PQ-006

SPECIAL DISTRIBUTION (IF DISTRIBUTION IS NOT COVERED BY AN EXISTING DDL WRITE IN DISTRIBUTION BELOW)

OUTLINE OF CONTENTS:

1. **Scope**
2. **Planetary quarantine constraints**
3. **Planetary quarantine operating procedures**
 - a. **Manufacturing**
 - (1) **Cleaning**
 - (2) **Handling**
 - (3) **Assembly**
 - (4) **Shipping**
 - b. **Test**
 - (1) **Handling**
 - (2) **Repair/replacement**
 - (3) **Shipping**
 - c. **Quality Assurance**
 - (1) **Inspection**
4. **References**

(CONTINUE ON THIRD SHEET, IF NECESSARY, AND AFFIX TO THIS DRD.)

GE EXHIBIT DRD PQ-007

VOYAGER DATA REQUIREMENT DESCRIPTION				DRD APPROVED BY		DATE		DATA CATEGORY					
ORGANIZATION ORIGINATING REQUIREMENT		CODE PQ	OFFICE RESPONSIBLE FOR DRD		CODE	DRD PREPARED BY F. S. Naylor		DATE 7/28/67		CONTRACT NO.		DRD NO. PQ-007	
TITLE OF DOCUMENT PROCEDURE, BIOASSAY TEST						ORGANIZATION RESPONSIBLE FOR DOCUMENT PREPARATION System Engineering		TASK OR SUBTASK		DRL ITEM NO			
						ORGANIZATION RESPONSIBLE FOR DOCUMENT REPRODUCTION		DRL NO.		LEVEL NO			
						ORGANIZATION RESPONSIBLE FOR DOCUMENT DISTRIBUTION		DDL NO.		FILE NO			
						TYPE OF DOCUMENT		☒ CONTROL		☐ ACTION		☐ REFERENCE	
USE OF DOCUMENT Establish detailed, step-by-step procedures for the conduct of bioassay tests by contractor personnel; implementation of bioassay test requirements specifications						ORGANIZATION RESPONSIBLE FOR DOCUMENT STOWAGE		NO OF COPIES 30					
						ESTIMATED MANHOURS FOR SINGLE PREPARATION		INFORMATION CUTOFF DATE OR MILESTONE					
						ESTIMATED COST (\$) FOR SINGLE PREPARATION		DATE DATA DUE TO USER					
						FREQUENCY OF ISSUE		PUBLICATION DATE					
INTERRELATIONSHIP WITH OTHER DATA REQUIREMENTS: PQ-004 Plan, Planetary Quarantine, Spacecraft PQ-005 Plan, Planetary Quarantine, Planetary Vehicle Test PQ-012 Specification, Bioassay Test Requirements TE-112 Plan, Spacecraft Mission Operations Test						☐ ANNUALLY ☐ SEMI-ANNUALLY ☐ QUARTERLY ☐ BI-MONTHLY ☐ MONTHLY ☐ SEMI-MONTHLY ☐ BI-WEEKLY ☐ WEEKLY ☐ DAILY ☒ OTHERWISE, AS SPECIFIED One time		UPDATE (FREQUENCY OR MILESTONE) As required through FACI					
								ESTIMATED EXPIRATION DATE					
								CLASSIFICATION		☐ GROUP 1 ☐ GROUP 2 ☐ GROUP 3 ☐ GROUP 4 ☐ PROPRIETARY ☐ PUBLIC DOMAIN		☐ SPECIAL HANDLING ☐ NASA DISCREET ☐ JPL DISCREET ☐ PROJECT DISCREET ☐ NOFORN	
								☐ SECRET ☐ CONFIDENTIAL ☐ SECRET RESTRICTED DATA ☐ CONFIDENTIAL RESTRICTED DATA ☒ UNCLASSIFIED					
FORM OF DATA			KIND OF DATA			REFERENCE DOCUMENTS NASA, Standard Procedures for the Microbiological Examination of Space Hardware							
☒ PRINTED DOCUMENT ☐ CHART ☐ DIAGRAM ☐ DRAWING ☐ FILM (STATIC OR MOTION) ☐ ILLUSTRATION ☐ MODEL ☐ RECORDING (TAPE OR DISC) ☐ COMPUTER CARD ☐ COMPUTER TAPE ☐ MICROFILM (W/OR W/O CARD) ☐ OTHER			☐ ABSTRACT ☐ BROCHURE ☐ BULLETIN ☐ CATALOG ☐ CONTRACT ☐ DIRECTIVE ☐ DISCLOSURE ☐ ENGINEERING CHANGE ORDER ☐ REQUEST FOR ENGINEERING CHANGE PROPOSAL ☐ ENGINEERING CHANGE PROPOSAL ☐ HANDBOOK ☐ INDEX									☐ INSTRUCTION ☐ LETTER ☐ LIST ☐ LOG ☐ MANUAL ☐ MEMORANDUM ☐ MINUTES ☐ PLAN ☒ PROCEDURE ☐ REGULATION ☐ REPORT ☐ SCHEDULE ☐ SPECIFICATION ☐ STANDARD ☐ VOUCHER	
APPLICABLE STANDARDS													
REVIEWS AND/OR APPROVALS REQUIRED (LIST IN ORDER OF SUBMITTAL)													
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SUBMIT FOR APPROVAL TO		BY		BY		BY							
Manager, System Engineering													

GE EXHIBIT DRD PQ-007

VOYAGER DATA REQUIREMENT DESCRIPTION - 2ND SHEET

SPECIAL INSTRUCTIONS

DRD NO.:

PQ-007

Bioassay techniques to be employed shall be in accordance with those techniques set forth in the NASA "Standard Procedures for the Microbiological Examination of Space Hardware," by L. B. Hall and O. E. Reynolds, 1966.

SPECIAL DISTRIBUTION: (IF DISTRIBUTION IS NOT COVERED BY AN EXISTING DDL WRITE IN DISTRIBUTION BELOW)

OUTLINE OF CONTENTS:

1. Scope
2. Reference Documents (Specs, NASA Procedures, etc.)
3. Bioassay Procedure
 - a. Facility Monitoring (air flow, filtration system, and clean room surfaces)
 - (1) Preparation for assay
 - (2) Step-by-step assay procedure
 - (3) Data recording forms
 - (4) Approval sheets
 - b. Hardware monitoring
 - Components
 - Subsystems
 - Systems
 - (1) Preparation for assay
 - (2) Step-by-step assay procedure
 - (3) Data recording forms
 - (4) Approval sheets
4. Quality assurance provisions
5. Appendixes

(CONTINUE ON THIRD SHEET, IF NECESSARY, AND AFFIX TO THIS DRD.)

