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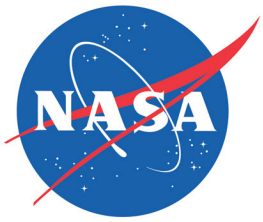

NASA Standing Review Board Handbook

REV A

NASA/SP-2014-3706

National Aeronautics and Space Administration

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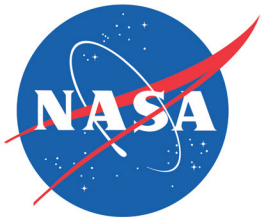

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Preface

This handbook provides guidance based on best practices for the planning, preparation, review, reporting, and closeout of Standing Review Board (SRB) activities. Revision A updates the baseline version of the *SRB Handbook* published in 2009 to incorporate process improvements and changes in NASA's Life-Cycle Review requirements and review guidance documented in *NPR 7120.5E, NASA Space Flight Program and Project Management Requirements*. This handbook is consistent with the *NASA Space Flight Program and Project Management Handbook* (*PM Handbook*) issued by the Office of the Chief Engineer concurrently with this version of the *NASA Standing Review Board Handbook* as a companion document to *NPR 7120.5*. The SRB content in both handbooks is complementary; however, the *PM Handbook* contains a summary of SRB processes from the standpoint of the program or project manager, while this handbook provides more details of SRB processes and best practices for conducting independent assessments for SRBs and other participants in the LCR process. This handbook also provides review guidance and best practices to most effectively administer and satisfy the program and project review requirements established in *NPR 7123.1B, NASA Systems Engineering Processes and Requirements*.

The SRB is the board responsible for conducting independent reviews (life cycle and special) of a program or project and for providing objective, expert judgments to the Convening Authorities.

NASA implements space flight programs and projects of various sizes and complexity and requires them all to undergo LCRs. The overall program or project life cycle includes two categories of reviews:

- The internal reviews conducted by the program or project as defined and maintained in the program or project plan.
- The independent reviews conducted by the SRB as defined in the terms of reference.

NPR 7120.5 introduces the concept of SRBs performing independent assessments of space flight programs and projects as part of the LCRs to help increase the likelihood of success. *NPR 7120.5* requires the program or

project and an independent SRB to conduct most, but not all, of the LCRs. The body of this document addresses the designated SRB reviews.

As a companion to *NPR 7120.5*, this handbook focuses solely on space flight programs and projects. Programs and projects governed by other NASA procedural requirements, such as *NPR 7120.7, NASA Information Technology and Institutional Infrastructure Program and Project Management Requirements* and *NPR 7120.8, NASA Research and Technology Program and Project Management Requirements*, that need independent review can use this handbook for reference. For projects that do not follow the typical NASA life cycle, such as those involving commercialization, reimbursable agreements, and foreign partnerships, implementation of this handbook's guidance can be adjusted to match the specific program's or project's review needs.

NPR 7120.5 assigns responsibility for the independent reviews performed by SRBs to the Independent Program Assessment Office (IPAO) and the Centers. The IPAO is responsible for independent reviews of all programs, all Category 1 projects, and Category 2 projects with a life-cycle cost greater than or equal to $250 million. These reviews are Agency-level reviews. Host Centers are responsible for independent reviews of Category 3 projects and Category 2 projects with a life-cycle cost less than $250 million; these reviews are Center-level reviews. The Decision Authority may alter these criteria.

Centers and other organizations using an SRB or equivalent independent review board should use this handbook as guidance and adjust the Agency-level specific content to the Center's review processes, practices, and organizational structure.

Centers and other organizations using an SRB or equivalent independent review board should use this handbook as guidance and adjust the Agency-level specific content to the Center's review processes, practices, and organizational structure.

The *SRB Handbook* consists of five chapters:

- **Chapter 1** provides the context for the process of independent LCRs and identifies major principles of the SRB process derived from best practices. It defines the governance of SRBs throughout the life cycle of the program or project.
- **Chapter 2** defines the highest-level principles that govern SRBs. It includes a discussion of the SRB review criteria and a list of SRB stakeholders, and defines SRB participation in reviews for the different types of programs.
- **Chapter 3** establishes the guidelines for the formation of SRBs for the different NASA programs and projects. It describes the three possible SRB structures and outlines the means by which SRB members and consultants-to-the-board are qualified to serve.

- **Chapter 4** provides a description of the LCR processes from beginning to end.
- **Chapter 5** discusses the products and responsibilities of the SRB. It provides examples of program and project assessment guidance and details the six SRB assessment criteria.

The appendices include examples and templates for the products identified, as well as reference material for SRBs that supplement the core chapters.

Note that this handbook uses the word "independence" in broad terms, and it encompasses the term "independent" that is used extensively in NASA policy and requirements documents.

1 Introduction

As a key element in the National Aeronautics and Space Administration's (NASA's) strategic framework for managing space flight programs, Standing Review Boards (SRBs) help ensure appropriate program and project management oversight in order to increase the likelihood of mission success. This chapter explains the purpose and applicability of this *SRB Handbook*, notes SRB governance, and lists key guidelines considered major principles underlying SRB processes and products.

1.1 Purpose of This Handbook

This *SRB Handbook* provides review guidance for the program and project communities and for the SRBs regarding the expectations, processes, products, timelines, and working interfaces with review organizations, Centers, Mission Directorates, Mission Support Organizations, and Management Councils. It provides guidelines for membership selection, review implementation, review products, and reporting of results.

Independent reviews conducted by SRBs are key elements in the Agency's oversight of programs and projects.

The *SRB Handbook* guidance may be tailored, with the Convening Authorities' approval, to meet the needs of the Agency, Mission Directorates, Centers, and the programs and projects being reviewed. The final review agreement of the SRB, program and project, and Convening Authorities for program and project Life-Cycle Reviews (LCRs) is documented in the terms of reference, as described in Section 4.1 and Appendix H.

1.2 SRB Governance and Convening Authorities

NPR 7120.5, NASA Space Flight Program and Project Management Requirements, the governing document for LCR processes and products, establishes the requirement for an SRB to perform an independent assessment of a space flight program or project at specific LCRs. *NPR 7120.5* governance of

the SRB is derived from and consistent with *NPD 1000.0, NASA Governance and Strategic Management Handbook*.

The traceability matrix of the SRB-specific requirements in *NPR 7120.5* is located in Appendix G.

SRBs are convened by the management officials, called Convening Authorities, identified in Table 2-2 in *NPR 7120.5*. This table defines the participation and role of each Convening Authority in establishing the SRBs for programs and for each of the three categories of projects. Specifically, the table defines who is responsible for convening each type of review, approving the terms of reference, approving the SRB chair, and approving SRB membership. These individuals are the management officials who receive the briefings and documented results of the SRB.

NPR 7120.5 requires SRBs to conduct specific life-cycle reviews. The SRBs are convened by NASA senior management officials, called Convening Authorities.

In addition to the standard LCRs, the Convening Authorities can authorize an SRB to conduct special reviews as needed.

1.3 Applicability of the Handbook

This handbook focuses on Independent Program Assessment Office (IPAO) implementation of SRBs for independent reviews. Centers and any other organization using an SRB or equivalent independent review board should use this document as guidance and adjust the IPAO-specific content to its own review processes, practices, and organizational structure.

The program and project life-cycle figures in *NPR 7120.5* identify the typical LCRs that require independent SRB review.

1.4 Major Principles

This handbook presents guidelines derived from best practices for SRB processes and products. Some of these guidelines are worth noting as "major principles." Additional principles are noted throughout this handbook.

1.4.1 General Guidance

NPD 1000.5, Policy for NASA Acquisition, *NPR 7120.5*, and *NPR 7123.1, NASA Systems Engineering Processes and Requirements* define the LCR requirements; the PM Handbook provides guidance on requirements' implementation; this handbook describes how to implement the SRB process and assess the LCR requirements.

1.4.2 Purpose of the SRB

1. The LCR Convening Authorities are the explicit customers of the SRB; the program or project under review is the implicit customer of the SRB. The schedule of work performed by the SRB should support the needs of those customers.
2. SRBs have an advisory role. The SRB conducts the LCRs and can provide recommendations, but the SRB members and consultants-to-the-board do not impose requirements on, make decisions for, or direct the program or project.
3. The SRB is intended to promote Agency mission success.

1.4.3 SRB Membership

1. The Programmatic Assessment Group (PAG) Analyst and the Review Manager are SRB members.
2. For Agency-level reviews, the Review Manager and programmatic analysts are assigned by the IPAO. For Center-level reviews, the host Center Director is responsible for assigning these personnel.
3. The SRB is intended to have the same core membership through its engagement with the program or project, although its membership could be adjusted with specialized reviewers. For Center-level reviews, Center-specific processes should be used for Center SRB membership approval.
4. The SRB remains intact for the duration of the programs. For projects, the SRB completes its work after the Operational Readiness Review (ORR).

1.4.4 Roles and Responsibilities of the SRB

1. The SRB chair and the Review Manager manage the content and schedule of work performed by the SRB.
2. The SRB chair and the Review Manager coordinate the SRB's activities with the program or project to minimize the resource and schedule impact while fulfilling the LCR and SRB requirements, e.g., SRB members or consultants-to-the-board may attend program or project reviews rather than the SRB chair requesting special sessions.
3. For each Agency-level review, the IPAO and the Mission Directorate collaborate to develop a budget addressing civil servant and contractor travel, labor, and procurement costs.
4. The SRB briefs the program or project on its preliminary findings at the conclusion of the site review.

1.4.5 SRB Independence and Integrity

1. Apart from the Organizational Conflicts of Interest (OCI) and the Personal Conflicts of Interest (PCI) review and clearance process discussed in Chapter 3 and Appendices C and D, this handbook is strictly advisory; it is not a requirements document. It provides field-proven best practice guidance.
2. The SRB functions independently of the program or project. SRB members are selected from outside the program or project management chain and are free of any OCI or PCI, or have approved mitigation plans in place.
3. The SRB chair acts as an observer at any non-SRB-led activity to ensure his/her continued independence.
4. The contractor must annually vet its contracted SRB members and consultants-to-the-board in compliance with the independence criteria outlined in Section 3.2 and Appendices C and D. The IPAO ensures integrity and compliance with this process.

2 Standing Review Board Overview

This chapter provides an overview of the Standing Review Board (SRB) and its purpose, function, and participation in the Life-Cycle Review (LCR) process. It defines the SRB's role and explains the importance of its standing nature as well as lists the SRB's stakeholders and the role of its Decision Authority.

2.1 SRB Introduction

NPR 7120.5, NASA Space Flight Program and Project Management Requirements defines the life cycles of the space flight programs and projects with each life-cycle phase including one or more LCRs. An LCR comprises an independent review that provides an assessment of a program's or project's technical and programmatic status and health at a key point in its life cycle. *NPR 7120.5* requires the use of a single, independent review team called the SRB to conduct certain LCRs. LCRs are essential to conducting, managing, evaluating, and approving space flight programs and projects, and are an important part of NASA's system of checks and balances. NASA accords special importance to maintaining the integrity of its independent review process. LCRs provide the program or project and NASA's senior management with a credible, objective assessment of the program's or project's progress, issues, risks, and status. An LCR is complete when the governing Decision Authority makes his or her decision to authorize a program or project to continue down the life cycle.

The SRB process integrates the review requirements of *NPR 7120.5*, *NPR 7123.1, NASA Systems Engineering Processes and Requirements*, the Mission Directorate, and the Center into a single LCR set of requirements. The SRB is responsible for fulfilling all the review requirements of all the Convening Authorities at each LCR, avoiding an individual review for each Convening Authority.

The SRB process integrates the review requirements of *NPR 7120.5*, *NPR 7123.1*, the Mission Directorate, and the Center into a single LCR set of requirements.

The standing nature of SRBs provides a strong advantage in terms of continuity and familiarity with the program's or project's purpose, history, programmatic and technical approach, challenges, risks, and issues. The SRB process ensures that the program or project, Convening Authorities, Technical Authorities, and other appropriate stakeholders are briefed in a consistent fashion on results and conclusions based on the same material gathered by the same SRB.

SRBs serve an advisory role to the Convening Authorities and have no programmatic or technical authority over the programs or projects.

SRBs engage with the programs or projects around their assigned LCRs and normally are inactive between LCRs except as needed to maintain some level of awareness of the activities of the program or project. Members may attend program or project subsystem reviews as authorized by the SRB chair, the Review Manager, and the program or project.

SRBs serve an advisory role to the Convening Authorities; consequently, they have no programmatic or technical authority over the programs or projects they review. SRBs present their findings and recommendations for consideration by the Convening Authorities.

2.2 SRB Review Criteria and Maturity States

The Agency has six assessment criteria for all space flight programs and projects:

- **Alignment with and contribution to Agency strategic goals.**
- **Adequacy of management approach.**
- **Adequacy of technical approach.**
- **Adequacy of the integrated cost and schedule estimates and funding strategy.**
- **Adequacy and availability of resources other than budget.**
- **Adequacy of the risk management approach.**

NASA formulates programs and projects to implement a diversity of products with widely varying costs and risks. For this reason, the SRBs have varying levels of assessment, participation, and reporting based on the categorization of the program or project.

NPR 7120.5 lists assessment criteria for all space flight programs and projects with LCR entry/exit criteria per *NPR 7123.1*. The SRBs use these criteria, customized for each type of program implementation and for each LCR, in support of their independent assessment. Section 5.1 contains a detailed description of these criteria and their application.

Appendix I of *NPR 7120.5E* defines the expected maturity of program and project products and control plans at each LCR. Programs and projects are expected to have achieved these maturities unless the requirements for them have been tailored and approved. Appendix D of the *NASA Space Flight Program and Project Management Handbook* (*PM Handbook*) contains additional information on maturity states.

2.3 SRB Program and Project Reviews

There are four basic types of programs: uncoupled, loosely coupled, tightly coupled, and single-project. The *PM Handbook* provides more detail on

the program types. There is a specific life cycle for each of these programs and a specific expected project maturity state for each review described in *NPR 7120.5*.

For tightly coupled programs and their projects, the SRB can be either a single SRB for the program and all projects or separate SRBs for the program and each of the projects. Tightly coupled program reviews typically occur after all of the program's projects have completed equivalent reviews at the project level. SRB participation in the LCR of each type of program and project is summarized in Table 2-1. The Key Decision Points (KDPs) are shown in blue, and the level of board participation is indicated in the table.

Table 2-1 Agency-Level Reviews Conducted by SRBs

Review	Uncoupled or Loosely Coupled Programs	Single-Project Programs	Tightly Coupled Programs	Projects
System Requirements Review (SRR)	X	X	X	X
System Definition Review (SDR) , or Mission Definition Review (MDR)	**X**	**X**	**X**	**X**
Preliminary Design Review (PDR)		**X**	**X**	**X**
Critical Design Review (CDR)		X	X	X
System Integration Review (SIR)		**X**	**X**	**X**
Operational Readiness Review (ORR)		X	X	X
Program Implementation Reviews (PIR)	**X**	**X**	**X**	

Some reviews are only conducted at the request of the Mission Directorate Associate Administrator, the Center Director, or the Decision Authority. The Convening Authorities can also authorize the SRB to conduct special reviews as needed. Section 4.11 addresses special reviews.

2.4 SRB Participation in Selected Program or Project Internal Reviews

In coordination with the program or project manager, the SRB chair and selected SRB members may participate at program or project planned internal reviews as observers. Any SRB member, except the SRB chair, may serve as a member of the internal review board. The SRB chair is not permitted to be a member so as to preserve his/her independence.

The SRB chair and some SRB members or consultants-to-the-board may attend program or project internal reviews as observers to gain insight into the program or project status and health. The program or project manager must approve their attendance.

3 Forming a Standing Review Board

This chapter provides a number of principles to consider when forming a Standing Review Board (SRB). The factors considered for membership are competency, currency, and independence. There is no master formula or predetermination in staffing boards (see Section 3.3) since each SRB is structured to fit the unique characteristics of the program or project under review.

3.1 Structure

NASA implements three SRB structures for Agency-level space flight program or project Life-Cycle Reviews (LCRs). They are the Civil Service Consensus Board (CS), the Civil Service Consensus Board with Expert Support (CS2), and the Non-Consensus Mixed Board (NC). SRB organization, management, and reporting differ among these three structures. Each SRB has a single chair and a NASA Review Manager.[1] The table in Appendix E compares the features of the different SRB structures and provides detail to assist in board type selection.

The SRB has three options for its structure. These options are the civil service consensus board, the civil service consensus board with expert support, and the non-consensus mixed board. A consensus board is preferred.

NASA prefers CS or CS2 boards, as civil service members are generally more current on Agency policy, procedures, and culture. Experience demonstrates that a consensus board leads to a more meaningful discussion of the review findings and recommendations, especially where dissenting opinions are discussed. NC boards are typically used when the required expertise of a member cannot be obtained from the civil service workforce.

[1] The NASA Review Manager may be from the Jet Propulsion Laboratory.

3.2 SRB Independence and Integrity

SRBs must conduct assessments free of bias through a membership balanced in terms of knowledge, experience, and perspectives. Balanced unbiased boards fulfill NASA policy that seeks to ensure the integrity of SRBs.

Balanced SRBs composed of highly qualified members and consultants-to-the-board from various sectors of society (i.e., academia, industry, government, and nonprofit organizations) enable NASA to produce accurate and objective assessments of its programs and projects consistently.

NASA requires conflict-of-interest-free SRB members and consultants-to-the-board throughout the SRB process. Members and consultants-to-the-board must stay free from conflicts that have the potential to significantly impair their individual objectivity or create an unfair competitive advantage for any person or organization. The NASA policy guidance on conflict of interest is set forth in Appendix C. Appendix D contains a copy of the NASA forms for Background Information, Confidential Conflict of Interest Disclosure, and Non-Disclosure Agreement (NDA) that all non–civil service members who serve on an SRB must complete.[2] All non–civil service SRB members and consultants-to-the-board must provide a signed NDA and certified Confidential Conflict of Interest Disclosure before participating in any SRB activity. The contractor through which the services of the member or consultant-to-the-board are obtained will ensure the member or consultant-to-the-board has no conflicts of interest. The contractor will submit any mitigation concerns to the Contracting Officer for approval. NDA and the conflict of interest forms must be completed and signed.

SRB members must be free of personal or organizational or positional conflict of interest.

Conflicts of interest may include:

- Personal conflict of interest based on the personal financial interests of the individual.
- Organizational conflict of interest based on the interests of the individual's employer.
- Positional conflict of interest based on the position the civil servant holds.

[2] The NDA limits the individual's use and disclosure of restricted information obtained during the course of SRB activities. These restrictions do not apply to information once it becomes publicly available.

3.2.1 Civil Servant Conflict of Interest and Independence Screening

Internal screening is performed to ensure the independence of civil servants on an SRB. All civil servants must have a current Office of Government Ethics Form 450 or Standard Form 278, as applicable, on file with NASA (or available to NASA) prior to being considered for SRB membership. These forms must be updated annually.

The Langley Research Center (LaRC) Office of Chief Counsel (OCC) will identify disqualifying personal and positional conflicts of interest in accordance with the relevant laws and regulations governing standards of ethical conduct.[3] A civil servant must not participate in any SRB activity until the LaRC OCC has made a determination that the civil servant has no financial interests that will create a conflict with service on an SRB. When the OCC informs the Independent Program Assessment Office (IPAO) that a person cannot serve on the SRB due to a personal or positional conflict of interest, the IPAO may:

- Find an alternative SRB member,
- Request divestiture of a financial interest that creates the conflict of interest, or
- Pursue a waiver for the disqualified individual.

If a Mission Directorate, SRB chair, Center, or the IPAO seeks to pursue a divestiture or waiver, the IPAO must coordinate the action with the LaRC OCC or the Center must coordinate with the local OCC. In the event that a conflict of interest exists for a particular proposed civil service SRB member, as part of the waiver request, the Decision Authority may prepare a written statement explaining that an SRB's need for a civil servant's expertise and the importance of his/her participation on the SRB outweigh any concern that the member's financial interest is so significant that it will call into question the integrity of the employee's service on the SRB and Government operations. The statement may be appended to a request for an approved statutory waiver of the ethics prohibition (prohibiting participation on a matter in which the civil servant has a conflicting financial interest) submitted through the appropriate chain of authority in accordance with *NPR 1900.3B, Ethics Program Management*, Paragraph 3.4.3. The appropriate authority must submit the waiver request to the NASA Office of General Counsel for concurrence and then to the Administrator for final signed approval before the civil servant participates in any SRB activity.

[3] See 18 USC § 208 and "Standards of Ethical Conduct for Employees of the Executive Branch" contained in 5 CFR (Code of Federal Regulation) part 2635, as supplemented by 14 CFR 1207.

3.2.2 Contractor Conflict of Interest Screening

To the extent consistent with the contractual requirements, the Contracting Officer (CO) on the relevant contract is responsible for facilitating the screening of any proposed contractor SRB member or consultant-to-the-board for organizational and personal conflicts of interest prior to initiating any work on SRB activities. The CO will conduct an organizational conflict of interest analysis in accordance with the Federal Acquisition Regulation (FAR), contract requirements, and Appendices C and D.[4] The CO is also responsible for ensuring organizational conflicts of interest are eliminated and mitigated (e.g., through recusal, limitation of future contracting, firewalls, and NDAs).

