

# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Quality Plan	2. Current Version Date	3. DRL Line Item No. 1	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data) The Quality Plan documents the quality assurance provisions to be employed for the flight hardware development. Upon completion and approval, the Quality Plan will become part of the contract and the contractor shall be responsible for implementing the processes and procedures specified therein.			
5. DRD Category: (check one) <input type="checkbox"/> Technical <input type="checkbox"/> Administrative <input checked="" type="checkbox"/> SR&QA			
6. References (Optional)		7. Interrelationships (e.g., with other DRDs) (Optional)	
8. Preparation Information (Include complete instructions for document preparation)			

The Quality Plan shall be prepared per the NASA template. The Quality Plan shall be reviewed and approved as part of the hardware Preliminary Design Review. Upon completion and approval, the Quality Plan will become part of the contract and the contractor shall be responsible for implementing the processes and procedures specified therein.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Acceptance Data Package	2. Current Version Date	3. DRL Line Item No. 2	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data) All flight hardware provided under contract to NASA shall have an Acceptance Data Package (ADP) upon final delivery. The ADP will be reviewed by NASA and discussed at the pre-delivery acceptance review. The acceptance of any equipment item will be contingent upon NASA's approval of the ADP for that item.			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input checked="" type="checkbox"/> SR&QA			
6. References (Optional)  Section 3.5.2.1 of the VOILA HRD.  SSP 30695, Acceptance Data Package Requirements Specification		7. Interrelationships (e.g., with other DRDs) (Optional)	
8. Preparation Information (Include complete instructions for document preparation)			

Per Section 3.5.2.1 of the VOILA HRD:

The contents of the ADP shall be based upon SSP 30695, Acceptance Data Package Requirements Specification but shall also include the following:

#	Document	Required for Project		Comments
		Yes	No	
1	Engineering Drawings	X		Prior to turnover
2	Inventory of Serialized Components	X		
3	Operating, Maintenance, and Handling Procedures	X		
4	"As run" Test Procedures, Data, and Reports	X		
5	Safety Data	X		Prior to turnover
6	Structural Analyses		X	
7	Radioactive Material Data		X	
8	Calibration Data	X		

1. Engineering Drawings: As-built engineering drawings shall be provided. The drawings shall include the top assembly drawing for each major component and any other drawings necessary to perform receiving inspection and any test or operation to be performed at the destination.
2. Inventory of Serialized Components: A list of "field replaceable" serialized components will be included in the ADP. The list will contain the component part number, component name and component serial number.
3. Operating, Maintenance, and Handling Procedures: Each delivered functional end item

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shall have a separate manual covering its maintenance, repair, and operation. The manual shall include, but not be limited to, the following (as applicable):

- a. Operational instructions suitable to support operator training and containing a system description and general instructions for operating the equipment.
- b. Any special handling, packing, transportation or storage procedures (i.e., must be stored/transported in a specific orientation, specific environmental conditions, etc.)
- c. A list of special tools, support and facilities equipment and all other materials necessary to perform maintenance.
- d. A schedule chart listing the time at which all maintenance is to be performed. This shall also include inspection for required repair, maintenance, or replacement of parts.
- e. Conditions of environment in which maintenance is to be performed.

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- f. Detailed maintenance procedures that describe removal, disassembly, type of maintenance or repair, cleaning, reassemble and reinstallation of all parts or subassemblies. Also included shall be points of inspection and notes of caution.
  - g. Illustrated part breakdowns showing the details of the part being worked on.
  - h. Schematic and interconnecting wiring diagrams in sufficient detail to enable troubleshooting to be performed down to the replaceable subassembly or printed circuit board level.
  - i. Fault analysis will be provided to facilitate maintenance. The repair procedures shall be adequate for testing, checkout, disassembly, cleaning, inspection, repair, reassembly, adjustment, calibration and servicing of the equipment as applicable.
4. “As Run” Test Procedures and Reports: The original “as run” test procedures used for any of the testing required in this HRD, along with any associated data and test reports shall be included in the ADP. These procedures shall include quality approval, if applicable, as documented in the Quality Plan.
  5. Safety Data: Copies of hazard reports and other safety data prepared or collected as a result of ground and/or flight safety requirements.
  6. Structural Analyses: Copies of any structural analyses performed as specified in this HRD or required in the contract with NASA.
  7. Radioactive Material Data: If the shipment contains any radioactive material, this section shall include copies of all required data on radioactive material.
  8. Calibration Data: This section shall include any calibration or scaling data required to interpret the output signals from or measurements made using the equipment being shipped.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Experiment Management Plan and Experiment Activities and Milestones Schedule	2. Current Version Date	3. DRL Line Item No. 3	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data) The purpose of the experiment management plan is to document the organizational relationships within the PI's team and the management approach that the PI will take for his/her experiment implementation, including experiment unique equipment. NASA will use the Experiment Activities and Milestones Schedule in conjunction with the Experiment Management plan to evaluate the feasibility of developing the experiment and experiment unique equipment on a timetable that is consistent with program objectives and to determine which ISS increment should be targeted for flight.			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> SR&QA			
6. References (Optional) LS-20079-2, <i>Experiment Document Format and Instructions for Human Flight Research Experiments</i>	7. Interrelationships (e.g., with other DRDs) (Optional)		

## 8. Preparation Information (Include complete instructions for document preparation)

### *Experiment Management Plan*

The purpose of the experiment management plan is to document the organizational relationships within the PI's team and the management approach that the PI will take for his/her experiment implementation, including experiment unique equipment development if applicable. This plan is a useful tool in establishing the lines of communication and points of contact for the NASA experiment development team.