GE EXHIBIT DRD PQ-008

VOYAGER DATA REQUIREMENT DESCRIPTION				DRD APPROVED BY		DATE	DATA CATEGORY
ORGANIZATION ORIGINATING REQUIREMENT	CODE	OFFICE RESPONSIBLE FOR DRD	CODE	DRD PREPARED BY	DATE	CONTRACT NO	DRD NO.
	PQ			H. G. Lorsch	7/28/67		PQ-008
TITLE OF DOCUMENT REPORT, BIOASSAY TEST				ORGANIZATION RESPONSIBLE FOR DOCUMENT PREPARATION System Engineering		TASK OR SUBTASK	DRD ITEM NO
				ORGANIZATION RESPONSIBLE FOR DOCUMENT REPRODUCTION		DRD NO.	LEVEL NO
				ORGANIZATION RESPONSIBLE FOR DOCUMENT DISTRIBUTION		DDL NO.	FILE NO
TYPE OF DOCUMENT ☐ CONTROL ☐ ACTION ☐ REFERENCE ☒ INFORMATION				ORGANIZATION RESPONSIBLE FOR DOCUMENT STORAGE		NO OF COPIES 50	
USE OF DOCUMENT Document the degree of biological contamination of facilities and spacecraft hardware as ascertained by contractor tests.				ESTIMATED MAN HOURS FOR SINGLE PREPARATION		INFORMATION CUTOFF DATE OR MILESTONE	
				ESTIMATED COST (\$) FOR SINGLE PREPARATION		DATE DATA DUE TO USER	
INTERRELATIONSHIP WITH OTHER DATA REQUIREMENTS: PQ-004 Plan, Planetary Quarantine, Spacecraft PQ-007 Procedure, Bioassay Test PQ-012 Specification, Bioassay Test Requirements				FREQUENCY OF ISSUE ☐ ANNUALLY ☐ SEMI-ANNUALLY ☐ QUARTERLY ☐ BI-MONTHLY ☐ MONTHLY ☐ SEMI-MONTHLY ☐ BI-WEEKLY ☐ WEEKLY ☐ DAILY ☒ OTHERWISE, AS SPECIFIED Maintain current		PUBLICATION DATE HDR	
						UPDATE (FREQUENCY OR MILESTONE) As required through FACI ESTIMATED EXPIRATION DATE	
CLASSIFICATION ☐ SECRET ☐ CONFIDENTIAL ☐ SECRET RESTRICTED DATA ☐ CONFIDENTIAL RESTRICTED DATA ☒ UNCLASSIFIED				☐ GROUP 1 ☐ GROUP 2 ☐ GROUP 3 ☐ GROUP 4 ☐ PROPRIETARY ☐ PUBLIC DOMAIN		☐ SPECIAL HANDLING ☐ NASA DISCREET ☐ JPL DISCREET ☐ PROJECT DISCREET ☐ NOFORM	
FORM OF DATA ☒ PRINTED DOCUMENT ☐ CHART ☐ DIAGRAM ☐ DRAWING ☐ FILM (STATIC OR MOTION) ☐ ILLUSTRATION ☐ MODEL ☐ RECORDING (TAPE OR DISC) ☐ COMPUTER CARD ☐ COMPUTER TAPE ☐ MICROFILM (W/OR W/O CARD) ☐ OTHER				KIND OF DATA ☐ ABSTRACT ☐ BROCHURE ☐ BULLETIN ☐ CATALOG ☐ CONTRACT ☐ DIRECTIVE ☐ DISCLOSURE ☐ ENGINEERING CHANGE ORDER ☐ REQUEST FOR ENGINEERING CHANGE PROPOSAL ☐ ENGINEERING CHANGE PROPOSAL ☐ HANDBOOK ☐ INDEX			
				☐ INSTRUCTION ☐ LETTER ☐ LIST ☐ LOG ☐ MANUAL ☐ MEMORANDUM ☐ MINUTES ☐ PLAN ☐ PROCEDURE ☐ REGULATION ☒ REPORT ☐ SCHEDULE ☐ SPECIFICATION ☐ STANDARD ☐ VOUCHER			
REFERENCE DOCUMENTS NASA/JPL Bioassay Procedures				APPLICABLE STANDARDS			
REVIEWS AND/OR APPROVALS REQUIRED: (LIST IN ORDER OF SUBMITTAL)							
DRAFT		DATE		PREPUBLICATION PROOF		DATE	
SUBMIT FOR REVIEW TO:							
		BY				BY	
SUBMIT FOR APPROVAL TO		BY				BY	
Manager.							
System Engineering							

GE EXHIBIT DRD PQ-008

VOYAGER DATA REQUIREMENT DESCRIPTION - 2ND SHEET

SPECIAL INSTRUCTIONS

DRD NO.:
PQ-008

A test report is to be submitted for each bioassay test. Summary reports are to be submitted at the conclusion of each test phase.

SPECIAL DISTRIBUTION. (IF DISTRIBUTION IS NOT COVERED BY AN EXISTING DDL WRITE IN DISTRIBUTION BELOW)

OUTLINE OF CONTENTS.

1. Summary
 - a. Test performed
 - b. Results
 - c. Conclusion
2. Applicable documents
3. Tests performed
 - a. Test description
 - b. Procedures and methods
 - c. Results
4. Conclusion and recommendation

(CONTINUE ON THIRD SHEET, IF NECESSARY, AND AFFIX TO THIS DRD.)

GE EXHIBIT DRD PQ-009

VOYAGER DATA REQUIREMENT DESCRIPTION

DRD APPROVED BY

DATE

DATA
CATEGORYORGANIZATION ORIGINATING
REQUIREMENT

CODE

OFFICE RESPONSIBLE FOR DRD

CODE

DRD PREPARED BY

DATE

CONTRACT
NO

DRD NO

PQ

F. S. Naylor

7/28/67

PQ-009

TITLE OF DOCUMENT

REPORT, PLANETARY QUARANTINE ANALYSIS

ORGANIZATION RESPONSIBLE
FOR DOCUMENT PREPARATION

System Engineering

TASK OR
SUBTASKDRL ITEM
NOORGANIZATION RESPONSIBLE
FOR DOCUMENT REPRODUCTION

DRL NO

LEVEL NO

ORGANIZATION RESPONSIBLE
FOR DOCUMENT DISTRIBUTION

DDL NO

FILE NO

TYPE OF DOCUMENT

☐ CONTROL☐ ACTION☐ REFERENCE☒ INFORMATION

USE OF DOCUMENT

Provides a mathematical probability analysis on the potential of Mars contamination based on the developing spacecraft design. Used to define areas requiring further design effort, approval of operational procedures, and proof of capability to fulfill quarantine requirements.

ORGANIZATION RESPONSIBLE
FOR DOCUMENT STOWAGE

NO OF COPIES

50

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FOR SINGLE PREPARATIONINFORMATION CUTOFF
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INTERRELATIONSHIP WITH OTHER DATA REQUIREMENTS:

PQ-004 Plan, Planetary Quarantine, Spacecraft
PQ-006 Procedures, Planetary Quarantine, Operating
PQ-007 Procedure, Bioassay Test
PQ-010 Report, Planetary Quarantine Audit

FREQUENCY OF ISSUE

PUBLICATION DATE

- ☐ ANNUALLY
☐ SEMI-ANNUALLY
☐ QUARTERLY
☐ BI-MONTHLY
☐ MONTHLY
☐ SEM-MONTHLY
☐ BI-WEEKLY
☐ WEEKLY
☐ DAILY
☒ OTHERWISE, AS SPECIFIED