The responsible CO will coordinate with the local OCC to evaluate contractor personal conflict of interest concerns and make recommendations on all issues.[5] When the local OCC recommends that an individual contractor employee or consultant not serve on an SRB due to a personal conflict of interest, the IPAO will coordinate with the CO to:

- Request an alternative individual,
- Inquire as to a possible divestiture of the conflicting interest, or
- Pursue a personal conflict of interest waiver for the contractor employee or consultant.[6]

Personal and organizational conflict of interest analysis will be conducted annually.

3.2.3 Positional Conflicts of Interest

Civil servant SRB members must also remain free of positional conflicts of interest.

A civil servant employed by an organization that institutionally supports the program or project (e.g., a NASA Center, Mission Directorate) may not serve as a member of an SRB unless it has been determined by the OCC, in

[4] The FAR provisions on organizational conflict of interest only apply to contractors and consultants on an SRB. Those organizational conflict of interest provisions concerned with bias are designed in part to ensure the objectivity of any contractor or consultant on an SRB.

[5] For the Jet Propulsion Laboratory and the Advanced Physics Laboratory, the NASA Headquarters legal office is used.

[6] Under the NASA Policy Guidance on Standing Review Board Composition, Balance, and Conflicts of Interest (see Appendix C), the Decision Authority has the authority to approve a written determination that a contractor's expertise outweighs the conflict of interest in those cases where the local OCC determines a personal conflict of interest exists.

consultation with the IPAO, that a positional conflict of interest does not exist as a result of the following requirements being met:

- The service of the individual on the SRB must be based upon the unique scientific, technical, or programmatic expertise that the individual brings to the SRB;
- The individual and the individual's supervisory chain must not be located within the chain of command for programmatic-level decisions made at the program or project level; and
- There must be a specific determination, made by the OCC, during the SRB appointment process that service by the individual will not compromise the independence or objectivity of the review.

Having SRB members and consultants-to-the-board who have no conflicts of interest is mandatory to maintaining the independence of the assessment.

3.3 Composition and Balance

For a balanced SRB, the needs of the Convening Authorities and other stakeholders are considered. Some of their needs are unique to individual organizations, while others are shared needs. The selection and vetting process ensures the technical and programmatic areas are covered expertly and adequately, while simultaneously satisfying the Agency-level need to have an informed, independent assessment and recommendation to the Convening Authorities and Decision Authority at Key Decision Points (KDPs). In cases of reimbursable programs and projects, the SRB composition will be determined based on the NASA-to-sponsor agreements for the work being performed.

Members and consultants-to-the-board can be selected both from within the Agency and from external sources, including such communities as the Department of Defense, industry, academia, and other Government Agencies. When looking internally within the Agency, consideration is given to unique insights of the various NASA Centers and the perspective that cross-mission opportunities can add to SRB expertise.

Depth is the degree of competency in a particular discipline or area and is a prerequisite for being selected for the SRB. However, competency is also viewed from management, programmatic, testing, and integration perspectives. As a program or project matures toward System Integration Review (SIR) and Operational Readiness Review (ORR), a best practice is to streamline SRB participation by selectively using only the needed skill mix from its member pool for the ORR. On the other hand, an expert with rare and unique skills could be brought in to serve as a consultant-to-the-board for the SRB in a specific review only. SRBs that have members with breadth of

knowledge and experience have the advantage of topics being assessed by several individuals, resulting in a more thorough evaluation.

The factors considered for SRB membership are competency, currency, and independence.

Two additional attributes are independence and currency as a practitioner. In NASA, where technology, process, and policy are changing rapidly, currency is an important aspect to consider for a reviewer. Hence, in the selection of well-qualified SRB members and consultants-to-the-board, currency is a key consideration.

3.3.1 SRB Membership Balance Assessment

The SRB chair and Review Manager develop an SRB membership balance assessment, which may be presented to IPAO management and the Convening Authorities as required/requested. The balance assessment addresses affiliation, primary expertise, currency, competency, and independence. The assessment addresses the members' demographics, such as industry versus civil servant participation, total NASA participation, NASA host Center's versus other NASA Centers' participation, and participation from other Agencies. A skills matrix, presenting each member's primary skill and secondary skills to be used as the basis for SRB selection, is compiled and is part of the balance assessment. The balance assessment is an important set of information used by the Convening Authorities in determining the acceptability of the SRB membership.

3.3.2 Size and Composition

For an Agency-level review, the SRB chair, Review Manager, and lead Programmatic Analysis Group analyst are board members. When forming the SRB, a very important aspect is determining the "right size" of the membership that is able to meet the expectations of the LCR. Minimizing the number of members is considered best practice; however, every SRB size decision requires consideration of variables including balance, competency, currency, and relevance. The balance assessment documents the rationale for the board size and composition.

The members are selected for the duration of the program or project life cycle. Multiple disciplines can be covered by one member (e.g., electrical and systems engineering). Consultants-to-the-board can be added temporarily to review specific items identified by the SRB members.

There are many Mission Support Offices internal to the Agency that are defined by the Agency governance model to be independent of the program or project. These Mission Support Offices can give an SRB a second level of support when analysis is needed. Such support consultants-to-the-board

can come from the Office of Safety and Mission Assurance, the NASA Safety Center, Center Safety and Mission Assurance organizations, the Office of the Chief Engineer, the Office of the Chief Health and Medical Officer, the NASA Engineering and Safety Center, and Center engineering organizations. Another option to leverage existing resources is to use membership from other related teams; e.g., project SRB chairs may have membership on program SRBs.

3.4 Selection and Approval of SRB Members and Consultants-to-the-Board

SRB formulation includes the identification and approval of the SRB chair and all other board members and consultants-to-the-board, assignment of the Review Manager, and development of the Terms of Reference (ToR). (See Figure 3-1.) The ToR is the official document for final approval of the SRB members, consultants-to-the-board, SRB chair, and Review Manager.

The Convening Authorities approve all SRB members and consultants-to-the-board.

3.4.1 SRB Chair

The SRB chair and the Review Manager of the SRB are the first members approved.

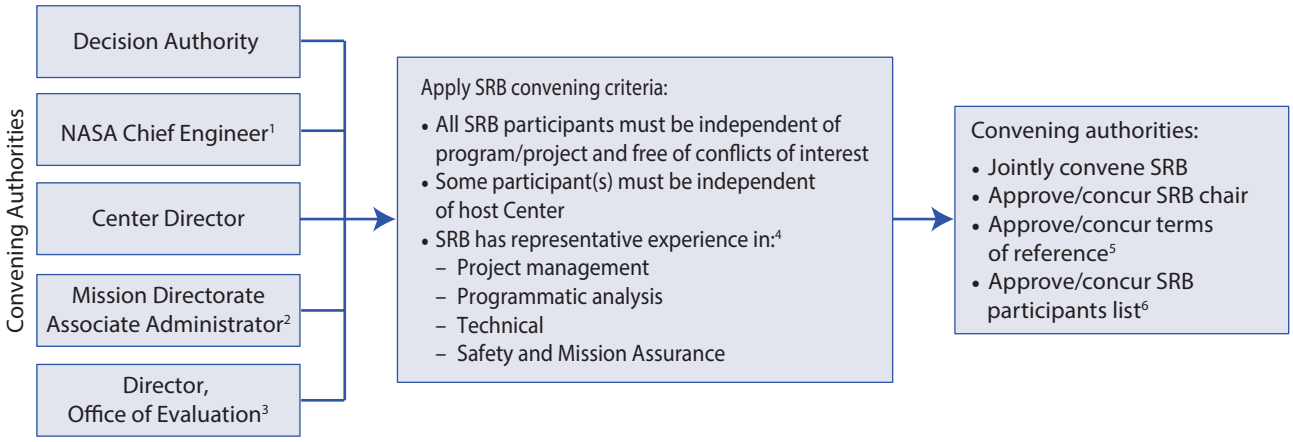
3.4.1.1 Nomination

The SRB chair is typically a leader who is also a recognized expert with relevant experience for the respective space flight program and project LCRs. In general, good communication skills (both written and oral) and time commitment are also desirable for leading all the required program or project LCRs. When possible, civil servant chair candidates are nominated as a best practice.

The SRB chair and the Review Manager are the first SRB members approved.

3.4.1.2 Approval

The SRB chair nomination requires collaboration among the Convening Authorities. The nomination can come from any of the Convening Authorities. Usually, more than one candidate is considered. All Convening Authorities have the opportunity to review the nomination(s) and submit alternative nomination(s). The Review Manager facilitates the identification and evaluation process of the candidates with the Convening Authorities until one candidate is found suitable to all of the Convening Authorities. If the Convening Authorities cannot reach agreement, the Decision Authority makes the selection.



[1] The Chief Engineer is not a Convening Authority for Category 3 projects.

[2] The Mission Directorate Associate Administrator acts as a Convening Authority only when not already acting as the Decision Authority.

[3] The Director of the Office of Evaluation is not a Convening Authority for Category 3 projects and Category 2 projects of less than $250 million.

[4] When applicable and at the request of the Office of the Chief Engineer, the Office of the Chief Health and Medical Officer/Health and Medical Technical Authority will determine the need for health and medical participation on the SRB.

[5] Terms of reference content may vary with the organization responsible for the SRB.

[6] For each life-cycle review conducted by an SRB, the SRB chair selects SRB participants from the approved list.

Figure 3-1 Forming an SRB

For Agency-level reviews, the SRB chair nomination is facilitated by the IPAO with the Convening Authorities. The IPAO will then process the approved nominee through legal and procurement to complete the necessary steps for bringing the nominee on board. The IPAO will then send a formal approval letter to the Convening Authorities for their electronic signatures to complete the nomination process.

3.4.2 Review Manager

3.4.2.1 Nomination

The Review Manager performs the critical function of ensuring appropriate and consistent implementation of Agency policy, process, and products for LCRs conducted by an SRB. The Review Manager must possess a high level of knowledge of the SRB policies derived from *NPD 1000.5, Policy for NASA Acquisition*, *NPR 7120.5, NASA Space Flight Program and Project Management Requirements*, and *NPR 7123.1, NASA Systems Engineering Processes and Requirements*; and program and project review processes defined in the *NASA Space Flight Program and Project Management Handbook*, *NASA/*

SP-2007-6105, NASA Systems Engineering Handbook, and this handbook. The Review Manager may serve on the SRB as a discipline expert.

3.4.2.2 Approval

The IPAO is responsible for assigning a Review Manager for Agency-level reviews. The same approval mechanisms are used for the Review Manager as are used to approve the SRB chair.

The Review Manager performs the critical function of ensuring appropriate and consistent implementation of Agency policy, process, and products for LCRs conducted by an SRB.

3.4.3 SRB Members and Consultants-to-the-Board

3.4.3.1 Nomination

The SRB members and consultants-to-the-board nomination process requires collaboration among the Mission Directorate Associate Administrator, the NASA Chief Engineer, the Center Director, and the Director of the Office of Evaluation in accordance with *NPR 7120.5*. The SRB chair and Review Manager, in collaboration with the program or project manager and the program executive, initiate the nomination process for SRB members and consultants-to-the-board. The process starts with the SRB chair and Review Manager, in collaboration with those listed above, developing a list of required areas of content that the SRB will review over the full life cycle of the program or project and then developing a list of candidates to support all LCR needs. The Convening Authorities approve the list of participants.

A good practice is to start with the program's or project's Work Breakdown Structure (WBS). Particular consideration should be given to the program's or project's risk areas. When considering subject matter experts to support the SRB, the best-case scenario for optimizing team size would be to have candidates who can support more than one skill area in addition to their primary area of expertise. It is also desirable to have institutional/functional support organization candidates from both non-host Centers and the host Center.

For Agency-level reviews, the IPAO would be able to reference its subject matter expert database to expedite the search for qualified candidates who would meet the necessary requirements.

The nomination process develops a list of members and consultants-to-the-board needed for all LCRs conducted by the SRB over the programs' and projects' life cycle. The SRB chair selects participants from this list for each specific LCR.

3.4.3.2 Approval

The SRB chair, working with the Review Manager, program or project manager, and program executive, develops the initial candidate list for the SRB. The SRB chair ensures that the proposed SRB has the appropriate balance relative to currency and competency. The Review Manager will facilitate the approval of the proposed SRB candidates by the Convening

Authorities. If agreement cannot be reached among the Convening Authorities, the Decision Authority will make the final decision.

Once a decision is reached, the candidate names are included in the ToR with the required supporting information. The candidates are approved when the Convening Authorities sign the ToR.

If approval of the members is needed before approval of the ToR, the Review Manager will use an approval letter. The SRB approval letter contains the following as a minimum: program or project identification information, subject matter experts' brief but relevant biography, appropriate organizational/personal conflict of interest compliance verification statement, and a summary SRB skills matrix. The Review Manager will facilitate the approval of this letter by the Convening Authorities.

The SRB chair should sustain a core body of members who participate in each LCR to provide continuity over the full program or project life cycle. As an LCR approaches, the SRB chair selects members and consultants-to-the-board whom he/she determines are needed to support that LCR. Since the participants are preapproved, the SRB chair is only required to notify the Convening Authorities of those selected prior to that LCR.

3.4.4 Change Process for SRB Membership

For Agency-level reviews, replacement of the Review Manager and of the Programmatic Analysis Group analyst will only need the Office of Evaluation Director's approval before distributing the results to the other Convening Authorities as updated information.

Replacement of the SRB chair, members, and consultants-to-the-board can be approved and documented in two ways. The first way is to update the ToR with the changes if modifications to other parts of the ToR are required. The second way is to use a change letter when modifications of other parts of the ToR are not needed.

The Convening Authorities must approve any change in the membership of the SRB.

The following information is included for either path: program or project identification information, subject matter experts' brief but relevant biography, appropriate organizational/personal conflict of interest compliance verification statement, and a summary SRB skills matrix showing the changes.

4 Life-Cycle Review Process

Life-Cycle Reviews (LCRs) are conducted under documented Agency review processes. The *NASA Space Flight Program and Project Management Handbook* (*PM Handbook*) provides more detail on the LCR process. The LCR process provides:

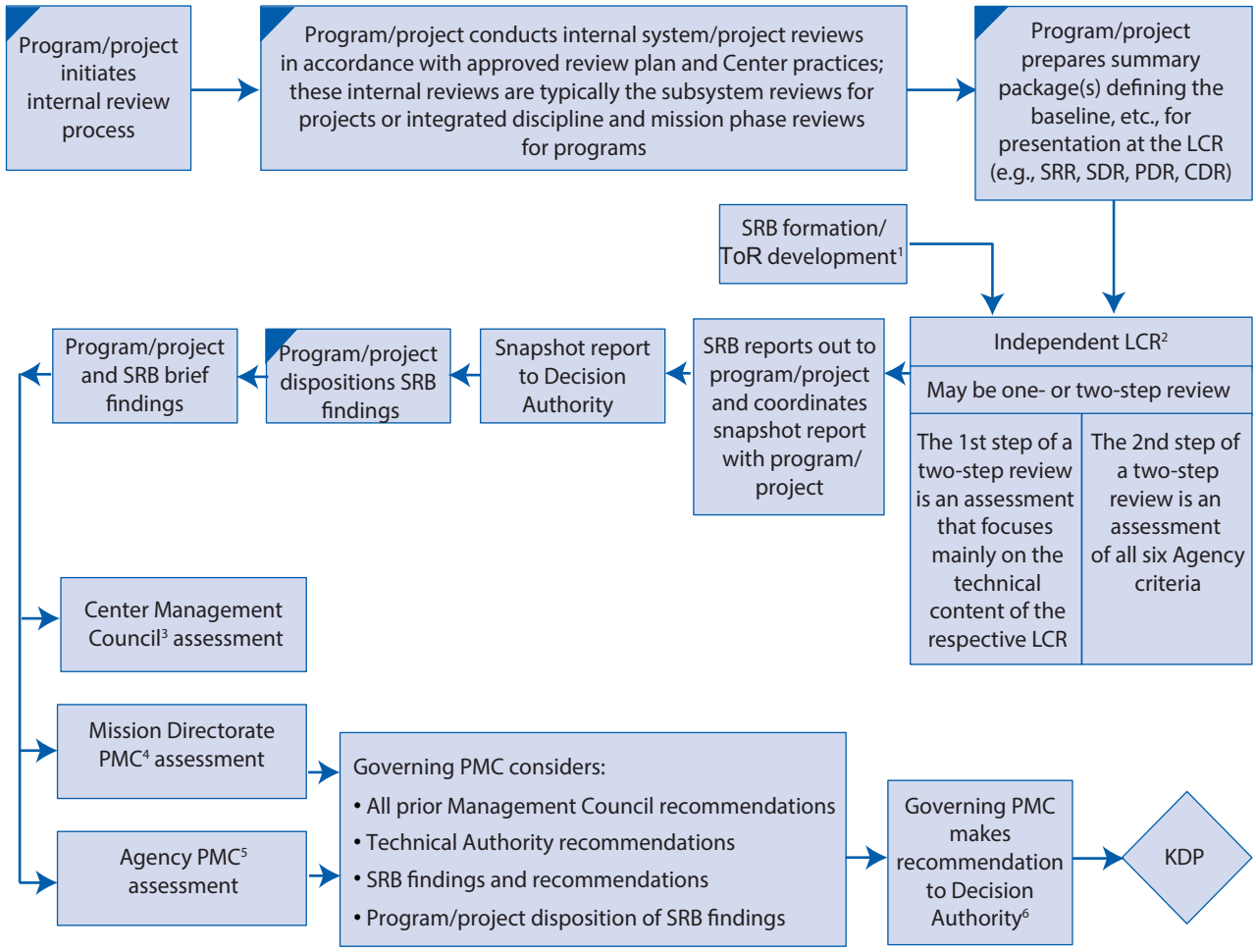
- The program or project with a credible, objective assessment of how it is performing.
- NASA senior management with an understanding of whether:
  - The program or project is on track to meet objectives,
  - The program or project is performing according to plan, and
  - Impediments to program or project success are addressed.
- A credible basis for the Decision Authority to approve or disapprove the transition of the program or project at a Key Decision Point (KDP) to the next life-cycle phase.

The Standing Review Board (SRB) is only responsible for conducting independent reviews during specific LCRs. This chapter focuses on the LCRs conducted by an SRB. An integrated perspective of the overall review process is presented in Figure 4-1. Figures 4-2 and 4-3 show key elements that are part of the LCR.

The SRB is a required part of the Agency's LCR process. The SRB conducts only the specific LCRs identified in *NPR 7120.5, NASA Space Flight Program and Project Management Requirements* and as requested by the Convening Authorities.

4.1 Terms of Reference

The Terms of Reference (ToR) is the agreement between the SRB, Convening Authorities, and program or project that specifies the nature, scope, schedule, and ground rules for the conduct of the LCR by the SRB. Only one ToR is written for the life cycle of a program or project, and it includes all LCRs to be performed by the SRB. The ToR can be revised as necessary, but all revisions, additions, and deletions must be approved by the ToR signato-



Legend: ◤ Program/project activity

Acronyms: CDR = Critical Design Review, KDP = Key Decision Point, LCR = Life-Cycle Review, PDR = Preliminary Design Review, PMC = Program Management Council, SDR = System Definition Review, SRR = System Requirements Review, ToR = Terms of Reference.

[1] See Figure 3-1.

[2] Successful readiness assessment prerequisite for advancing to the site review. See Section 4.2 for details.

[3] May be an Integrated Center Management Council when multiple Centers are involved.

[4] The Mission Directorate PMC is the Governing PMC for Category 2 and 3 projects.

[5] The Agency PMC is the Governing PMC for programs and Category 1 projects.

[6] The LCR is complete when the Governing PMC and the Decision Authority complete their assessment.

Figure 4-1 Program/Project Independent Life-Cycle Review Process

ries. Appendices may be used to augment the original ToR to document new or unique requirements, unknown when originally written, for future LCRs.

The SRB chair and the Review Manager lead the ToR development. They work collaboratively and iteratively with the Convening Authorities and the program or project to develop a ToR that meets the Agency's assessment expectations. The Review Manager ensures that the ToR has been coordinated with all Convening Authorities' points of contact and the program's or project's points of contact. Once the SRB chair, Review Manager, Convening Authorities' points of contact, and program or project have an agreed-upon draft ToR, it is submitted to the Convening Authorities for approval. The ToR is developed before any LCR occurs.

For **tightly coupled programs**, separate ToRs are not required for each project. The projects may be listed with the program under the description and governance section of the ToR. The program's ToR may include the projects' LCRs.

For **loosely coupled** or **uncoupled programs**, the projects typically have separate ToRs. For **single-project programs**, there will be a single ToR.

The ToR template is provided in Appendix H.

4.2 Readiness Assessment

The readiness assessment is a check conducted to ensure that the programmatic and technical products for the LCR will be available with the expected maturity to support the LCR timelines. A successful readiness assessment is a prerequisite for the program's or project's advancing to the site review under the planned timeline. The content of the technical and programmatic products is not assessed by the SRB at this point. The Review Manager and the SRB chair work with the program or project to schedule an appropriate time for this assessment.