The experiment management plan should provide a detailed explanation of the PI's approach or techniques for executing essential management functions such as: delegation of tasks and authority, appraisal of task progress and status, and monitoring and control of costs. If applicable, the plan should describe the management approach for each of the three following types of activity: (1) in-house tasks not related to spacecraft equipment development; (2) tasks related to the development of equipment for use aboard a spacecraft; and (3) out-of-house contracts.

Personnel who will carry out the experiment should be identified, along with a description of their activities during all phases of the program. A graphical illustration of the relationships for managing and conducting the work is very helpful. The illustrations should include an explanation of the internal structure and lines of authority and/or responsibility for the PI's institution. External interfaces and relationships with NASA, support organizations, and associated investigators should also be delineated.

### *Experiment Activities and Milestones Schedule*

The PI shall prepare and maintain two types of schedules showing experiment milestones and activity time spans. One schedule will highlight activities performed during the experiment design, definition, and development phases. A second schedule will be created for each increment the given experiment is manifested on. This schedule will highlight activities that will take place during the experiment's flight phase and will be developed with the help of the NASA experiment team.

NASA will use the Experiment Activities and Milestones Schedule initially to evaluate the feasibility of developing the experiment on a timetable that is consistent with program objectives and to determine which ISS increment should be targeted for flight. Periodic updates of the schedule are then used to assess the progress of experiment development activities and to re-evaluate compliance with increment and program schedule requirements.

The schedule should reflect the major development activities and milestones for the experiment, including (but not limited to) ground supporting studies, PI-provided EUE and EUSW activities, protocol development activities, BDC or other hardware procurements, etc. The schedule should be prepared according to the format in LS-20079-2, *Experiment Document Format and Instructions for Human Flight Research Experiments*, Figure 11.1.1.2.

The Experiment Activities and Milestones Schedule will be continually updated during the course of the experiment development, but should be initially submitted to the Experiment Hardware Manager during the definition phase.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Software Test Plan (STP)	2. Current Version Date	3. DRL Line Item No. 4	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data) The Software Test Plan shall clearly document each step necessary to prove that the software meets the requirements stated in the HRD.			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> SR&QA			
6. References (Optional)		7. Interrelationships (e.g., with other DRDs) (Optional)	
8. Preparation Information (Include complete instructions for document preparation)			

## OPERATIONAL AND ACCEPTANCE TEST REPORTS

The Software Test Plan shall be formatted per the template in the HRF Software Development Plan, LS-71020, Appendix A, and shall include the information described below.

### Scope

This section lists the specific software item(s) under test.

### Personnel

This section lists the personnel and the skill sets required to complete the test.

### Referenced Documents

This section lists all documents referenced in the test plan.

### Hardware Preparation

This section should describe the hardware set-up required for the test, identifying the specific hardware to be used, switch settings or cabling, connection diagrams, and instructions for placing the hardware in a state of test readiness. Describe how the hardware configuration will be controlled during testing.

### Software Preparation

This section should describe the software setup required for the test, identifying the specific software to be used, the storage medium of the item under test, the storage medium of any related software, instructions and proper sequence for loading the software, and instructions for initialization common to more than one test case. Describe how the software configuration will be controlled during testing.

### Test Data

This section should describe test data specific to each test case.

### Criteria for Evaluation Results

This section should describe the evaluation criteria to be used for each test case.

### Test Procedure

This section should describe the step-by-step instructions to prove each software requirement listed in the Hardware Requirements Document.

### Requirements Traceability

This section should map each software requirement (listed in the Hardware Requirements Document) to the test case that proves the requirement.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Software Version Description Document (VDD)	2. Current Version Date	3. DRL Line Item No. 5	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data) Software configuration management and control is accomplished primarily through the controlled release of different versions of the software and through the thorough documentation of those versions in the Version Description Document.			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> SR&QA			
6. References (Optional)	7. Interrelationships (e.g., with other DRDs) (Optional)		
8. Preparation Information (Include complete instructions for document preparation)			

## VERSION DESCRIPTION DOCUMENT

A Version Description Document shall be prepared and delivered to NASA with each revision release of the experiment software, including the initial release. The Version Description Document shall be formatted per the template in the HRF Software Development Plan, LS-71020, Appendix A, and shall include the information described below.

### Inventory of Materials Released

This section lists the part numbers, serial numbers, titles, version numbers, release numbers, as applicable, and the physical media that make up the software version being released.

### Related Documents

This section shall list all documents pertinent to the software version being released but not changed by the release.

### Inventory of Software Contents and Materials Released

This section should include a list of all software in the new version that is being released as well as any new or changed documentation or other materials affected, updated or released with this new software version.

