MPR 8060.3
BASELINE
EFFECTIVE DATE: October 28, 2004
EXPIRATION DATE: October 28, 2009

MARSHALL PROCEDURAL REQUIREMENTS

QD01

REQUIREMENTS AND DESIGN REVIEWS, MSFC PROGRAMS AND PROJECTS

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DOCUMENT HISTORY LOG

Status (Baseline/ Revision/ Canceled)	Document Revision	Effective Date	Description
Baseline		10/28/2004	Converted from MWI 8060.3.

TABLE OF CONTENTS

Preface

P.1 Purpose
P.2 Applicability
P.3 Authority
P.4 Applicable Documents
P.5 References
P.6 Cancellation

Document Content

1. Definitions
2. Responsibilities
3. Procedure
4. Records
5. Flow Diagram

Appendix Z Guidance for Conducting Successful Reviews
Z.1 Program/Project Readiness
Z.2 RID Criteria
Z.3 RID Screening
Z.4 RID Tracking
Z.5 Review Kickoff
Z.6 Pre-Board and Board
Z.7 Review Checklists
Z.8 Sample RID form

PREFACE

P.1 PURPOSE

This Marshall Procedural Requirements (MPR) provides instructions for planning and conducting formal Requirements and Design Reviews. It provides a consistent and disciplined process to assure thorough technical review and adequate management oversight prior to authorization for Programs/Projects to proceed to the next stage of development.

P.2 APPLICABILITY

This requirement applies to all formal Requirements and Design Reviews conducted at the system and subsystem level for Programs, Projects or activities governed by MPR 8060.1. This requirement does not apply to informal reviews, audits, acceptance reviews, pre-ship reviews, or flight readiness reviews.

P.3 AUTHORITY

NPR 7120.5, "NASA Program and Project Management Processes and Requirements"

P.4 APPLICABLE DOCUMENTS

4.1 MPR 1150.1, "Establishment of Councils, Boards, and Committees"

4.2 MPR 7120.1, "Program/Project Planning"

4.3 MPR 8040.1, "Configuration Management"

4.4 MPR 8060.1, "Flight Systems Designs/Development Control"

4.5 NPR 1441.1, "NASA Record Retention Schedules"

P.5 REFERENCES

MSFC-HDBK-3173, "Project Management and System Engineering Handbook"

P.6 CANCELLATION

This document replaces and cancels MWI 8060.3A dated May 10, 2004.

Original signed by
Robin N. Henderson for

David A. King
Director

DOCUMENT CONTENT

1. DEFINITIONS

1.1 Board - The management panel that serves as the final disposition authority for Review Item Discrepancies (RIDs). This is an ad hoc Board, in accordance with MPR 1150.1, "Establishment of Councils, Boards, and Committees."

1.2 Data Package - Package of Review Documentation, and supporting Reference Documents, provided for evaluation during the review.

1.3 Developer – Individual or organization involved in development of the documents comprising the Data Package.

1.4 Disposition – Approval of a suitable plan of action to resolve a RID, including actionee and suspense date.

1.5 Pre-board - The panel, chaired by the Chief Engineer, that serves as an intermediate management review authority between the Review Committee and the Board. The Pre-board recommends RID Dispositions to the Board, or forwards RIDs to the Board for review and disposition.

1.6 Reference Documentation - Documentation against which the Review Documentation is assessed for compliance.

1.7 Review Committee – Committee that assesses the Data Package for compliance with the criteria established in the Review Plan.

1.8 Review Documentation - Documentation provided to the Review Committee to be evaluated in accordance with the Review Plan.

1.9 Review Item Discrepancy (RID) – A formal finding of noncompliance that meets criteria established in the Review Plan.

1.10 RID Actionee – Individual who is assigned a formal action item required to correct a deficiency identified in a RID.

1.11 RID Closure – Formal approval of RID resolution, based upon documented evidence of completion of actions required by the RID Disposition.

1.12 RID Coordinator – Individual responsible for administering the RID tracking process.

1.13 RID Criteria - The criteria, defined in the Review Plan, used to determine whether or not a valid RID exists.

1.14 Review Plan - Document provided by the Project Manager (PM), that establishes the objectives and scope of the Review, entrance and exit criteria, data package contents, RID criteria, review committee/team roles and responsibilities, and other plans and ground rules for the review.

1.15 Review Team – Subset of the review committee that assesses a specific area of the data package.

1.16 Screening Official – The Lead Systems Engineer (LSE), or other designated individual with authority to review and determine validity of proposed RIDs for compliance with RID criteria.

2. RESPONSIBILITIES

2.1 Program/Project Manager shall:

2.1.1 Determine the formal Requirements and Design Reviews to be held for the Program/Project, in accordance with MPR 8040.1, MPR 8060.1, and MPR 7120.1.

2.1.2 Determine Program/Project readiness for the Review in accordance with 3.1.2

2.1.3 Develop the Review Plan in accordance with 3.1.10

2.1.4 Concur with Review Committee membership and ensure Pre-board and Board are established in accordance with 3.1.4 and 3.1.5**.** Ensure that a RID Coordinator is appointed.

2.1.5 Serve as a member of the Board in accordance with Program/Project Office instructions.

2.1.6 Approve Review Item Discrepancy (RID) closures in accordance with 3.3

2.1.7 Document results of the Review in accordance with MPR 8060.1 and 3.2.11.

2.1.8 Designate custodians for records in accordance with 4.0**.**

2.2 Program/Project Office Director shall:

2.2.1 Appoint Board and Pre-board chairpersons in accordance with 3.1.4.

2.2.2 Request support from other Directorates, Offices, Centers, or other organizations for review committee, Pre-Board, and Board membership in accordance with 3.1.4 and 3.1.5.

2.3 Directors of supporting Directorates, Offices and other organizations shall provide requested support for Review Committee, Pre-board, and Board membership in accordance with 3.1.4 and 3.1.5.

2.4 RID coordinator shall set up the RID processing and tracking system in accordance with the Review Plan, and track all RIDs from initial submission to closure utilizing the process established in the Review Plan.

2.5 Document developers and other Program/Project team members shall:

2.5.1 Prepare presentation materials and data package contents and distribute in accordance with the Review Plan

2.5.2 Present presentation materials at the kickoff, screening meetings, Boards, or other meetings as required in the Review Plan.

2.5.3 Participate as review committee members if required in the Review Plan.

2.5.4 Provide support and clarification to review committee members in order to facilitate an effective review.

2.5.5 Provide responses to RIDs as required in the Review Plan

2.6 Lead Systems Engineer shall:

2.6.1 Serve as the RID screening official. If the Review Plan requires a RID screening committee, the LSE shall lead the committee, and shall have the final authority for screening decisions at the screening meetings.

2.6.2 Present a summary of the review to the Pre-Board and Board.

2.6.3 Review and concur with RID closure data if required by the Review Plan.

2.7 Review Committee members shall:

2.7.1 Assess the review documents for compliance with reference documents, and to ensure technical accuracy and completeness in accordance with review objectives stated in the Review Plan.

2.7.2 Submit candidate RIDs when issues meet RID criteria stated in the Review Plan.

2.7.3 Participate in processing RIDs to recommend dispositions to the Pre-board and Board.

2.7.4 Have authority to disapprove RIDs accepted by the RID Screening Official after further study.

2.8 Review Team leads shall:

2.8.1 Provide leadership and direction to their teams to monitor progress, ensure complete and thorough review of the Data Package, provide guidance, and facilitate discussions between reviewers and Document Developers in compliance with the Review Plan.

2.8.2 Lead their teams in processing RIDs to recommend RID dispositions

2.8.3 Present the results of their teams review to the Pre-Board and Board. In the event that the review Committee is not organized into teams, the LSE shall perform the duties of the team leads.

2.8.4 Review and concur with RID closure data if required by the Review Plan

2.9 RID Initiators shall:

2.9.1 Submit candidate RIDs prior to the RID submission deadline

2.9.2 Have authority to modify and resubmit RIDS that do not meet RID criteria any time prior to the deadline imposed by the RID screening official.

2.9.3 Have authority to withdraw any RID they submitted prior to the Pre-board meeting

2.9.4 Have authority to appeal any RID disapproved by the Review Committee or Pre-board to the Pre-board or Board

2.9.5 Have authority to request Pre-board review of rejected RIDs.

2.9.6 Review and concur with RID closure data if required by the Review Plan

2.10 Pre-Board shall convene a meeting to:

2.10.1 Determine adequacy of the Review

2.10.2 Confirm that the Program/Project has met the entry and exit criteria of the review as stated in the Review Plan

2.10.3 Confirm that the Program/Project is ready to proceed to the next phase of development. If the Pre-Board determines that the Program/Project is not ready to proceed, corrective actions shall be assigned.

2.10.4 Concur with, modify or disapprove RID dispositions presented by the review committee.

2.10.5 Forward RIDs to the Board in accordance with 3.2.9.

2.10.6 Make a recommendation regarding the necessity of a Board meeting in accordance with 3.2.8.6.e.

2.11 Chief Engineer shall:

2.11.1 Serve as chairperson of the Pre-Board

2.11.2 Publish minutes of the Pre-board meeting.

2.11.3 Serve as a member of the Board

2.11.4 Review and concur with RID closure data if required in the Review Plan.

2.11.5 Review and approve the Review Plan.

2.12 The Board shall:

2.12.1 Establish the formal disposition for all RIDs

2.12.2 Have authority to change actions and disposition recommendations previously established by the Pre-Board or review teams, or accept the recommended actions and dispositions.

2.12.3 Determine adequacy of the review.

2.12.4 Confirm that the Program/Project has met the entry and exit criteria of the review as stated in the Review Plan

2.12.5 Confirm that the Program/Project is ready to proceed to the next phase of development

2.13 The Board Chairperson shall:

2.13.1 Determine whether or not a Board meeting shall be held.

2.13.2 Publish the Board meeting minutes.

2.13.3 If the Board did not convene, publish a summary of the review results.

2.14 RID Actionees shall complete actions to resolve RIDs and provide documented evidence such as revised drawings or other documentation.