SDR

UPDATE (FREQUENCY
OR MILESTONE)
As required
through launch

ESTIMATED
EXPIRATION DATE

CLASSIFICATION

- ☐ SECRET
☐ CONFIDENTIAL
☐ SECRET RESTRICTED DATA
☐ CONFIDENTIAL RESTRICTED DATA
☒ UNCLASSIFIED
- ☐ GROUP 1
☐ GROUP 2
☐ GROUP 3
☐ GROUP 4
☐ PROPRIETARY
☐ PUBLIC DOMAIN
- ☐ SPECIAL HANDLING
☐ NASA DISCREET
☐ JPL DISCREET
☐ PROJECT DISCREET
☐ NOFORN

Maintain current

FORM OF DATA

KIND OF DATA

- ☒ PRINTED DOCUMENT
☐ CHART
☐ DIAGRAM
☐ DRAWING
☐ FILM (STATIC OR MOTION)
☐ ILLUSTRATION
☐ MODEL
☐ RECORDING (TAPE OR DISC)
☐ COMPUTER CARD
☐ COMPUTER TAPE
☐ MICROFILM (W/O OR W/O CARD)
☐ OTHER
- ☐ ABSTRACT
☐ BROCHURE
☐ BULLETIN
☐ CATALOG
☐ CONTRACT
☐ DIRECTIVE
☐ DISCLOSURE
☐ ENGINEERING CHANGE
ORDER
☐ REQUEST FOR ENGINEER-
ING CHANGE PROPOSAL
☐ ENGINEERING CHANGE
PROPOSAL
☐ HANDBOOK
☐ INDEX
- ☐ INSTRUCTION
☐ LETTER
☐ LIST
☐ LOG
☐ MANUAL
☐ MEMORANDUM
☐ MINUTES
☐ PLAN
☐ PROCEDURE
☐ REGULATION
☒ REPORT
☐ SCHEDULE
☐ SPECIFICATION
☐ STANDARD
☐ VOUCHER

REFERENCE DOCUMENTS

None

APPLICABLE STANDARDS

REVIEWS AND/OR APPROVALS REQUIRED:
(LIST IN ORDER OF SUBMITTAL)

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DATE

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SUBMIT FOR
APPROVAL TO

Manager,
System Engineering

BY

BY

GE EXHIBIT DRD PQ-009

VOYAGER DATA REQUIREMENT DESCRIPTION - 2ND SHEET

SPECIAL INSTRUCTIONS

DRD NO.:

PQ-009

Data for the continual update of this report will be supplied, in part, by the Planetary Quarantine Audit Report.

SPECIAL DISTRIBUTION. (IF DISTRIBUTION IS NOT COVERED BY AN EXISTING DDL WRITE IN DISTRIBUTION BELOW)

OUTLINE OF CONTENTS:

1. Summary
2. Mathematical techniques employed
3. Status of design
4. Probability analysis
 - a. By subsystem/system contamination sources
 - b. By mission phases
 - c. By major events/catastraophies
5. Recommendations
6. Appendixes

(CONTINUE ON THIRD SHEET, IF NECESSARY, AND AFFIX TO THIS DRD.)

GE EXHIBIT DRD PQ-010

VOYAGER DATA REQUIREMENT DESCRIPTION				DRD APPROVED BY		DATE	DATA CATEGORY				
ORGANIZATION ORIGINATING REQUIREMENT	CODE PQ	OFFICE RESPONSIBLE FOR DRD	CODE	DRD PREPARED BY F. S. Naylor	DATE 7/28/67	CONTRACT NO	DRD NO PQ-010				
TITLE OF DOCUMENT REPORT, PLANETARY QUARANTINE AUDIT				ORGANIZATION RESPONSIBLE FOR DOCUMENT PREPARATION System Engineering		TASK OR SUBTASK	DRD ITEM NO				
				ORGANIZATION RESPONSIBLE FOR DOCUMENT REPRODUCTION		DRD NO	LEVEL NO				
				ORGANIZATION RESPONSIBLE FOR DOCUMENT DISTRIBUTION		DDL NO	FILE NO				
TYPE OF DOCUMENT ☒ CONTROL ☐ ACTION ☐ REFERENCE ☐ INFORMATION				ORGANIZATION RESPONSIBLE FOR DOCUMENT STOWAGE		NO OF COPIES 25					
USE OF DOCUMENT Provides an accounting of the bioassay test results, serving as an input to the planetary quarantine analysis, a log of all operations affecting contamination loading and a current status report.				ESTIMATED MANHOURS FOR SINGLE PREPARATION		INFORMATION CUTOFF DATE OR MILESTONE					
				ESTIMATED COST (\$) FOR SINGLE PREPARATION		DATE DATA DUE TO USER					
INTERRELATIONSHIP WITH OTHER DATA REQUIREMENTS PQ-004 Plan, Planetary Quarantine, Spacecraft PQ-008 Report, Bioassay Test PQ-009 Report, Planetary Quarantine Analysis				FREQUENCY OF ISSUE ☐ ANNUALLY ☐ SEMI-ANNUALLY ☒ QUARTERLY ☐ BI-MONTHLY ☐ MONTHLY ☐ SEMI-MONTHLY ☐ BI-WEEKLY ☐ WEEKLY ☐ DAILY ☐ OTHERWISE, AS SPECIFIED		PUBLICATION DATE HQR					
						UPDATE (FREQUENCY OR MILESTONE) Quarterly					
CLASSIFICATION ☐ SECRET ☐ CONFIDENTIAL ☐ SECRET RESTRICTED DATA ☐ CONFIDENTIAL RESTRICTED DATA ☒ UNCLASSIFIED				☐ GROUP 1 ☐ GROUP 2 ☐ GROUP 3 ☐ GROUP 4 ☐ PROPRIETARY ☐ PUBLIC DOMAIN		☐ SPECIAL HANDLING ☐ NASA DISCREET ☐ JPL DISCREET ☐ PROJECT DISCREET ☐ NOFORN					
FORM OF DATA ☒ PRINTED DOCUMENT ☐ CHART ☐ DIAGRAM ☐ DRAWING ☐ FILM (STATIC OR MOTION) ☐ ILLUSTRATION ☐ MODEL ☐ RECORDING (TAPE OR DISC) ☐ COMPUTER CARD ☐ COMPUTER TAPE ☐ MICROFILM (W/O OR W/O CARD) ☐ OTHER				KIND OF DATA ☐ ABSTRACT ☐ BROCHURE ☐ BULLETIN ☐ CATALOG ☐ CONTRACT ☐ DIRECTIVE ☐ DISCLOSURE ☐ ENGINEERING CHANGE ORDER ☐ REQUEST FOR ENGINEERING CHANGE PROPOSAL ☐ ENGINEERING CHANGE PROPOSAL ☐ HANDBOOK ☐ INDEX ☐ INSTRUCTION ☐ LETTER ☐ LIST ☐ LOG ☐ MANUAL ☐ MEMORANDUM ☐ MINUTES ☐ PLAN ☐ PROCEDURE ☐ REGULATION ☒ REPORT ☐ SCHEDULE ☐ SPECIFICATION ☐ STANDARD ☐ VOUCHER				REFERENCE DOCUMENTS			
				APPLICABLE STANDARDS							
REVIEWS AND/OR APPROVALS REQUIRED (LIST IN ORDER OF SUBMITTAL)											
DRAFT		DATE		PREPUBLICATION PROOF		DATE					
SUBMIT FOR REVIEW TO											
		BY				BY					
SUBMIT FOR APPROVAL TO		BY				BY					
Project Manager											

GE EXHIBIT DRD PQ-010

VOYAGER DATA REQUIREMENT DESCRIPTION - 2ND SHEET

SPECIAL INSTRUCTIONS

DRD NO.:

PQ-010

SPECIAL DISTRIBUTION (IF DISTRIBUTION IS NOT COVERED BY AN EXISTING DDL WRITE IN DISTRIBUTION BELOW)

OUTLINE OF CONTENTS:

1. Summary
 - a. Significant changes from previous report
 - b. Major problem areas
 - c. Anticipated significant events
2. Activities during reporting period
 - a. Assays conducted
(at what stage of fabrication/assembly)
3. Detailed Audit
 - a. Major Systems
 - b. Subsystems
 - c. Components
4. Action items for next quarter
5. References
 - a. Bioassay test reports

(CONTINUE ON THIRD SHEET, IF NECESSARY, AND AFFIX TO THIS DRD.)