### Changes Installed

This section lists all of the changes incorporated into the software version since the previous version.

### Adaptation Data

Identify all changes that are unique and specific to this version of the software—for example, changes made specifically to accommodate hardware limitations for a training session or to simulate a failure for working malfunctions.

### Installation Instructions

This section shall provide or reference the following information, as applicable:

- a. Instructions for installing or upgrading the software version.
- b. Identification of other changes that have to be installed for this version to be used, including site-unique adaptation data not included in the software version.
- c. Security, privacy, or safety precautions relevant to the installation.
- d. Procedures for determining whether the version has been installed properly.
- e. A point of contact to be consulted if there are problems or questions with the installation.

### Possible Problems and Known Errors

This section shall identify any possible problems or known errors with this software version at the time of release, any steps being taken to resolve the problems or errors, and instructions for recognizing, avoiding, correcting or otherwise handling each one.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Software Interface Control Document (ICD)	2. Current Version Date	3. DRL Line Item No. 6	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data) The software Interface Control Document (ICD) describes the interface between the contractor provided experiment unique software and any other external flight or Hardware software. The ICD shall control the interface design and communicate those interfaces to the parties responsible for the various pieces of Hardware software.			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> SR&QA			
6. References (Optional)		7. Interrelationships (e.g., with other DRDs) (Optional)	
8. Preparation Information (Include complete instructions for document preparation)			

An Interface Control Document (ICD) describes the interface characteristics of the experiment unique software (EUSW) and any other software that is “external” to the EUSW, such as HRF common software, Workstation II software, etc. For the purposes of this document, we will refer to such external software generically as “Hardware software”. The ICD should describe all such interfaces between the EUSW and the Hardware software. The ICD serves to control the interface design and to communicate those design decisions to parties responsible for the various pieces of Hardware software.

A NASA-specified format for the ICD will be provided prior to the Preliminary Design Review.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Hardware User Guide	2. Current Version Date	3. DRL Line Item No. 7	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data) The User's Guide will provide any operator or user with all of the pertinent information needed to run the experiment successfully.			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> SR&QA			
6. References (Optional)		7. Interrelationships (e.g., with other DRDs) (Optional)	
8. Preparation Information (Include complete instructions for document preparation)			

A Users Guide template will be provided to the PI.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title  Hardware Interface Control Document (ICD)	2. Current Version Date	3. DRL Line Item No. 8	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data) The hardware Interface Control Document (ICD) describes the interface between the contractor provided experiment unique equipment (EUE) and any other external flight hardware. The hardware ICD shall control the interface design and communicate those interfaces to the parties responsible for the various pieces of Hardware.			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> SR&QA			
6. References (Optional)	7. Interrelationships (e.g., with other DRDs) (Optional)		
8. Preparation Information (Include complete instructions for document preparation)			

An Interface Control Document (ICD) describes the interface characteristics of the experiment unique equipment (EUE) and any other hardware that is “external” to the EUE, such as the HRF workstation II, HRF rack, etc. The ICD should describe all such interfaces. The ICD serves to control the interface design and to communicate those design decisions to parties responsible for the various pieces of Hardware.

A NASA-specified format for the ICD will be provided prior to the Preliminary Design Review.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title IRB Protocol/Human Research Protocol	2. Current Version Date	3. DRL Line Item No. 9	RFP/Contract No. (Procurement completes)
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4. Use (Define need for, intended use of, and/or anticipated results of data)

The PI shall provide the experiment protocol for CPHS submittal 60 days prior to Critical Design Review (CDR).

5. DRD Category: (check one)	<input checked="" type="checkbox"/> Technical	<input type="checkbox"/> Administrative	<input type="checkbox"/> SR&QA
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6. References (Optional)	7. Interrelationships (e.g., with other DRDs) (Optional)
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8. Preparation Information (Include complete instructions for document preparation)

The PI shall reference the IRB Red Book Doc. # JSC 20483 Rev B and the checklist on page G-15.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Crew Informed Consent Briefing Material	2. Current Version Date	3. DRL Line Item No. 10	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data)  Provide material for and support Crew Informed Consent Briefing.			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> SR&QA			
6. References (Optional)		7. Interrelationships (e.g., with other DRDs) (Optional)	
8. Preparation Information (Include complete instructions for document preparation)			

NASA will provide the template for the ICB presentation to the PI.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Science Verification Report	2. Current Version Date	3. DRL Line Item No. 11	RFP/Contract No. (Procurement completes)
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## 4. Use (Define need for, intended use of, and/or anticipated results of data)

When all elements of the experiment are sufficiently mature, including flight hardware, software and crew procedures, a Science Verification Test (SVT) and analyses will be performed to verify that the overall experiment system satisfies the scientific objectives stated in Section 2.0 of the Experiment Document (ED). As a part of this process, the PI shall prepare and submit a Science Verification Report.

