

SM3-WI-008

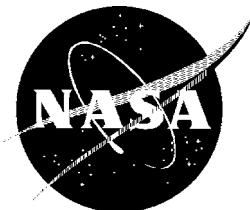
Payload and Experiment Reviews

MISSION AND PROJECT MANAGEMENT OFFICE
Biomedical Systems Test and Project Management Office

August 2001

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CCB Controlled



National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
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Payload and Experiment Reviews

Approved by:

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1.0 **GENERAL**

The Biomedical Systems Test and Project Management Office (SM3) conducts status reviews at various payload and experiment levels for investigations managed by SM3. The type of review and requirements of the review schedule is unique to the program and adheres to the program.

2.0 **PURPOSE**

This SM3 Work Instruction (WI) is a guide for the local implementation of payload and experiment reviews for life sciences experiments managed by SM3. The level of detail and schedule for the conduct of the reviews are program dependent.

3.0 **SCOPE**

This WI is applicable to all NASA and contractor personnel who are associated with the design and development of SM3 managed life sciences experiments and payloads. This WI applies to both payload and experiment level reviews.

4.0 **DEFINITIONS**

- 4.1 **Design Review:** Documented, comprehensive and systematic examination of an experiment or payload to evaluate its capability to meet documented, baselined programmatic, functional and/or performance requirements; identify problems, if any; and propose the development of solutions. The design review results in the baseline of the reviewed experiment or payload, as modified by documented actions received.

Design reviews will be consistent with the program requirements on which the experiment or payload is manifested.

- 4.2 **Review Item Disposition:** The Review Item Disposition (RID) form, JSC Form 1491, shall be used for all reviews to document, track, and disposition unresolved issues or problems identified by review of the published review data package. Direct actions may be assigned and tracked as they surface as part of the presentation and discussion at the review; use of the RID form is not required for direct actions. RIDs that affect documentation placed under Configuration Control Board (CCB) control at previous reviews, impact contract cost of the project, or affect program schedules at the higher level, must be processed through the Biomedical Configuration Control Board prior to authorization to implement. The Payload or Experiment Review Board will disposition all other RIDs that do not find mutual agreement at the review.

- 4.3 **Payload or Experiment Review Board:** The Payload or Experiment Review Board convenes at the completion of a review to determine the disposition of unresolved RIDs and assignment of action items as applicable. The membership of the Board shall be comprised as follows:

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- a) Chairman - SM3 Manager or designee
- b) Secretary - Review Board Secretary
- c) Members - EB Payload Project Engineering Manager
- d) - SM3 Project Scientist or designee
- e) - SM3 Payload Project Manager or designee
- f) - SM3 Experiment Systems Manager(s) or designee(s)
- g) - SR&QA Representative
- h) - Materials Representative
- i) - Other personnel, as recommended by the SM3 Project Manager/
Experiment Systems Manager and approved by the Chairman

4.4 **Payload or Experiment Review Pre-Board:** Prior to convening the Payload or Experiment Review Board, a pre-Board meeting is scheduled. During this meeting, which is held immediately after the review, the SM3 Project Manager/Experiment Systems Manager reviews the RIDs with the initiators and determines the response to each RID, assigns actions, and signs and dates the RIDs. If resources need to be committed to close a RID or no resolution of an action on a RID can be reached, the Payload or Experiment Review Board is convened. It may be scheduled the day after the review or at a later time if information must be acquired to support a position in response to a RID.

5.0 **RECORDS, REPORTS, AND FORMS**

JSC Form 1491, *Review Item Disposition*

Design Review Minutes

6.0 **SAFETY PRECAUTIONS AND WARNING NOTES**

None.

7.0 **REFERENCES**

None.

8.0 **TOOLS, EQUIPMENT, AND MATERIALS**

None.

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9.0 **PERSONNEL TRAINING AND CERTIFICATION**

None.

10.0 **PROCEDURE**

10.1 RESPONSIBILITY

The SM3 Payload Project Manager (PPM) shall assure that the reviews, as defined by the Mission Manager or Program Manager, are conducted on all payload elements. For payload level reviews, the PPM is responsible for establishing the review and coordinating the activities required to conduct a review. The SM3 Experiment Systems Manager (ESM) shall assure that the reviews, as appropriate for the project are conducted on experiment elements. For experiment level reviews, the ESM is responsible for establishing the review and coordinating activities required to conduct a review. It is at the discretion of the PPM and/or the ESM to determine the type, quantity, level of detail, and schedule of reviews based on the program for each payload and/or experiment.