3. PROCEDURE

3.1 Planning the Review
The program/project manager shall plan the review. Review planning shall include:

3.1.1 Establishing formal Requirements and Design Reviews
During formulation, the PM shall establish the formal Requirements and Design Reviews to be held for the Program/Project, in accordance with MPR 8040.1, MPR 8060.1, and MPR 7120.1. Guidelines for determining which reviews should be included are available in MSFC-HDBK-3173, "Project Management and Systems Engineering Handbook."

3.1.2 Determining readiness for each review
Prior to conducting specific reviews, the PM shall determine Program/Project readiness for the Review. Guidance for assessing readiness may be found in MSFC-HDBK-3173 Section 4.3.6 and Appendix A, and in Appendix Z of this document. The review shall not be scheduled unless there is reasonable assurance the data package meets the review entry criteria stated in the Review Plan.

3.1.3 Screening Technical Standards
The data package shall be screened and all technical standards, whether included in the package directly or as applicable or reference documents, shall be entered on the NASA Standards Update Notification System http://standards.nasa.gov to determine if the technical standards are the most current versions available.

3.1.4 Appointing the Board and Pre-Board members
A majority of the Board and Pre-Board shall consist of institutional or functional managers that are not part of the project or program team. Each organization represented on the review committee shall be represented on the Pre-board and Board. If non-MSFC organizations participate on the review committee, then the PM shall state in the Review Plan whether or not the non-MSFC Pre-Board and Board members hold voting or non-voting positions. The Systems Management Office, Safety and Mission Assurance Directorate, and the Independent Technical Authority shall be represented on the Board and Pre-Board in a voting capacity. The MSFC Center representative for the NASA Engineering and Safety Center (NESC) shall be invited to attend as an ad hoc (non-voting) member of the Pre-Board and Board. The Program/Project Chief Engineer shall chair the Pre-Board. The same individual shall not serve as an organization's Pre-Board and Board member. Guidance on Board and Pre-Board membership is in Appendix Z.

3.1.5 Appointing the Review Committee
The review committee shall be established by the PM based on the review objectives, scope, the amount and complexity of the review data and the time allotted for review. The committee shall consist of project personnel and independent reviewers to ensure a thorough and independent review. Committee members shall be functional/technical experts capable of performing a

detailed evaluation of the data package. Safety & Mission Assurance and the customer shall be represented on the review committee. The PM may organize the review committee into teams based on functional areas, disciplines, subsystems, organizations or other categories. If the PM organizes the committee into teams, review team leads shall be appointed to manage each team's review. Team leads shall be functional/technical team leads or senior level engineers. Team leads shall not serve as Pre-Board or Board members. If the Review Committee is not organized into teams, the PM shall perform the functions of review team leads. The PM may delegate this responsibility to the LSE, or LSSEs .

3.1.6 Appointing the RID Screening Team.
The Program/Project LSE shall serve as the RID screening official, with sole authority to rule on the screening classifications of all proposed RIDs. The PM may appoint a screening committee to review and make recommendations on the screening classifications in order to assist the LSE. The LSE shall not serve as a review team lead, Pre-Board Chairperson, or Board Chairperson. If the PM gives the screening official authority to reject invalid RIDs, it shall be specifically stated in the Review Plan. Rejected RIDs shall not be forwarded through the disposition process.

3.1.7 Establishing RID cost and schedule thresholds.
The PM shall establish thresholds for cost and schedule impacts which, if exceeded, require RIDs to be forwarded to the Pre-Board or Board. Cost/schedule thresholds for Board review should be based upon the cost and schedule reserve available to the PM. Guidance on the use of thresholds is in Appendix Z.

3.1.8 Establishing the RID processing and tracking system.
The PM shall establish a system to track RID generation, submission, screening, disposition development, processing through the Pre-Board and Board, and processing through the closure process. The system shall utilize a form to record and track the following data:

3.1.8.1 Project Name

3.1.8.2 Type of Review

3.1.8.3 RID Number, and if used in the process, pre-RID or Candidate RID (CRID) Number

3.1.8.4 Name and contact information for RID initiator

3.1.8.5 Description of the discrepancy

3.1.8.6 Review documentation and location containing the discrepancy

3.1.8.7 Reference documentation and location of requirement being violated (this can include violation of the Review Plan when required data is not available, or upper level applicable documents not included in the data package when issues are discovered that would prevent the Program/Project from meeting its upper level requirements).

3.1.8.8 Screening and disposition classifications

3.1.8.9 Document developer's suggested corrective action, and associated cost and schedule impacts of resolving RID.

3.1.8.10 Action, actionee and suspense date

3.1.8.11 Record of closure concurrences and dates, closure approval signature and date, and associated evidence of closure.

3.1.9 Appointing the RID System Coordinator

3.1.10 Developing the Review Plan.
The Review Plan shall contain:

3.1.10.1 Objectives, scope, entry and exit criteria
Objectives, scope, entry and exit criteria for the review shall be clearly stated in order for the Board to determine whether or not the review was successful. Guidance on objectives, scope, entry, and exit criteria for specific reviews is available in MSFC-HDBK-3173 and in Appendix Z of this document.

3.1.10.2 Data package contents:
A list of review documentation and reference documentation and their expected maturity levels shall be included. If reference documents are not RID-able, that shall be clearly stated. Typically, reference documents are base- lined and are therefore not RID-able. Guidance on data package contents for selected reviews may be found in MSFC-HDBK-3173, Appendix A, and in Appendix Z of this document.

3.1.10.3 RID processing requirements
The process for submission, screening, disposition, tracking and closure of RIDs shall be described. Typically, the initial RID submissions are referred to as pre-RIDs or Candidate RIDs (CRIDs). The process shall clearly establish closure ground rules, such as required concurrences, and the processing of rejected RIDs, if permitted. The process description shall include:

a. RID form and processing system

b. RID submission and screening criteria
The criteria used to determine whether or not a valid discrepancy exists shall be described. These criteria shall include discrepancies between the reference documentation and the review documentation, absence of needed information, and data package maturity that is not at the appropriate level based upon the review objectives, entry and exit criteria. Typical examples of RID criteria for selected reviews are listed in Appendix Z.

c. RID screening process
While the LSE shall serve as the RID screening official, the PM may appoint a RID screening committee to assist the LSE. The LSE shall be the sole authority for the RID screening decisions during the screening. Approved RID screening designations shall be described in the plan, including whether or not rejection of invalid RIDs is permitted. Detailed requirements on RID screening designations are in 3.2.3. Guidance can be found in Appendix Z.

d. RID disposition process
The process by which dispositions of the RIDs are developed and approved shall be described. Typically, RIDs are assigned to teams or individual review committee members to develop a recommended disposition. Recommended dispositions shall be presented to the Pre-Board, and the Pre-Board shall in turn recommend dispositions to the Board. The Board shall have final disposition authority. Disposition classifications characterize the findings of the review committee, review teams, Pre-Board and Board and shall be in accordance with 3.2.5**.** The review plan shall state whether or not approval or acceptance for study, or combining of RIDs shall be permitted.

3.1.10.4 Review Organization
The review organization shall be described, including a list of the review committee members, Pre-Board and Board members, RID coordinator, the LSE, and if applicable, the RID screening committee and team leads.

3.1.10.5 Review schedule
The review schedule shall be provided, and shall include:

a. Data package availability - The data package shall be available to the review committee no later than the kickoff meeting.

b. Kickoff meeting date/time and location

c. RID submission deadline

d. RID screening meeting(s) dates/times and locations

e. Pre-Board meeting date/time and location

f. Board meeting date/time and location

3.1.11 Obtaining Review Plan approval.
Prior to distribution, the project Chief Engineer, the Systems Management Office, and the Center ITA shall approve the Review Plan.

3.1.12 Distributing the Review Plan.

The Review Plan shall be distributed to all review committee members, team leads, the LSE, the RID screening committee members, the Pre-Board and the Board Members.

3.1.13.Distributing the Data Package.
The data package shall be provided to the review committee no later than the kickoff meeting.

3.2 Conducting the Review

3.2.1 Kickoff Meeting
A kickoff meeting shall be conducted to present the review committee with the review objectives, scope, organization, ground rules and an overview of the system and/or subsystems under review. Attendance by the review committee and review team leads shall be mandatory. Guidelines and an agenda template for the kickoff meeting are in Appendix Z.

3.2.2 Review of data package/generation of proposed RIDs
The review committee shall assess the review documentation for compliance with reference documentation, evaluate for technical accuracy and completeness, and appropriate maturity in accordance with review objectives. They shall identify and discuss potential issues with document developers, and submit proposed RIDs when issues meet the criteria in the Review Plan. If the Review Committee is organized into teams, the team leads shall provide leadership and direction to their review teams to monitor progress, ensure complete and thorough review of the data package, provide guidance, and facilitate discussions between reviewers and document developers. Program/project document developers shall provide support and clarification to review committee members in order to facilitate an effective review.

3.2.3 RID Screening
All RIDs shall be screened against the RID criteria for validity and shall be designated as:

3.2.3.1 A valid RID.
Valid RIDs shall be assigned a RID tracking number and assigned to a team or review committee member for development of a disposition recommendation.

3.2.3.2 Failing to meet criteria and returned to submitter for withdrawal or modification to meet criteria. Only the RID submitter shall have authority to withdraw the RID. If the submitter chooses to modify the RID in order to comply with RID criteria, the modified RID shall be submitted within time limits established by the RID screening official. If the RID submitter refuses to withdraw the RID, and invalid RID rejection is not specifically permitted in the Review Plan, the RID shall be forwarded to a team or review committee member for further study, and development of a disposition recommendation.