5. DRD Category: (check one)	<input checked="" type="checkbox"/> Technical	<input type="checkbox"/> Administrative	<input type="checkbox"/> SR&QA
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## 6. References (Optional)

LS-20079-2A ED Template, section 10.2.6

## 7. Interrelationships (e.g., with other DRDs) (Optional)

## 8. Preparation Information (Include complete instructions for document preparation)

Per section 10.2.6 of the Experiment Document (ED):

Science verification will begin with the conduct of a SVT by JSC personnel. This test will consist of a flight-like sequence of experiment operations which includes ground support and monitoring activities and the collection of experiment data in the same format planned for the collection of actual in-flight experiment data. In some cases, the entire flight protocol may be performed, and in others a representative portion of the experiment may yield enough data for evaluation.

The verification test data will then be provided to the PI who shall reduce and analyze the data using the same techniques and methods planned use with actual flight data. When the analyses have been performed, the PI will prepare and submit a Science Verification Report that describes the results of the analyses. The PI will end the report with a statement certifying the adequacy of the experiment system to support the scientific objectives of the experiment.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Certification Data Package	2. Current Version Date	3. DRL Line Item No. 12	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data) To provide objective evidence to NASA that the delivered item meets requirements. The certification data package, when approved, is the NASA certification.			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input checked="" type="checkbox"/> SR&QA			
6. References (Optional) Work Instruction NT3-GFE-007	7. Interrelationships (e.g., with other DRDs) (Optional)		
8. Preparation Information (Include complete instructions for document preparation)			

Certification Data Package (CDP): The CDP contains, by inclusion or reference, all information needed to provide objective evidence that the design meets the requirements. The CDP contains information pertaining to the acceptance and qualification activity for the qualification unit. The CDP is made up of one or more notebooks with index tabs and contains, at a minimum, the following items:

- a. Verification and Validation plan, or customer approved equivalent, with annotated Verification Matrix
- b. Risk assessment documents (e.g. hazard analysis, FMEA, etc.)
- c. Acceptance Test Reports (for qualification unit)
- d. Environmental Test Reports
- e. Waivers and deviations
- f. Discrepancy Reports and Problem Closure Reports
- g. Limited Life Items List (or Limited Life Document)
- h. Top Assembly Drawing and other Select Engineering Drawings
- i. Approved Change Request to the VOILA HRD
- j. Listing of Project Approved Operational Controls

NOTE: Revisions, changes, or updates to certification data packages may contain only that data which is required to provide information related to the change from the original package. Reference to the certification data package containing this information is required to allow audit of the complete set of data.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Materials List	2. Current Version Date	3. DRL Line Item No. 13	RFP/Contract No. (Procurement completes)
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4. Use (Define need for, intended use of, and/or anticipated results of data)

This information is used for a Material Certification for flight.

5. DRD Category: (check one)  Technical  Administrative  SR&QA

6. References (Optional)

7. Interrelationships (e.g., with other DRDs) (Optional)

8. Preparation Information (Include complete instructions for document preparation)

Compile a list of non-metallic materials that includes the following:

- a. Part number
- b. Part name
- c. Next higher assembly drawing number

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title  EEE Parts List	2. Current Version Date	3. DRL Line Item No. 14	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data)  This information will be used for CDR and flight certification for flight			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> SR&QA			
6. References (Optional)	7. Interrelationships (e.g., with other DRDs) (Optional)		
8. Preparation Information (Include complete instructions for document preparation)			

## Electrical, Electronic, and Electromechanical Parts Burn-In

Burn-in screening shall be completed (100%) on all flight hardware (units).

## Electrical, Electronic, and Electromechanical Parts Burn-In

The burn-in test may be accomplished at the component or assembly level, and is specified as:

- 72 hrs continuously at room ambient temperature while functioning. During this test, two sets of 5 power cycles each shall be performed. Each set of 5 power cycles shall be completed within a period of 20 minutes. Power cycle timing shall allow sufficient time for the hardware and electronics to reach a steady-state before power to the hardware is restored following power-down.
- 96 hrs continuously at a specified controlled temperature while functioning. During this test, three sets of 5 power cycles each shall be performed. Each set of 5 power cycles shall be completed within a period of 20 minutes. Power cycle timing shall allow sufficient time for the hardware and electronics to reach a steady-state before power to the hardware is restored following power-down.

Full functional tests shall be performed on the experiment hardware before and after the burn-in test. Controlled temperature is defined as 15 °C below the maximum rating of the device with the lowest temperature rating in the article under test. (LS-71000, Section 5.4.1.1.10).

A EEE parts list for non-COTS parts should be provided at CDR.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title  RESERVE	2. Current Version Date	3. DRL Line Item No. 15	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data)			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> SR&QA			
6. References (Optional)		7. Interrelationships (e.g., with other DRDs) (Optional)	
8. Preparation Information (Include complete instructions for document preparation)			