GE EXHIBIT DRD PQ-011

VOYAGER DATA REQUIREMENT DESCRIPTION				DRD APPROVED BY		DATE	DATA CATEGORY
ORGANIZATION ORIGINATING REQUIREMENT	CODE PQ	OFFICE RESPONSIBLE FOR DRD	CODE	DRD PREPARED BY F. S. Naylor	DATE 7/28/67	CONTRACT NO	DRD NO PQ-011
TITLE OF DOCUMENT REPORT, PLANETARY QUARANTINE, PLANETARY VEHICLE (PV) TEST				ORGANIZATION RESPONSIBLE FOR DOCUMENT PREPARATION Test		TASK OR SUBTASK	DRD ITEM NO
				ORGANIZATION RESPONSIBLE FOR DOCUMENT REPRODUCTION		DRD NO	LEVEL NO
				ORGANIZATION RESPONSIBLE FOR DOCUMENT DISTRIBUTION		DDL NO	FILE NO
				ORGANIZATION RESPONSIBLE FOR DOCUMENT STOWAGE		NO OF COPIES 30	
TYPE OF DOCUMENT ☐ CONTROL ☐ ACTION ☐ REFERENCE ☒ INFORMATION				ESTIMATED MANHOURS FOR SINGLE PREPARATION		INFORMATION CUTOFF DATE OR MILESTONE	
USE OF DOCUMENT To document the effects of planetary vehicle tests on the sterilization/decontamination integrity of the vehicle. Provides a contractor record.				ESTIMATED COST (\$) FOR SINGLE PREPARATION		DATE DATA DUE TO USER	
INTERRELATIONSHIP WITH OTHER DATA REQUIREMENTS: PQ-004 Plan, Planetary Quarantine, Spacecraft PQ-005 Plan, Planetary Quarantine, Planetary Vehicle Test PQ-010 Report, Planetary Quarantine Audit				FREQUENCY OF ISSUE ☐ ANNUALLY ☐ SEMI-ANNUALLY ☐ QUARTERLY ☐ BI-MONTHLY ☐ MONTHLY ☐ SEMI-MONTHLY ☐ BI-WEEKLY ☐ WEEKLY ☐ DAILY ☒ OTHERWISE, AS SPECIFIED As required		PUBLICATION DATE CDR UPDATE (FREQUENCY OR MILESTONE) None ESTIMATED EXPIRATION DATE	
CLASSIFICATION ☐ SECRET ☐ CONFIDENTIAL ☐ SECRET RESTRICTED DATA ☐ CONFIDENTIAL RESTRICTED DATA ☒ UNCLASSIFIED				☐ GROUP 1 ☐ GROUP 2 ☐ GROUP 3 ☐ GROUP 4 ☐ PROPRIETARY ☐ PUBLIC DOMAIN		☐ SPECIAL HANDLING ☐ NASA DISCREET ☐ JPL DISCREET ☐ PROJECT DISCREET ☐ NOFORN	
FORM OF DATA: ☒ PRINTED DOCUMENT ☐ CHART ☐ DIAGRAM ☐ DRAWING ☐ FILM (STATIC OR MOTION) ☐ ILLUSTRATION ☐ MODEL ☐ RECORDING (TAPE OR DISC) ☐ COMPUTER CARD ☐ COMPUTER TAPE ☐ MICROFILM (W/OR W/O CARD) ☐ OTHER				KIND OF DATA ☐ ABSTRACT ☐ BROCHURE ☐ BULLETIN ☐ CATALOG ☐ CONTRACT ☐ DIRECTIVE ☐ DISCLOSURE ☐ ENGINEERING CHANGE ORDER ☐ REQUEST FOR ENGINEERING CHANGE PROPOSAL ☐ ENGINEERING CHANGE PROPOSAL ☐ HANDBOOK ☐ INDEX ☐ INSTRUCTION ☐ LETTER ☐ LIST ☐ LOG ☐ MANUAL ☐ MEMORANDUM ☐ MINUTES ☐ PLAN ☐ PROCEDURE ☐ REGULATION ☒ REPORT ☐ SCHEDULE ☐ SPECIFICATION ☐ STANDARD ☐ VOUCHER			
REVIEWS AND/OR APPROVALS REQUIRED (LIST IN ORDER OF SUBMITTAL)				REFERENCE DOCUMENTS			
APPLICABLE STANDARDS							
SUBMIT FOR REVIEW TO _____				SUBMIT FOR APPROVAL TO _____			
BY _____				BY _____			
DATE _____				DATE _____			
PREPUBLICATION PROOF _____				PREPUBLICATION PROOF _____			
DATE _____				DATE _____			
Manager, System Engineering							

GE EXHIBIT DRD PQ-011

VOYAGER DATA REQUIREMENT DESCRIPTION - 2ND SHEET

SPECIAL INSTRUCTIONS

DRD NO.:
PQ-011

SPECIAL DISTRIBUTION: (IF DISTRIBUTION IS NOT COVERED BY AN EXISTING DDL WRITE IN DISTRIBUTION BELOW)

OUTLINE OF CONTENTS:

1. Scope
2. References
 - a. Planetary Quarantine Plan, Planetary Vehicle Test
 - b. Planetary Vehicle Test Report
3. Discussion
 - a. Activities affecting cleanliness integrity
 - b. Precautions taken/adequacy of precautions
 - c. Integrity compromised
 - (1) During preparation/handling
 - (2) During test
 - (3) During post-test repair/replacement
 - d. Effects of compromise
 - e. Recommended corrective action
4. Quality assurance report section
5. Appendixes

(CONTINUE ON THIRD SHEET, IF NECESSARY, AND AFFIX TO THIS DRD.)