3.2.3.3 Rejected as failing to meet criteria, if specifically permitted in the Review Plan. Rejected RIDs shall be returned to the submitter for withdrawal or modification to meet criteria. Only the RID submitter shall have authority to withdraw the RID. If the submitter chooses to modify the RID in order to comply with RID criteria, the modified RID shall be submitted within

time limits established by the RID screening official. If the RID submitter refuses to withdraw or modify the RID, or if the modified RID still fails to meet criteria, the RID shall be rejected and shall not be forwarded for disposition development. The RID initiator shall have the authority to request that a rejected RID be reviewed by the Pre-Board. This request shall be submitted to the Pre-Board member representing their organization.

3.2.3.4 Combined with another RID if the same corrective action will close both RIDs. This classification is most effectively used during the review team activity rather than in screening. RID initiators shall be notified when their RIDs are combined and they shall have the authority to appeal to the Pre-Board.

3.2.4 Developer comments

Document developers shall provide required responses to RIDs in accordance with RID processing requirements in the Review Plan. At a minimum, the cost and schedule impacts and suggested corrective action shall be provided.

3.2.5 Development of proposed RID dispositions

The review teams or review committee members shall work with the document developers and develop recommended dispositions for RIDs assigned to them by the screening official. Allowable dispositions shall include:

3.2.5.1 Accepted if the RID is acceptable as written or as modified, and an agreed-to action, actionee, and suspense date has been assigned.

3.2.5.2 Disapproved if the review committee, review team. Pre-Board, or Board has determined that the RID is not valid; has failed to agree on the description of the RID, or has failed to reach agreement on an appropriate action, actionee or suspense date for resolution of the RID. Disapproved RIDs shall be presented to the Pre-Board and Board.

3.2.5.3 Combined when the corrective action will close both RIDs. If combining of RIDs is permitted, it shall be explicitly stated in the Review Plan. Initiators of combined RIDs shall be notified and given the opportunity to appeal to the Pre-Board.

3.2.5.4 Withdrawn by initiator. The RID initiator is the only person who shall have authority to withdraw a RID, at anytime prior to the Pre-Board meeting.

3.2.5.5 Accepted for study, if specifically permitted in the Review Plan. This disposition shall only be used when absolutely necessary, when it is not possible to determine RID validity without further study. All RIDS that are accepted for study shall be presented to the Pre-Board and the Board. This disposition is discouraged, and the Review shall not be officially completed until all such studies are completed, and the subject RIDs are accepted with actions levied for resolution; or closed based on failure to validate the discrepancies. At a minimum, the Pre-Board and Board membership shall be notified in writing of the results of the studies, and the Board chairperson shall issue amended Board minutes approving or accepting the dispositions.

3.2.6 Reconsideration of Reject RIDs

The RID initiator shall have the authority to request that a rejected RID be reviewed by the Pre-Board. This request shall be submitted to the Pre-Board member representing their organization. The Pre-Board member shall review any such requests from RID initiators, and if in the Pre-Board member's opinion, the RID is valid, the RID shall be presented to the Pre-Board. If the Pre-Bard member determines that the RID is not valid, it shall not be processed further.

3.2.7 Conduct Pre-Board Meeting

The LSE or designee shall present a summary of the review to the Pre-Board. The summary shall include a complete list of all valid RIDs, the recommended dispositions, and associated cost and schedule impacts. A total of the cost impacts for all valid RIDs shall be presented. RIDs forwarded to the Pre-Board for review and action shall be presented individually in sufficient detail to facilitate Pre-Board disposition recommendations. The following RIDs shall be presented:

3.2.7.1 Disapproved RIDs. The RID initiator shall be required to attend the meeting in order to defend the RID.

3.2.7.2 RIDs that exceed thresholds for cost and schedule impacts established in the Review Plan

3.2.7.3 All open RIDs from previous reviews

3.2.7.4 RIDs meeting other criteria established in the Review Plan. Guidance is provided in Appendix Z.

3.2.7.5 RIDs determined by the team leads to merit Pre-Board review, even if the previous criteria are not met.

3.2.8 Pre-Board Findings. The pre-board shall:

3.2.8.1 Approve recommend dispositions for all RIDs or forward to the Board for review and disposition.

3.2.8.2 Change action items or disposition recommendations previously established by the review committee or review teams, if the Pre-Board disagrees with the committee or team findings. If a suitable disposition recommendation cannot be established, or if the Pre-Board determines that the RID is not valid, the RID shall be disapproved and forwarded to the Board.

3.2.8.3 Review rejected RIDs submitted by other Pre-Board members and concur with rejection, or over-rule the decisions of the RID screening official and accept the RID, or forward to the Board for review.

3.2.8.4 Review open RIDs from previous reviews and determine if Board review is warranted.

3.2.8.5 Determine whether the entry and exit criteria, as stated in the Review Plan, have been met, and whether the Program/Project is ready to proceed to the next stage of development.

a. If the Pre-board finds that the entry and exit criteria have been met, that the Program/Project is ready to proceed to the next stage of development, and that there are no RIDs requiring Board review, then a formal Board meeting shall not be required. In this case the Board chairperson shall determine whether or not to convene the Board.

b. If the Pre-Board finds that the Program/Project is not ready to proceed, or finds that entry and/or exit criteria have not been met, or that specific RIDs require Board review, the Board shall convene.

3.2.8.6 Publish Pre-Board meeting minutes and distribute to the PM, LSE, Lead Subsystem Engineer (LSSE) (for subsystem reviews), the Pre-Board members and the Board members. The minutes shall include:

a. A listing and summation of cost and schedule impacts and recommended disposition classifications for all RIDs,

b. A description of any RIDs requiring Board review;

c. A list and status of all open RIDs from previous reviews, and whether or not Board review is required.

d. A statement of whether or not the Pre-Board considers the entry and exit criteria to have been met, and their recommendation regarding the readiness of the Program/Project to proceed to the next stage of development.

e. A statement of whether or not the Pre-Board recommends that the Board convene.

A suggested Pre-Board concurrence sheet format is included in Appendix Z.

3.2.9 Conduct Board Meeting

If a Board meeting is required in accordance with 3.2.8.5, the LSE or designee shall present a summary of the review to the Board. The summary shall include a complete list of all valid RIDs, the recommended dispositions, and associated cost and schedule impacts. A total of the cost impacts for all valid RIDs shall be presented. RIDs forwarded to the Board for review and action shall be presented individually in sufficient detail to facilitate Board disposition. The following RIDs shall be presented:

3.2.9.1 Disapproved RIDs if the initiator requests Board review, or if the Pre-board determines Board review is required. The RID initiator shall be required to attend the meeting in order to defend the RID.

3.2.9.2 RIDs that exceed thresholds for cost and schedule impacts established in the Review Plan

3.2.9.3 Rejected RIDs, if forwarded by the Pre-Board

3.2.9.4 Open RIDs from previous reviews, if forwarded by the Pre-Board

3.2.9.5 RIDs that were "accepted for study"

3.2.9.6 RIDs meeting other criteria established in the Review Plan. Guidance is provided in Appendix Z.

3.2.9.7 RIDs determined by the Pre-board to merit Board review, even if the previous criteria are not met.

3.2.10 Board Findings
The Board shall:

3.2.10.1 Establish disposition for all RIDs. The Board is the final disposition authority for all RIDs, and has the authority to change action items or dispositions previously recommended by the review committee or review teams, or the Pre-Board.

3.2.10.2 Review rejected RIDs submitted by the Pre-Board, and concur with rejection, or over-rule the decisions of the RID screening official and accept the RID, and establish a disposition.

3.2.10.3 Review open RIDs from previous reviews submitted by the Pre-Board, and assign any actions if warranted.

3.2.10.4 Determine whether the entry and exit criteria, as stated in the Review Plan, have been met, and whether the Program/Project is ready to proceed to the next stage of development. If the stated criteria have not been met, or the Program/Project is not ready to proceed, then the Board shall determine required corrective actions. The Program/Project shall not proceed further until the conditions established by the Board have been fulfilled.

3.2.10.5 Publish Board meeting minutes and distribute to the PM, LSE, Lead Subsystem Engineer (LSSE) (for subsystem reviews), the Pre-Board members and the Board members. The minutes shall include:

a. A listing and summation of cost and schedule impacts and final dispositions for all RIDs

b. A description of any RIDs specifically reviewed by the Board and any associated actions levied by the Board

c. A list and status of all open RIDs from previous reviews, and any associated actions levied by the Board

d. A statement of whether or not the entry and exit criteria to have been met, and a determination of the readiness of the Program/Project to proceed to the next stage of development. If the stated criteria have not been met, or the Program/Project is not ready to proceed, required corrective actions shall be included in the minutes.

e. If the Board did not convene, the Board Chairperson shall publish a list of all RIDs along with their dispositions, cost and schedule impacts, and confirmation that the entry and exit criteria as stated in the Review Plan have been met, and that the Program/Project is ready to proceed to the next stage of development. A suggested Board concurrence sheet format is included in Appendix Z.

3.2.11 Documentation of review results

The PM shall document results of the Review in accordance with MPR 8060.1, including copies of the Pre-board and Board minutes. If the Board Chairperson did not issue a positive finding of Program/Project readiness to proceed, a plan for repeating the review or a portion of the review, or other corrective actions assigned by the Board shall be included. Positive Board findings, approved dispositions for all RIDs, and documentation of review results constitute formal completion of the Review.

3.3 Closure of RIDs

RID actionees shall complete actions to resolve RIDs and provide documented evidence such as revised drawings or other documentation to the RID coordinator. If required by the Review Plan, RID Initiator concurrence shall be required prior to RID closure. The PM shall designate in the Review Plan, any concurrences required for RID closure. The PM shall review and approve final closure of all RIDs. Closure shall be based upon documented evidence that the RID has been resolved. RIDs shall not be closed based upon a plan of action for RID resolution.