	Item name	Fabrication by	Environmental Testing (Flight & Flight back-up units only)									
			EEE parts & thermal profile			Vibration		Bench Handling (test fit back-up units only)	Flammability Test	Offgass Test (On Fft or Fft back-up unit)	EMI	Acoustic
			72 hr ambient	48 hr Elev Temp	3 cycle thermal profile	Acceptance Level						
1	Tracker	MIT	MIT	MIT	MIT	MIT <sup>1</sup>	MIT	N <sup>2</sup>	JSC	JSC <sup>3</sup>	-	
2	Electronics drawer	JSC/MIT	MIT	MIT	MIT	MIT <sup>1</sup>	MIT	N <sup>2</sup>	JSC	JSC <sup>3</sup>	JSC	
3	Chestpack	MIT	MIT	MIT	MIT	MIT <sup>1</sup>	MIT	N <sup>2</sup>	JSC	JSC <sup>3</sup>	-	
4	Interconnect Cable Set <sup>a</sup>	MIT	-	-	-	-	-	N <sup>4</sup>	JSC	-	-	
5	Head Display <sup>b</sup>	MIT	MIT	MIT	MIT	-	-	N <sup>2</sup>	JSC	JSC <sup>3</sup>	-	
6	Subject Restraint System											
	Restraint Platform	MIT	MIT	-	-	-	MIT	N <sup>2</sup>	JSC	JSC <sup>3</sup>	-	
	Restraint Pole	MIT	-	-	-	-	-	N <sup>2</sup>	TBD	-	-	
	Torso marker plate	MIT	MIT	MIT	MIT	-	-	N <sup>2</sup>	JSC	JSC <sup>3</sup>	-	
	Restraint Spring	JSC	-	-	-	-	-	N <sup>2</sup>	JSC	-	-	
	Vest	JSC	-	-	-	-	-	N <sup>2</sup>	JSC	-	-	
7	Joystick	MIT	MIT	MIT	MIT	-	MIT	N <sup>2</sup>	JSC	JSC <sup>3</sup>	-	
8	Paddle/Pushbutton	MIT	MIT	MIT	MIT	-	MIT	N <sup>2</sup>	JSC	JSC <sup>3</sup>	-	
9	Subject Camera	MIT	MIT	MIT	MIT	-	-	N <sup>2</sup>	JSC	JSC <sup>3</sup>	-	
10	Headphones	MIT	MIT	MIT	MIT	-	-	N <sup>2</sup>	JSC	JSC <sup>3</sup>	-	
<sup>a</sup> Includes:			Ambient	15°C < max op. temp	Need COTS op. & storage temp	6g rms	MIL STD 810-E procedure IV	-	-	-	-	
W1, Drawer to R2WS cable												
W3, Drawer to CODA cable												
W4, Drawer to CODA cable			Notes: MIT <sup>1</sup> - H/W items are hard mounted to shaker table. NOT tested in stowage configuration.									
W5, Drawer to Restraint platform cable			N <sup>2</sup> - No test needed, but will need analysis by Materials Engineer and maybe a MUA									
W6, Drawer to Chest Pack cable			JSC <sup>3</sup> - Screening of EMI emissions done at MIT. Acceptance EMI performed at the top assy level at JSC.									

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Experiment Unique Software code	2. Current Version Date	3. DRL Line Item No. 16	RFP/Contract No. (Procurement completes)
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4. Use (Define need for, intended use of, and/or anticipated results of data)

The PI shall provide all flight software provided under contract to NASA.

5. DRD Category: (check one)  Technical  Administrative  SR&QA

6. References (Optional) | 7. Interrelationships (e.g., with other DRDs) (Optional)

8. Preparation Information (Include complete instructions for document preparation)

The software code shall be provided on a CD with a VDD and Software Test Plan (STP).

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Verification of Experiment Data	2. Current Version Date	3. DRL Line Item No. 17	RFP/Contract No. (Procurement completes)
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## 4. Use (Define need for, intended use of, and/or anticipated results of data)

The verification of the entire experiment package is needed to ensure the accuracy of the data archived.

5. DRD Category: (check one)	<input checked="" type="checkbox"/> Technical	<input type="checkbox"/> Administrative	<input type="checkbox"/> SR&QA
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6. References (Optional)	7. Interrelationships (e.g., with other DRDs) (Optional)
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## 8. Preparation Information (Include complete instructions for document preparation)

The PI typically has one year after the receipt of the last data set to provide all final analyses, which are then archived in the complete experiment package by LSDA. The package includes all elements of information to be archived, and is given to the PI once all data are archived. The PI is asked to review the experiment and provide a signature that it is acceptable for archival. The PI also has the opportunity to provide edits.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Operational Accomplishments Report	2. Current Version Date	3. DRL Line Item No. 18	RFP/Contract No. (Procurement completes)
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4. Use (Define need for, intended use of, and/or anticipated results of data)

The Operational Accomplishments Report focuses not so much on the analysis of data, but rather on the operational aspects of the mission. Its purpose is to determine if data was able to be collected, whether it was properly received, and to assess the quality of the data.

5. DRD Category: (check one)	<input checked="" type="checkbox"/> Technical	<input type="checkbox"/> Administrative	<input type="checkbox"/> SR&QA
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6. References (Optional)	7. Interrelationships (e.g., with other DRDs) (Optional)
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8. Preparation Information (Include complete instructions for document preparation)

The PI shall use the Research Planning Working Group (RPWG) postflight reporting guidelines to document the Operational Accomplishments Report. These guidelines will be provided to the PI by the ESS.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Final Research Report	2. Current Version Date	3. DRL Line Item No. 19	RFP/Contract No. (Procurement completes)
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4. Use (Define need for, intended use of, and/or anticipated results of data)

The Final research report is designed to capture information comparing planned research with research actually completed and the results of any studies and analyses of data.