10.2 REVIEWS FOR EQUIPMENT REQUIRING DEVELOPMENT

10.2.1 Requirements Review

The Project Requirements Review, if appropriate for the project, is to establish project schedule and requirements for the integrated experiments. The Experiment Requirements Review, if appropriate, is to establish the schedule and requirements for the individual experiments. These reviews will also form the basis for further development and implementation of requirements. At this review, the programmatic and performance requirements for the experiments will be presented. The requirements review package shall include, but not be limited to, the following data:

- Science Measurement Specification (SMS) and/or detailed Technical Task Agreement (TTA)
- Preliminary IERD or equivalent sections (project level only)
- Mission resources requirements
 - stowage
 - electrical interfaces
 - power
 - thermal
 - Command and Data Management System (CDMS)
 - crew time
 - Baseline Data Collection (BDC)

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- ground operations
- training
- Preliminary ED Sections (3,4, and 5) or equivalent for experiment level reviews
- Payload Project/Experiment Schedule
- Summary of proposed design reviews to be held for this experiment/payload

10.2.2 Preliminary Design Review

The Preliminary Design Review (PDR) or equivalent level review -- if required by the PPM for the project or the ESM for the experiment -- will be conducted when the basic design of the payload/experiment is from ten to thirty percent complete, to assure acceptability of the implementation approach, and to baseline the design. A PDR shall be conducted after NASA systems and design engineering or the contractor have completed their analysis on the design, and have sufficient details to prove they are meeting the intent of the experiment(s) specification(s).

The product of a PDR is the approval of the design approach and the authorization for the contractor or developer to proceed with further design. Any changes to the basic design approach must be approved by the SM3 Payload Project Manager or Experiment Systems Manager, as appropriate, prior to implementation.

The PDR review package shall include the following data, as applicable. The developer shall be ready to explain "missing" items.

- a. Payload Project/Experiment Schedule.
- b. Payload Project/Experiment Overview.
- c. Payload Project IERD or equivalent (Project Level)/Experiment Document (ED) or equivalent (Experiment level).
- d. Summary of mission resources requirements.
- e. Preliminary layouts.
- f. Preliminary block diagrams.
- g. Preliminary power and data interfaces.
- h. Environmental constraints.
- i. Preliminary engineering analyses status and schedule (thermal and structural).
- j. Waivers or deviations tracking log status.
- k. Phase 0/I safety report.
- l. Summary of Ground Operations Requirements.
- m. Status of Training Plans.
- n. Status of Baseline Data Collection.

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10.2.3 Critical Design Review

The Critical Design Review (CDR) or equivalent level review -- if required by the PPM for the project or the ESM for the experiment -- is a technical review of the detailed design of the payload/experiment to determine the compliance of the completed design with the science and mission requirements. A CDR shall be conducted when the detailed design is approximately ninety percent complete. The product of a CDR is formal (baselined and placed under CCB control) approval of specific payload/experiment documentation which further defines the design of the payload/experiment.

The CDR review package shall include the following data, as applicable.

- a. Payload Project/Experiment Schedule.
- b. Payload Project/Experiment Overview.
- c. Payload Project IERD or equivalent (Project Level)/Experiment Document (ED) or equivalent (Experiment level).
- d. Interface control drawings.
- e. Environmental constraints.
- f. Verification plan or Acceptance/certification test plan.
- g. Engineering analysis (thermal and TVFEM).
- h. Waivers or deviations status and tracking log.
- i. Phase II safety report.
- j. Limited life list.
- k. List of open PDR RIDs.
 - Summary of mission resource requirements.
 - Experiment crew procedures.
 - Summary of ground operations requirements.
 - Status of training.
 - Status of Baseline Data Collection.

NOTE: Open RIDs from the previous review will be closed automatically unless renewed at the next level review.

10.3 AGENDA

The agenda is established by the Payload Project Manager/Experiment Systems Manager. The following is a guideline agenda for payload/experiment reviews:

Payload/experiment overview

Schedule

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Interfaces

Total mission resources

Certification/verification

Crew Procedures

Training

Baseline Data Collection

Ground Operations

Safety

RID/action item review (pre-board)

Board review

10.4 REVIEW PROCEDURE

It is recommended that all experiment reviews be conducted prior to payload level reviews and all payload level reviews be conducted prior to mission level reviews.