4. RECORDS

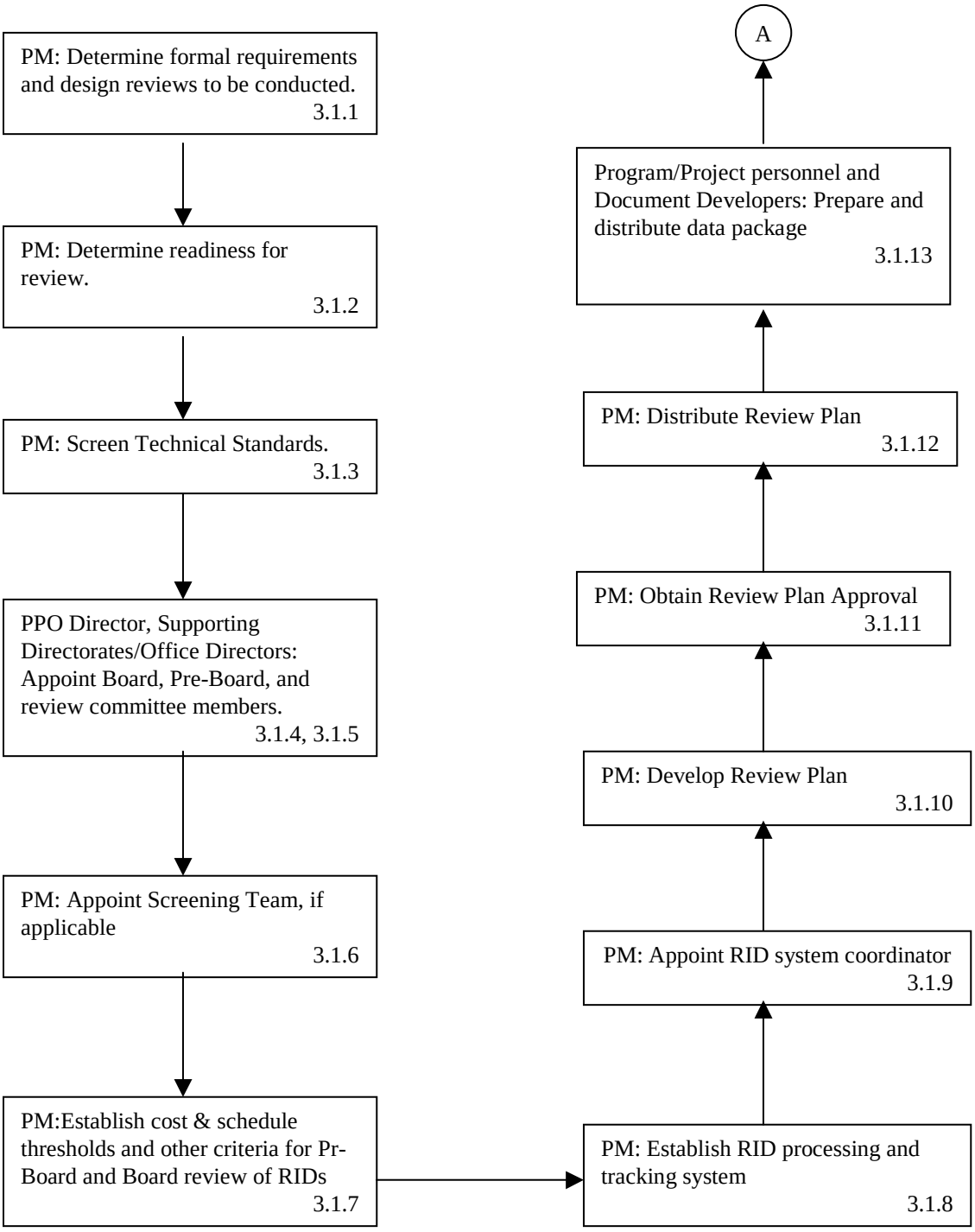
The following records are required by this MPR:

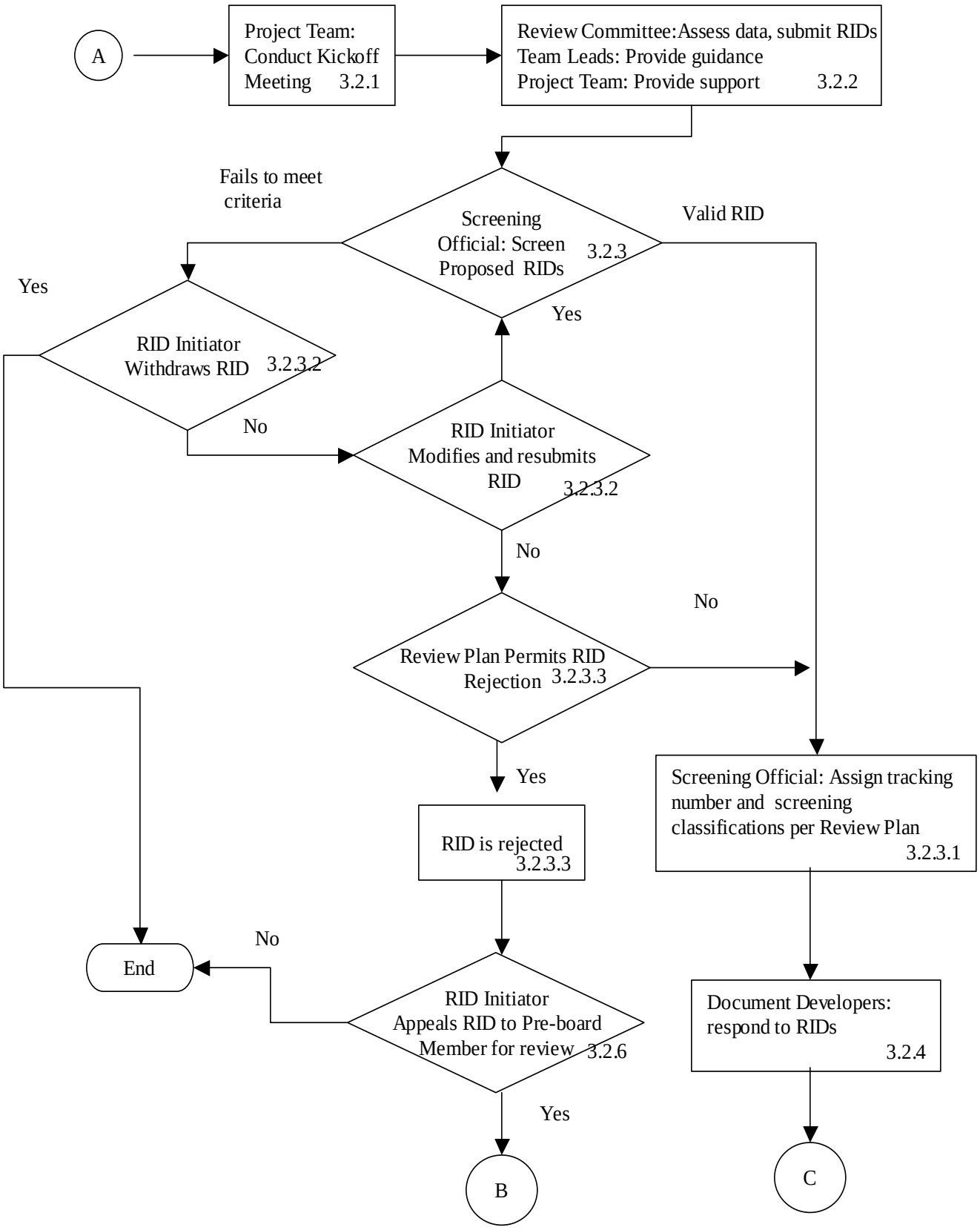
Record	Custodian
Data Package	PM or designee
Review Plan	PM or designee
Kickoff Presentation	PM or designee
RIDs and associated closure data	PM or designee
Pre-board minutes	PM or designee

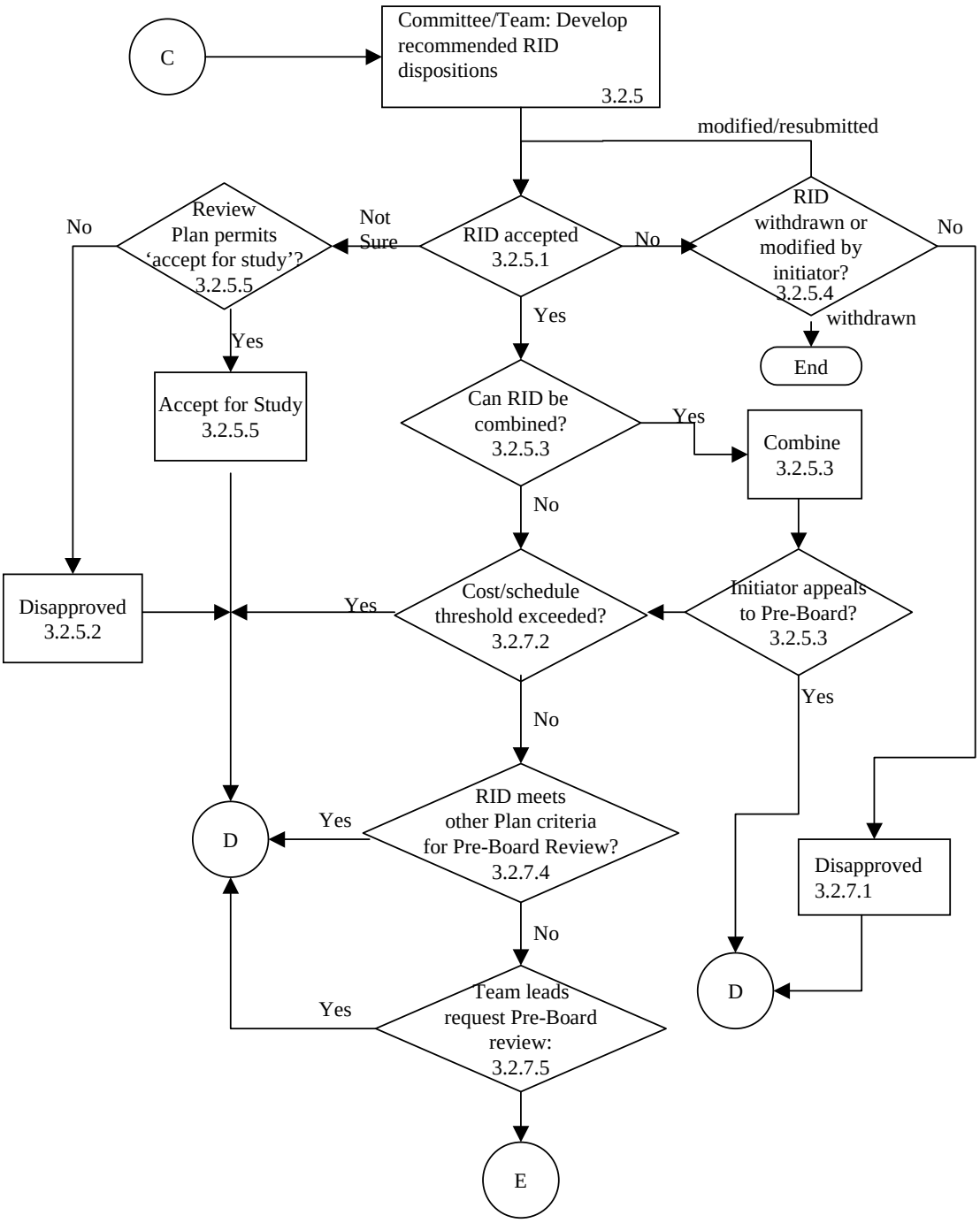
Board minutes	PM or designee
Review results	PM or designee