GE EXHIBIT DRD PQ-012

VOYAGER DATA REQUIREMENT DESCRIPTION				DRD APPROVED BY		DATE	DATA CATEGORY
ORGANIZATION ORIGINATING REQUIREMENT	CODE PQ	OFFICE RESPONSIBLE FOR DRD	CODE	DRD PREPARED BY H. G. Lorsch	DATE 7/28/67	CONTRACT NO.	DRD NO. PQ-012
TITLE OF DOCUMENT SPECIFICATION, BIOASSAY TEST REQUIREMENTS				ORGANIZATION RESPONSIBLE FOR DOCUMENT PREPARATION System Engineering		TASK OR SUBTASK	DRL ITEM NO.
				ORGANIZATION RESPONSIBLE FOR DOCUMENT REPRODUCTION		DRL NO.	LEVEL NO.
				ORGANIZATION RESPONSIBLE FOR DOCUMENT DISTRIBUTION		DDL NO.	FILE NO.
TYPE OF DOCUMENT: ☒ CONTROL ☐ ACTION ☐ REFERENCE ☐ INFORMATION				ORGANIZATION RESPONSIBLE FOR DOCUMENT STOWAGE		NO OF COPIES 30	
USE OF DOCUMENT Specify tests to be performed by contractor for the determination of biological contamination of spacecraft hardware and facilities.				ESTIMATED MANHOURS FOR SINGLE PREPARATION		INFORMATION CUTOFF DATE OR MILESTONE	
				ESTIMATED COST (\$) FOR SINGLE PREPARATION		DATE DATA DUE TO USER	
				FREQUENCY OF ISSUE ☐ ANNUALLY ☐ SEMI-ANNUALLY ☐ QUARTERLY ☐ BI-MONTHLY ☐ MONTHLY ☐ SEMI-MONTHLY ☐ BI-WEEKLY ☐ WEEKLY ☐ DAILY ☒ OTHERWISE, AS SPECIFIED One time		PUBLICATION DATE PDR UPDATE (FREQUENCY OR MILESTONE) As required through HDR ESTIMATED EXPIRATION DATE	
INTERRELATIONSHIP WITH OTHER DATA REQUIREMENTS: PQ-004 Plan, Planetary Quarantine, Spacecraft PQ-007 Procedure, Bioassay Test PQ-008 Report, Bioassay Test SE-008 Specification, System Performance/Design Requirements							
CLASSIFICATION: ☐ SECRET ☐ CONFIDENTIAL ☐ SECRET RESTRICTED DATA ☐ CONFIDENTIAL RESTRICTED DATA ☒ UNCLASSIFIED				☐ GROUP 1 ☐ GROUP 2 ☐ GROUP 3 ☐ GROUP 4 ☐ PROPRIETARY ☐ PUBLIC DOMAIN			
☐ SPECIAL HANDLING ☐ NASA DISCREET ☐ JPL DISCREET ☐ PROJECT DISCREET ☐ NOFORN							
FORM OF DATA: ☒ PRINTED DOCUMENT ☐ CHART ☐ DIAGRAM ☐ DRAWING ☐ FILM (STATIC OR MOTION) ☐ ILLUSTRATION ☐ MODEL ☐ RECORDING (TAPE OR DISC) ☐ COMPUTER CARD ☐ COMPUTER TAPE ☐ MICROFILM (W/OR W/O CARD) ☐ OTHER				KIND OF DATA: ☐ ABSTRACT ☐ BROCHURE ☐ BULLETIN ☐ CATALOG ☐ CONTRACT ☐ DIRECTIVE ☐ DISCLOSURE ☐ ENGINEERING CHANGE ORDER ☐ REQUEST FOR ENGINEERING CHANGE PROPOSAL ☐ ENGINEERING CHANGE PROPOSAL ☐ HANDBOOK ☐ INDEX			
				REFERENCE DOCUMENTS NASA/JPL Bioassay Procedures			
				APPLICABLE STANDARDS			
REVIEWS AND/OR APPROVALS REQUIRED: (LIST IN ORDER OF SUBMITTAL)							
DRAFT		DATE		PREPUBLICATION PROOF		DATE	
SUBMIT FOR REVIEW TO:							
		BY				BY	
SUBMIT FOR APPROVAL TO		BY				BY	
Manager,							
System Engineering							

GE EXHIBIT DRD PQ-012

VOYAGER DATA REQUIREMENT DESCRIPTION - 2ND SHEET

SPECIAL INSTRUCTIONS

DRD NO.:
PQ-012

None

SPECIAL DISTRIBUTION: (IF DISTRIBUTION IS NOT COVERED BY AN EXISTING DDL WRITE IN DISTRIBUTION BELOW)

None

OUTLINE OF CONTENTS.

1. Scope
2. Applicable documents
3. Requirements
 - a. Facility certification
 - (1) Bioassay of air; methods, limits, procedures of permissible contamination
 - (2) Bioassay of filter banks; methods, procedures, limits of permissible contamination
 - (3) Bioassay of clean room surfaces; methods, procedures, limits of permissible contamination
 - b. Facility Monitoring
 - (1) Bioassay of air; methods, procedures, frequency, limits
 - (2) Bioassay of clean room surfaces; methods, procedures, frequency, limits
 - (3) Bioassay of tools, clothing, and personnel; methods, procedures frequency, limits

(CONTINUE ON THIRD SHEET, IF NECESSARY, AND AFFIX TO THIS DRD.)

GE EXHIBIT DRD PQ-012

- c. Hardware monitoring**
 - (1) Methods, procedures, frequency, interpretation**
 - (2) Subassembly monitoring**
 - (3) Assembly monitoring**
 - (4) Monitoring during test, transportation, and prelaunch**
- 4. Test and verification (quality assurance provisions)**
- 5. Preparation for delivery (not applicable)**
- 6. Notes**
- 7. Appendixes**

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GE EXHIBIT DRD PQ-013

VOYAGER DATA REQUIREMENT DESCRIPTION - 2ND SHEET

SPECIAL INSTRUCTIONS

DRD NO.:
PQ-013

SPECIAL DISTRIBUTION. (IF DISTRIBUTION IS NOT COVERED BY AN EXISTING ODL WRITE IN DISTRIBUTION BELOW)

OUTLINE OF CONTENTS.

1. Scope
2. Applicable documents
3. Requirements
 - a. Manufacturing facilities
 - (1) Clean room
 - Air flow rates
 - Particles/ft³ (allowable)
 - (2) Special facilities
 - Class x x x rooms
 - Bioclean areas
 - Class xxx clean benches
 - (3) Clothing for clean room operation
 - Entry conditions
 - Work clothes
 - Exit conditions
 - (4) Personnel hygiene
 - Baths, showers, etc.
 - Eating
 - Illness

(CONTINUE ON THIRD SHEET, IF NECESSARY, AND AFFIX TO THIS DRD.)

GE EXHIBIT DRD PQ-013

- b. Handling - packing materials, packing techniques, etc.**
 - (1) Components**
 - (2) Assemblies**
 - (3) System**
- 4. Test and verification**
- 5. Preparation for delivery (not applicable)**
- 6. Notes**
- 7. Appendixes**