The SRB chair provides an assessment of the program's or project's readiness to enter the LCR.

A readiness assessment is typically conducted 30–90 days before the site review and can be accomplished via a teleconference between the SRB chair, the Review Manager, the Center Director (or designated Technical Authority), and the program or project manager. The Program Executive is invited. In this discussion, the readiness of the technical and programmatic products to support the requirements of the LCR under the planned timelines is addressed. The assessment is made with respect to the LCR parameters in Table 4-1. In a two-step review process, there may be one or two readiness assessments.

Table 4-1 Maturity Parameters to Be Assessed

Maturity Parameter	Requirement Location
Review entry criteria	*NPR 7123.1*, Appendix G
Review success criteria	*NPR 7123.1*, Appendix G
Control plans maturity matrix	*NPR 7120.5E*, Appendix I
Products maturity matrix	*NPR 7120.5E*, Appendix I
Expected maturity state overall at KDP reviews and specific LCRs	*NPR 7120.5E*, Tables 2-3–2-6
Maturity tables (with review criteria details)	*NASA Space Flight Program and Project Management Handbook*, Appendix D

The SRB chair develops his/her individual assessment of the program's or project's readiness. If the SRB chair agrees that the program or project is at the proper programmatic and technical level to support the Agency's maturity expectations for that LCR, the LCR is held. If the SRB chair's assessment is not aligned with that of the program or project, the disagreement is reported to the Decision Authority, who determines whether to proceed with the LCR.

4.3 Life-Cycle Review Methods

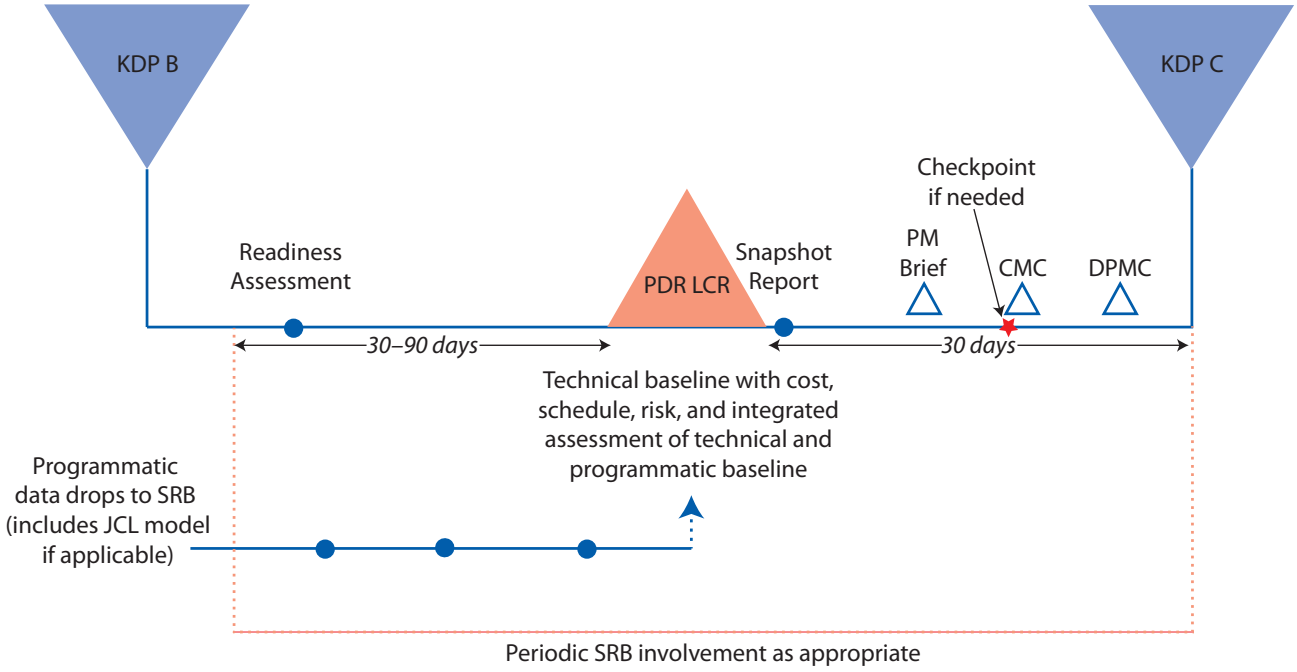
All LCRs must assess both the program's or project's technical maturity and its alignment with the Agency's six assessment criteria identified in *NPR 7120.5, NASA Space Flight Program and Project Management Requirements*, Section 2, and described in Section 5.1 of this handbook. Reviews are conducted as either a one-step or a two-step review. *NPR 7120.5* specifies that the program or project manager determine whether a one- or two-step review will be conducted. This decision is made well in advance of the LCR to provide time for the program or project and the SRB to prepare for the LCR.

***NPR 7120.5* requires the program or project manager to determine if the LCR is a one-step or two-step review.**

There are cases, particularly for human space flight programs and projects, where an internal program or project review is held concurrently with the SRB review.

4.3.1 One-Step Review

A one-step review is an LCR chaired by the SRB chair. All six Agency assessment criteria are reviewed in a one-step review. The one-step review is referred to by the name of the LCR. For example, the one-step review preceding KDP C is called the "Preliminary Design Review (PDR) Life-Cycle Review." Figure 4-2 presents an overview of the one-step review using the PDR as the example.



Acronyms: CMC = Center Management Council, DPMC = Division Program Management Council, JCL = Joint Confidence Level, KDP = Key Decision Point, LCR = Life-Cycle Review, PM = Program or Project Manager.

Notes: A one- or two-step review may be used for any LCR. This handbook provides information on the readiness assessment, snapshot reports, and checkpoints associated with LCRs. Figure is not drawn to scale.

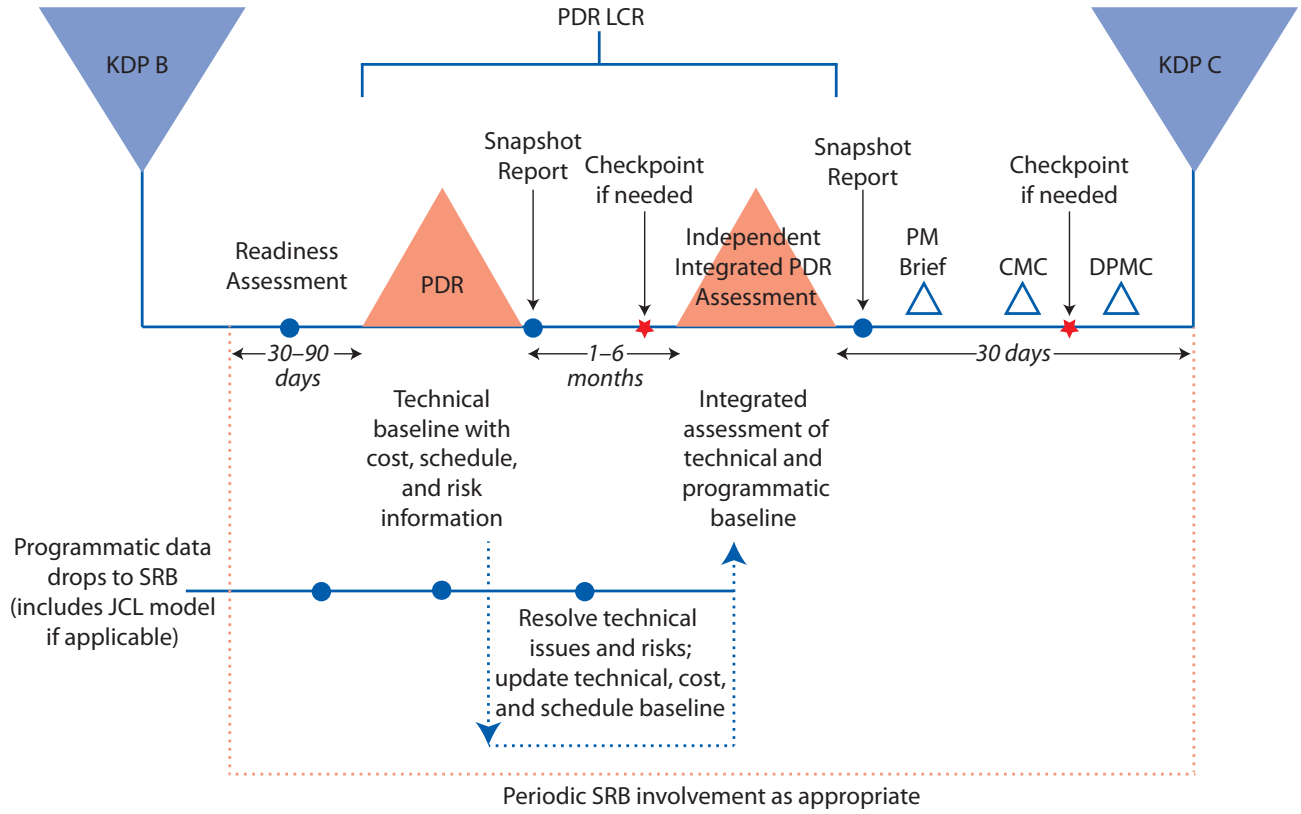
Figure 4-2 One-Step PDR Life-Cycle Review Overview

4.3.2 Two-Step Review

Typically, a two-step review is appropriate when the program or project needs the results of the first step before it can fully mature the cost and schedule products for the integrated LCR (step two). When a two-step review method is used, the second step of the review covers all six of the Agency's assessment criteria.

The first step of the review typically focuses on the program's or project's technical maturity and health, taking into consideration preliminary cost and schedule information available at that time. This step addresses the adequacy of the program's or project's technical approach, as defined by *NPR 7123.1, NASA Systems Engineering Processes and Requirements* entrance and success criteria, and establishes the technical baseline. The first step of the two-step review is conducted by the SRB and chaired by the SRB chair.

The second step of the review occurs no later than six months after the conclusion of the first step. It is an independent review conducted by the SRB and chaired by the SRB chair. Figure 4-3 presents an overview of the two-step review using the PDR as the example.



Acronyms: CMC = Center Management Council, DPMC = Division Program Management Council, JCL = Joint Confidence Level, KDP = Key Decision Point, LCR = Life-Cycle Review, PDR = Preliminary Design Review, PM = Program or Project Manager.

Notes: A one- or two-step review may be used for any LCR. This handbook provides information on the readiness assessment, snapshot reports, and checkpoints associated with LCRs. Figure is not drawn to scale.

Figure 4-3 Two-Step PDR Life-Cycle Review Overview

4.3.3 Human Space Flight Review

There are cases, particularly for human space flight programs and projects, where the program or project uses the internal LCR to make formal decisions to complete its technical work and align this work with the budget and schedule. In these cases, the program or project manager may co-chair the LCR with the SRB chair, since he/she is using this forum to make program or project decisions, and the SRB will conduct the independent assessment concurrently. The program or project manager works with the SRB chair to develop the LCR agenda and agree on how the LCR will be conducted to ensure that it enables the SRB to fully accomplish the independent assessment. The program or project manager and the SRB chair work together to ensure that the ToR reflects their agreements and that the Convening Authorities approve the approach.

4.4 Snapshot Report

Rapid reporting to the Convening Authorities and Decision Authority is essential to efficient and effective management of programs and projects. To support this requirement, the SRB chair is required to provide a one-page written summary of his/her preliminary findings no later than 24 to 48 hours after the site review (see Section 4.8) conclusion. This summary report is known as the snapshot report.

The Snapshot Report, which is a one-page written summary of the SRB's preliminary findings, is provided within 24 to 48 hours of the site review's conclusion.

The snapshot report contains an LCR overview, the SRB's summary findings, a discussion of significant issues, a discussion of significant risks, and the schedule for briefing all required management councils that will lead up to the applicable Governing Program Management Council.

The SRB chair briefs the Convening Authorities on the snapshot information in a teleconference setting after the site review's conclusion. The SRB chair provides the program or project manager with a courtesy copy of the snapshot report prior to the teleconference.

For a one-step review process, one snapshot report is required for the single review, as shown in Figure 4-2. For the two-step review process, a snapshot report is required after both the first step and the second step, as shown in Figure 4-3.

4.5 Checkpoints

Neither the SRB nor the SRB chair is directly involved in the checkpoint process. Any involvement by the SRB in checkpoints will be as directed by the Decision Authority.

At a checkpoint, the program or project manager describes to the Decision Authority the detailed program or project plans for significant decisions, activities, and commitments. The Decision Authority provides the program or project with interim authorization, guidance, and direction.

4.6 SRB Kick-Off Meeting

The SRB kick-off meeting is a prepatory activity that precedes the active engagement of the SRB in the site review (see Section 4.8). An SRB kick-off meeting is conducted before each LCR the SRB conducts. The objective of the meeting is to familiarize the SRB members and consultants-to-the-board with the current state of the program or project under review,

the current LCR process, any new policies, and the expectations of NASA management.

4.6.1 Preparation for the Meeting

The SRB chair and the Review Manager conduct a kick-off meeting prior to each LCR to familiarize the SRB members and consultants-to-the-board with the current state of the program or project and the expectations of NASA senior management and the SRB chair.

The SRB chair and the Review Manager prepare the kick-off meeting agenda. Coordination and execution of the meeting is the responsibility of the Review Manager. The SRB members and consultants-to-the-board should participate in the meeting. It is recommended that the first kick-off meeting be conducted at a designated site. The program or project manager, the Program Executive, and the Strategic Investments Division (SID) analyst usually present during this meeting. Subsequent kick-off meetings for this SRB may then be conducted via WebEx or teleconference. The SRB members should prepare for the kick-off meeting by familiarizing themselves with the program or project and this handbook. The SRB chair will request a short briefing from the members who attended any program or project subsystem reviews prior to the kick-off meeting. In addition, the SRB program analyst will conduct a briefing for the SRB chair and Review Manager on best practices and tools that are applicable to the specific review prior to the kick-off meeting.

4.6.2 Meeting Attendees and Meeting Conduct

For Agency-level reviews, the Mission Directorate Program Executive, the SID point of contact, and the Technical Authority are invited to the kick-off meeting. The Independent Program Assessment Office Director or designee typically briefs the SRB on his/her expectations and discusses the SRB process at a high level. The SID's point of contact presents an overview of the budget formulation and external reporting status for the program or project and the financial portfolio of the mission for the program or project under review.

The SRB kick-off meeting is typically held 30–90 days prior to the start of the site review. This meeting provides the SRB with insight into Agency expectations, expectations of the SRB during the site review, and other topics deemed pertinent by the SRB chair. During the meeting, the SRB program analyst coordinates with the SRB regarding the SRB risk input process, risk meetings, and preliminary risk analysis pertinent to the review and the site visit. Also during the kick-off meeting, the SRB chair and Review Manager share content from the SRB Document Library, facilitate program or project document access, and ensure the initiation of the appropriate independent programmatic analyses. This early interaction eliminates the need for many informational questions asked by SRB members during the time-constrained LCR.

4.7 Programmatic Data Submittal from Program or Project

It is very beneficial for the program or project management to meet with the chair, the Review Manager, and the lead programmatic analyst at the SRB planning session to plan for the review approximately six months in advance of the site review. Requirements for the review, required data products, and the SRB review timeline should be discussed and understood by all parties. This will provide a basis of expectations between the program or project and the SRB, as well as allow for a more streamlined data delivery process.

A component in all reviews is the programmatic assessment of the program's or project's progress relative to the schedule and cost. The SRB programmatic analysis is performed prior to the site review. Analysis results are briefed out to SRB members and consultants-to-the-board at the time of the site review. If there are any major discrepancies, an opportunity to revise the analysis is available during the SRB caucus sessions.

The SRB programmatic analysis is performed prior to the site review.

Before the site review, data access and then two data deliveries of programmatic data are required to allow for preparatory analyses by the SRB. The following data access and release timelines were established using best practices to meet the SRB briefing schedule. During the SRB planning session with the programs or projects, and well in advance of the first programmatic access, delivery timelines maybe adjusted if agreed to by all parties.

Access to existing programmatic data commences 100 days prior to the site review. There is no intention for the projects to do additional work preparing the products available for data access at 100 days before the site review. It is recognized that the data are preliminary and products may be incomplete and very likely could change before subsequent data deliveries and/or the review. At that time, data are posted on the SRB website for the SRB to review. Requirements for the data products are outlined in *NPR 7120.5*: the Program Plan; the risk list; staffing requirements and plans; infrastructure requirements; the Integrated Master Schedule (IMS); Basis Of Estimates (BOEs) for both cost and schedule; documentation of performance against plan; plan for work to be accomplished during implementation; external cost and schedule commitments; Cost Analysis Data Requirement (CADRe) data; Technical, Schedule, and Cost Control Plans; the Risk Management Plan; the Work Breakdown Structure (WBS), the time-phased budget allocation by WBS, and WBS dictionary; Cost (Unallocated Future Expenses—UFE) and schedule reserves and the basis for reserves; and Earned Value Management (EVM) data for contracts requirement EVM. Additionally, other documents that are useful include: past status reports;

Access to existing programmatic data commences 100 days prior to the site review. This allows the SRB members to become familiar with the program or project prior to participating in subsystem reviews and to communicate any issues to the program or project in advance.

the Master Equipment List (MEL) and mass properties report, the Power Estimate List (PEL), and metrics for software lines of code. Depending upon the LCR, it is understood that, in many cases, these data may be in preliminary format. Access to data 100 days prior to the review allows the SRB members to become familiar with the program or project prior to participating in subsystem reviews, and communicate any issues to the program or project in advance; it also assists the chair in evaluating whether the program or project meets the criteria for the readiness assessment milestone.

Data delivery is made 60 days prior to the site review.

The first formal data delivery is made 60 days prior to the site review. At this time, if any of the aforementioned data products have been updated, those updates should be re-posted to the SRB website. Additionally, an updated risk list; an updated IMS and an analysis schedule, if a range estimate or Joint Confidence Level (JCL) analysis is being performed; and the cost estimate should be formally delivered and posted to the website. The SRB will begin programmatic and risk analysis once these data are received. The SRB risk meetings begin upon the receipt of these data. It is understood that this is the initial data drop and that there could be changes (potentially significant) before the final analysis commencing 20 days prior to the site review when the final data deliveries are received.

An updated risk list; an updated IMS and an analysis schedule, if a range estimate or JCL analysis is being performed; and the cost estimate should be formally delivered.

The final data delivery occurs 20 days prior to the site review.

The final data delivery occurs 20 days prior to the site review. If any of the aforementioned data products have been updated, those updates should be posted to the SRB website. The final data delivery includes the final versions of the program or project risk list; the IMS and an analysis schedule, if a range estimate or JCL analysis is being performed; and the final cost estimate.

The final data delivery includes the final versions of the program or project risk list; the IMS and an analysis schedule, if a range estimate or JCL analysis is being performed; and the final cost estimate. This delivery supports the final SRB risk evaluation meeting prior to the site review.

This delivery supports the final SRB risk evaluation meeting prior to the site review. The SRB program analysts will provide analysis results to the SRB prior to the site review. Because the data access and first data delivery occur well before the review, the data and products are likely to change. The SRB should not view these changes as instability in the project but rather a normal part of the design maturation process.

4.8 Site Review

The site review is the formal, independent review of the programs or projects by the SRB for the LCR.

The formal independent review of the program or project by the SRB is called the site review. The site review's start and end dates are, respectively, the anchor points for the activities preceding and following the site review.

4.8.1 Preparation for the Site Review

The program or project develops the first draft of the site review agenda prior to the readiness assessment. Using this draft as a starting point, the final agenda is negotiated by the SRB chair, Engineering Technical Authority, the Safety and Mission Assurance Technical Authority, the Program Executive, the Center representative, the Review Manager, and the program or project. The final agenda is due no later than 30 days before the site review and must have the concurrence of the SRB chair, the Technical Authority, and the program or project manager. The review schedule is developed with a goal of minimizing adverse impacts to the ongoing activities of the program or project.

The SRB chair is responsible for ensuring that the depth of the site review enables the SRB to make an informed assessment of whether the program's or project's state meets the LCR's success criteria and the expected maturity states.

4.8.2 Conducting the Site Review

During the site review, the program or project presents its status through sequential briefings for each topic, typically given by the program or project leadership. The SRB chair presides over the review and is responsible for keeping it on schedule. The presenters answer questions from the SRB members in real time, if possible. If further detail is required, the program or project may offer to provide the necessary information later in the review or arrange a splinter session in parallel with additional presentations. During the site review, the SRB members may submit Requests For Action (RFAs). The RFAs must comply with the RFA process approved for the review. SRB members may sponsor RFAs from nonmembers.

4.8.3 Reporting Out Site Review Findings

SRB members and consultants-to-the-board determine the strengths and weaknesses of the program or project and report their findings on their Individual Member Independent Reports (IMIRs) and score cards.