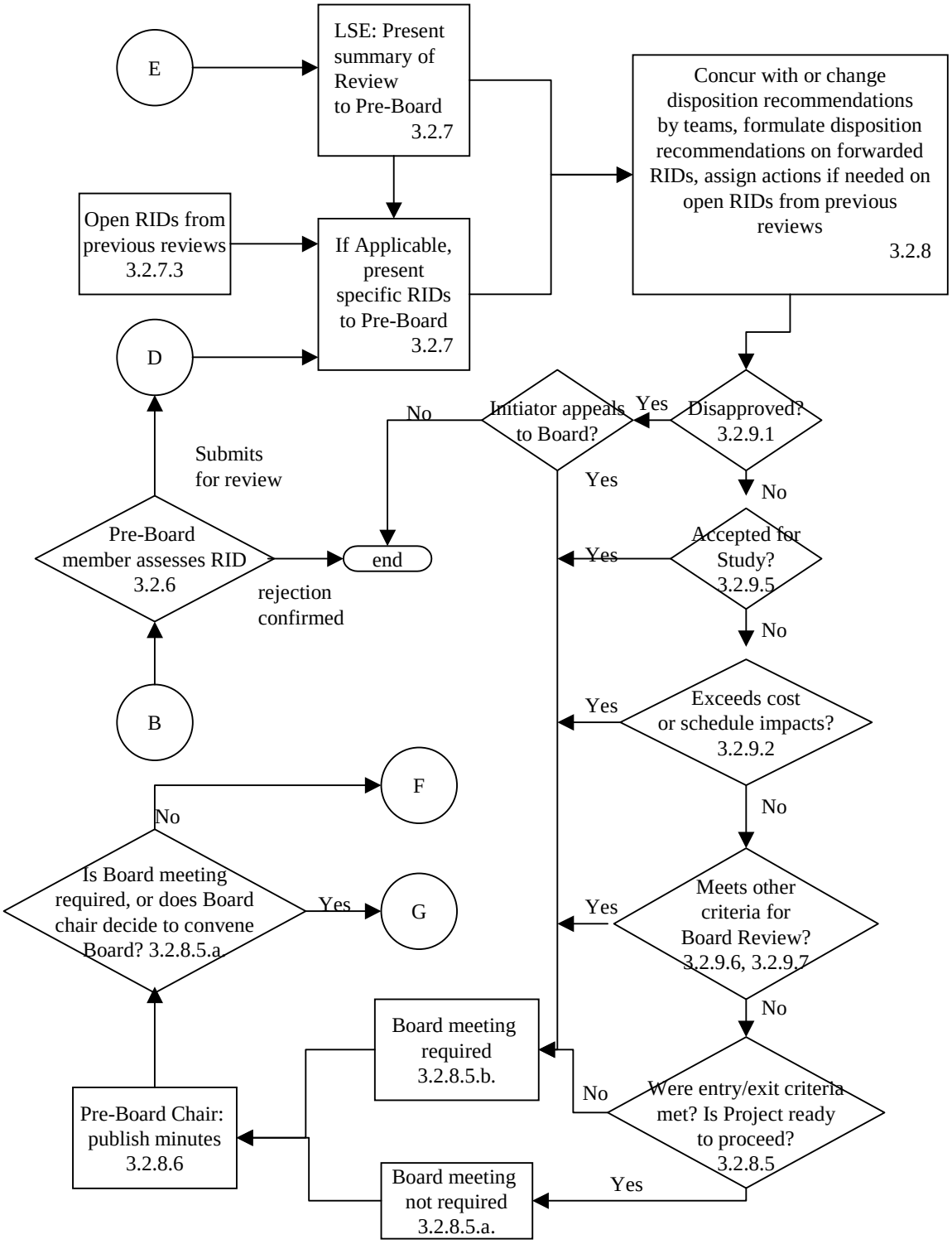
The PM shall designate a custodian for these records, and document the designation in the Program/Project Plan, Data Management Plan, or Records Management Plan. The records shall be retained and dispositioned in accordance with NPR 1441.1, "NASA Records Retention Schedules" (NRRS) 8, Item 5.

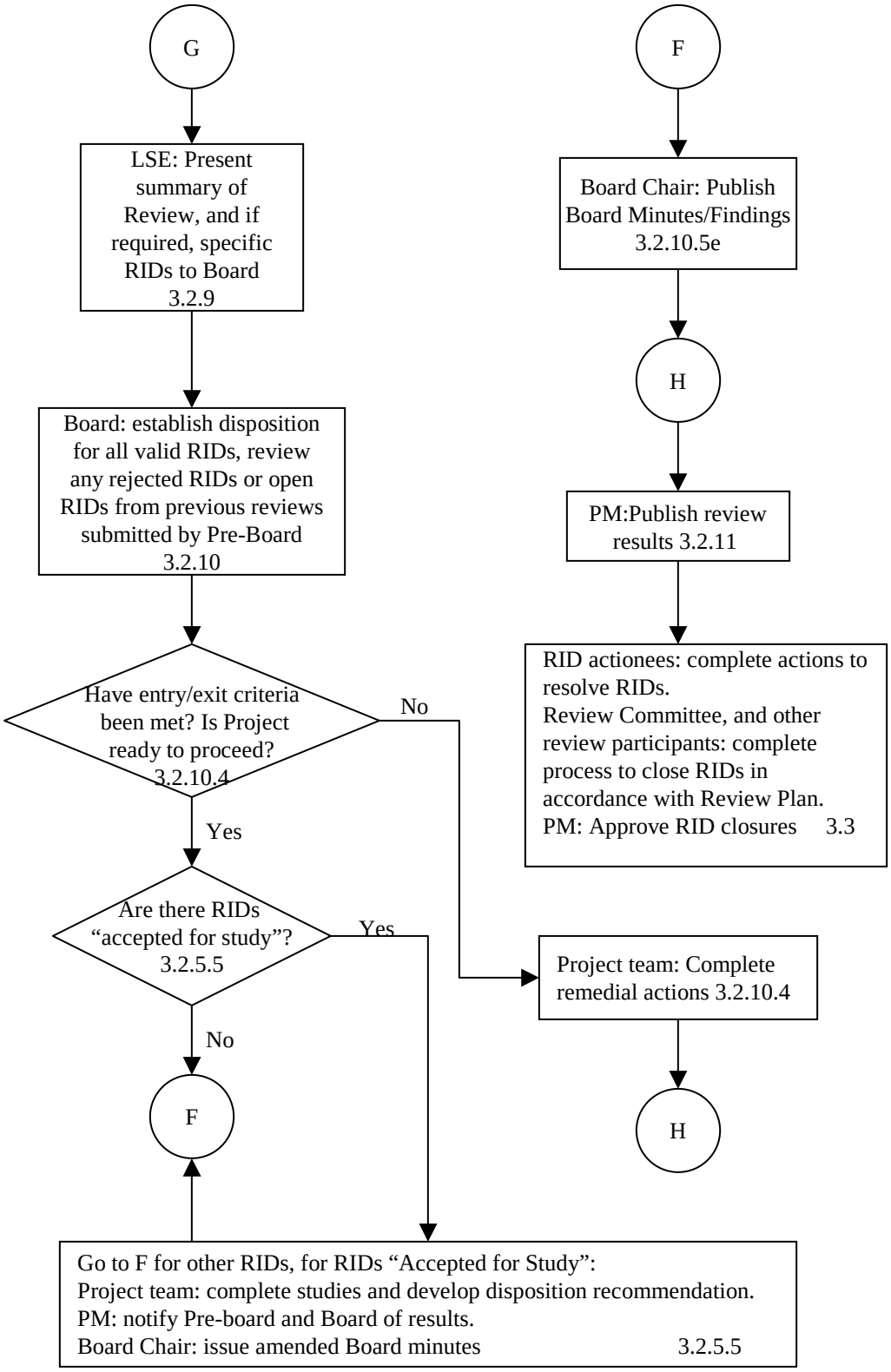
5. FLOW DIAGRAM


PM: Determine formal requirements and design reviews to be conducted. 3.1.1
PM: Determine readiness for review. 3.1.2
PM: Screen Technical Standards. 3.1.3
PPO Director, Supporting Directorates/Office Directors: Appoint Board, Pre-Board, and review committee members. 3.1.4, 3.1.5
PM: Appoint Screening Team, if applicable 3.1.6
PM:Establish cost & schedule thresholds and other criteria for Pr-Board and Board review of RIDs 3.1.7
PM: Establish RID processing and tracking system 3.1.8
PM: Appoint RID system coordinator 3.1.9
PM: Develop Review Plan 3.1.10
PM: Obtain Review Plan Approval 3.1.11
PM: Distribute Review Plan 3.1.12
Program/Project personnel and Document Developers: Prepare and distribute data package 3.1.13
A