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GE EXHIBIT DRD PQ-014

VOYAGER DATA REQUIREMENT DESCRIPTION				DRD APPROVED BY		DATE	DATA CATEGORY
ORGANIZATION ORIGINATING REQUIREMENT	CODE PQ	OFFICE RESPONSIBLE FOR DRD	CODE	DRD PREPARED BY H. G. Lorsch	DATE 7/28/67	CONTRACT NO	DRD NO PQ-014
TITLE OF DOCUMENT SPECIFICATION, GENERAL ENGINEERING PLANETARY QUARANTINE DESIGN				ORGANIZATION RESPONSIBLE FOR DOCUMENT PREPARATION System Engineering		TASK OR SUBTASK	DRD ITEM NO
				ORGANIZATION RESPONSIBLE FOR DOCUMENT REPRODUCTION		DRL NO	LEVEL NO
				ORGANIZATION RESPONSIBLE FOR DOCUMENT DISTRIBUTION		DDL P.C	FILE NO
TYPE OF DOCUMENT: ☒ CONTROL ☐ ACTION ☐ REFERENCE ☐ INFORMATION				USE OF DOCUMENT To provide overall requirement on the system design to insure fulfilling the planetary quarantine constraint.			
INTERRELATIONSHIP WITH OTHER DATA REQUIREMENTS. PQ-004 Plan, Planetary Quarantine, Spacecraft PQ-014 Specification, Bioassay Test Requirement SE-008 Specification, System Performance/Design Requirements SE-023 General Engineering Specification, Cleanliness				ORGANIZATION RESPONSIBLE FOR DOCUMENT STORAGE		NO OF COPIES 30	
				ESTIMATED MANHOURS FOR SINGLE PREPARATION		INFORMATION CUT OFF DATE OR MILESTONE	
				ESTIMATED COS. (\$) FOR SINGLE PREPARATION		DATE DATA DUE TO USER	
CLASSIFICATION ☐ SECRET ☐ CONFIDENTIAL ☐ SECRET RESTRICTED DATA ☐ CONFIDENTIAL RESTRICTED DATA ☒ UNCLASSIFIED ☐ GROUP 1 ☐ GROUP 2 ☐ GROUP 3 ☐ GROUP 4 ☐ PROPRIETARY ☐ PUBLIC DOMAIN ☐ SPECIAL HANDLING ☐ NASA DISCREET ☐ JPL DISCREET ☐ PROJECT DISCREET ☐ NOFORN				FREQUENCY OF ISSUE ☐ ANNUALLY ☐ SEMI-ANNUALLY ☐ QUARTERLY ☐ BI-MONTHLY ☐ MONTHLY ☐ SEMI-MONTHLY ☐ BI-WEEKLY ☐ WEEKLY ☐ DAILY ☒ OTHERWISE AS SPECIFIED One time		PUBLICATION DATE SDR UPDATE (FREQUENCY OR MILESTONE) As required through PDR ESTIMATED EXPIRATION DATE	
				REFERENCE DOCUMENTS			
FORM OF DATA ☒ PRINTED DOCUMENT ☐ CHART ☐ DIAGRAM ☐ DRAWING ☐ FILM (STATIC OR MOTION) ☐ ILLUSTRATION ☐ MODEL ☐ RECORDING (TAPE OR DISC) ☐ COMPUTER CARD ☐ COMPUTER TAPE ☐ MICROFILM (W/OR W/O CARD) ☐ OTHER				KIND OF DATA ☐ ABSTRACT ☐ BROCHURE ☐ BULLETIN ☐ CATALOG ☐ CONTRACT ☐ DIRECTIVE ☐ DISCLOSURE ☐ ENGINEERING CHANGE ORDER ☐ REQUEST FOR ENGINEERING CHANGE PROPOSAL ☐ ENGINEERING CHANGE PROPOSAL ☐ HANDBOOK ☐ INDEX ☐ INSTRUCTION ☐ LETTER ☐ LIST ☐ LOG ☐ MANUAL ☐ MEMORANDUM ☐ MINUTES ☐ PLAN ☐ PROCEDURE ☐ REGULATION ☐ REPORT ☐ SCHEDULE ☒ SPECIFICATION ☐ STANDARD ☐ VOUCHER			
APPLICABLE STANDARDS							
REVIEWS AND/OR APPROVALS REQUIRED: (LIST IN ORDER OF SUBMITTAL)							
DRAFT		DATE		PREPUBLICATION PROOF		DATE	
SUBMIT FOR REVIEW TO							
		BY				BY	
SUBMIT FOR APPROVAL TO		BY				BY	
Manager, System Engineering							

GE EXHIBIT DRD PQ-014

VOYAGER DATA REQUIREMENT DESCRIPTION - 2ND SHEET

SPECIAL INSTRUCTIONS

DRD NO.
PQ-014

SPECIAL DISTRIBUTION (IF DISTRIBUTION IS NOT COVERED BY AN EXISTING DDL WRITE IN DISTRIBUTION BELOW)

OUTLINE OF CONTENTS

1. Scope
2. Applicable documents
3. Requirements
 - a. Planetary quarantine constraints
 - (1) Probability of contamination
 - (2) Allocation of probability of contamination
 - b. Cleanliness
 - (1) Permissible load prior to contamination
 - (2) Permissible load after contamination
 - c. Decontamination - flow chart specifying type of decontamination to be employed at each assembly stage
4. Test and verification (not applicable)
5. Preparation for shipment (not applicable)
6. Notes
7. Appendixes

(CONTINUE ON THIRD SHEET, IF NECESSARY, AND AFFIX TO THIS DRD.)

DOCUMENTATION RELATIONSHIP TREES

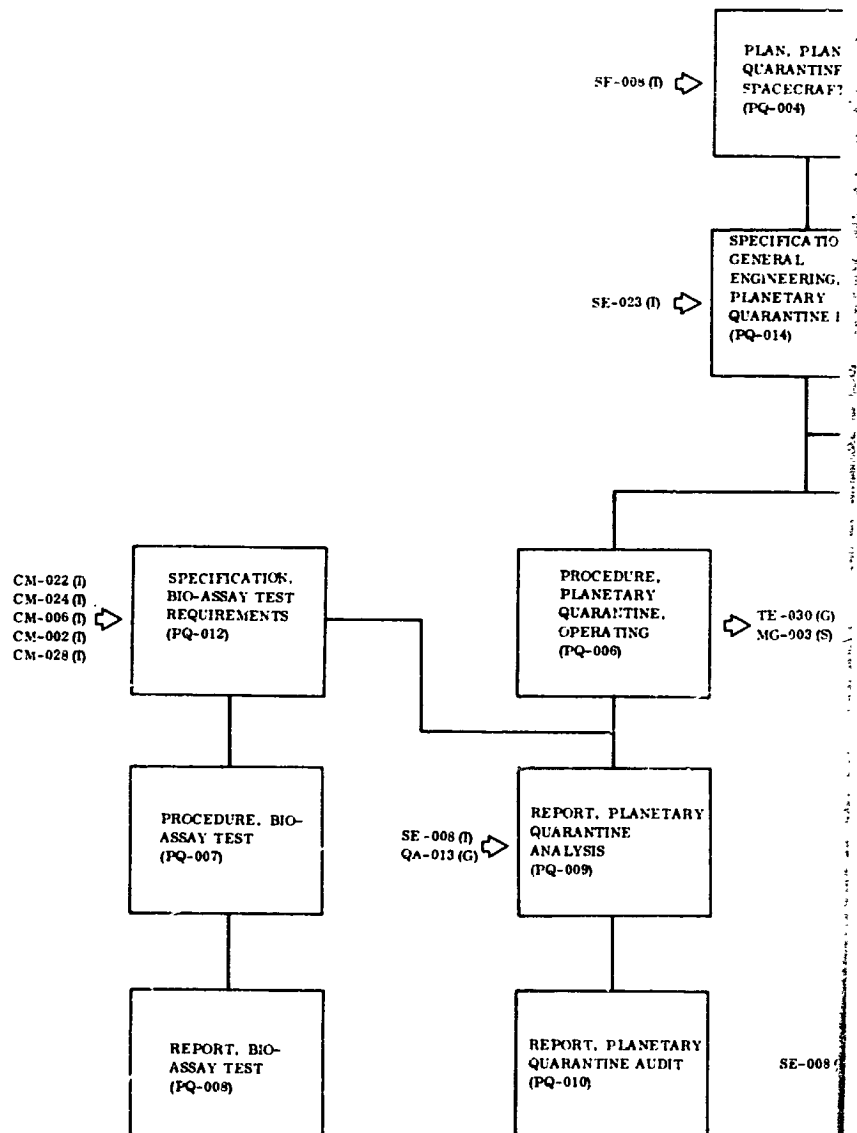
A documentation relationship tree has been prepared to show the relationship of data items within this functional category as well as their relationships across categories.