When the review concludes, the SRB meets to complete its assignments, and each member reports his/her findings and conclusions. Consultants-to-the-board provide their technical analyses, but do not participate in developing the final SRB position. The SRB members and consultants-to-the-board provide the SRB chair and the Review Manager with an initial written IMIR prior to the program or project out-brief and a final IMIR within 48 hours of the site review's conclusion. Section 5.5 provides more detail on the IMIR.

4.9 Key Decision Points

The Decision Authority uses the SRB assessment and other information to make the decision for a program's or project's advancement to the next life-cycle phase.

Central to the program and project management process are the program and project life cycles and the KDPs within these life cycles. A KDP is an event where the Decision Authority determines the readiness of a program or project to advance to the next phase of the life cycle (with the exception of KDP E; the program or project transitions to Phase E at the Post-Launch Assessment Review (PLAR)). Although the KDP is outside of the scope of the SRB's responsibilities, the SRB provides essential information to the Decision Authority to make this determination. Understanding what information the Decision Authority needs to make the decision is critical in conducting an effective review. The standard needs and any special needs of the Decision Authority in support of the KDP must be understood and incorporated into the ToR.

4.10 Late Life-Cycle Reviews

The Operational Readiness Review (ORR) is the last LCR the SRB routinely conducts.[1] The ORR is conducted like any other LCR, except that the SRB chair reports the ORR's results at the Mission Readiness Review (MRR), Mission Readiness Briefing (MRB)/Flight Readiness Review (FRR) for human space flight.

After the ORR, all SRB members and consultants-to-the-board with the exception of the SRB chair and Review Manager will conclude their activities. The SRB chair and the Review Manager are retained through launch.

For supporting briefings after the ORR that lead to the KDP E, the SRB chair represents the SRB regarding the results of the ORR assessment. On other items, the SRB chair provides only his/her personal opinion/views since the SRB has been dissolved by this point (unless it is reconstituted at the request of the Convening Authorities).

The Centers generally conduct the LCRs after the ORR and do not use an SRB. These reviews happen in rapid succession and include the Safety and Mission Success Review (SMSR), the FRR (for human space flight, the FRR is usually chaired by the Mission Directorate Associate Administrator), the PLAR, and the Critical Events Readiness Review (CERR). Center practices are followed for Center-convened reviews. The Center is responsible for assembling the review team. The Center must procure (contract and fund)

[1] For programs, the SRB is usually retained to conduct the Program Implementation Review (PIR).

any former SRB member that it desires to be on the institutional review team for post-ORR reviews. Such a member represents the institutional review team, not the SRB.

The Convening Authorities may request that the SRB participate in or conduct any of these late LCRs. The SRB should know well in advance of the ORR if it will conduct any of the late LCRs. If the SRB is conducting reviews after the ORR, the approach for the execution, briefings, and written reports is streamlined for efficiency. Since each program or project is different with different timing for the late reviews, the planning for each review's execution, briefings, briefing content, and combination of review briefings is unique for each program or project.

At the request of the Convening Authorities, the SRB can participate in LCRs after the ORR.

4.11 Special Reviews Conducted by the SRB

Per *NPR 7120.5*, the Decision Authority can request the SRB to lead other LCRs or special reviews. A special review follows the same process, procedures, and requirements as an LCR, including reporting, unless a lesser set of requirements is defined in the sanctioning document. Additional outside experts may be used as needed.

The Decision Authority can request the SRB to lead other LCRs or special reviews.

The special review focuses on a specific topic or set of issues. Circumstances that may warrant a special review include unanticipated changes to the program's or project's baseline; trends indicating the program or project is not meeting technical, cost, or schedule requirements; issues maturing an enabling technology; or other areas of special attention, such as earned value management. The Review Manager and SRB chair work with the authorizing Convening Authority to identify the issues to address, the execution requirements, reporting requirements, and method for conduct of the review. The sanctioned governing document is typically a ToR or a Memorandum of Understanding, which includes the reason for the special review and all conduct, assessment, and reporting requirements. The SRB chair and Review Manager either develop the governing document with the Convening Authority, or the Convening Authority provides this document to them. The Review Manager coordinates the required approvals, which are the authorizing Convening Authority and—typically—the Mission Directorate Program Executive, the program or project manager, and the SRB chair.

4.11.1 Rebaseline Review

An important special review is the rebaseline review. The three criteria for requiring a rebaseline review are in *NPR 7120.5*. The Decision Authority

decides if the SRB or another body conducts the rebaseline review. The review is conducted like a KDP C LCR using the requirements, content, and expectations for that review. The review revisits the maturity expectations that set the baseline at approval for implementation.

Per *NPR 7120.5*, a rebaseline review requires tightly coupled programs, single-project programs, or projects with an estimated life-cycle cost greater than $250 million to provide a resource-loaded schedule and a cost estimate with basis of estimate, and to perform a risk-informed probabilistic analysis that produces a JCL. Loosely coupled and uncoupled programs are required to perform an analysis that provides a status of the program's risk posture when a project's Agency Baseline Commitment (ABC) is rebaselined.

5 Standing Review Board Products

The Standing Review Board (SRB) is charged with the responsibility of making an independent assessment of the program's or project's health and maturity. The SRB's role is to provide the Convening Authorities with an expert judgment of the adequacy of the program's or project's technical and programmatic approach, risk posture, progress relative to the baseline, and readiness to advance to the next development level.

An SRB has three primary functions: (1) to perform complete, comprehensive, and independent assessments of the program or project; (2) to develop findings and formulate recommendations based on these assessments; and (3) to report its results to the program or project and Convening Authorities.

The following are key points regarding SRB responsibilities and products:

- **Depth of penetration.** It is the responsibility of the SRB to establish a review level that sufficiently meets the requirements of the Terms of Reference (ToR) and enables the SRB to determine if the program or project is within the guidelines of its technical and programmatic requirements. SRB outputs are briefed to the program or project under review prior to being provided to NASA management.
- **SRB awareness between Life-Cycle Reviews (LCRs).** Because the SRB is on standby between LCRs, it is the responsibility of the Review Manager to maintain contact with the program or project and coordinate with the SRB chair regarding the informational materials provided to SRB members outside of the LCRs. Examples of materials that may be provided to the SRB team are presentation material from periodic reviews—e.g., quarterly reviews, risk reviews, and major decisional change boards. The SRB members will not attend the program's or project's internal meetings or reviews outside of the LCRs, unless this is coordinated with the Review Manager, the SRB chair, and the program or project.

- **SRB ownership of programmatic analyses.** The SRB has full ownership of the programmatic assessments because they link cost, schedule, and management with the technical aspects of the program or project. Programmatic assessments combined with the technical aspects formulate a complete status of the program or project under review.
- **Time criticality for preparation and review of programmatic analyses.** Programmatic data (as described in Section 4.7) must be received within the required timeframes in order to afford the SRB an opportunity to provide feedback to the program or project prior to a review. This provides the program or project with the opportunity to make any necessary data adjustments, as opposed to receiving a notification that the program or project does not meet requirements.

5.1 Assessment Criteria

At the LCR, the SRB assesses the program's or project's health and status relative to the six assessment criteria identified in *NPR 7120.5*. The guidance for assessing these six criteria and technical success criteria is in *NPR 7123.1* and the maturity matrices for control plans and products in *NPR 7120.5* and the *PM Handbook*.

LCR assessment criteria (discussed in Sections 5.1.1–5.1.6) are presented in *NPR 7120.5, NASA Space Flight Program and Project Management Requirements* and are required for all LCRs. These criteria are used for all SRB-conducted LCRs in support of their independent assessment. The criteria are customized for each type of program implementation and each LCR. Using the same assessment criteria approach throughout the life cycle with emphasis consistent with the entrance and success criteria from *NPR 7123.1, NASA Systems Engineering Processes and Requirements* creates a consistent metric for traceability. The evaluation of the assessment criteria is supported by the maturity expectations of the control plans, products, and overall expected maturity state provided in matrix form in *NPR 7120.5* and the *NASA Space Flight Program and Project Management Handbook* (*PM Handbook*). The matrices are discussed in Section 5.2.

These assessment criteria are helpful in establishing the scope of SRB independent assessment activities and are used by the SRB to organize and summarize its findings (discussed in Section 5.4.2).

The standard metric for the SRB success criteria evaluations is a three-level metric scale: i.e., successful (green), partially successful (yellow), or unsuccessful (red). This is sometimes referred to as a "stop-light" assessment. The SRB provides assessments for each of the Agency's six criteria, along with a supporting rationale that addresses the assessment metrics provided as guidance in Tables 5-1 and 5-2. As the program or project matures, the metrics for the criteria should become more demanding. A deficiency that might be acceptable early in the program's or project's life cycle is likely to be unacceptable later. It is up to the SRB to use its expertise to evaluate the program or project, taking into account life cycle stage or other circum-

stances and assessing the risks that any deficiency poses against the "green" standard for successful execution of the program or project. Examples for a program and project are in Tables 5-1 and 5-2, respectively.

The assessment of the criteria should address the maturity expectations of the applicable milestone products and control plans in the maturity matrices in *NPR 7120.5* and the expected maturity state table in the *PM Handbook*.

5.1.1 Alignment With and Contributing to Agency Needs, Goals, and Objectives, and the Adequacy of Requirements Flow-Down From Those

One of the first assessments each SRB must perform in the program or project life cycle is the alignment of program or project requirements with Agency needs, goals, and objectives, and determination of how well these requirements flow down to drive all defined levels of program content and project design without stray or open-ended requirements. This assessment typically takes place in the Formulation phase leading to the program System Requirements Review (SRR) and, for projects, may continue into Phase B as the project continues to refine the definition of its design at the subsystem and component levels. The System Requirements Document and Requirements Traceability Report are two key documents that the SRB should use in conducting this assessment. The SRB should complete its initial assessment findings before program acquisition or at the start of Phase B for a project. This alignment is also assessed at subsequent LCRs.

5.1.2 Adequacy of Management Approach

The SRB will perform an evaluation of how well the program or project is managing its responsibilities. The scope of this evaluation includes (1) the management approach, e.g., organizational structure, integrated product teams, lines of authority; and (2) management processes and practices for planning, tracking, and control. An expected benefit of this SRB assessment is the contribution of lessons learned from the background of experience that a well-qualified SRB team can offer.

5.1.3 Adequacy of Technical Approach as Defined by *NPR 7123.1*

Technical assessments are somewhat different for projects and tightly coupled programs versus uncoupled or loosely coupled programs; therefore, each is addressed separately in Sections 5.1.3.1 and 5.1.3.2.

Table 5-1 Example of Program Assessment Guidance

Criteria	Program Assessment Metrics		
	Successful	Partially Successful	Unsuccessful
Alignment with and contributing to Agency needs, goals, and objectives	Program objectives are prioritized and well-aligned with strategic goals; objective-driven requirements are defined for current and near-term projects.	Program objectives are not well-aligned with strategic goals; requirements for near-term projects are immature.	Program objectives are notional and/or do not align with strategic goals; requirements for existing projects may be lacking and do not exist for near-term projects.
Adequacy of management approach	The program organizational structure is defined and effective; interfaces to projects are clear; program policies and controls are defined; the program base is adequate.	The program organizational structure lacks clarity; lines of authority may be duplicated; policies/controls are not well defined; interfaces are incomplete; program base is weak.	Organizational structure is unacceptable; control processes are notional and not in place; necessary interfaces are not defined; program base is not defined.
Adequacy of technical approach	A 10-year architecture exists, consistent with program/Agency goals; project concepts exist for the architecture that are driving near-term technology investments; key external interfaces/needs are defined.	The 10-year architecture is notional and not always consistent with Agency goals; future mission concepts are inadequate for planning guidance; external needs are poorly defined.	A 10-year architecture does not exist; future mission concepts are without basis; little or no planning guidance exists for current readiness investments.
Adequacy of the integrated cost and schedule estimate and funding strategy in accordance with *NPD 1000.5*	The current program budget and phasing are adequate to support existing program scope; the approved 5-year budget plan is sufficient to implement the Program Plan; the program funding wedge is adequate for the formulation of projects beyond the 5-year horizon; the project and program UFE is adequate to support the program JCL.[1] The PIMS consisting of schedule data for all project effort included in the program scope and WBS and with all effort that is under the responsibility of the program organization to perform shall be delivered electronically. If logical relationships between projects exist, they are linked within the PIMS. The program and project critical paths are identifiable within the analysis/PIMS. Schedule data for all effort that falls under the responsibility of the program should be reflected in lower discrete detailed schedules with vertical and horizontal integration in the PIMS. Program costs are mapped to the PIMS. The analysis/PIMS follows government best practices and is green on schedule health check. Program has and is following a program Schedule Management Handbook. The SRB is able to use the PIMS for risk identification and schedule and risk analysis of program risks.	The current and approved 5-year baseline budget and phasing may not be adequate to support the Program Plan; the program funding wedge may not be adequate for the formulation of projects beyond the 5-year horizon; program and project UFE is either phased inappropriately or falls short of levels needed to support program and project JCLs.[1] The program analysis schedule or PIMS consisting of schedule data for all project effort included in the program scope and WBS is partially identified, and with most of the effort that is under the responsibility of the program organization to perform shall be delivered electronically. The program and project critical paths are partially identifiable. If logical relationships between projects exist, they are partially linked within the PIMS. Schedule data for all effort that falls under the responsibility of the program should be reflected in lower discrete detailed schedules with vertical and horizontal integration in the PIMS. Program costs are partially mapped to the PIMS. The analysis/PIMS attempts to implement government best schedule practices, but is yellow on health check. The program has but is not following a Program Schedule Management Handbook. The SRB is able to use the PIMS for risk identification and preliminary schedule and risk analysis of program risks.	The current program budget and phasing are inadequate to support program content; no plan exists to bring program content and budget into alignment; the 5-year budget plan is inadequate to support program expectations; the program funding wedge is inadequate for the formulation of projects beyond the 5-year horizon; the program and project UFE or the phasing of the UFE does not support the program and project JCLs.[1] The program analysis schedule or PIMS does not consist of schedule data for all project effort included in the program scope and WBS, and with all effort that is under the responsibility of the program organization to perform. Schedule is not delivered electronically. Schedule data for all effort that falls under the responsibility of the program is not reflected in lower discrete detailed schedules, and vertical and horizontal integration is missing. There is missing schedule logic, and a program/project critical path(s) does not exist. Program costs are not mapped to the PIMS. The analysis/PIMS does not follow government best practices and is red on schedule health check. The program does not have or is not following a Program Schedule Management Handbook. The SRB is not able to use the PIMS for risk identification and schedule and risk analysis of program risks.
Adequacy and availability of resources other than budget	All key implementation facilities have been identified and are available to support near-term (5-year) missions; staffing resource needs have been determined and are available; needed external resources are available.	Not all key resources and facilities may be identified to support near-term (5-year) missions; known resources may not be available when needed; external resource needs are notional.	Needed resources and/or facilities are not identified; availability of either internal or external resources is unknown.

Table 5-1 Example of Program Assessment Guidance (continued)

Criteria	Program Assessment Metrics		
	Successful	**Partially Successful**	**Unsuccessful**
Adequacy of risk management approach and risk identification/ mitigation per *NPR 8000.4*	The NASA continuous risk management paradigm is practiced. A knowledgeable program risk manager has been assigned. A program risk management plan exists and is followed; a risk database is being utilized to monitor, track, and communicate risks. Risks have been identified within the schedule with mitigation plans and are under configuration control. Reserves are adequate to manage risks. A full list of program or project risks—including title, description, mitigation plan, likelihood, and consequence—is delivered to support SRB schedule risk analysis, cost risk analysis, range estimate, and/or JCL. Uncertainty is mapped to cost and schedule.	The NASA continuous risk management paradigm is practiced. A program risk manager has been assigned. A program risk management plan exists, but risk identification and/or mitigation is incomplete; reserves may not be adequate to manage risks. Risk management plan implementation is incomplete or ineffective. A list of program or project risks—including title, description, mitigation plan, likelihood, and consequence—is delivered to support SRB preliminary schedule risk analysis, cost risk analysis, range estimate and/or JCL. Uncertainty is mapped to cost and schedule.	A risk management plan does not exist; categorization of current projects is inconsistent; near-term projects have not been categorized, projects do not meet classification requirements or are not executing risk management processes; no longer-term program risk strategy exists.

Acronyms: JCL = Joint Confidence Level, PIMS = Program Integrated Master Schedule, UFE = Unallocated Future Expenses, WBS = Work Breakdown Structure.

[1] A JCL is only required at Key Decision Point (KDP) I for tightly coupled or single-project programs or by special request by the Convening Authorities.

5.1.3.1 Technical Assessments for All Projects, Single-Project Programs, and Tightly Coupled Programs

The SRB conducts an independent technical assessment of the program or project at each LCR beginning in Formulation, continuing during Implementation, and concluding during the Operations phase. Beginning with the program or project requirements, this assessment subsequently focuses on technical readiness, fabrication, integration, verification/validation testing, launch, operations, mission products, and life-cycle logistics support.

Throughout this process, technical risk, failure tolerance, and margin adequacy are continually reviewed. Guidance for these assessments is found in the unique entrance and success criteria for each LCR in *NPR 7123.1B* Appendix G. There may be NASA Center–specific engineering processes and documentation that need to be included in the assessment criteria.

Each assessment effort begins with a thorough review of the appropriate program or project documentation, followed by selective attendance (as observers) at internal project reviews. Each SRB member typically performs off-line analyses checks and participates in the formal LCRs. Additional meetings with project personnel may be necessary to ensure full understanding of complex issues and solutions. The planning and execution of these additional meetings are defined via a coordinated effort between the SRB chair, the Review Manager, and the program or project manager. Each assessment should

Table 5-2 Example of Project Assessment Guidance

Criteria	Project Assessment Metrics		
	Successful	**Partially Successful**	**Unsuccessful**
Alignment with and contributing to Agency needs, goals, and objectives	Project objectives are well-aligned with strategic goals; project aligns with Level 2 requirements; objective-driven requirements are clearly flowed down through the WBS and drive the baseline mission design; project is in compliance with required NPDs and NPRs.	Traceability of project objectives to strategic goals is unclear; project is working to align with Level 2 requirements; requirements flow-down is incomplete; design capabilities are not yet consistent with requirements; project is satisfactorily working to meet compliance with required NPDs and NPRs.	Concept capabilities are driving project objectives; project does not align with Level 2 requirements; objectives do not align with strategic goals; requirements flow-down is haphazard, without traceability, and/or not driving the design; project does not appear to meet compliance with NPDs and NPRs.
Adequacy of management approach	An effective organizational structure exists; management processes exist to effectively direct/control the project; essential interfaces are defined, and agreements are in place.	Organizational structure is lacking in some areas; control processes are questionable or have latency issues; interfaces are incomplete.	Organizational structure is unacceptable; necessary interfaces do not exist; control processes are notional and not in place.
Adequacy of technical approach	There is an acceptable baseline design; the design is requirements driven; the capabilities of the design ensure adequate technical margins against the requirements.	The design has not yet stabilized; design trades remain open beyond expected milestones; some baseline design margins are inadequate against requirements; technical readiness is a concern.	There is an inadequate baseline design; technical margins are clearly inadequate at this point in the project life cycle; technical maturity is unlikely within planned schedules.
Adequacy of the integrated cost and schedule estimate and funding strategy in accordance with *NPD 1000.5*	An adequate BOE exists for the baseline LCC; annual phasing fully supports the scheduled work content. The commitment baseline incorporates the UFE required to support the JCL;[1] the project's management baseline includes an appropriate allocation of the UFE. A government project IMS reflecting scheduling practices, which captures the project's scope of work from the WBS in a logic network, with JCL required costs or detailed resources loading, with durations supported by historical projects' data and BOE, that is integrated horizontally and vertically with a valid critical path(s) and reasonable schedule slack appropriate to life-cycle phase is delivered electronically to support a SRB schedule risk analysis. Schedule health check is green; status is up to date, and approved (baseline) schedule is maintained. Project has and is implementing well-defined schedule management processes. Schedule margin, which is covered by an appropriate amount of UFE that is consistent with project schedule risk analysis/range estimate/JCL results.	The BOE is incomplete or at issue for the baseline LCC; annual phasing partially supports the scheduled work content or is inadequate in some years. The commitment baseline incorporates only some of the UFE required to support the JCL;[1] the project's management baseline includes an inadequate allocation of the UFE. Analysis schedule or IMS partially captures the project's scope of work from the WBS in a logic network, with costs/resources partially loaded, with durations mostly supported by historical projects' data and BOE, that is integrated horizontally and vertically with a partially valid critical path(s) and reasonable schedule slack appropriate to life-cycle phase is delivered electronically to support a preliminary SRB schedule risk analysis. Schedule health check is yellow; government best practices need to be applied to the schedule; status is up to date, and approved (baseline) schedule is maintained. Project has and is implementing well-defined schedule management processes. Schedule margins and funded schedule margin are consistent with preliminary project schedule risk analysis/range estimate/JCL results.	The BOE is not provided or is substantially at issue for the baseline LCC; annual phasing inadequately supports the scheduled work content or is insufficient in many years. The commitment baseline does not incorporate the UFE required to support the JCL;[1] the project's management baseline does not include an allocation of the UFE. Analysis schedule or IMS does not reflect the project's scope of work and WBS; there is missing schedule logic; costs and resources are not loaded; durations are unrealistic and are not supported by historical data; horizontal and vertical integration are lacking; the critical path is not evident, and slack values are unrealistic. The schedule does not pass the schedule health check and is not viable for performing a schedule risk analysis, range estimate, or JCL calculation. The project does not have or is not following well-defined schedule management processes. Schedule margins and funded schedule margins are not justified by probabilistic analysis.
Adequacy and availability of resources other than budget	All resources and facilities have been identified and are available; resources are properly aligned with integrated cost and schedule described above; project is adequately staffed.	Availability of some needed resources and/or facilities is questionable; staffing may be inadequate or lagging plan.	Needed resources and/or facilities are either not identified or are not available within schedule and cost; staffing is clearly inadequate.