5. DRD Category: (check one)  Technical  Administrative  SR&QA

6. References (Optional) | 7. Interrelationships (e.g., with other DRDs) (Optional)

8. Preparation Information (Include complete instructions for document preparation)

The PI shall use the Research Planning Working Group (RPWG) postflight reporting guidelines to document the Final Research Report. These guidelines will be provided to the PI by the ESS.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title	2. Current Version Date	3. DRL Line Item No.	RFP/Contract No. (Procurement completes)
Monthly Progress Report		20	

## 4. Use (Define need for, intended use of, and/or anticipated results of data)

In order to effectively track the development of the experiment, the NASA ESM will need a periodic progress report from the PI. This requirement can be met through means other than a formal written report, such as monthly teleconferences, frequent regular communications, etc. In some circumstances, however, the generation of a written report may be the most effective way of meeting this requirement (example, a foreign PI under direct experiment development management by his/her sponsoring agency). If the NASA ESM and the PI sponsoring agency representative agree to a written report, it should include separate discussions of science activities and engineering activities (as necessary).

5. DRD Category: (check one)	<input checked="" type="checkbox"/> Technical	<input type="checkbox"/> Administrative	<input type="checkbox"/> SR&QA
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6. References (Optional)	7. Interrelationships (e.g., with other DRDs) (Optional)
LS-20079-2A ED Template, section 10.1.3	

## 8. Preparation Information (Include complete instructions for document preparation)

Per ED Template, section 10.1.3:

Each of these discussions should include the following information:

- a. A quantitative description of overall progress
- b. A discussion of the work performed during the past month
- c. A discussion of the work to be performed during the next monthly reporting period.
- d. A description of any current problems that may impede performance, and a discussion of proposed solutions for those problems.

In the discussions in the monthly reports the PI should provide a clear picture of where the PI stands with respect to meeting the major milestones of the project (the ERR, the PDR, the CDR, etc.). Any proposed changes or updates to the Experiment Activities and Milestones schedule changes should also be included in the report. This report should be provided to the ESM by the 10<sup>th</sup> day of each month for the previous month's work.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Shelf Life List	2. Current Version Date	3. DRL Line Item No. 21	RFP/Contract No. (Procurement completes)
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4. Use (Define need for, intended use of, and/or anticipated results of data)

Shelf life is defined as that period of time during which the components of a system can be stored under controlled conditions and put into service without replacement of parts (beyond servicing and installation of consumables).

5. DRD Category: (check one)  Technical  Administrative  SR&QA

6. References (Optional) VOILA HRD, section 3.2.3.2.2	7. Interrelationships (e.g., with other DRDs) (Optional)
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8. Preparation Information (Include complete instructions for document preparation)

Per section 3.2.3.2.2 of the VOILA HRD:

Shelf life items shall be identified and tracked on a list that is maintained as a part of the hardware acceptance data pack.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Hardware Functional Test Procedures	2. Current Version Date	3. DRL Line Item No. 22	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data)  These procedures will be used perform a functional of the PI-provided hardware.			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> SR&QA			
6. References (Optional)		7. Interrelationships (e.g., with other DRDs) (Optional)	
8. Preparation Information (Include complete instructions for document preparation)			

Use the following as a template for the Functional Test Procedures:

## PURPOSE:

Functional test procedures for biomedical hardware are a part of the acceptance test program. The hardware to be tested, the nature of the proposed test, its objectives, test set-up and step-by-step procedures to implement the test are described. The test support equipment required, the method for recording the test data, and any deviations and anomalies are also described.

## CONTENTS:

- 1.0 Introduction
- 2.0 Applicable Documents
- 3.0 Facility Requirements
- 4.0 Test Equipment
- 5.0 Quality Assurance Requirements
- 6.0 Detailed Functional Test Procedures
- 7.0 Certification of Completion

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Monthly Contract Financial Mgt Report	2. Current Version Date	3. DRL Line Item No. 23	RFP/Contract No. (Procurement completes)
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4. Use (Define need for, intended use of, and/or anticipated results of data)

Used to inform NASA of financial status.

5. DRD Category: (check one)  Technical  Administrative  SR&QA

6. References (Optional)

7. Interrelationships (e.g., with other DRDs) (Optional)

8. Preparation Information (Include complete instructions for document preparation)

Use NASA Form 533M as a template.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Quarterly Contract Financial Mgt Report	2. Current Version Date	3. DRL Line Item No. 24	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data)  Used to inform NASA of financial status.			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> SR&QA			
6. References (Optional)		7. Interrelationships (e.g., with other DRDs) (Optional)	
8. Preparation Information (Include complete instructions for document preparation)			

NASA Form 33Q as a template

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Provide inputs to Hardware Requirements Document (HRD)	2. Current Version Date	3. DRL Line Item No. 25	RFP/Contract No. (Procurement completes)
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4. Use (Define need for, intended use of, and/or anticipated results of data)

The HRD shall address the specific implementation of the requirements in LS 71000A, *Program Requirements Document for the Human Research Facility*, and will document responsibility for the required testing and analyses. Formal review and baseline of the HRD shall ideally coincide with the hardware preliminary design review. Formal baseline of the HRD is required before the contractor may begin fabrication of flight hardware.