A
Project Team: Conduct Kickoff Meeting 3.2.1
Review Committee: Assess data, submit RIDs
Team Leads: Provide guidance
Project Team: Provide support 3.2.2
Fails to meet criteria
Screening Official: Screen Proposed RIDs 3.2.3
Valid RID
Yes
RID Initiator Withdraws RID 3.2.3.2
No
Yes
RID Initiator Modifies and resubmits RID 3.2.3.2
No
Review Plan Permits RID Rejection 3.2.3.3
No
Yes
RID is rejected 3.2.3.3
Screening Official: Assign tracking number and screening classifications per Review Plan 3.2.3.1
No
End
RID Initiator Appeals RID to Pre-board Member for review 3.2.6
Document Developers: respond to RIDs 3.2.4
Yes
B
C


C
Committee/Team: Develop recommended RID dispositions 3.2.5
modified/resubmitted
RID withdrawn or modified by initiator? 3.2.5.4
No
withdrawn
End
RID accepted 3.2.5.1
No
Not Sure
Review Plan permits 'accept for study'? 3.2.5.5
No
Yes
Accept for Study 3.2.5.5
Yes
Can RID be combined? 3.2.5.3
Yes
Combine 3.2.5.3
No
Disapproved 3.2.5.2
Yes
Cost/schedule threshold exceeded? 3.2.7.2
Initiator appeals to Pre-Board? 3.2.5.3
Yes
No
D
Yes
RID meets other Plan criteria for Pre-Board Review? 3.2.7.4
Disapproved 3.2.7.1
No
D
Yes
Team leads request Pre-Board review: 3.2.7.5
E


E
LSE: Present summary of Review to Pre-Board 3.2.7
Concur with or change disposition recommendations by teams, formulate disposition recommendations on forwarded RIDs, assign actions if needed on open RIDs from previous reviews 3.2.8
Open RIDs from previous reviews 3.2.7.3
If Applicable, present specific RIDs to Pre-Board 3.2.7
D
Disapproved? 3.2.9.1
Yes
Initiator appeals to Board?
No
Yes
No
Submits for review
Pre-Board member assesses RID 3.2.6
end
rejection confirmed
Accepted for Study? 3.2.9.5
Yes
No
B
Exceeds cost or schedule impacts? 3.2.9.2
Yes
No
F
No
Is Board meeting required, or does Board chair decide to convene Board? 3.2.8.5.a.
Yes
G
Meets other criteria for Board Review? 3.2.9.6, 3.2.9.7
Yes
No
Board meeting required 3.2.8.5.b.
Were entry/exit criteria met? Is Project ready to proceed? 3.2.8.5
No
Pre-Board Chair: publish minutes 3.2.8.6
Board meeting not required 3.2.8.5.a.
Yes


G
LSE: Present summary of Review, and if required, specific RIDs to Board 3.2.9
Board: establish disposition for all valid RIDs, review any rejected RIDs or open RIDs from previous reviews submitted by Pre-Board 3.2.10
Have entry/exit criteria been met? Is Project ready to proceed? 3.2.10.4
No
Yes
Are there RIDs "accepted for study"? 3.2.5.5
Yes
No
F
Go to F for other RIDs, for RIDs "Accepted for Study":
Project team: complete studies and develop disposition recommendation.
PM: notify Pre-board and Board of results.
Board Chair: issue amended Board minutes 3.2.5.5
F
Board Chair: Publish Board Minutes/Findings 3.2.10.5e
H
PM:Publish review results 3.2.11
RID actionees: complete actions to resolve RIDs.
Review Committee, and other review participants: complete process to close RIDs in accordance with Review Plan.
PM: Approve RID closures 3.3
Project team: Complete remedial actions 3.2.10.4
H

Appendix Z Guidance for Conducting Successful Reviews

Z.1 Program/Project Readiness

Scope, objectives, entry and exit criteria are used to determine readiness for a review, determining validity of proposed RIDs, and determining whether or not the review was successfully completed.

Scope is the extent or range of review activity. For instance, a subsystem review would have a scope that encompasses the subsystem and its interfaces with other subsystems, but would not include issues with the design of other subsystems, even if they impact the subsystem under review.

Objectives are the goals and purposes of the review. If the objectives are not met, the review is not considered a success. A follow-on review may be required.

Entry and exit criteria are statements of the maturity of the system under review. They can be considered analogous to success criteria in a verification plan; if certain criteria are met, the verification is acceptable. Examples of entry criteria would be:

- All documentation and drawings are at a level of maturity stated in the review plan (mature draft, complete, outline, etc)
- System, subsystem, and component designs are of sufficient detail to allow orderly hardware manufacturing, software coding, integration, and test within acceptable risk levels.
- Models used to conduct analyses are based on the appropriate criteria and constraints, and are of appropriate fidelity for design completion

Examples of exit criteria would be:

- No RIDs that will require more than 90 days to close
- There are no issues without anticipated solutions, or that pose unacceptable risks
- There are no RIDs that will use all the management reserves
- Detail design at the system, subsystem and component levels meets performance and functional requirements within cost and schedule constraints.

For more guidance on entry and exit criteria for specific reviews, refer to the checklists in Z.7.

Ensuring adequate project maturity is crucial to the successful completion of the review. Conducting the review before the Program/Project is sufficiently mature will most likely result in large numbers of legitimate RIDs and/or RIDs that require lengthy study, analysis, or prerequisite work. The PM is encouraged to conduct an internal audit of review documentation prior to scheduling the review to ensure that the requirements and/or design are sufficiently

mature for the review, and that the documentation of the data accurately reflects the configuration.

The PM may elect to establish a threshold for RID suspense dates, such as 90 days. RIDs which are anticipated to exceed the threshold for resolution may need review by the Pre-Board and/or Board to determine if the RID is valid for the subject review, and if the Program/Project is mature enough to meet the intent of the review milestone.

The RID process is always very resource demanding. Project management should have budget and personnel allocated for RID resolution. Furthermore, to facilitate an effective RID process, all individuals actively working on the project should be up-to-date on the project and proactive in resolving format and content deficiencies well before the review is conducted.

Z.2 RID Criteria

Clear and effective RID criteria are crucial to the success of the review. Ambiguous RID criteria will likely result in a large number of RIDs of limited value to the project. It is important to keep in mind that every issue should not be worked as a RID. For instance, during a design review, new requirements or design changes to improve the product should be incorporated through the engineering change process, rather than through the RID process. RIDs should not be accepted against presentation packages because presentations do not constitute official requirements or design documentation that can be updated per a RID action to correct discrepancies. Samples of appropriate RID criteria for selected reviews include the following:

Z.2.1 Technical Requirements Review

Z.2.1.1 A requirement is not necessary, achievable, verifiable, clear or consistent with Agency policy or higher-level requirements.

Z.2.1.2 One or more requirements have not been properly flowed to the next lower level.

Z.2.1.3 Requirements are inconsistent.

Z.2.1.4 Missing or incomplete requirements.

Z.2.1.5 Lack of sufficient information (sufficient basis for RID only if the review committee has exhausted all reasonable means to obtain information, and the requirement for the information is reasonable based on the project maturity, review scope, objectives and entry criteria).

Z.2.2 Project Requirements Review

Z.2.2.1 Inadequate or ineffective project planning.

Z.2.2.2 Planning is not in compliance with upper level requirements.

Z.2.2.3 Lack of sufficient information (sufficient basis for RID only if the review committee has exhausted all reasonable means to obtain information, and the requirement for the information is reasonable based on the project maturity, review scope, objectives and entry criteria).

Z.2.3 Design Review

Z.2.3.1 A finding that a deficiency exists in meeting requirements.

Z.2.3.2 Addition of or change in requirements is a valid basis for a RID only if such action is required for the system to meet its overall safety or performance requirements, and only if the requirements documentation is not base lined. Changes to base lined requirements should be incorporated through the Engineering Change Process to ensure proper identification and review of effectivity and impacts.

Z.2.3.3 Lack of sufficient information (sufficient basis for RID only if the review committee has exhausted all reasonable means to obtain information, and the requirement for the information is reasonable based on the project maturity, review scope, objectives and entry criteria).

Z.2.3.4 Improvements to base-lined requirements or base-lined design implementation are not valid RIDs. Suggestions for improvements should be submitted through the Engineering Change Process. Assigning an official non-RID action item as part of the review, or using the program/project action item tracking system to submit an ECR can accomplish this. The change process should provide sufficient review to determine whether or not the change can or should be approved.

Non-RID action items should be formally tracked within a formal action item tracking system. The action item and the closure record and evidence of closure should be included in the review records. Some projects may require that the closure data be provided to the no-RID action initiator for concurrence prior to closure. Non-RID action items typically are not presented to the Board or Pre-Board. However, the Board or Pre-Board may require that closures to the actions levied during the Board and/or Pre-Board meetings be provided to the Board and Pre-Board membership.

Z.3 RID Screening

Screening is another crucial element of a successful review. RIDs should be screened to ensure that they really document a technical deficiency between reference and review documentation, and that they are founded on reasonable expectations based on the objectives and scope of the review. If the RID screening is just a rubber stamp approval of all proposed RIDs, then the project may be burdened with large numbers of trivial or inappropriate RIDs, diverting resources to administrative RID processing, as well as working through actual technical changes and refinements of the design. When conducting the screening, the screening official should consider the following:

Z.3.1 Does the proposed RID meet the criteria established in the Review Plan?

Z.3.2 Does the proposed RID document a technical deficiency, or does it reflect a political issue? The RID process is not the appropriate avenue for working political issues.

Z.3.3 Is the proposed RID based upon accurate requirements? A RID based upon a "potential" change in reference documents should not be ruled as valid.

Z.3.4 Will the RID require lengthy study or analysis to resolve (i.e., longer than 90 days)? This could indicate that the RID is not appropriate for the review objectives (i.e., a CDR level RID written at PDR), or that the Program/Project has not reached the appropriate maturity level for the review.