Table 5-2 Example of Project Assessment Guidance (continued)

Criteria	Project Assessment Metrics		
	Successful	Partially Successful	Unsuccessful
Adequacy of risk management approach and risk identification/mitigation per *NPR 8000.4*	The NASA continuous risk management paradigm is practiced. A knowledgeable risk manager has been assigned. A risk management plan exists and is followed; a risk database is being utilized to monitor, track, and communicate risks. Risks have been identified within the schedule with mitigation plans and are under configuration control. Reserves are adequate to manage risks. A full list of program or project risks—including title, description, mitigation plan, likelihood, and consequence—is delivered to support SRB schedule risk analysis, cost risk analysis, range estimate, and/or JCL. Uncertainty is mapped to cost and schedule.	The NASA continuous risk management paradigm is practiced. A risk manager has been assigned. A risk management plan exists, but risk identification and/or mitigation is incomplete; reserves may not be adequate to manage risks. Risk management plan implementation is incomplete or ineffective. A list of program or project risks—including title, description, mitigation plan, likelihood, and consequence—is delivered to support SRB preliminary schedule risk analysis, cost risk analysis, range estimate, and/or JCL. Uncertainty is mapped to cost and schedule.	A risk management plan does not exist or is incomplete; top risks have not been identified; not possible to determine adequacy of reserves to manage risks.

Acronyms: BOE = Basis Of Estimate, LCC = Life-Cycle Cost, IMS = Integrated Master Schedule, JCL = Joint Confidence Level, NPD = NASA Policy Directive, NPR = NASA Procedural Requirement, UFE = Unallocated Future Expenses, WBS = Work Breakdown Structure.

[1] A range estimate is required at Key Decision Point (KDP) B; a JCL is only required at KDP C or by special request by the Convening Authorities.

respond to issues defined in the previous LCR and identify important issues to be resolved before the next LCR.

5.1.3.2 Technical Assessments for Uncoupled or Loosely Coupled Programs

For uncoupled or loosely coupled programs, the SRB technical assessments are characterized by specific contents defined during the initial technical assessment for program approval. These are then periodically reexamined after program acquisition in status/implementation reviews performed as directed by the Decision Authority. These assessments are conducted at a less-detailed level of engineering than project reviews since they are performed at a higher level. This Program Plan should typically cover a decade to understand the program's strategy for pursuing Agency needs, goals, and objectives. Project conceptual definitions within the plan should be of sufficient detail to support technical and programmatic development plans within the program. The technical assessment also ensures that technology readiness level maturity is consistent with the Program Plan. Each assessment should respond to issues defined in the previous program review and identify important issues to be resolved before the next status review.

5.1.4 Adequacy of the Integrated Cost and Schedule Estimate and Funding Strategy in Accordance with *NPD 1000.5*

Five programmatic assessment approaches are in place for ensuring that cost and schedule estimates and funding strategies are adequately compliant with *NPD 1000.5, Policy for NASA Acquisition*. Each approach is described separately in the following subsections.

5.1.4.1 Independent Cost Analysis

The SRB uses the ICA approach to assess the adequacy of the budget and financial management practices to accomplish the work through the budget horizon. The ICA is comprehensive, qualitative, and broad in scope. The programmatic analysts assess the program or project programmatic data based on the planning information provided by the program or project.

An Independent Cost Analysis (ICA) is an independent analysis of program or project resources. The SRB uses the ICA approach to assess the adequacy of the budget and financial management practices to accomplish the work through the budget horizon. The ICA is comprehensive, qualitative, and broad in scope. The programmatic analysts assess the program or project programmatic data based on the planning information provided by the program or project. A combined uncertainty and risk analysis of the program or project cost estimate is used to support recommendations for the amount of funded schedule reserve the program or project should be carrying in its budget plan. The ICA includes the cost estimating uncertainty inherent to the development project estimating, the program's or project's identified risks possibly adjusted by the SRB, and new risks identified by the SRB. The ICA results are shared with the program or project prior to being finalized. When available, earned value management data are used to generate an independent cost analysis.

5.1.4.2 Benchmarking

Benchmarking is used to support the ICA by comparing the Program or Project Plan with actual historical data or independent estimates.

Benchmarking is used to support the ICA by comparing the Program or Project Plan with actual historical data or independent estimates. Benchmarks may be in the form of an analogy, which may be a similar program or project, system, subsystem, component, or activity with its actual cost and/or schedule to be used for comparison with the Program or Project Plan. Analogies are generally applicable throughout the program or project life cycle. Benchmarks may also be in the form of an independent cost estimate developed by a different methodology than the program or project for comparison with the Program or Project Plan. Independent cost estimates are typically produced when directed by the Convening Authorities, at Key Decision Point (KDP) B (Mission Definition Review (MDR), System Definition Review (SDR)) and KDP C (Preliminary Design Review (PDR)), but are also generated if warranted by special circumstances to support the review. The intent is to use benchmarking to help substantiate the program

or project estimate and/or budget, as well as identify areas of risk that may affect the Program or Project Plan.

5.1.4.3 Independent Schedule Assessment/Analysis and Schedule Risk Assessment per *NASA/SP-2010-3403*

Each program and project is expected to implement government best schedule practices as part of its responsibilities as outlined in *NASA/SP-2010-3403, NASA Schedule Management Handbook*. The NASA Schedule Test and Assessment Tool (STAT) is recommended as a basis for assessing the schedule to ensure it meets best practices. Schedule assessment is the process of determining schedule validity and performance at a given point in time. Periodic assessment is necessary to ensure that the Integrated Master Schedule (IMS) continues to generate valid data and support program or project objectives throughout the program's or project's life cycle. Schedule analysis is the process of evaluating the magnitude, impact, and significance of actual and forecast variances to the baseline and/or current schedules. A Schedule Risk Assessment (SRA) is an important analysis process that evaluates the likelihood that a project plan, reflected in the IMS, is achievable within the planned finish date constraints.

Schedule assessment is the process of determining schedule validity and performance at a given point in time.

Schedule analysis is the process of evaluating the magnitude, impact, and significance of actual and forecast variances to the baseline and/or current schedules. An SRA is an important analysis process that evaluates the likelihood that a project plan, reflected in the IMS, is achievable within the planned finish date constraints.

A program-level schedule assessment/analysis and SRA are performed from a portfolio viewpoint using the Program Plan to assess the viability of the program planning. It includes an assessment of the program's long-term alignment with sponsor goals and objectives. In tightly coupled programs, individual project schedules should be logically integrated into an IMS, allowing the SRB to assess the integrated effects across all projects and their impact on the program critical path. The independent schedule assessment will be shared with the program prior to being finalized.

A project-level schedule assessment/analysis and SRA focus on the detailed implementation plan for that specific project. Various scheduling and risk assessment data collections are used in performing the assessment.

The full membership of the SRB participates in schedule assessments. Using assessment data, the SRB can develop an understanding of the realism and completeness of the program or project schedule and risk areas, and identify where there may be inadequate phasing of available resources and resource availability. Additionally, the SRB will gain a better understanding of the risk impacts on primary, secondary, and tertiary critical paths and the relative probability of each.

The full membership of the SRB participates in schedule assessments. Using assessment data, the SRB can develop an understanding of the realism and completeness of the program or project schedule and risk areas, and identify where there may be inadequate phasing of available resources and resource availability.

5.1.4.4 Cost and Schedule Range Estimate Assessments

Tightly coupled and single-project programs (regardless of life-cycle cost) and projects that fall under the requirements of *NPR 7120.5* (Section 2) shall provide cost and schedule ranges at KDP 0/KDP B. Each range (with confidence levels identified for the low and high values of the range) is established by a probabilistic analysis and based on identified resources and associated uncertainties by fiscal year. Separate analyses of cost and schedule, each with associated confidence levels, meet the requirement. A joint cost and schedule Joint Confidence Level (JCL) is not required, but may be used at KDP 0/KDP B.

The SRB is responsible for evaluating the submitted program or project cost and schedule range estimates to determine the quality of the product and acceptability of the process used.

The SRB is responsible for evaluating the submitted program or project cost and schedule range estimates to determine the quality of the product and acceptability of the process used. The SRB will incorporate any inputs identified in the ICA and risk assessment into the program or project cost range and evaluate any impacts. The SRB will incorporate any inputs from the schedule assessment/analysis and SRA into the program or project schedule range estimate and evaluate any impacts.

5.1.4.5 Cost and Schedule Joint Confidence Level Assessments

Tightly coupled and single-project programs (regardless of life-cycle cost) and projects that fall under the requirements of *NPD 1000.5* and Section 2 of *NPR 7120.5* shall develop a cost- or resource-loaded schedule and perform a risk-informed probabilistic analysis that produces a JCL at KDP I/KDP C. A JCL is also required when the program or project is rebaselined. The JCL is the product of a probabilistic analysis of the coupled cost and schedule to measure the probability of completing remaining work on schedule and within budget levels, and on or before the planned completion of Phase D.

The SRB is responsible for analyzing the submitted program or project JCL to determine the quality of the product and acceptability of the process used.

The SRB is responsible for analyzing the submitted program or project JCL to determine the quality of the product and acceptability of the process used. The SRB will incorporate the inputs identified in the ICA, independent schedule assessment/analysis, and SRA into the program or project JCL and evaluate their impact.

5.1.5 Adequacy and Availability of Resources Other Than Budget

Resources other than budget are essential elements of successful program functionality and project implementation and operation. These resources include workforce, fabrication, assembly, test facilities and equipment, test beds, ground support equipment, launch sites, communication networks,

and mission operation centers. They can be either government or privately held resources.

The SRB is expected to assess the adequacy of the availability and capacity of these resources to meet the needs of the program or project throughout the life cycle. The SRB's assessment should consider not only the adequacy of the proposed and acquired resources, but also alternatives that might reduce cost or risk or improve the performance of associated life-cycle activities.

5.1.6 Adequacy of Risk Management Approach and Risk Identification/Mitigation

Each program or project is expected to execute a Risk Management Plan as part of its responsibilities. The Risk Management Plan is a plan for reducing risks in all mission execution domains (safety, technical, cost, and schedule) during all program or project phases. See *NPR 8000.4, Agency Risk Management Procedural Requirements* and *NASA/SP-2011-3422, NASA Risk Management Handbook* for further requirements and guidance on risk management and the *PM Handbook* for further guidance on addressing the expected maturity for each of these criteria. Program or project risk management entails two major processes: risk-informed decision making and Continuous Risk Management (CRM). The two processes are characterized as follows:

***NPR 7120.5* and the *PM Handbook* have specific maturity expectations for the programs' and projects' products and control plans for each LCR.**

- Risk-informed decision making concerns the use of risk information to assist in the decision process for key decisions, such as architecture and design decisions, make or buy decisions, source selection in major procurements, and budget reallocation (allocation of reserves), which typically involve requirements-setting or rebaselining of requirements. It is divided into three major tasks: (1) identification and screening of decision alternatives, (2) risk assessment of decision alternatives, and (3) risk-informed selection of the alternative to be implemented. As part of these tasks, risk assessment is used to evaluate the ability of each alternative to meet specified performance commitments within risk-tolerance limits set by the decision makers.

Risk-informed decision making concerns the use of risk information to assist in the decision process for key decisions.

- CRM entails the continuous management of risks to keep all performance risks within tolerable limits throughout all phases of Implementation. The six main steps of CRM are to (1) identify individual risks as they arise, (2) analyze their effects on performance risks, (3) plan responses, (4) track the risk drivers, (5) control the residual risks, and (6) communicate and document the results. CRM processes are applicable at any level of the program or project hierarchy where performance requirements are defined. The CRM processes at each level are focused on achieving the requirements defined at that level. CRM is a dynamic activity with new

CRM entails the continuous management of risks to keep all performance risks within tolerable limits throughout all phases of Implementation.

risk issues being added as existing risks are retired through prevention and mitigation responses.

Typical performance risks of interest to the SRB would include cost overruns, schedule slippage, safety mishaps, environmental impact, failure to achieve a needed scientific or technological objective, or failure to meet specified success criteria. During the life cycle, the program or project will maintain an integrated risk model that characterizes the performance of the program or project relative to requirements in these areas. The SRB is expected to assess the ability of the program or project risk management actions and plans to manage all significant threats to its success adequately.

In support of the independent programmatic analysis, the SRB will engage in discussion regarding the assessment of project risks and uncertainty starting at the SRB kick-off meeting or no later than site review start date minus 60 days. SRB members and consultants-to-the-board are encouraged to use time at the kick-off meeting to interface with the program or project regarding questions to any risks in their areas of expertise.

In support of the independent programmatic analysis, the SRB will engage in discussion regarding the assessment of project risks and uncertainty starting at the SRB kick-off meeting or no later than site review start date minus 60 days. SRB members and consultants-to-the-board are encouraged to use time at the kick-off meeting to interface with the program or project regarding questions to any risks in their areas of expertise.

A final risk review meeting will be held following the program or project final data delivery. SRB members are expected to provide their final risk and uncertainty assessment to the SRB independent programmatic analyses at that time. The programmatic analysis is to be completed prior to the site review; however, the analysts will engage with the SRB during caucus sessions at the site review to ensure that the most accurate assessment of project risks and uncertainty has been captured. If any changes to risk scoring or uncertainty ratings need to be reflected in the analysis, these changes will be made at the site review.

5.2 Maturity Matrices

NPR 7120.5 and the *PM Handbook* provide maturity matrices that are a key component to determining if the program or project is ready to enter the next life-cycle phase. The matrices in *NPR 7120.5* present the maturity expectations for the program's or project's control plans and milestone products for each LCR. The *PM Handbook* provides further elaboration on the expected maturity state by LCR and KDP broken down by each of the Agency's six assessment criteria. These matrices address each type of program and project (uncoupled and loosely coupled programs, tightly coupled programs, single-project programs, and projects). SRBs use these matrices to guide their assessment of program or project fulfillment of the Agency's six assessment criteria.

5.3 *NPR 7123.1* Entrance and Success Criteria

NPR 7123.1B Appendix G describes the required best practices for entrance and success criteria for the technical portion of the LCRs. The appendix lists each LCR separately and identifies the unique expectations for each review. The entrance criteria define the program's or project's expected technical maturity before the program or project can hold the review. The success criteria identify the level of technical maturity the program or project must have achieved before it can advance to the next development level. This assessment supports the Agency's technical assessment criterion described in Section 5.1.3.

NPR 7123.1 provides guidance on the temporal importance of each of the entrance and success criteria for each of the program or project LCRs. As an example, Appendix F of this handbook provides the success criteria mapped onto the six assessment criteria addressed in Section 5.1.

***NPR 7123.1* has the expected technical maturity for both the entrance and success criteria for both programs and projects for each LCR.**

5.4 Requests for Action, Findings, and Recommendations

5.4.1 Requests for Action

5.4.1.1 Program or Project Internal Reviews

While participating in any program or project internal reviews as observers, the SRB chair and members may submit a Request For Action (RFA) through a "sponsor"—that is, a member of the internal review board.

The RFA process used by the program or project must be a closed-loop process that provides tracking, disposition, and closure of the RFAs. The review chair of the Center's independent internal review team and the program's or project's representative typically discuss each RFA and reach agreement on its merit for official acceptance as an RFA. The RFA initiator must be in agreement with the response before the RFA is closed. The goal is to have all program or project internal review RFAs closed before the SRB's site review.

5.4.1.2 Life-Cycle Review Site Review

The RFA process must ensure that each RFA is tracked from submission to closure. The program or project is responsible for RFA tracking, closure (with the concurrence of the initiator), and status reporting.

Only SRB members can submit RFAs at the site review. SRB members submit RFAs if they believe a concern is not being addressed adequately and is unlikely to be resolved within the time-span of the review or more information is needed. The Review Manager collects all RFAs written during the site review and is responsible for reviewing them for clarity and scope. The SRB chair eliminates redundancies, rejects those that are out of scope, and requests rewrites if the intent or description is unclear. Before concluding the site review, the SRB and the program or project review the RFA list to determine which submittals are closed, rejected, accepted as actions, or accepted as advisory comments.

It is acceptable practice for an SRB member to sponsor an RFA submitted by an observer or expert consultant-to-the-board at the review if he/she believes that the subject matter is appropriate. The SRB member is accountable for that RFA upon submittal.

5.4.1.3 Site Review RFA Closure

The program or project provides a written response explaining how the RFA issue will be resolved. After reviewing the resolution, the author of the RFA determines whether the program or project response is satisfactory. The RFA author must endorse the resolution before the RFA is closed.

If a disagreement occurs between the SRB and the program or project regarding closure of an RFA, attempts to resolve differences at the SRB and program or project level are essential. If resolution of the RFA is unobtainable, information from the SRB and the program or project is elevated for resolution. Resolution escalates to successively higher levels of the governance structure until resolved.

5.4.2 Findings

A finding is a conclusion reached based on examination or investigation. During the site review, SRB members document their findings according to the SRB chair's guidance. A finding can be a strength or a weakness. Weaknesses include issues, concerns, and observations.

- **Strength.** A strength describes a feature of the program or project that in the judgment of the SRB is better than expected at a particular stage of the life cycle. It can also be an observed attribute from which the rest of the Agency could benefit.
- **Weakness (issue, concern, or observation).** Weaknesses constitute a threat to the future success of the program or project. If the weakness is judged to be a very significant threat, it is an issue. Weaknesses that are

less significant threats are concerns. Observations are findings that have little immediate threat, but are areas to which the SRB feels the program or project should be sensitive.

5.4.3 SRB Recommendation

The SRB's major conclusion is its determination of whether the program or project passed or failed the LCR assessment. The SRB provides a recommendation to the Convening Authorities to move the program or project into the next phase of development or hold it in the current phase. Additionally, the SRB offers any available recommendations for findings (issues and concerns) discovered during the review. If the SRB recommends that the program or project be passed with qualifications, it will explain the qualifications and rationale for advancing the program or project to the next development level. If the program or project does not pass, the SRB provides the reasons and rationale. The rationale should explain why the SRB has reservations, the significance of the reservations, and what corrective actions are recommended. It is not the responsibility of the SRB to determine if a delta review is necessary, but it may include this as part of its recommendation. The SRB will make a mitigation recommendation for each issue or concern that it brings forward to the Convening Authorities.

The SRB's major conclusion is its recommendation to the Convening Authorities.

The Decision Authority makes the final determination of whether a program or project has passed or failed the LCR and if it will be approved to progress to the next development phase.

5.5 SRB Member Product

SRB members provide the Review Manager and the SRB chair with individual written assessments. The Individual Member Independent Report (IMIR) and score card are the required format for the assessments. SRB members deliver a preliminary draft of the IMIR to the SRB chair prior to the SRB's post-site-review discussion. The final written IMIR is due 48 hours after this discussion.

Each SRB member and consultant-to-the-board documents his/her assessment in a written IMIR.

The IMIR content is the member's assessment of the program's or project's health and maturity relative to the LCR criteria. The IMIRs are used in reaching final SRB conclusions and archived as part of the Response, Recommendation, and Decision (RRD) package.

5.6 Snapshot Report Briefing

The snapshot report briefing takes place via a teleconference unless the Decision Authority requests otherwise. The Review Manager facilitates the discussion by briefly introducing the topic, the review milestone, and the key participants in the teleconference. The Review Manager introduces the senior manager who is chairing the meeting for any opening comments. The SRB chair is responsible for presenting the snapshot report. Section 4.4 discusses the snapshot report content. The program or project is given an opportunity to provide responses to the SRB's findings.

The SRB chair is responsible for presenting the snapshot report to the Decision Authority.

Upon completion of the briefing, the Review Manager prepares a summary of any actions assigned at the briefing. The actions are captured by the Review Manager and sent to the participants.

5.7 SRB Management Briefing Package

The SRB management briefing package is usually a Microsoft PowerPoint presentation, with annotated notes, that reports the SRB's assessment to the Convening Authorities. The SRB chair and the Review Manager develop the SRB management briefing package (with inputs from the SRB members) in compliance with established guidelines.

The final SRB product is the SRB management briefing package with annotated notes, including charts from the independent programmatic analysis.

This package follows the briefing sequence as described in Section 5.8. The SRB chair modifies the package as he/she deems appropriate based on feedback.

The SRB management briefing (including independent programmatic analysis charts) package, presented to the governing Program Management Council (PMC), is the SRB's final product.