5. DRD Category: (check one)	<input checked="" type="checkbox"/> Technical	<input type="checkbox"/> Administrative	<input checked="" type="checkbox"/> SR&QA
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6. References (Optional)

LS 71000A, *Program Requirements Document for the Human Research Facility*  
LS 71099, *Hardware Requirements Document (HRD) template for Human Research Facility Program (TEMPLATE)*

7. Interrelationships (e.g., with other DRDs) (Optional)

8. Preparation Information (Include complete instructions for document preparation)

The HRD shall be prepared per the instructions in LS 71099, *Hardware Requirements Document (HRD) template for Human Research Facility Program*, which is the template for the HRD. The HRD documents the specific implementation of the requirements in LS 71000A, *Program Requirements Document for the Human Research Facility*, and documents responsibility for the required testing and analyses. The HRD is a product of the hardware development phase and shall be formally reviewed and baselined as part of the hardware Preliminary Design Review.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Provide inputs to Payload Safety Data	2. Current Version Date	3. DRL Line Item No. 26	RFP/Contract No. (Procurement completes)
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## 4. Use (Define need for, intended use of, and/or anticipated results of data)

The safety documentation contains, by inclusion or reference, all information needed to provide objective evidence that the Experiment Unique Equipment (EUE) meets the safety requirements for flight use.

5. DRD Category: (check one)	<input checked="" type="checkbox"/> Technical	<input type="checkbox"/> Administrative	<input type="checkbox"/> SR&QA
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6. References (Optional) LS-20079-2A ED Template, section 10.4.1	7. Interrelationships (e.g., with other DRDs) (Optional)
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## 8. Preparation Information (Include complete instructions for document preparation)

Per LS-20079-2A ED Template, section 10.4.1:

A detailed safety review will be conducted for the flight experiment and equipment. This safety review is conducted in several stages or phases, and the PI is required to provide certain information for inclusion in the safety data package. (Those PIs who are developing EUE will find additional safety reporting requirements in their HRDs.) This information shall, at a minimum, include the following items at the appropriate phase:

1. Phase 0
  - a. Experiment description and operation.
  - b. Inputs to description of safety critical subsystems and their operations.
2. Phase I (Phase 0 and I are usually grouped into a single review.)
  - a. Input for block diagrams, schematics, and/or a description of safety-critical subsystems and their operations.
  - b. Input for Hazard Reports (JSC form 1230/542B). Radioactive source questionnaire (JSC form 44), if applicable.
  - c. A list of battery types, their uses, and manufacturer.
  - d. Inputs to Fire Detection and Suppression approach.
  - e. Inputs to on-orbit maintenance safety assessment.
3. Phase II
  - a. Updates to all phase 0/I data.
  - b. Inputs to wire sizing and fusing diagrams.
  - c. Inputs to the list of Orbiter and/or ISS provided critical services.
  - d. Information on test failures, anomalies, and accidents involving qualification or potential flight hardware.
  - e. Inputs for updated hazard reports and support data including the following:
    - (1) Radioactive source questionnaire (update), if applicable.
    - (2) List of toxic materials, if applicable.
4. Phase III
  - a. Updates to all Phase II data.
  - b. Inputs to final as-built payload description.
  - c. Results of applicable safety verification tests and analyses.
  - d. A summary and safety assessment of all test failures, anomalies, and accidents.
  - e. Information required to close all action items.
  - f. Assistance with identification of flight safety non-compliances.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Provide inputs to Ground Safety Data	2. Current Version Date	3. DRL Line Item No. 27	RFP/Contract No. (Procurement completes)
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## 4. Use (Define need for, intended use of, and/or anticipated results of data)

The safety documentation contains, by inclusion or reference, all information needed to provide objective evidence that the Experiment Unique Equipment (EUE) and Ground Support Equipment (GSE) meets the safety requirements for ground use at KSC.

5. DRD Category: (check one)	<input checked="" type="checkbox"/> Technical	<input type="checkbox"/> Administrative	<input type="checkbox"/> SR&QA
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## 6. References (Optional)

LS-20079-2A ED Template, section 10.4.2

## 7. Interrelationships (e.g., with other DRDs) (Optional)

## 8. Preparation Information (Include complete instructions for document preparation)

Per LS-20079-2A ED Template, section 10.4.1:

In addition to the flight safety review process referenced in Section 10.4.1, there is a ground safety review process that covers activities conducted at KSC. As with the flight safety process, the PI is required to provide certain information for inclusion in the safety data package. (Those PIs who are developing EUE will find additional safety reporting requirements in their HRDs.) The safety analysis data shall consider all experiment hardware and GSE. The hazard analyses shall consider the effect of each hazard on the Orbiter, the launch site facilities, other payloads, and personnel. The Phase 0, I, II, and III Ground safety reviews are usually grouped together unless the flight hardware, processing or GSE are particularly complicated. This information shall, at a minimum, include the following items at the appropriate phase:

### 1. Phase 0

#### Experiment/GSE conceptual design established.

- (1) Provide experiment description and operation.
- (2) Assist with identification of potential hazards.
- (3) Input to ground operations scenario.