10.4.1 SM3 Payload Project Manager/Experiment Systems Manager

The following procedure is a guideline for each review:

- a. Publish the review letter setting forth the time, date, place, agenda, and board members for each review. Coordinate these items with the board Chairman and Secretary. As a minimum, the review letter and the data package shall be distributed as follows:
 - Office Manager SM3
 - Payload Project Manager (SM3)
 - Experiment Systems Manager (SM3)
 - Payload Engineering Manager (EB)
 - Materials sections (EM2)
 - SR&QA Directorate
 - Principal Investigator (Experiment level)
 - Mission Manager (Payload level)
 - Astronaut Office Rep.

The distribution list indicates, if any, those not receiving the review package.

The SM3 Payload Project Manager/Experiment Systems Manager distributes the review letter/package no less than 10 working days prior to the review.

NOTE: A review package shall be placed in the Technical Documentation and Information (TDI) Center (Bldg. 36).

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- b. Present Engineering Change Proposals (ECPs) resulting from the review(s) to the EB CCB for approval prior to implementation.
- c. Conduct the reviews and present the results to the Review Board.

10.4.2 Review Board Secretary

The following procedure is a guideline for each review:

- a. Support the SM3 Payload Project Manager/Experiment Systems Manager in pre-review activities as required.
- b. Receive RIDs and prepare copies for the RID actionee and RID initiator.
- c. Assist the Board in dispositioning RIDs, as required.
- d. Categorize approved RIDs into the following:
 - 1. RIDs requiring contractor to submit an ECP (requires CCB approval to implement)
 - 2. RIDs to be imposed on contractor by Task Order Change.
 - 3. RIDs accepted by contractor as no impact.
- e. Record the minutes of the review. The minutes shall include a list of attendees, agenda, and Action Item/RID summary log. The minutes shall be published no later than five (5) working days after the review.
- f. Finalize and distribute the approved minutes.
- g. Enter the action items and RIDs into the payloads/experiment Review Action/RID log.
- h. Follow-up on open Action Items and RIDs for timely closure.
- i. Update the action item and RID status weekly to show closure of any item.

10.4.3 Review Package Evaluators

Individuals evaluating review packages shall utilize the RID form (JSC Form 1491) to identify problems or discrepancies. RIDs will be submitted to the Review Board Secretary prior to Review Board meeting.

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10.4.4 Conduct of the Review

The following procedure is a guideline for conducting a review:

- a. The Review Board Secretary assures that a conference room, viewgraph equipment, etc., is available for the review.
- b. The SM3 Payload Project Manager/Experiment Systems Manager assures that equipment and documentation, as required, is available at the review.
- c. The Review Board Secretary records minutes of the session. These shall be brief, composed of only important problems, and action items not covered by RIDs. A listing of RIDs reviewed is included.
- d. Prior to the convening of the Board, all RIDs are turned into the Review Board Secretary. The Secretary assigns a tracking number to each RID. RIDs are given to the SM3 Payload Project Manager/Experiment Systems Manager for pre-Board discussions.
- e. The Board convenes to determine the disposition of the RIDs not resolved during the pre-Board discussions. The SM3 Payload Project Manager/Experiment Systems Manager presents the RIDs to the Board and recommends disposition. Actionee(s) and suspense dates are assigned by the Board chairman.
- f. Upon completion of the review, the Review Board Secretary prepares minutes, obtains the concurrence of the SM3 Payload Project Manager/Experiment Systems Manager, the signature of the Review Board Chairperson, and distributes the minutes.

10.4.5 Closing of RIDs

RIDs are closed when the directed action has been completed and concurred upon by the initiator. No RIDs shall be withdrawn except with the concurrence of the initiator. If RIDs are not closed prior to the next review, they shall be reassessed, dispositioned with concurrence of the Review Board Chairman and documented in the minutes of the next review. If they cannot be dispositioned in this manner, they will be added to the agenda of the next review.

- The actionee submits closure rationale to Review Board Secretary using RID/Action Item Closure form.
- The Review Board Secretary coordinates closure data with the initiator of the RID, the SM3 PPM/ESM and obtains their approval on the form. Any technical problems will be resolved by the assignee.
- The Review Board Secretary updates the Payload/Experiment Review RID/Action log and submits a copy of the RID and closure rationale to the initiator of the RID and files original of the RID and closure rationale.