5.8 Briefings

Briefings capture a summary of the LCR process and highlight SRB findings and recommendations. The briefings communicate the results of the review to the program or project and NASA management. The ToR identifies the reporting venues for each specific LCR.

5.8.1 Initial Debriefing to Program or Project

On the last day of the site visit, the SRB chair, with support from the SRB members and the Review Manager, orally briefs the program or project on

the SRB's high-level findings. The purpose of this briefing is to inform the program or project of the SRB findings regarding the program's or project's issues, concerns, and strengths and to ensure that the findings are based on accurate data. The program or project can respond to the findings if there is additional data that address a finding.

5.8.2 IPAO/OoE Quality Product Review (Dry Run)

The SRB chair and the Review Manager prepare the SRB management briefing package, coordinating with Programmatic Analysis Group analysts. The Independent Program Assessment Office/Office of Evaluation (IPAO/OoE) Quality Product Review is the initial dry run of the package. Its function is to ensure that the management briefing package has a clear and concise message and complies with Agency policies. Participants receive a copy of the package 24–48 hours prior to the briefing.

5.8.3 SRB Briefing to Program or Project and CMC

The SRB orally briefs its findings to the program or project and then, using the SRB Management Briefing package, briefs the management councils leading up to the appropriate governing PMC.

After the Quality Product Review, the SRB chair and the Review Manager send the updated SRB management briefing package by email to the program or project manager, the host Center Technical Authority, and the Program Executive. The program or project may send comments on the revised briefing package to the SRB chair and the Review Manager.

The management briefing date is coordinated by the host Center and the program or project. The Center Management Council (CMC) briefing includes the program or project responses to the SRB findings and the SRB recommendations on passing the program or project into the next life-cycle phase; and responses to all SRB recommendations, including those proposed to mitigate issues and concerns. The SRB briefing is presented by the SRB chair to the CMC or to an integrated CMC if multiple Centers are involved with the program or project.

5.8.4 SRB Briefing to the DPMC

The highest reporting level for Category 1 and 2 projects at non-KDP LCRs is the Directorate Program Management Council (DPMC). The timelines and procedures for the reporting of these projects' LCRs should be similar in nature to those for Category 1 projects. (See Section 5.8.5.)

The SRB chair typically provides an overall pass/fail recommendation at the DPMC. If the DPMC is the governing PMC, this briefing should occur within 30 days of the review.

5.8.5 SRB Briefing to the APMC

All Category 1 and program reviews are briefed to the Agency Program Management Council (APMC); however, the NASA Associate Administrator and the APMC reserve the right to request briefings on any project review. The briefing occurs within 30 days of the conclusion of the site review or at the next regularly scheduled APMC thereafter.

The SRB management briefing package (including programmatic input) will be delivered in coordination with the APMC Executive prior to the APMC. The presentation is a coordinated effort between the program or project manager and the SRB chair. If required by the Decision Authority, a prebrief is conducted and coordinated with the APMC Executive.

5.9 KDP Decision Memorandum

The Decision Authority's key decisions are summarized and recorded in the Decision Memorandum, signed at the conclusion of the governing PMC. More description of the Decision Memorandum is found in *NPR 7120.5* and the *PM Handbook*. The Review Manager coordinates the OoE review of the Decision Memorandum prior to the governing PMC.

5.10 Customer Surveys

For Agency-level review, customer feedback helps to monitor and improve the SRB process. Surveys fall under specific customer categories: Convening Authorities, SRB members, and Agency customers. Surveys are requested after every LCR conducted by the SRB. This allows the IPAO to capture statistics and metrics over many reviews. The survey questions preserve the anonymity of the respondent.

At the conclusion of an LCR, the Review Manager will send the survey information via email to the SRB members and Agency customers. Convening Authorities receive surveys at the discretion of IPAO management, but no less than once per fiscal year.

5.11 RRD Package

For Agency-level review, RRD packages are the official record of the LCRs conducted by the SRBs and kept by the IPAO. The Review Manager will prepare an RRD package that documents the total LCR. This is a summary package of existing LCR materials. The IPAO retains RRDs in an archive library for historical reference.

Appendices

A Definitions

Acceptable Risk. The risk that is understood and agreed to by the program or project, governing PMC, Mission Directorate, and other customer(s) such that no further specific mitigating action is required. (Some mitigating actions might have already occurred.)

Acquisition. The process for obtaining the systems, research, services, construction, and supplies that NASA needs to fulfill its missions. Acquisition, which may include procurement (contracting for products and services) and begins with an idea or proposal that aligns with the NASA Strategic Plan and fulfills an identified need and ends with the completion of the program or project or the final disposition of the product or service.

Acquisition Strategy Meeting. A forum where senior Agency management reviews major acquisitions in programs and projects before authorizing significant budget expenditures. The ASM is held at the Mission Directorate/Mission Support Office level, implementing the decisions that flow out of the earlier Agency acquisition strategy planning. The ASM is typically held early in Formulation, but the timing is determined by the Mission Directorate. The ASM focuses on considerations, such as impacting the Agency workforce, maintaining core capabilities and make-or-buy planning, and supporting Center assignments and potential partners.

Agency Baseline Commitment (ABC). Establishes and documents an integrated set of project requirements, cost, schedule, technical content, and an agreed-to JCL that forms the basis for NASA's commitment with the external entities of Office of Management and Budget (OMB) and Congress. Only one official baseline exists for a NASA program or project and it is the ABC.

Agency Program Management Council (APMC). The senior management group, chaired by the NASA AA or designee, responsible for reviewing Formulation performance, recommending approval, and overseeing

implementation of programs and Category 1 projects according to Agency commitments, priorities, and policies.

Alternate Opinion. A disagreement with a recommendation or action resulting from a NC board that is based on a sound rationale (not on unyielding opposition) that an individual judges is of sufficient importance that it warrants a specific review and decision by higher-level management and the individual specifically requests that the alternate view be recorded and resolved by the Dissenting Opinion process.

Approval. Authorization by a required management official to proceed with a proposed course of action. Approvals must be documented.

Approval (for Implementation). The acknowledgment by the Convening Authority that the program or project has met stakeholder expectations and formulation requirements, and is ready to proceed to implementation. By approving a program or project, the Decision Authority commits the budget resources necessary to continue into implementation. Approval (for Implementation) must be documented.

Architecture. A term used to describe the structure and content of a NASA program. It is not to be confused with program roadmap, which describes how/when program architecture, is executed.

Baseline (general context). An agreed-to set of requirements, cost, schedule, designs, documents, etc. that will have changes controlled through a formal approval and monitoring process.

Baseline Design. The mission design of a project, when it is sufficiently mature to comply with all requirements, has an implementation and operational schedule, and is consistent with approved/planned funding; within the project life cycle; the baseline design is expected at or shortly before the end of the formulation phase, i.e., in time for a PDR.

Baseline Performance Review. A monthly Agency-level independent assessment to inform senior leadership of performance and progress toward the Agency's mission and program or project performance. The monthly meeting encompasses a review of crosscutting mission support issues and all NASA mission areas.

Basis Of Estimate (BOE). The documentation of the ground rules, assumptions, and drivers used in developing the cost and schedule estimates, including applicable model inputs, rationale or justification for analogies, and details supporting cost and schedule estimates. The basis of estimate is contained in material available to the SRB and management as part of the LCR and KDP process.

Budget. A financial plan that provides a formal estimate of future revenues and obligations for a definite period of time for approved programs, projects, and activities. (See *NPR 9420.1* and *NPR 9470.1* for other related financial management terms and definitions.)

Categorization. A means of establishing Agency expectations of PMs relative to oversight council and planning detail; projects are either Category 1, 2, or 3, with Category 1 receiving the highest level of scrutiny. (See Section 2.1.4 of *NPR 7120.5E* for a full explanation.)

Center Management Council (CMC). The council at a Center that performs oversight of programs and projects by evaluating all program or project work executed at that Center.

Concern. A minor weakness or deficiency that is substantial enough to be worthy of note and brought to the attention of the project for mitigation consideration, but is not a discriminator in and of itself that affects the ability of the project to be successful.

Concurrence. A documented agreement by a management official that a proposed course of action is acceptable.

Confidence Level. A probabilistic assessment of the level of confidence of achieving a specific goal.

Configuration Management. A management discipline applied over the product's life cycle to provide visibility into and to control changes to performance, functional, and physical characteristics.

Conflict of Interest. A conflict of interest involves the abuse—actual, apparent, or potential—of the trust that NASA has in its personnel. A conflict of interest is a situation in which financial or other personal considerations have the potential to compromise or bias professional judgment and objectivity. An apparent conflict of interest is one in which a reasonable person would think that the individual's judgment is likely to be compromised. A potential conflict of interest involves a situation that may develop into an actual conflict of interest. A conflict of interest exists whether or not decisions are affected by a personal interest; a conflict of interest implies only the potential for bias, not likelihood.

Continuous Risk Management (CRM). A systematic and iterative process that efficiently identifies, analyzes, plans, tracks, controls, communicates, and documents risks associated with implementation of designs, plans, and processes.

Convening Authority. The management official(s) responsible for convening a program or project review; establishing the Terms of Reference, including

review objectives and success criteria; appointing the SRB chair; and concurring in SRB membership. These officials receive the documented results of the review.

Cost Analysis Data Requirement. A formal document designed to help managers understand the cost and cost risk of space flight projects. The Cost Analysis Data Requirement (CADRe) consists of a Part A "Narrative" and a Part B "Technical Data" in tabular form, both provided by the program or project or Cost Analysis Division. In addition, the project team produces the project life-cycle cost estimate, schedule, and risk identification, which is appended as Part C.

Critical Path. A sequential path of tasks in a network schedule that represents the longest overall duration from "time-now" through project completion. Any slippage of the tasks in the critical path will increase the project duration.

Critical Path Analysis. Analysis of the schedule critical path determines how long the project will take and where to best focus project management efforts so that the project will complete on time. It provides insight into which activities may need to be compressed to keep the schedule on track. It also provides insight into which activities have slack and can be delayed without impacting the project completion date. Critical path analysis requires constant review of the validity of the tasks, durations and logical relationships that are on the primary critical path, and secondary paths. Changes made to durations and or logical relations may shorten the critical path and prevent the project from slipping.

Decision Authority (program and project context). The individual authorized by the Agency to make important decisions on programs and projects under this or her authority.

Decision Memorandum. The document that summarizes the decisions made at KDPs or as necessary in between KDPs. The decision memorandum includes the Agency Baseline Commitment (if applicable), Management Agreement cost and schedule, UFE, and schedule margin managed above the project, as well as life-cycle cost and schedule estimates, as required.

Dissenting Opinion. A Dissenting Opinion is a disagreement with a decision or action that is based on a sound rationale (not on unyielding opposition) that an individual judges is of sufficient importance that it warrants a specific review and decision by higher level management, and the individual specifically requests that the dissent be recorded and resolved by the Dissenting Opinion process.

Earned Value Management. A tool for measuring and assessing project performance through the integration of technical scope with schedule and cost objectives during the execution of the project. EVM provides quantification of technical progress, enabling management to gain insight into project status and project completion costs and schedules. Two essential characteristics of successful EVM are EVM system data integrity and carefully targeted monthly EVM data analyses (e.g., identification of risky WBS elements).

Earned Value Management System. An integrated management system and its related subsystems that allow for planning all work scope to completion, assignment of authority and responsibility at the work performance level, integration of the cost, schedule, and technical aspects of the work into a detailed baseline plan, objective measurement of progress (earned value) at the work performance level, accumulation and assignment of actual costs, analysis of variances from plans, summarization and reporting of performance data to higher levels of management for action, forecast of achievement of milestones and completion of events, forecast of final costs, and disciplined baseline maintenance and incorporation of baseline revisions in a timely manner.

Entrance Criteria. The readiness requirements imposed by *NPR 7123.1* on program or project for all LCRs; these criteria are used as a helpful reminder by program or project as they prepare for each LCR.

Evaluation. The continual self- and independent assessment of the performance of a program or project and incorporation of the evaluation findings to ensure adequacy of planning and execution according to plans.

Final (document context). Implies the expectation of a finished product. All approvals required by Center policies and procedures have been obtained.

Finding. A conclusion reached by the SRB based on examination or investigation; a finding can be a concern, issue, observation, or strength.

Formulation. The identification of how the program or project supports the Agency's strategic goals; the assessment of feasibility, technology and concepts; risk assessment, team building, development of operations concepts and acquisition strategies; establishment of high-level requirements and success criteria; the preparation of plans, budgets, and schedules essential to the success of a program or project; and the establishment of control systems to ensure performance to those plans and alignment with current Agency strategies.

Formulation Authorization Document. The document issued by the MDAA to authorize the formulation of a program whose goals will fulfill

part of the Agency's Strategic Plan and Mission Directorate strategies and establish the expectations and constraints for activity in the Formulation Phase. In addition, a Formulation Authorization Document (FAD), or equivalent, is used to authorize the formulation of a project.

Funding (budget authority). The authority provided by law to incur financial obligations that will result in expenditures. There are four basic forms of budget authority, but only two are applicable to NASA: appropriations and spending authority from offsetting collections (reimbursables and working capital funds). Budget authority is provided or delegated to programs and projects through the Agency's funds distribution process.

Governance. The combination of processes and structures implemented by NASA in order to inform, direct, manage and monitor the activities of the organization toward the achievement of its objectives.

Host Center. The Center with defined responsibility for a program or project at the Acquisition Strategy Planning (ASP) meeting and documented in the FAD.

Implementation. The execution of approved plans for the development and operation of the program or project, and the use of control systems to ensure performance to approved plans and continued alignment with the Agency's goals.

Independence. Unbiased and outside the management chain of the program or project. The freedom from conditions that threaten objectivity or the appearance of objectivity. Such threats to objectivity must be managed at the individual reviewer and organizational levels.

Independent Assessment(s) (includes reviews, evaluations, audits, analysis oversight, investigations). Assessments are independent to the extent the involved personnel apply their expertise impartially, without any conflict of interest or inappropriate interference or influence, particularly from the organization(s) being assessed.

Independent Cost Analysis. An independent analysis of program or project resources (including budget) and financial management associated with the program or project content over the program's budget horizon, conducted by an impartial body independent from the management of the program or project. ICA includes, but is not limited to, the assessment of cost estimates, budgets, and schedules in relation to a program or project and a program's constituent Projects' technical content, performance, and risk. ICAs may include ICE, assessment of resource management, distribution, and planning, and verification of cost-estimating methodologies. (ICAs are not LCCEs, but are assessments of the adequacy of the budget and management

practices to accomplish the work scope through the budget horizon. As such, ICAs can be performed for program or project when a life-cycle ICE is not warranted.).

Independent Cost Estimate (ICE). An independent program or project cost estimate prepared by an office or other entity that is not under the supervision, direction, or control of the program or project (or its chain of command) that is responsible for carrying out the development or acquisition of the program or project. An ICE is bound by the program or project scope (total life cycle through all phases), schedule, technical content, risk, ground rules, and assumptions and is conducted with objectivity and the preservation of integrity of the cost estimate. ICEs are generally developed using parametric approaches that are tailored to reflect the design, development state, difficulty, and expertise of team members.

Integrated Master Schedule. A logic network-based schedule that reflects the total project scope of work, traceable to the WBS, as discrete and measurable tasks/milestones and supporting elements that are time phased through the use of valid durations based on available or projected resources and well-defined interdependencies.

Independent Schedule Assessment. An independent program or project schedule assessment prepared by an office or other entity that is not under the supervision, direction, or control of the program or project (or its chain of command) that is responsible for carrying out the development or acquisition of the program or project that includes a schedule health and quality check, a schedule analysis and a probabilistic schedule risk assessment.

Issue. A deficiency or set of deficiencies taken together that are judged to substantially affect the ability of the project to meet their requirements within the planned cost and schedule. A set of deficiencies may be multiple concerns that taken together create a major weakness. Issues can be found against the project or against other organizations that affect the ability of the project to be successful. A major, significant weakness is an issue.

Joint Cost and Schedule Confidence Level. (1) The probability that cost will be equal to or less than the targeted cost and schedule will be equal to or less than the targeted schedule date. (2) A process and product that helps inform management of the likelihood of a project's programmatic success. (3) A process that combines a project's cost, schedule, and risk into a complete picture. JCL is not a specific methodology (e.g., resource-loaded schedule) or a product from a specific tool. The JCL calculation includes consideration of the risk associated with all elements, regardless of whether or not they are funded from appropriations or managed outside of the project. JCL calcula-

tions include the period from KDP C through the hand over to operations, i.e., end of the on-orbit checkout.

Key Decision Point (KDP). The event at which the Decision Authority determines the readiness of a program or project to progress to the next phase of the life cycle (or to the next KDP).

Life-Cycle Cost (LCC). The total of the direct, indirect, recurring, nonrecurring, and other related expenses both incurred and estimated to be incurred in the design, development, verification, production, deployment, prime mission operation, maintenance, support, and disposal of a project, including closeout, but not extended operations. The LCC of a project or system can also be defined as the total cost of ownership over the project or system's planned life cycle from Formulation (excluding Pre-Phase A) through Implementation (excluding extended operations). The LCC includes the cost of the launch vehicle.

Life-Cycle Phase. The life cycle of NASA program or project is divided into phases, each of which defines the activities/achievements to be accomplished before proceeding to the next phase; at the highest level, there are two phases for both programs and projects: the formulation phase, followed by the implementation phase. For programs the formulation phase entails pre-program acquisition, while the implementation phase involves program acquisition and operations; for projects the formulation phase entails pre-systems acquisition (Phases A and B), and the implementation phase involves system acquisition (Phases C and D), operations (Phase E), and decommissioning (Phase F).

Life-Cycle Review. A review of a program or project designed to provide a periodic assessment of the technical and programmatic status and health of a program or project at a key point in the life cycle, e.g., PDR, Critical Design Review (CDR). Certain LCRs provide the basis for the Decision Authority to approve or disapprove the transition of a program or project at a KDP to the next life-cycle phase.

Management Agreement. Within the Decision Memorandum, the parameters and authorities over which the program or project manager has management control constitute the program or project Management Agreement. A program or project manager has the authority to manage within the Management Agreement and is accountable for compliance with the terms of the agreement.

Margin. The allowances carried in budget, projected schedules, and technical performance parameters (e.g., weight, power, or memory) to account for uncertainties and risks. Margins are allocated in the formulation

process, based on assessments of risks, and are typically consumed as the program or project proceeds through the life cycle.

Metric. A measurement taken over a period of time that communicates vital information about the status or performance of a system, process, or activity.

Mission. A major activity required to accomplish an Agency goal or to effectively pursue a scientific, technological, or engineering opportunity directly related to an Agency goal. Mission needs are independent of any particular system or technological solution.

Mission Directorate Program Management Council (MDPMC). The forum that evaluates all programs and projects executed within that Mission Directorate and provides input to the MDAA. For programs and Category 1 projects, the MDAA carries forward the MDPMC findings and recommendations to the APMC.

Observation. A finding that is not substantial enough to be considered as a concern, but has the potential to become a concern.

P/p. Program/project.

Preliminary (document context). Implies that the product has received initial review in accordance with Center best practices. The content is considered correct, though some TBDs may remain. All approvals required by Center policies and procedures have been obtained. Major changes are expected.

Program. A strategic investment by a Mission Directorate or MSO that has a defined architecture and/or technical approach, requirements, goals, objectives, funding level, and a management structure that initiates and directs one or more projects. A program defines a strategic direction that the Agency has identified as critical.

Program Commitment Agreement. The contract between the AA and the responsible MDAA that authorizes transition from Formulation to Implementation of a program.

Program/Project Management Requirements. Requirements that focus on how NASA and Centers perform program and project management activities.

Program Plan. The document that establishes the program's baseline for implementation, signed by the MDAA, Center Director(s), and program manager.

Program (Project) Team. All participants in program or project Formulation and Implementation. This includes all direct reports and others that support meeting program or project responsibilities.

Programmatic Authority. Programmatic Authority includes the Mission Directorates and their respective program or project managers. Individuals in these organizations are the official voices for their respective areas. Programmatic Authority sets, oversees, and ensures conformance to applicable programmatic requirements.

Programmatic Requirements. Requirements set by the Mission Directorate, program or project, and Principal Investigator, if applicable. These include strategic scientific and exploration requirements, system performance requirements, and schedule, cost, and similar non-technical constraints.

Project. A specific investment identified in a Program Plan having defined requirements, a life-cycle cost, a beginning, and an end. A project also has a management structure and may have interfaces to other projects, agencies, and international partners. A project yields new or revised products that directly address NASA's strategic goals.

Project Plan. The document that establishes the project's baseline for implementation, signed by the responsible program manager, Center Director, project manager, and the MDAA, if required.

Rebaselining. The process that results in a change to a project's ABC.

Request For Action (RFA). A formal written request from the SRB that asks for additional information from, or action by, the program or project team.