Z.4 RID Tracking

Tracking RID closure is a valuable Technical Performance Metric that PMs are encouraged to utilize as part of the regular project status. This is easily done by using the RID suspense dates for the "planned" performance, and obtaining status from the RID coordinator on "actual" closures. RID closure tracking by WBS is an effective means of determining technical areas that require management attention. An example of typical RID tracking chart is shown in figure Z-1.

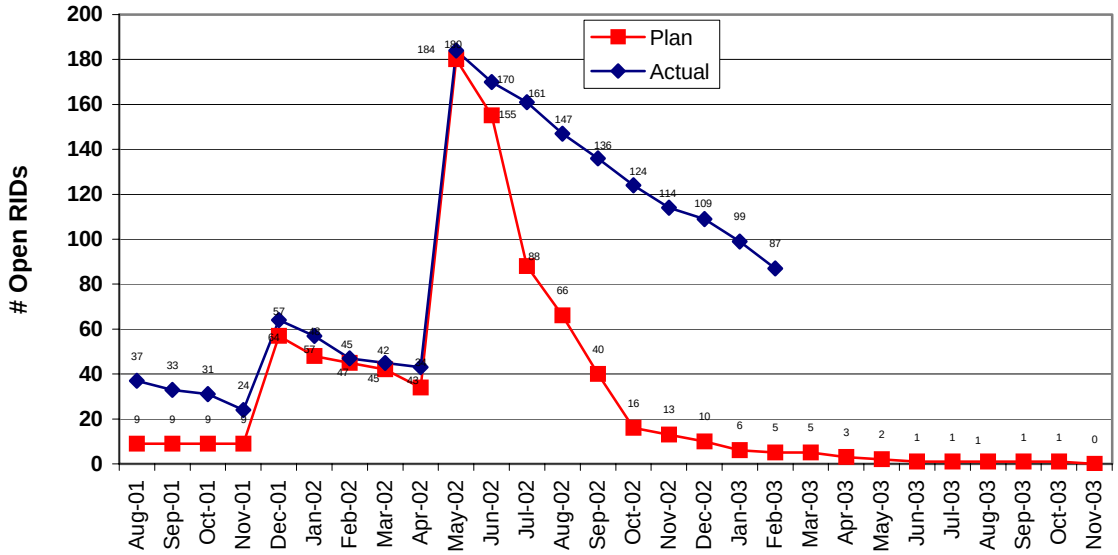


Figure Z-1

Z.5 Review Kickoff Meeting

Z.5.1 Purpose

The purpose of the kickoff meeting is to provide the review committee with an overview of the objectives, scope, ground rules and processes of the review; and a top-level understanding of the system and subsystems under review. The committee should be presented with the driving requirements, and how they are implemented. Block diagrams, signal flow diagrams, schematics, logic flow diagrams, and results of analyses, models and simulations should be presented. Estimates of mass, power, volume, crew time requirements and other constrained resources, and the basis for estimates should also be presented. Parts selection, de-rating, radiation hardness, identification of single point failures, high risk and life-limiting aspects of the design should be covered as well.

Z.5.2 Agenda

A typical agenda for a design review kickoff:

Introduction/Welcoming Remarks Safety Procedures (protected areas/evacuation routes, etc) Project Overview Review Scope and Objectives Review Teams/Responsibilities Review Process/Ground rules RID Criteria and other Ground rules	Project Manager
RID Processing	RID Coordinator
System Overview Requirements/Verification Flow Design Overview Interfaces, Integration and Test Issues/Concerns	Lead Systems Engineer
Subsystem A Requirements/Verification Design Overview Interfaces Manufacturing, Integration and Test Issues/Concerns	Lead Subsystem Engineer
Other Subsystems as Applicable	Lead Subsystem Engineers
Operations	Lead Operations

Requirements/Verification Concept/Planning Overview Training Issues/Concerns	Engineer
Safety and Mission Assurance	Lead S&MA Engineer
Concluding Remarks	Project Manager

Z.6 Pre-Board and Board

Z.6.1 Typically, the Board Chairperson is a manager two levels above the PM. For very large projects, where the PM is a high level manager, the PM may serve as the Board Chairperson. The Chief Engineer is required to serve as the Pre-Board Chairperson in accordance with 3.1.4. Board members are typically managers two levels above review team leads and Pre-Board members are managers one level above review team leads. If the Review Plan does not stipulate review teams, Board members should be managers two levels above review committee members, and Pre-Board members should be managers one level above review committee members.

Z.6.2 Template for Pre-Board/Board Certification

Program/Project Name

Name of Review

Pre-Board or Board Findings

Date

The Pre-Board/Board Chair recommends the following:

_____ The Project has demonstrated successful completion of the Entry Criteria defined in the Review Plan.

_____ The Project has demonstrated successful completion of the Exit Criteria defined in the Review Plan and it is recommended that they proceed to the next major milestone.

_____ The Project has not demonstrated successful completion of the defined Criteria. In order to address these issues the following actions are required:

a. List issues and corrective actions required

_____ Rationale/Additional data as needed…

Pre-Board Member Concurrences:

Board Member Concurrences:

Attach list of all RIDs, disposition classifications (or disposition classification recommendations by Pre-board), and cost/schedule impacts.

Z.7 Review Checklists

The following review checklists are provided to assist the Program/Project personnel in planning and conducting the review, and to assist the review committee, Pre-Board and Board in evaluating the Program/Project.

Z.7.1 Program/Project Requirements Review (PRR)

Z.7.1.1 Roles and Responsibilities

- Are roles and responsibilities, including PM, LSE, LSSEs and line organizations well defined and communicated?
- Are appropriate agreements or planning for agreements in place?
- Are accountability and responsibility at the right levels?
- Are reporting mechanisms to Project, Center, and Program Management in place?
- Are cost, schedule, and technical issues and associated risks presented as an integrated picture?

Z.7.1.2 Requirements and Mission Success Criteria

- Are Level I requirements clear and consistent? Are they clear and traceable from Agency policy?
- Are Level I requirements reasonable and achievable?
- Are requirements flowed down from Level I through the appropriate lower level?
- Are requirements specific and realistic at the appropriate level? Are they verifiable?
- Do minimum and full mission success criteria exist? Are the criteria relevant and measurable? Is "Mission Success First" reflected in the top-level requirements?

Z.7.1.3 Management

- Have the Program Commitment Agreement (PCA)/Program Plan been approved? Is the Project Plan ready for submission to the approval process?
- Are the levels of insight established?
- Are project management processes in place?
- Is there a product oriented WBS?
- Is there a credible cost estimate based on the WBS?
- Are there identified reserves in the budget, and are they adequate?
- Is the staffing plan adequate? Is funding adequate for staffing levels?
- Are adequate Earned Value Management measures in place?

Z.7.1.4 Analysis and Trade Studies

- Is there sufficient technical analysis in all elements, systems, subsystems and technical disciplines to provide appropriate assurance of the ability to meet requirements?
- Have sufficient trade studies been completed at the mission, element, system, and subsystem level?

Z.7.1.5 System Engineering and Verification

- Are systems engineering processes in place?
- Has verification planning been developed, including interfaces?
- Has independent verification and validation been planned?
- Is a rigorous change control process in place?
- Have technical performance metrics been defined and plans for regular tracking put in place?

Z.7.1.6 Technology

- Is any new technology needed that has not adequately matured? Does it represent acceptable deployment risk? Has project identified clear technology readiness level (TRL) transition criteria?
- If there are foreign or commercial partners, are safeguards in place to prevent proliferation of sensitive technologies?

Z.7.1.7 Schedule

- Is the schedule based on an integrated logic network rather than just a task list?
- What is the critical path? What is the difficulty level of items on the critical path? What are the high-risk items on the critical path?
- What are constrained dates on the schedule
- How much slack is carried in the schedule? Where is it located?
- What is the calendar for the schedule? Does it allow for holidays, and other downtime?
- Does the schedule reflect the WBS?
- Is the schedule resource loaded?
- Is there a process for schedule management and reporting in place?
- Are time scales for development decisions in technology readiness reasonable and credible?

Z.7.1.8 Risk

- Is there a credible Risk Management Plan?
- Has the acceptable level of risk been identified and bought into by all management levels?
- Are risks integrated with cost and schedule estimates?
- Are risk management tools in place (e.g., requirements for failure modes and effects analysis (FMEA), fault tree analysis (FTA), hazard analysis, and probabilistic risk assessment?)?

Z.7.2 System Requirements Review (SRR)

Z.7.2.1 General

- Did the project conduct a PRR? If not, checklist for PRR is appropriate for SRR, in addition to SRR checklist.
- Have all open RIDs from PRR been closed? Open RIDs should be presented to Pre-board and Board and appropriate actions taken, but should not be readdressed by the review committee.

Z.7.2.2 Requirements

- Are all requirements flowed down and appropriately allocated in the system specification? Is there a Requirements Traceability Matrix?
- Are requirements specific and realistic at the appropriate level? Are they verifiable?
- Are requirements developed for special test equipment, ground support equipment, flight support equipment, crew/ground support personnel trainers and ground data systems?

Z.7.2.3 Analysis and Trade Studies

- Is there sufficient technical analysis in all elements, systems, and technical disciplines to provide assurance of the ability to meet requirements? Analyses should include:
    - mission operations
    - logistics
    - electrical systems
    - command, data handling and software systems
    - maintainability
    - reliability
    - safety
    - structures and dynamics
    - materials, contamination control, manufacturing and other processes
    - human factors
    - acoustics
    - electromagnetic compatibility
    - radiation effects
- Is functional flow analysis of sufficient detail to ensure appropriate requirements allocations and derivations? Is it based on the design mission analysis?
- Have sufficient trade studies been completed at the mission, element, system, and subsystem level?

Z.7.2.4 Systems Engineering and Verification

- Have verification methods been determined, including interfaces, and are they appropriate? Are necessary agreements in place with partners to accomplish total system level verification?

- Does the system engineering management plan include adequate emphasis on mechanical and electrical integration?
- Is the qualification approach adequate and appropriate for the level of complexity of the systems and subsystems?
- Is there a preliminary error budget?
- Are resource allocations established?