### 2. Phase I

#### Experiment/GSE preliminary design established.

- (1) Updates to all Phase 0 data
- (2) Provide block diagrams, schematics, and/or a description of safety-critical subsystems and their operations.
- (3) Inputs to the ground operations concept for the integration and testing of the experiment at KSC.
- (4) Inputs to the preparation of hazard reports (JSC form 542B).
- (5) Estimated KSC on-dock arrival date
- (6) Input to post-flight operations at KSC or alternate landing site.

### 3. Phase II

#### Experiment/GSE final design established.

- (1) Help to refine and expand safety analysis, evaluate interfaces, and ground operations procedures.
- (2) Update hazard descriptions, causes, and controls.
- (5) Inputs to update safety-critical subsystems descriptions.
- (6) Provide a list of technical operating procedures to be used at KSC, with particular attention to hazardous procedures.

### 4. Phase III

#### Experiment/GSE fabrication and testing complete.

- (1) Updates to all Phase 0, I, II data.
- (2) Submit results of applicable safety verification tests and analysis.
- (3) Provide technical operating procedures (provide inputs).

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

*(Based on JSC-STD-123)*

- (4) Provide a list of safety-related failures or accidents.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Provide inputs to Crew Training Lesson Plans	2. Current Version Date	3. DRL Line Item No. 28	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data)  The PI will need to provide input and verification of the training lesson plan.			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> SR&QA			
6. References (Optional)		7. Interrelationships (e.g., with other DRDs) (Optional)	
8. Preparation Information (Include complete instructions for document preparation)			

The training lesson plan will be provided to the PI. The PI will need to provide input to and verification of the training lesson plan.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Provide inputs to Crew Procedures	2. Current Version Date	3. DRL Line Item No. 29	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data)  Crew procedures are needed for training of the crew and for inflight use.			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> SR&QA			
6. References (Optional)		7. Interrelationships (e.g., with other DRDs) (Optional)	
8. Preparation Information (Include complete instructions for document preparation)			

The PI will need to provide detailed procedures including cabling set-up, screen shots and nominal experiment activity to the HRF procedures group.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Provide inputs to Test Readiness Review (TRR) for BDC and Training	2. Current Version Date	3. DRL Line Item No. 30	RFP/Contract No. (Procurement completes)
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4. Use (Define need for, intended use of, and/or anticipated results of data)

A Test Readiness Review must be performed before any “human-in-the-loop” activity may occur. For NASA-sponsored experiments, this requirement is levied on the PI for any testing that occurs, whether at JSC or another site.

5. DRD Category: (check one)	<input checked="" type="checkbox"/> Technical	<input type="checkbox"/> Administrative	<input type="checkbox"/> SR&QA
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6. References (Optional)	7. Interrelationships (e.g., with other DRDs) (Optional)
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8. Preparation Information (Include complete instructions for document preparation)

The PI shall provide all the necessary information to successfully complete a Test Readiness Review (TRR) per NT-QAS-027.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Provide inputs to Technical Interchange Meeting support	2. Current Version Date	3. DRL Line Item No. 31	RFP/Contract No. (Procurement completes)
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4. Use (Define need for, intended use of, and/or anticipated results of data)

The information supplied by the PI will be used to successfully complete a Preliminary Design Review (PDR).

5. DRD Category: (check one)	<input checked="" type="checkbox"/> Technical	<input type="checkbox"/> Administrative	<input type="checkbox"/> SR&QA
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6. References (Optional)	7. Interrelationships (e.g., with other DRDs) (Optional)
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8. Preparation Information (Include complete instructions for document preparation)

Provide all necessary documentation and information to support a TIM, as well as review any necessary documentation provided by JSC.

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# JSC DATA REQUIREMENTS DESCRIPTION (DRD)

(Based on JSC-STD-123)

1. DRD Title Provide inputs to CDR support documentation	2. Current Version Date	3. DRL Line Item No. 32	RFP/Contract No. (Procurement completes)
4. Use (Define need for, intended use of, and/or anticipated results of data)  The information supplied by the PI will be used to successfully complete a Preliminary Design Review (PDR).			
5. DRD Category: (check one) <input checked="" type="checkbox"/> Technical <input type="checkbox"/> Administrative <input type="checkbox"/> SR&QA			
6. References (Optional)  SM3 Work Instruction SM3-WI-008 EB Work Instruction EA-WI-023		7. Interrelationships (e.g., with other DRDs) (Optional)	
8. Preparation Information (Include complete instructions for document preparation)			

The requirements for a CDR, for which the PI will need to provide the necessary information, is listed in the SM3 Work Instruction for the science requirements and in the EB Work Instruction for the hardware requirements as follows:

Section 10.2.3 of SM3-WI-008

Section 7.1.5.3 of EA-WI-023