Residual Risk. The remaining risk that exists after all mitigation actions have been implemented or exhausted in accordance with the risk management process. (See *NPD 8700.1.*)

Review Manager. The Review Manager has the responsibility to ensure the objectivity, quality, integrity, and consistency of each assigned independent review and will: define the scope of the review (with the Convening Authorities); facilitate the identification and approval of the chair and team members; participate on the SRB as an authority in the programmatic aspects (compliance to *NPR 7120.5* and generally accepted rules of good project management, cost, schedule, and risk), and in specific technical areas, if appropriate; facilitate the review process; ensure that the scope of the review is fully exercised; and be accountable for ensuring that the results of the review have been properly vetted, documented and reported.

Risk. In the context of mission execution, risk is *operationally* defined as a set of triplets: (1) The *scenario(s)* leading to degraded performance with

respect to one or more performance measures (e.g., scenarios leading to injury, fatality, destruction of key assets; scenarios leading to exceedance of mass limits; scenarios leading to cost overruns; scenarios leading to schedule slippage); (2) the *likelihood(s)* (qualitative or quantitative) of those scenarios; and (3) the *consequence(s)* (qualitative or quantitative severity of the performance degradation) that would result if those scenarios were to occur. Uncertainties are included in the evaluation of likelihoods and consequences. (See *NPR 8000.4, Agency Risk Management Procedural Requirements*.)

Risk Assessment. An evaluation of a risk item that determines: (1) what can go wrong, (2) how likely is it to occur, (3) what the consequences are, (4) what the uncertainties are that are associated with the likelihood and consequences, and (5) what the mitigation plans are.

Risk-Informed Decision Making. A risk-informed, decision-making process uses a diverse set of performance measures (some of which are model-based risk metrics) along with other considerations within a deliberative process to inform decision making.

Risk Management. Risk management includes risk-informed decision making (RIDM) and CRM in an integrated framework. RIDM informs systems engineering decisions through better use of risk and uncertainty information in selecting alternatives and establishing baseline requirements. CRM manages risks over the course of the development and the Implementation Phase of the life cycle to ensure that safety, technical, cost, and schedule requirements are met. This is done to foster proactive risk management, to better inform decision making through better use of risk information, and then to more effectively manage Implementation risks by focusing the CRM process on the baseline performance requirements emerging from the RIDM process. (See *NPR 8000.4, Agency Risk Management Procedural Requirements*.) These processes are applied at a level of rigor commensurate with the complexity, cost, and criticality of the program.

Signature. A distinctive mark, characteristic, or thing that indicates identity; one's name as written by oneself.

Stakeholder. An individual or organization outside a specific program or project having an interest (or stake) in the outcome or deliverable of a program or project.

Standards. NASA Standards are formal documents that establish a norm, requirement, or basis for comparison, a reference point to against which measure or evaluate. A technical standard, for example, establishes uniform

engineering or technical criteria, methods, processes, and practices. (Refer to *NPR 7120.10, Technical Standards for NASA Programs and Projects*.)

Standing Review Board (SRB). The board responsible for conducting independent reviews (life cycle and special) of a program or project and providing objective, expert judgments to the Convening Authorities. The reviews are conducted in accordance with an approved ToR (See ToR Template, Appendix H) and per the entrance and success criteria in 7123.1, the maturity matrices in the *PM Handbook*, and the life-cycle requirements in *NPR 7120.5*.

Strength. A finding that describes a feature of the program or project that in the judgment of the SRB is better than expected at a particular stage of the life cycle. It can also be an observed attribute from which the rest of the Agency could benefit.

Success Criteria. That portion of the top-level requirements that defines what must be achieved to satisfy NASA Strategic Plan objectives addressed by the program or project.

System. The combination of elements that function together to produce the capability required to meet a need. The elements include all hardware, software, equipment, facilities, personnel, processes, and procedures needed for this purpose.

Systems Engineering. A disciplined approach for the definition, implementation, integration, and operation of a system (product or service). The emphasis is on achieving stakeholder functional, physical, and operational performance requirements in the intended use environments over its planned life within cost and schedule constraints. Systems engineering includes the engineering processes and technical management processes that consider the interface relationships across all elements of the system, other systems, or as a part of a larger system.

Technical Authority. Part of NASA's system of checks and balances that provides independent oversight of programs and projects in support of safety and mission success through the selection of individuals at delegated levels of authority. These individuals are the Technical Authorities. Technical authority delegations are formal and traceable to the Administrator. Individuals with Technical Authority are funded independently of a program or project.

Technical Authority Requirements. Requirements invoked by OCE, OSMA, and OCHMO documents (e.g., NPRs or technical standards cited as program or project requirements) or contained in Center institutional docu-

ments. These requirements are the responsibility of the office or organization that established the requirement unless delegated elsewhere.

Terms of Reference. A document specifying the nature, scope, schedule, and ground rules for an independent review or independent assessment. (See ToR Template, Appendix H.)

Unallocated Future Expenses. The portion of estimated cost required to meet specified confidence level that cannot yet be allocated to the specific project WBS sub-elements because the estimate includes probabilistic risks and specific needs that are not known until these risks are realized.

Uncertainty. An imperfect state of knowledge or a physical variability resulting from a variety of factors, including, but not limited to, lack of knowledge, applicability of information, physical variation, randomness or stochastic behavior, indeterminacy, judgment, and approximation. Also defined as a situation in which the outcome is subject to an uncontrollable event stemming from an UNKNOWN probability distribution. Schedule uncertainty is due to inaccurate estimates from overestimating or underestimating durations (often referred to as uncertainty), changing or unaddressed scope, task definition changes, and late deliveries.

Validation. Proof that the product accomplishes the intended purpose based on stakeholder expectations. May be determined by a combination of test, analysis, demonstration, and inspection. (Answers the question, "Am I building the right product?")

Verification. Proof of compliance with design solution specifications and descriptive documents. May be determined by a combination of test, analysis, demonstration, and inspection. (Answers the question, "Did I build the product right?")

Waiver. A documented authorization releasing a program or project from meeting a requirement after the requirement is put under configuration control at the level the requirement will be implemented.

Work Breakdown Structure (WBS). A product-oriented hierarchical division of the hardware, software, services, and data required to produce the program's or project's end product(s), structured according to the way the work will be performed and reflective of the way in which program's or project's costs, schedule, technical, and risk data are to be accumulated, summarized, and reported.

B Acronyms

AA	Associate Administrator
ABC	Agency Baseline Commitment
APL	Advanced Physics Laboratory
APMC	Agency Program Management Council
BOE	Basis of Estimate
CA	Convening Authority
CADRe	Cost Analysis Data Requirement
CDR	Critical Design Review
CERR	Critical Events Readiness Review
CFR	Code of Federal Regulations
CMC	Center Management Council
CO	Contracting Officer
COI	Conflict of Interest
CRM	Continuous Risk Management
CS	Civil Service Consensus Board
CS2	Civil Service Consensus Board with expert support
DA	Decision Authority
DPMC	Division Program Management Council
EAG	Evaluation and Assessment Group
EVM	Earned Value Management
FAD	Formulation Authorization Document
FAR	Federal Acquisition Regulation
FRR	Flight Readiness Review
ICA	Independent Cost Analysis
ICE	Independent Cost Estimate
IMIR	Individual Member Independent Report
IMS	Integrated Master Schedule
IPA	Independent Programmatic Analysis
IPAO	Independent Program Assessment Office
JCL	Joint Confidence Level
JPL	Jet Propulsion Laboratory

KDP	Key Decision Point
LaRC	Langley Research Center
LCC	Life-Cycle Cost
LCCE	Life-Cycle Cost Estimate
LCR	Life-Cycle Review
MD	Mission Directorate
MDAA	Mission Directorate Associate Administrator
MDR	Mission Definition Review
MEL	Master Equipment List
MRB	Mission Readiness Briefing
MRR	Mission Readiness Review
MSO	Mission Support Office
NASA	National Aeronautics and Space Administration
NC	Non-Consensus Board
NDA	Non-Disclosure Agreement
NESC	NASA Engineering and Safety Center
NPD	NASA Policy Directive
NPR	NASA Procedural Requirement
NSC	NASA Safety Center
NSCKN	NASA Safety Center Knowledge Now
OCC	Office of Chief Counsel
OCE	Office of the Chief Engineer
OCHMO	Office of the Chief Health and Medical Officer
OCI	Organizational Conflict of Interest
OGC	Office of the General Counsel
OGE	Office of Government Ethics
OMB	Office of Management and Budget
OoE	Office of Evaluation
ORR	Operational Readiness Review
OSMA	Office of Safety & Mission Assurance
PAG	Programmatic Analysis Group
PAR	Program Approval Review
PCI	Personal Conflict of Interest
PCOI	Positional Conflict of Interest
PDR	Preliminary Design Review
PE	Program Executive
PEL	Power Estimate List
PIMS	Program Integrated Master Schedule
PIR	Program Implementation Review
PLAR	Post-Launch Assessment Review
PM	Program or Project Manager
PMC	Program Management Council
POC	Point of Contact

PPBE	Planning, Programming, Budgeting, and Execution
PP&C	Program/project Planning and Control
PRM	Principal Review Manager
RFA	Request For Action
RIDM	Risk Informed Decision Making
RMP	Risk Management Plan
RRD	Response, Recommendation, and Decision
S&MA	Safety & Mission Assurance
SBU	Sensitive But Unclassified
SDR	System Definition Review
SF	Standard Form
SID	Strategic Investments Division
SIR	System Integration Review
SMSR	Safety and Mission Success Review
SRA	Schedule Risk Analysis
SRB	Standing Review Board
SRD	System Requirements Document
SRR	System Requirements Review
STAT	Schedule Test and Assessment Tool
TBD	To Be Determined
ToR	Terms of Reference
TRL	Technology Readiness Level
UFE	Unallocated Future Expenses
WBS	Work Breakdown Structure

C NASA Policy on SRB

This appendix presents the NASA Policy on Standing Review Board Composition, Balance, and Conflicts of Interest dated December 2008.

This Policy has been implemented since December 2008, and was issued with the Standing Review Board Handbook*, dated November 2009.*

The National Aeronautics and Space Administration

POLICY ON
STANDING REVIEW BOARD (SRB)
COMPOSITION, BALANCE, AND **CONFLICTS OF INTEREST**

December 2008[1]

Introduction

The National Aeronautics and Space Administration (NASA) accords special importance to the policies and procedures established to assure the integrity of Standing Review Board (SRB) reports. The work of the SRBs are largely done by persons drawn from every part of the nation and from every sector of society—academia, industry, government, and nonprofit. The technical skills and perspectives of these individuals are essential to the ability of NASA to consistently produce accurate and objective assessments of NASA programs and projects.

Extensive efforts are made by NASA to assure the soundness of reports by selecting highly qualified SRB members. Yet, if a report is to be not only sound, but also effective, the report also must be, and must be perceived to be, the result of a process that is generally free of bias and fairly balanced in terms of the knowledge, experience, and perspectives utilized to produce it.

Questions of SRB Composition and Balance

All individuals selected to serve on SRBs must be highly qualified in terms of knowledge, training, and experience—often highly specialized and particularized—to address the tasks assigned to the SRB properly. NASA identifies such individuals by drawing upon a network of national resources. Suggestions of potential SRB members come from the SRB Convening Authorities (CAs) and their staffs, from groups that have an interest in the underlying subject matter of a particular study and from other professionals with knowledge and expertise in relevant disciplines who have an interest in the programs and projects to be addressed.

Individual qualifications are not the only determinant in this process. Having an SRB of highly qualified and capable individuals is necessary, but is not the only element necessary for successful reviews. When considering SRB membership, a well-rounded, diverse set of backgrounds can provide the most versatile perspective of opinions. Members should be selected both from within the Agency and from external sources, including such communities as private industry, academia, and other government agencies, including the Department of Defense (DoD). When looking internal to the Agency, various NASA Centers and cross-mission opportunities, e.g., robotic versus human project expertise, can add unique insights. Therefore, the knowledge, experience, and perspectives of potential SRB members must be thoughtfully and carefully assessed and balanced in terms of the subtleties and complexities of the particular scientific, technical, and other issues to be addressed and the functions to be performed by the SRB. Diversity and balance of knowledge, design/development experience and organizational experience ensures the greatest opportunity to provide an independent perspective. These factors should be taken into consideration when making recommendations for SRB membership.

[1] This Policy has been implemented since December 2008 and it is being issued with the Standing Review Board Handbook, dated November 2009.

Questions of Conflict of Interest

The work of SRBs cannot be compromised by issues of bias and lack of objectivity. In most cases these issues are caused by various forms of conflicts of interest that individual SRB members may have. For purposes of this policy, "conflict of interest" means any financial or other interest which conflicts with the individual's service on an SRB because it (1) could significantly impair the individual's objectivity or (2) could create an unfair competitive advantage for any person or organization. This policy involves two different types of conflicts. The first type of conflict, known as an organizational conflict of interest, is based upon the interests of the individual's employer. The second type of conflict, known as personal conflicts of interest, is based upon the personal interests of the individual. No individual that has a conflict of interest that is significant enough, as determined by NASA, to likely impair their judgment, relative to the functions to be performed, can be appointed to serve (or continue to serve) on an SRB. In some cases, such as unique expertise, it may be in the best interest of the government to approve potential SRB members despite the presence of conflicts of interest. This policy describes the process that must be followed when this occurs.

General Principles: Organizational Conflicts of Interest

Organizational conflicts of interest (OCI) concern the interests of the contractor for whom the individual being considered for service on an SRB, works. Subpart 9.5 of the FAR contains guidance on OCIs which the agency must follow any time the agency uses a contract to obtain the services of an individual for an SRB. The regulations on OCI involve the two principles: preventing the existence of conflicting roles that might bias a contractor's judgment where a contractor may be a position to favor its own capabilities; and preventing unfair competitive advantage. There are three types of organizational conflicts of interest that emerge from these principles.

- "Unfair access to data" occurs when a contractor has access to nonpublic information as part of its performance and that information may provide the firm an unfair competitive advantage in a later competition for a government contract. The principle of unfair competition is involved in this conflict. An example of this conflict involves an SRB member having access to proprietary data that could give its employer an unfair competitive advantage in future competitions.
- "Biased ground rules" occurs when a contractor has the opportunity to skew a competition, whether intentionally or not, in favor of itself. The principles of unfair competition and bias are involved in this conflict. This conflict includes the interest of affiliates. An example of this conflict occurs when an SRB has substantial influence over a statement of work for a future competition when a member of that SRB intends to propose on the future competition.
- "Impaired objectivity" involves conflicting roles that might bias a contractor's judgment. This conflict contains two elements – the use of subjective judgment by the contractor and whether a contractor has a financial interest in the outcome of its performance. This conflict includes the interest of affiliates. The principle of bias is involved in this conflict. An example of this conflict occurs when an SRB member evaluates the work of its employer or of a competitor of its employer.

Strategies to avoid, neutralize, or mitigate conflicts can be addressed in a formal avoidance/mitigation plan submitted by the contractor when required by contract. In accordance with the FAR and NFS, if the contracting officer determines that a certain contractor presents an OCI that cannot be effectively avoided, neutralized or mitigated, individuals cannot serve on an SRB absent the granting of an OCI waiver by the Assistant Administrator for Procurement[2]. Waivers of FAR Subpart 9.5 on organizational conflicts of interest will be granted on a case-by-case basis when it is determined to be in the Government's interest to do so.

General Principles: Personal Conflicts of Interest

A personal conflict of interest means something more than individual bias. There must be an *interest,* ordinarily financial, that could be directly affected by the work of the SRB.

[2] This section would only apply to members on an SRB who are not civil servants.

Personal conflicts of interest are objective - they exist or they don't exist. They are not an assessment of one's actual behavior or character, one's ability to act objectively despite the conflicting interest, or one's relative insensitivity to particular dollar amounts of specific assets because of one's personal wealth. Assessments of conflicts of interest by NASA are designed to determine if certain specific, potentially compromising situations might create a conflict of interest. Eliminating or preventing these conflicts of interests protect the individual, the other members of the SRB, NASA, and the public interest.

Personal conflicts of interest refer to *current interests*. They do not apply to past interests that have expired, no longer exist, and cannot reasonably affect current behavior. Nor does it apply to possible interests that may arise in the future, but do not currently exist, because such future interests are inherently speculative and uncertain. For example, a pending formal or informal application for a particular job is a current interest, but the mere possibility that one might apply for such a job in the future is not a current interest.

Personal conflicts of interest are not only assessed against the personal financial interests of the individual, but also to the *interests of others* with whom the individual has substantial common financial interests if these interests are relevant to the functions to be performed. Thus, in assessing potential personal conflicts of interest, consideration must be given not only to the interests of the individual, but also to the interests of the individual's spouse and minor children, the individual's business partners, and others with whom the individual has substantial common financial interests. Consideration must also be given to the interests of those for whom the individual is acting in a fiduciary or similar capacity (e.g., being an officer or director of a corporation, whether profit or nonprofit, or serving as a trustee).

In assessing potential conflicts of interest in connection with an individual's service on an SRB, particular attention will be given to the following kinds of *financial interests* if they are relevant to the program or projects to be reviewed and evaluated: employment relationships (including private and public sector employment and self-employment); consulting relationships (including commercial and professional consulting and service arrangements, scientific and technical advisory board memberships, and serving as an expert witness in litigation); stocks, bonds, and other financial instruments and investments, including partnerships; real estate investments; patents, copyrights, and other intellectual property interests; commercial business ownership and investment interests; services provided in exchange for honorariums and travel expense reimbursements; and research funding and other forms of research support.

The Decision Authority has the authority to approve a written determination that a contractor's expertise outweighs the contractor's conflict of interest when the local Office of the Chief Counsel determines that a personal conflict of interest exists. In the case of NASA employee, only the NASA Administrator may approve a written determination that the employee's expertise outweighs the employee's personal conflict of interest.

Access to Restricted Information

For the purposes of this policy, "Restricted Information," means information that is not available to the public, such as information developed at private expense embodying trade secrets or comprising commercial or financial information that is privileged or confidential; information determined by NASA to be restricted, such as U.S. Government Sensitive But Unclassified information as defined in NASA Procedural Requirement (NPR) 1600.1; and "contractor bid or proposal information" or "source selection information" as defined in the FAR. The opportunity to have access to Restricted Information during the course of SRB activities at NASA, if abused or misused, may confer an unfair competitive advantage on certain contractors. Thus, individuals selected to serve on SRBs will be asked to sign a *Non-Disclosure Agreement* that provides restrictions on the individual's use of Restricted Information obtained during the course of SRB activities (a model *Non-Disclosure Agreement* is attached hereto). If an individual during the course of participating in a P/p activity obtains and uses, or intends to use, Restricted Information for the individual's own direct and substantial economic benefit, such conduct constitutes a breach of the Non-Disclosure Agreement and will be grounds for removal from the SRB. The same rule applies if the individual discloses, or intends to disclose, such information to other individuals or to organizations in such a manner that a direct and substantial economic benefit may be conferred on such individuals or organizations. These restrictions do not apply to information once it has become publicly available.

Employees of Sponsors[3]

There are special rules for employees of sponsors[4]. To the extent not prohibited by Federal or state laws or regulations, such an individual may serve as a member of such an SRB where the following requirements are met: (1) the service of the individual on the SRB must be based upon the unique scientific, technical or programmatic expertise which the individual brings to the SRB; (2) the individual and the individual's supervisory chain must not be located within the chain of command for programmatic level decisions for the P/p; (3) it must be specifically determined during the SRB appointment process that service by the individual will not compromise the independence or objectivity of the review.

Implementation of this Policy

Background Information and Confidential Conflict of Interest Disclosures

To address questions of SRB composition, balance and conflict of interest, individuals being considered for selection to serve on SRBs are required to submit certain background information, and certain information regarding conflicts of interest, relative to the P/p to be reviewed. The responsible independent review office (typically the Independent Program Assessment Office for all programs and projects with a life-cycle cost >$250 million) will ensure that all potential members provide the necessary information and work with appropriate procurement, legal and Convening Authorities in determining suitability for SRB service and appropriate SRB diversity and balance. To facilitate collection of this information from non-federal members, the "*Background Information and Confidential Conflict Of Interest Disclosure*" form (attached) will be used by appropriate contracting officers and contractors to collect the information. Disclosure of relevant information is a *continuing obligation* for the duration of the SRB for which the "*Background Information and Confidential Conflict Of Interest Disclosure*" form was prepared. If during an individual's period of service on the SRB it becomes apparent to the individual that there have been changes in the information disclosed, or that there is new information that needs to be disclosed, such information must be reported promptly to the Review Manager for the P/p for which the form was completed. For proposed federal SRB members, the Office of Government Ethics (OGE) Form 450 or Standard Form (SF) 278 (as appropriate) will be used.

In addition to the submission of these forms, SRBs are asked to discuss the issues of SRB composition, balance and conflict of interest, and the relevant circumstances of their individual members, at the first kick-off meeting, and annually thereafter.

Except as required by law or court order, *specific conflict of interest information obtained by NASA will be held in confidence by NASA*. Access to such information will be limited to those offices whose proper business requires access to such information. Such information is not otherwise released by *NASA* except with the approval of the individual to whom the information pertains, unless release is required by law.