Relationships within each functional category are shown by constructing a tier pattern beginning with the top-level (or governing) data item and relating in descending order all data items within the category to this top-level data item. (The location of a data item at a given level on the diagram does not necessarily indicate the importance of that specific item but identifies and defines its relation to all other data items in that category.)

Relationships between data items in one category and data items in other functional categories are shown by (1) shaded arrows to indicate the direction of the relationship and (2) an alphabetic code to indicate the nature of the interrelationship as follows:

- a. Data items needed for preparation and/or support of the referenced item. (I)
- b. Data items that are supported or needed by this data item. (S)
- c. Data items that relate "to" and provide information of a general nature but are not required in an input or support role. (G)

Each data item appearing on the Data Item List (DIL) was examined and evaluated with respect to its contribution to, or dependence upon, data items appearing in other categories and is included in the diagrams. Additionally, certain data elements indicated in the user flow diagrams (but currently not identified as individual data items) have been shown within a dashed rectangle to clarify relationships.



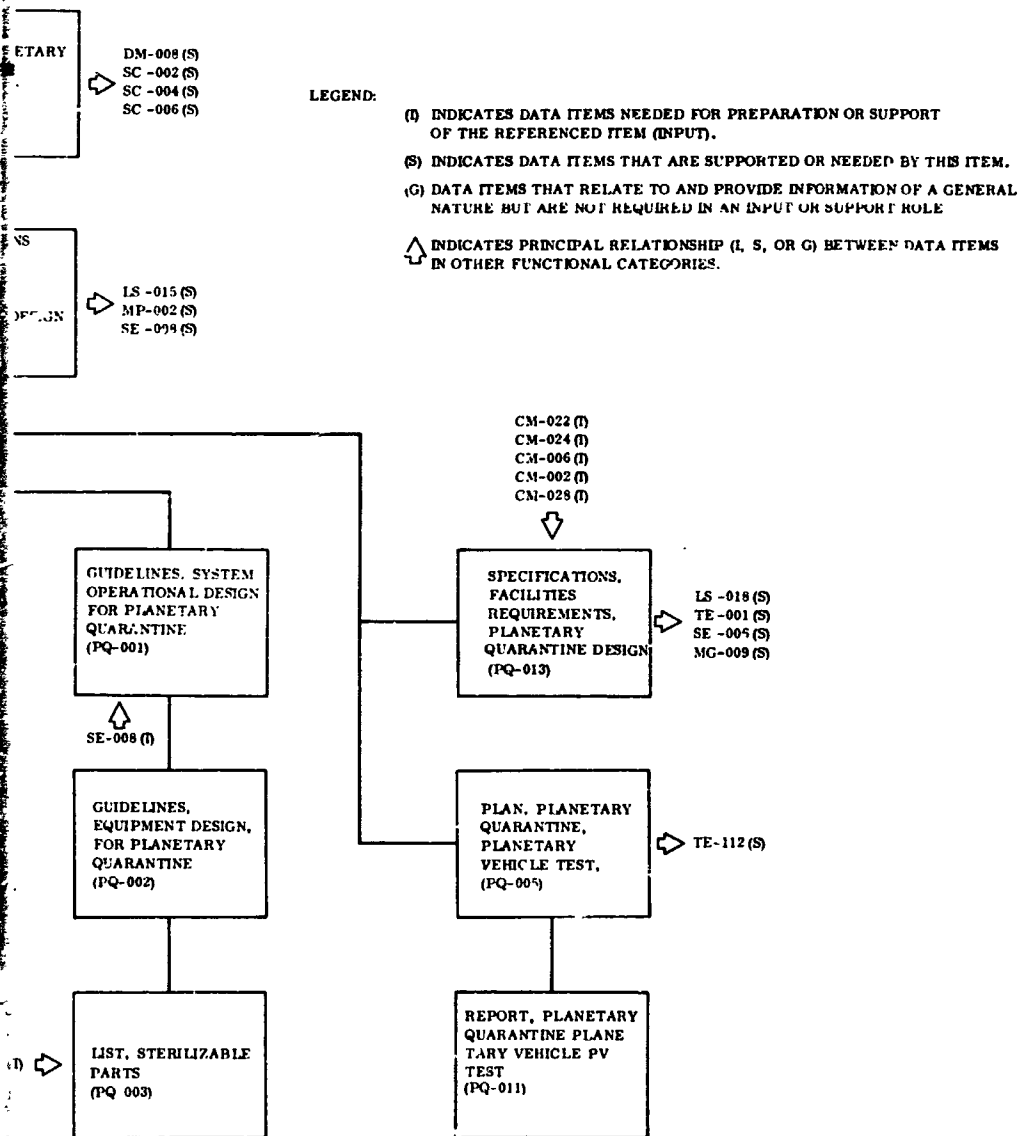


Figure B-1. Planetary Quarantine Documentation Relationship Tree (PQ)

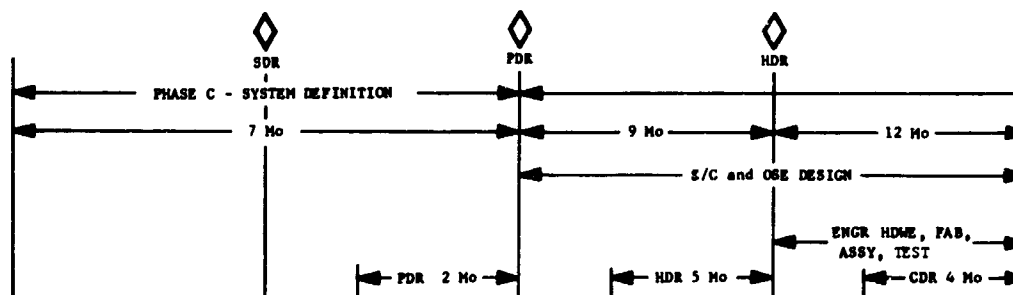
DATA ITEM PHASING/FREQUENCY

Data item frequency and phasing requirements for Planetary Quarantine are as shown in Figure B-2, Planetary Quarantine Data Item Phasing and Frequency Matrix.

Distribution and density of data item preparation requirements are shown in Figure B-3, Planetary Quarantine Data Item Density Profile.