Z.7.3 Preliminary Design Review (PDR)

Z.7.3.1 General

- Are there open actions and RIDs from previous reviews? If so, they should be reviewed by the Pre-Board and Board, but not readdressed by the review committee.

Z.7.3.2 Requirements

- Have all system Requirements been allocated to the subsystem and component levels and is the flow down adequate to verify system performance?
- Are all interface requirements firmly established? Are draft Interface Control Documents ready for release at completion of the review?

Z.7.3.3 Analysis and Systems Engineering

- Is Proof of Concept Engineering Analysis based upon the Design Reference Mission Document, or Reference Mission Scenario? (Proof of Concept Engineering Analysis includes models, analyses, schematics and other engineering data such as system connectivity diagrams, end to end functional schematics, thermal analysis, electrical power analysis, dynamics analysis, stress analysis, data handling and system software analysis, functional description of system and subsystem operations, etc.)
- Does Proof of Concept Engineering Analysis indicate that selected design approach will meet established requirements?
- Have system and subsystem performance and resource budgets been established (weight, power, data rate, central processing unit loading, acoustic, etc.)? Do analyses of subsystems and system indicate that final product will meet requirements?
- Does mission architecture provide adequate data for failure investigation?
- Are logistics, maintainability and sparing plans consistent and appropriate to meet established lifetime requirements?
- Are verification pass/fail criteria established, including those for interfacing subsystems?
- Have the submitted safety (FTA, Hazard Analysis) and reliability (FMEA) assessments been addressed by the design, and has the risk management process assessed any residual issues?

Z.7.3.4 Design

- Are models used to conduct analyses based upon the appropriate criteria and constraints and of appropriate fidelity for 50% design completion?
- Have breadboards and/or development units been built and tested as required to drive out design issues prior to development of detailed design drawings?
- Is there sufficient detail and maturity in design to demonstrate 50% design completion, 10% drawing completion, and readiness to proceed to detail design?
- Is appropriate planning in place for long lead items? Are there any issues with availability of parts that meet qualification requirements?
- Are ground operations and test plans consistent with verification planning, and are GSE designs mature enough to support availability of required GSE and test equipment when needed?
- Are designs developed for crew/ground support personnel trainers and ground data systems?
- Are there sufficiently detailed system and subsystem error budgets established? Will the designs fall within these budgets with adequate margins?
- Are qualification test levels appropriate?
- Is the Design verifiable? Are there aspects of the design that could cause major problems with potential schedule delays and cost overruns?

Z.7.4 Critical Design Review (CDR)

Z.7.4.1 General

- Was a PDR held for the subject system or subsystem? If not, PDR checklist should be included for CDR.
- Are there open actions and RIDs from previous reviews? If so, they should be reviewed by the Pre-Board and Board, but not readdressed by the review committee.
- Have all recommendations from Design audits been addressed, and action items closed?

Z.7.4.2 Analysis and Design

- Will the detail design at the system, subsystem, and component levels meet performance and functional requirements within cost and schedule constraints?
- Are models used to conduct analyses based upon the appropriate criteria and constraints and of appropriate fidelity for 90% design completion?
- Is design maturity at 90% completion, including final design drawings? Are drawings ready for release and manufacturing? Are fabrication drawings essentially complete, including complete bill of materials? Typically, the following details are expected for CDR drawings:
    - Dimensions are complete, concise and properly specified.
    - Tolerances are properly specified.
    - Inspectability of applicable attributes
    - Reference dimensions are properly shown.
    - Flag notes are clear and concise.
    - When a flag note is referenced, there is a corresponding flag note in the note section.

  - All flag notes in the notes section are properly referenced in the body of the drawing or parts list.
  - All material callouts are correct.
  - Find numbers are properly referenced.
  - Electrostatic discharge susceptibility requirements are properly referenced.
  - All special processes (soldering, crimping, finish, etc) reference a MSFC approved procedure.
  - Special handling and cleanliness requirements are specified.
  - Test requirements are referenced and properly specified.
- Is the detail design based upon completed engineering analyses?
- Will combined error budgets result in a total system performance that meets requirements?
- Are performance, schedule, and cost margins adequate?
- Are the system, subsystem, and component designs of sufficient detail to allow orderly hardware manufacturing, software coding, integration, and test within acceptable risk levels?
- Do software simulations and prototyping indicate acceptable risks to proceed?
- Do the submitted safety (FTS, Hazard Analysis) and reliability (FMEA) assessments indicate that residual issues from PDR have been addressed, and that risks are acceptable?
- Does the integrated logistics analysis indicate complete spares provisioning?

Z.7.4.3 Test and Verification

- Has a comprehensive system verification approach been established?
- Are qualification/environmental test plans and test flow adequate to ensure smooth transition to product delivery?
- Are tests repeated after configuration changes? Are adequate end-to-end tests planned?
- Have engineering models/prototypes been built and tested as required to drive out issues prior to development of flight system?

EXAMPLE RID FORM

Header

1. PreRID Number: (Use initials + sequence # - ABC-01 - then hit Enter) (PreRID Number)	**REVIEW ITEM DISCREPANCY (RID)** Note: Optional fields have a darker background.	**4. RID Number:** (Will be assigned by the system) (RID Number)
2. Project:		**5. Date:**
3. Review Type:		**6. RID Status:**
7. PreRIDs/RIDs Combined with this RID:		

Block A - Initiator

8. Initiator Name - First:	**9. Last**	**10. Site:** (Site)	**11. Org:**
12. Phone:		**13. E-mail:**	
14. Reviewed Item: (RIDable Document)			
15. Page/Sheet:	**16. Para/Zone:**	**17. Sec/Vol/Part:**	**18. Assigned Team:**
19. RID Subject: (200 characters max.)			
20. Discrepancy: (Fully describe the problem/discrepancy - 65K characters max.)			
21. Reference Document: (Document that contains the requirement not met by Reviewed Item.) (Reference Document)			**22. Para.:**
23. Consequences if Not Corrected: (2000 characters max.)			
24. Initiator's Recommended Corrective Action: (Where appropriate, use "From-To" Language - 2000 characters max.)			
25. Remarks: (2000 characters max.)			

Block B - Screening

26. RID Screening Disposition: ○ **Withdrawn by Initiator** ○ **Cancelled - 27. Rationale:** ○ **Combined With - 28. RID#:** ○ **29. Track as** (Tracking Classification)	
30. Sorting Category: (Sorting Category)	
31. Remarks: (May be added by any reviewer with screening access. Remarks will be date/time-stamped - 2000 characters max.)	
32. Screening Lead's Approval: (Signature will promote the RID to the next status level)	**33. Date:**

Block C - Developer

34. Developer's Recommended Corrective Action: (65K characters max.)

35. ☐ **Cost Impact ROM:**

36. ☐ **Schedule Impact ROM:**

37. ☐ **Other Impact (Specify):**

38. Developer's Approval: (Signature will promote the RID to the next status level)

39. Date:

Block D - Team

40. Team Recommendation:

- ○ **Approved**
- ○ **Disapproved**
- ○ **Withdrawn by Initiator**
- ○ **Combined With RID**
- ○ **Approved per Remarks**
- ○ **Recommended Study**

42. Present to PreBoard?

○ **Yes** ○ **No**

Disapprove & Recommend Study automatically marked 'Yes'
Withdrawn & Combined automatically marked 'No'
Approved & Approve per Remarks not automatically marked

43. Remarks: (May be added by any reviewer with Team access. Remarks will be date/time-stamped - 2000 characters max.)

Team Level Action Summary (Click Action # to view, update and concur with actions for this RID.)

#	Action	Actionee	Suspense	Recommended/Assigned By	Status

44. Team Lead's Approval: (Signature will promote the RID to the next status level and lock actions from further update)

45. Date:

Block E - PreBoard

46. PreBoard Recommendation:

- ○ **Approved**
- ○ **Disapproved**
- ○ **Withdrawn by Initiator**
- ○ **Combined With - RID#:**
- ○ **Approved per Remarks**
- ○ **Recommended Study**

48. Present to Board?

○ **Yes** ○ **No**

Disapprove & Recommend Study automatically marked 'Yes'
Withdrawn & Combined automatically marked 'No'
Approved & Approve per Remarks not automatically marked

49. Remarks: (May be added by any reviewer with PreBoard access. Remarks will be date/time-stamped - 2000 characters max.)

PreBoard Level Action Summary (Click Action # to view, update and concur with actions for this RID.)

#	Action	Actionee	Suspense	Recommended/Assigned By	Status

50. PreBoard Chairperson's Approval: (Signature will promote the RID to the next status level and lock actions from further update)

51. Date:

Block F - Board

52. Board Disposition:

- ○ **Approved**
- ○ **Disapproved**
- ○ **Withdrawn by Initiator**
- ○ **Combined With - RID#:**
- ○ **Approved per Remarks**
- ○ **Recommended Study**

54. Remarks: (May be added by any reviewer with Board access. Remarks will be date/time-stamped - 2000 characters max.)

Board Level Action Summary (Click Action # to view, update and concur with actions for this RID.)

#	Action	Actionee	Suspense	Recommended/Assigned By	Status
n	(Action Description)	(Actionee)	(Suspense Date	(Name of person assigning the Action)	(Action Status)

55. Board Chairperson's Approval: (Signature will promote the RID to the next status level and lock actions from further update)

56. Date:

Block G - Implem.

57. RID Implementation Information: (Summarize RID Actions. Where appropriate, use "From-To" language - 65K characters max.)

58. System Engineer's Approval: (Signature will promote the RID to the next status level)

59. Date:

60. RID Implementation Concurrence			61. RID Implementation Closure	
○ Yes ○ No	**Initiator:**		**Close RID?** ☐ **Yes**	
○ Yes ○ No	**Reviewer:**		**Proj. Mgr.:**	**Date:**

62. RID Implementation Remarks: (May be added by Implementation reviewers and Approval Authority - 2000 characters max.)