PLANETARY
QUARANTINE
(PQ)

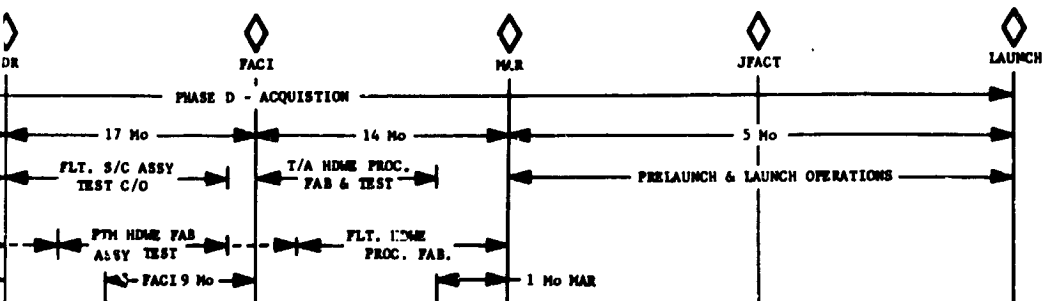
DATA ITEM
TITLE



DATA ITEM TITLE	QUANTITY	FREQUENCY	TOTAL	QUANTITY	FREQUENCY	TOTAL	QUANTITY	FREQUENCY	TOTAL	QUANTITY	FREQUENCY	TOTAL
GUIDELINES												
PQ-001 Guidelines, System Operational Design for Planetary Quarantine	1	I	1	1	U	1	1	F	1			
PQ-002 Guidelines, Equip. Design for Plan. Quar.	1	I	1	1	U	1	1	F	1			
LISTS												
PQ-003 List, Sterilizable Parts, Gen. Engrg.				1	I	1	1	U	1	1	2/U	2
PLANS												
PQ-004 Plan, Planetary Quarantine, Spacecraft	1	I	1	1	U	1						
PQ-005 Plan, Planet. Quar., Plan. Vehicle Test							1	I	1	1	2/U	3
PROCEDURES												
PQ-006 Procedure, Planetary Quar. Operating	1	I	1	1	U	1	1	U	1			
PQ-007 Procedure, Bio-Assay Test							1	I	1	1	3/U	4
REPORTS												
PQ-008 Report, Bio-Assay Test										100	A/R	100
PQ-009 Report, Planetary Quarantine Analysis				1	I	1	1	2/U	3	1	3/U	4
PQ-010 Report, Plan. Quar. Audit										1	Q	4
PQ-011 Report, Planetary Quarantine, Planetary Vehicle (PV) Test												
SPECIFICATIONS												
PQ-012 Specification, Bio-Assay Test Requirements				1	I	1	1	2/U	3			
PQ-013 Specification, Facilities Requirements, Planetary Quarantine Design	1	I	1	1	U	1						
PQ-014 Specification, General Engineering, Planetary Quarantine, Planetary	1	I	1	1	U	1						
TOTALS			6			9			12			118

*Key Informal Data

A	Annual	O/T	One Time	I	Initial	CDR	Critical Design R
S/A	Semi-Annual	A/R	As Required	F	Final	FACI	First Article Cor
WK	Weekly	U	Update	N/R	New and Revised	MAR	Mission Acceptan
MO	Monthly	I/U	One Update	SDR	System Design Review	J FACT	Joint Flight Acce
B/W	Bi-Weekly	DA	Daily	PDR	Preliminary Design Review		Composite Tes
B/M	Bi-Monthly	Q	Quarterly	HDR	Hard Design Review		



QUANTITY	FREQUENCY	TOTAL	QUANTITY	FREQUENCY	TOTAL	QUANTITY	FREQUENCY	TOTAL	QUANTITY	FREQUENCY	TOTAL	TOTALS	NOTES AND ASSUMPTIONS
												3	
												3	
1	U	1										6	
												2	
1	U	1										5	
												3	
1	U	1										6	
30	A/R	30	30	A/R	30	10	A/R	10				176	
1	4U	5	1	2/U	3	1	U	1	1	U	1	18	
1	Q	6	1	Q	5	1	Q	2				17	
1	A/R	1	1	A/R	1							2	
												4	
												2	
												2	
		45			39			13			1	243	

review
 Configuration Inspection
 Process Review
 Distance
 ing

Figure B-2. Planetary Quarantine Data Item Phasing and Frequency Matrix

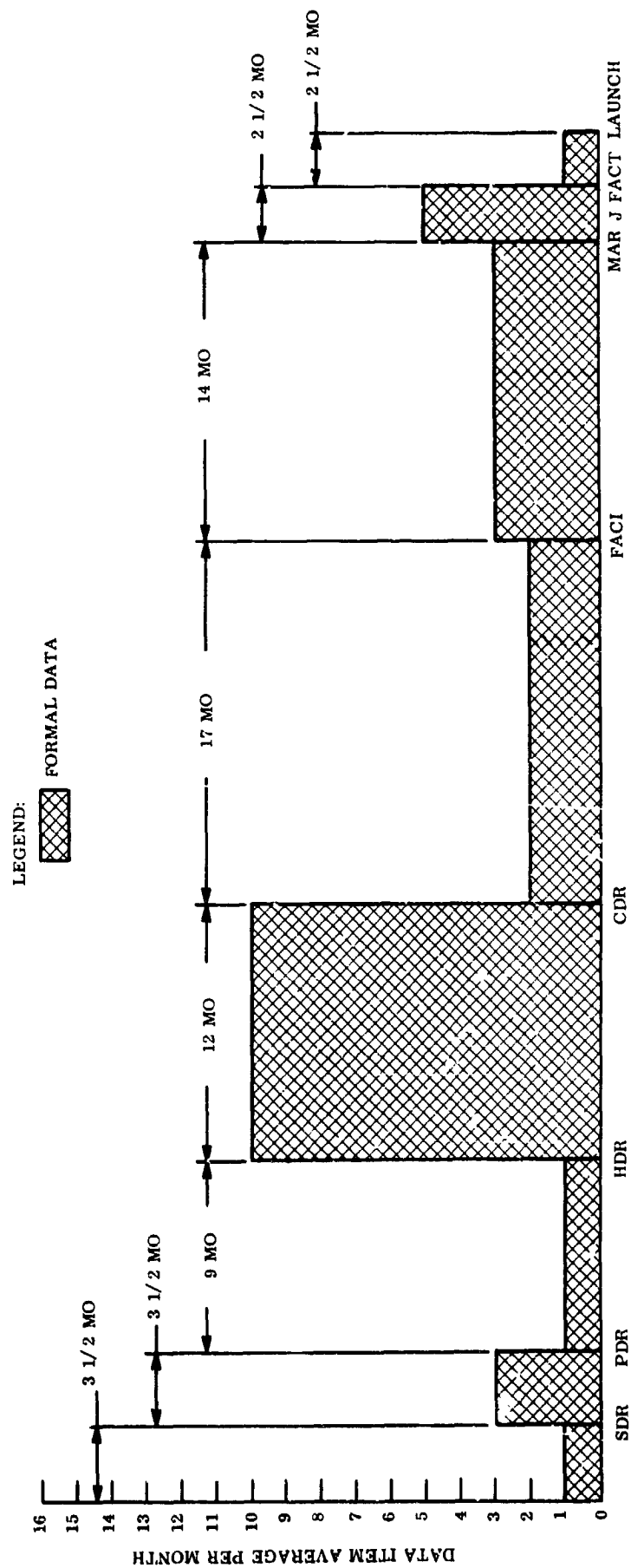


Figure B-3. Planetary Quarantine Data Item Density Profile