Determinations on Composition, Balance and Conflicts of Interest

The specific factors to be considered by NASA in assessing questions of SRB composition and balance will generally depend in each case upon the particular facts and circumstances involved. The resolution of these matters will be based in the final analysis upon the independent judgment of the CAs in conjunction with the appropriate support offices. Final authority over SRB appointments rests with the Decision Authority for the particular program or project under review. However, nothing in this section authorizes the Convening Authority or Decision Authority to make determinations required by, or reserved to another official by, statute, regulation or NASA directive; including, without limitation, 18 U.S.C. § 201, *et seq.* (criminal conflict of interest statutes), 5 CFR Part 2635 (Standards of Conduct), 48 CFR Subpart 9.5 (Federal Acquisition

[3] For purposes of this policy, the term "sponsor" means an organization that institutionally supports the program or project e.g., a NASA Center or Mission Directorate.

[4] This paragraph only applies to members of an SRB who are civil servants.

Regulation organizational conflict of interest regulation) and 48 CFR Subpart 1809.5 (NASA FAR Supplement organizational and consultant conflict of interest regulation).

Once a Convening Authority provides a list of candidates for membership that reflects the desired composition and balance for a particular SRB, the Review Manager will initiate the independence verification process to identify and analyze potential organizational and personal conflicts of interest. The list of candidates should include more individuals than are required to serve on an SRB to allow for alternate members if another candidate cannot serve due to a conflict of interest or other reason.

For any SRB, *the focus of the conflict of interest inquiry is on the identification and assessment of relationships to the program or projects to be reviewed and evaluated, as well as on other interests that might be directly affected by the review and evaluation.* The concern is the individual's objectivity while participating in the review and evaluation process could be impaired if that individual (or others with whom the individual has substantial common financial interests) has current interests, which could be directly affected by the P/p being evaluated. When contractors/consultants-to-the-board are or are being considered as members of SRBs, each member and his/her company must also be considered in the context of organizational conflicts of interest in relation to the program or project being independently reviewed as set forth in the FAR and the NFS.

Information obtained from the "*Background Information and Confidential Conflict Of Interest Disclosure*" forms (or OGE 450/SF 278 as appropriate) and from confidential SRB discussions of SRB composition, balance and conflict of interest at the initial SRB meeting and annually thereafter, will be used by the responsible officials in addressing and resolving questions of conflict of interest (both personal and organizational). No individual can be appointed to serve (or continue to serve) on an SRB if NASA determines a personal conflict of interest exists that is significant enough to raise questions about that individual's ability to provide unbiased advice and recommendations. A written determination that the need for the individual's expertise outweighs their conflict of interest will be made and approved by the Decision Authorities or Administrator as part of the nomination process in cases where an individual has a personal conflict of interest.

The responsible independent review office will manage the determination and maintenance of the SRB member independence. In accomplishing this task, contractors who provide proposed non-Federal members to the SRB will initiate the process of completing the "*Background Information and Confidential Conflict Of Interest Disclosure*" forms and will make an initial determination as to whether any OCI exists. In these cases, the support contractor will work with the responsible independent review office and the appropriate contracting officer to determine the degree of conflict and to devise appropriate mitigation plans. An assessment and determination will also be made on the existence of personal conflicts of interest and whether they can be eliminated or special approval obtained. Additionally, any mitigation plans or OCI waivers that are necessary for an individual's participation on an SRB must be completed prior to a final recommendation of SRB membership to the Convening Authority.

The responsible independent review office will review and analyze all relevant information; will finalize recommendations for SRB member participation and will submit a letter of nomination for the proposed SRB members defining the rationale for each member's nomination. Such letter will include the disposition of any conflict of interest waivers or mitigation plans, and no member shall be recommended without appropriate resolution of any conflicts. This letter will be directed to the CAs for their approval. When changes occur that affect previous determinations of conflicts of interest and independence, the same process will be followed leading to approval or removal of SRB members.

D Disclosure and NDA for Contracted SRB Member/ Consultant

This appendix contains the following forms:

- *Background Information and Confidential Conflict of Interest Disclosure*
- *Non-Disclosure Agreement*

The National Aeronautics and Space Administration

BACKGROUND INFORMATION AND CONFIDENTIAL CONFLICT OF INTEREST DISCLOSURE

NAME: _____ TELEPHONE: _____

ADDRESS: _____

_____

EMAIL ADDRESS: _____

CURRENT EMPLOYER: _____

PROGRAM/PROJECT SRB: _____

There are three parts to this form, Part I Background Information, Part II Confidential Conflict of Interest Disclosure, and Part III, Certification. Complete all parts, sign and date this form on the last page, and return the form to _____. Retain a copy for your records.

PART I **BACKGROUND INFORMATION**

INSTRUCTIONS

Please provide a curriculum/resume that identifies your relevant experience, organizational affiliations, government service, etc. to this SRB activity. In addition, please specifically respond to the three specific areas identified below to facilitate an overall assessment of any biases that may exist relative to this SRB activity.

I. ORGANIZATIONAL AFFILIATIONS. Report your relevant current business relationships (e.g., as an employee, owner, officer, director, consultant) and your relevant current remunerated or volunteer non-business relationships (e.g., professional organizations, trade associations, public interest or civic groups).

II. OTHER SUPPORT. Report relevant information regarding both public and private sources of current support (other than your present employer), including sources of funding, equipment, facilities.

III. ADDITIONAL INFORMATION. If there are relevant aspects of your background or present circumstances not addressed above that might reasonably be construed by others as affecting your judgment in matters within the assigned task of the SRB or panel on which you have been invited to serve, and therefore might constitute an actual or potential conflict of interest or source of bias, please describe them briefly. This could include your relationships with individuals (rather than organizations) involved in the subject of the SRB activity.

SPECIFIC AFFILIATIONS, SUPPORT, AND OTHER INFORMATION:

PART II **CONFIDENTIAL CONFLICT OF INTEREST DISCLOSURE**

INSTRUCTIONS

It is essential that the work of SRBs not be compromised by any significant conflict of interest. For this purpose, the term "conflict of interest" means any financial or other interest which conflicts with the individual's service on an SRB because it (1) could significantly impair the individual's objectivity or (2) could create an unfair competitive advantage for any person or organization. Additional information regarding potential biases and conflicts of interest are provided in the *NASA Policy on Standing Review Board (SRB) Composition, Balance and Conflicts Of Interest*

1. **RELATIONSHIPS TO THE PROGRAM/PROJECT(S)** BEING EVALUATED. Taking into account your interests and the interests of other individuals with whom you share substantial common financial interests (e.g., spouse, close research colleagues and collaborators, business partners) and considering the below prime contractors, major subcontractors, and partners involved in the Program/Projects(s):

Program/Project Prime Contractors, Major Subcontractors, and Partners

List those involved

(a) Do you or such others receive current *financial support* (e.g., research and/or development grants or contracts, procurement contracts, consulting contracts, other grant support) from the program/project(s) being evaluated?

(b) Do you or such others receive substantial current *non-financial support* (e.g., equipment, facilities, industry partnerships, research assistants and other research personnel), from the program/project(s) being evaluated?

(c) Do you or such others have *any other current financial interest* (e.g., patent rights, interests in partnerships and commercial ventures) obtained from or through the program/project(s) being evaluated?

If the answer to all of the above questions under RELATIONSHIPS TO THE PROGRAM/PROJECT(S) being evaluated is either "no" or "not applicable," check here ____ (NO).

If the answer to any of the above questions under RELATIONSHIPS TO THE PROGRAM/PROJECT(S) being evaluated is "yes," check here ___ (YES), and briefly describe the circumstances on the last page of this form.

2. **INVESTMENT INTERESTS**. Taking into account stocks, bonds, and other financial instruments and investments, including partnerships (but excluding broadly diversified mutual funds and any investment or financial interest valued at less than $15,000) –

(a) Do you or your spouse or minor children own directly or indirectly (e.g., through a trust or an individual account in a pension or profit-sharing plan) any stocks, bonds or other financial instruments or investments that could be affected, either directly or by a direct effect on the business enterprise or activities underlying the investments, by the program/project being evaluated?

(b) Do you have any other financial investments or interests, such as commercial business interests (e.g., sole proprietorships), investment interests (e.g., stock options), or investment relationships (e.g., involving parents or grandchildren) that could be affected, either directly or by a direct effect on the business enterprise or activities underlying the investments, by the program/project being evaluated?

If the answer to all of the above questions under INVESTMENT INTERESTS is either "no" or "not applicable," check here ____ (NO).

If the answer to any of the above questions under INVESTMENT INTERESTS is "yes," check here ___ (YES), and briefly describe the circumstances on the last page of this form.

3. **PROPERTY INTERESTS.** Taking into account real estate and other tangible property interests, as well as intellectual property interests (e.g., patents, copyrights) –

(a) Do you or your spouse or minor children own directly or indirectly any such property interests that could be directly affected by the program/project being evaluated?

(b) To the best of your knowledge, do any others with whom you have substantial common financial interests (e.g., employer, business partners, relatives) own directly or indirectly any such property interests that could be directly affected by the program/project being evaluated?

If the answer to all of the above questions under PROPERTY INTERESTS is either "no" or "not applicable," check here _____ (NO).

If the answer to any of the above questions under PROPERTY INTERESTS is "yes," check here ____ (YES), and briefly describe the circumstances on the last page of this form.

4. **OTHER INTERESTS.**

(a) Could your current employment or self-employment (or your spouse's current employment or self-employment) be directly affected by the program/project being evaluated?

(b) To the best of your knowledge, could any financial interests of your (or your spouse's) employer or, if self-employed, your (or your spouse's) significant clients and/or business partners be directly affected by the program/project being evaluated?

(c) If you are an officer, director or trustee of any corporation or other legal entity, could the financial interests of that corporation or legal entity be directly affected by the program/project being evaluated?

(d) If you are a consultant (whether full-time or part-time), could there be a direct effect on any of your current consulting relationships by the program/project being evaluated?

(e) Do you have a consulting relationship with a sponsor, grantee, or contractor of the program/project being reviewed and evaluated that is directly related to the subject matter of the program/project review and evaluation for which this disclosure form is being prepared (e.g., a consulting relationship to provide assistance to the sponsor, grantee, or contractor with respect to the program/project review and evaluation)?

(f) Is a central purpose of the program/project review and evaluation a critical review and evaluation of your own work or that of your employer?

(g) Are you an official or employee of an agency or organization, which is a sponsor of the program/project that is being reviewed and evaluated and/or a sponsor of this program/project review and evaluation SRB activity?

(h) Do you have any existing professional obligations (e.g., as an officer of a scientific or engineering society) that effectively require you to publicly defend a previously established position on an issue that is relevant to the functions to be performed in this SRB activity?

(i) If you have ever been a U.S. Government employee (either civilian or military), to the best of your knowledge are there any federal ethics restrictions that may be applicable to your service in connection with this SRB activity?

If the answer to all of the above questions under OTHER INTERESTS is either "no" or "not applicable," check here _____ (NO).

If the answer to any of the above questions under OTHER INTERESTS is "yes," check here ____ (YES), and briefly describe the circumstances below.

EXPLANATION OF "YES" RESPONSES (attach additional pages as necessary):

PART III **CERTIFICATION**

If, during my period of service in connection with the activity for which this form is being completed, there is any change in the information I reported, or any new information that I have not reported, which needs to be reported, I shall report it promptly by written or electronic communication to the Program Manager.

_____ _____

Signature Date

Reviewed by Contract Program Manager:

I certify that I have reviewed this disclosure form and there are no OCI/PCI's associated with performing work on the subject task order, or alternatively, any identified OCI/PCI issues have been mitigated.

_____ _____

Signature Date

NON-DISCLOSURE AGREEMENT

As a participant on a NASA Standing Review Board (SRB), I recognize that I may have access to information that is not available to the public. To the extent NASA shares such nonpublic information with me during the course of SRB activities, I agree as follows:

1. "RESTRICTED INFORMATION," as used herein, means information to which I have access as a member of a NASA SRB that is not available to the public, including, but not limited to, information developed at private expense embodying trade secrets or comprising commercial or financial information that is privileged or confidential; and information determined by NASA to be restricted, such as Sensitive But Unclassified (SBU) information as defined in NASA Procedural Requirement (NPR) 1600.1.

2. With respect to RESTRICTED INFORMATION, I agree that I will:
   (a) Use, disclose, or reproduce RESTRICTED INFORMATION only to the extent necessary to perform my duties and fulfilling my responsibilities as a member of a NASA SRB;
   (b) Safeguard RESTRICTED INFORMATION from unauthorized use, disclosure, or reproduction;
   (c) Discuss or reveal RESTRICTED INFORMATION or any information concerning SRB proceedings only to individuals who are participating in the same SRB proceedings, and then only to the extent such information is required in connection with such proceedings on a need-to-know basis;
   (d) Return or dispose of RESTRICTED INFORMATION, as NASA may direct, when the RESTRICTED INFORMATION is no longer needed by me for SRB activities.

3. Notwithstanding any restriction on use, disclosure, or reproduction of RESTRICTED INFORMATION provided in this Agreement, I will not be restricted in the use, disclosure, or reproduction of RESTRICTED INFORMATION that is:
   (a) Publicly available at the time of disclosure or thereafter becomes publicly available without breach of this Agreement;
   (b) Known to, in the possession of, or developed by me independent of carrying out my SRB responsibilities and independent of any disclosure of, or without reference to, RESTRICTED INFORMATION;
   (c) Received from a third party having the right to disclose such information without restriction; or
   (d) Required to be produced or released by me pursuant to a court order or other legal requirement.

4. If I believe that any of the events or conditions that remove restrictions on the use, disclosure, or reproduction of the RESTRICTED INFORMATION apply, I will promptly notify NASA of such belief prior to acting on such belief, and, in any event, will notify NASA prior to an unrestricted use, disclosure, or reproduction of such information.

5. I understand that failure to abide by these provisions may constitute grounds for termination of my participation in the SRB, administrative action, and/or civil or criminal prosecution.

_____ _____

YOUR SIGNATURE DATE

E Acceptable SRB Structures for a Life-Cycle Review

Option	CS	CS2	NC
Description	**Civil Service (CS) Consensus Board—No Expert Support**	**Civil Service Consensus Board with Expert Support**	**Non-Consensus Mixed Board**
SRB chair	CS	CS	Either CS or non-CS
SRB Review Manager	CS or JPL*	CS or JPL*	CS or JPL
SRB composition	CS only	CS only; experts provide analyses to SRB	Either CS or non-CS
SRB product	SRB produces a briefing package with findings of fact and recommendations; RFAs (or equivalent) from individual members**, chair briefs report.	SRB produces briefing package with findings of fact and recommendations; RFAs (or equivalent) from any individual**, reports from individual experts**; chair briefs SRB report.	Review manager assists the chair in assembling the briefing package based on inputs and RFAs from all individuals**; chair briefs personal findings and recommendations.
Minority report	Minority reports documented in SRB report and in RFAs	Minority reports documented in SRB report and RFAs	No minority report***
SRB interaction	For CS and CS2 boards, as noted: Consensus is reached by the Civil Service board members under the civil service consensus (CS) and the civil service with consult support (CS2) SRB configurations. Consultants (non-board members) supporting CS2 boards may interact with the projects or programs on behalf of the SRB members to gather information used to support SRB non-deliberative discussions. For all board options: All board members can participate in open discussion with the project and within the SRB. Everyone can openly discuss individual points of view.		
Independence	Normal CS ethics rules apply	Experts providing support are not on the SRB. Apply independence standards to experts.	Apply independence standards to experts, but allow some impairments, if approved.

* JPL review managers are not members and do not have a vote.

** Reports and RFAs can contain individual recommendations.

*** The minority report requirements do not abridge NASA's Dissenting Opinion process per *NPD 1000.0*.

SRB structure is determined on the needs of the program or project and is documented in the Terms of Reference (ToR).

F *NPR 7123.1* to *NPR 7120.5* Mapping Example

Program Life Cycle—Program Implementation Review						
	Assessment Criteria/*NPR 7120.5E*					
***NPR 7123.1B* (PIR success criteria)**	**Alignment with and contribution to Agency strategic goals**	**Adequacy of management approach**	**Adequacy of technical approach**	**Adequacy of the integrated cost and schedule estimates and funding strategy**	**Adequacy and availability of resources other than budget**	**Adequacy of the risk management approach**
Program still meets Agency needs and should continue.	P					
The program cost and schedule estimates are credible and within program constraints.		S		P	S	S
Risks are identified and accepted by program/project leadership, as required.		S	S	S	S	P
Technical trends are within acceptable bounds.		S	P			S
Adequate progress has been made relative to plans, including the technology readiness levels.		S	P	S		
Technologies have been identified that are ready to be transitioned to another project or to an organization outside the Agency.		P	S	S		

Note: P = Primary, S = Secondary.

G Traceability of SRB Requirements in *NPR 7120.5E* to the *SRB Handbook*

NPR Para #	***NPR 7120.5E* Requirement Statement**	Reqm't Owner	Tailor	MD AA	CD	PM	Comply?	SRB Reqm't	***SRB Handbook* Rev A**
2.2.5	The program or project and an independent Standing Review Board (SRB) shall conduct the SRR, SDR/MDR, PDR, CDR, SIR, ORR, and PIR LCRs in Figures 2-2, 2-3, 2-4, and 2-5.	OCE	X			A		Yes	Sections 2.2, 2.3, 2.4
2.2.5.1	The Conflict of Interest (COI) procedures detailed in the *NASA Standing Review Board Handbook* shall be strictly adhered to.	OCE	X	A	A	A		Yes	Section 3.2
2.2.5.2	The portion of the LCR conducted by the SRB shall be convened by the Convening Authorities in accordance with Table 2-2.	OCE	X	A	A	A		Yes	Chapters 2 and 3
2.2.5.3	The program or project manager, the SRB chair, and the Center Director (or designated Engineering Technical Authority representative) shall mutually assess the program's or project's expected readiness for the LCR and report any disagreements to the Decision Authority for final decision.	OCE	X		A	A		Yes	Section 4.2
2.3.4	Following each LCR, the independent SRB and the program or project shall brief the applicable management councils on the results of the LCR to support the councils' assessments.	OCE	X	A	A	A		Yes	Sections 5.7, 5.8, 5.9

Note: This table is an excerpt of the Compliance Matrix in Appendix C of *NPR 7120.5E, NASA Space Flight Program and Project Management Requirements* modified to show how its requirements map to the discussions in the present handbook. Note that *NPR 7120.5E* may have implied requirements that are applicable to the SRB as well.

H Terms of Reference Template

Notes to Users of This Template

1. In addition to specifying the Terms of Reference (ToR) for reviews, this template is also used as final approval for the list of individuals from which Standing Review Board (SRB) members and consultants-to-the-board are selected. (See Section 3.4.)
2. This template is designed with sufficient generality to be used for both programs and projects.
3. This template may be adapted to fit the special circumstances of the program or project.
4. Statements in curly brackets and italics {*italics*} are explanatory notes or reminders and are not intended to be a part of the final ToR.
5. Statements in straight brackets [xxx] are fields to be filled in.
6. For tightly coupled programs and their projects, separate ToRs are not required for each project. The projects may be listed with the program under the description/governance section. The program ToR may include the projects' life-cycle reviews.
7. For tightly coupled programs and their projects, separate SRBs may be structured for the program and each of the projects so the applicable sections of the template would need to be expanded to accommodate this. However, separate SRBs for each project are not required. There can be one SRB for a tightly coupled program and its projects.
8. For loosely coupled or uncoupled programs, the projects under the program typically have separate ToRs.
9. For single-project programs, there is a single ToR.
10. A Program Implementation Review (PIR) appendix is added to the initial ToR when the Decision Authority requests a PIR.
11. The program or project manager, prior to the readiness assessment, determines if the review will be a one-step review or a two-step review.
12. Use common sense to adapt the template for programs or projects to satisfy the review intent. For example, project "category" is not generally applicable to programs, and statements such as these should be eliminated.

Terms of Reference for the Life-Cycle Reviews
of the [Program or Project Name]

Approved by:

_____

[Name]
Director, Office of Evaluation
NASA Headquarters

_____

[Name] ***{Programs only}***
NASA Chief Engineer
NASA Headquarters

_____

[Name]
Associate Administrator, [Designated] Mission Directorate
NASA Headquarters

_____

[Name]
Center Director
[Center Name]

_____

[Name] ***{Programs & Category 1 Projects only}***
NASA Associate Administrator
NASA Headquarters

Concurred by:

_____

[Name] ***{Category 1 & 2 Projects only}***
NASA Chief Engineer
NASA Headquarters

Terms of Reference for the Life-Cycle Reviews of the [Program or Project Name]

Document Change Log

Document Version	Date	Prepared by	Change Summary

Terms of Reference for the Life-Cycle Reviews
of the [Program or Project Name]

1.0 INTRODUCTION

1.1 Purpose

1.1.1 This Terms of Reference (ToR) describes the agreed-upon terms for the NASA life-cycle reviews (LCR) of the [Program/project name] that are identified in Section 6.0 Table 6-1.

1.1.2 The [Program/project name] LCRs are conducted to meet the intent of Agency and Center review processes as documented in NPR 7120.5, *NASA Space Flight Program and Project Management Requirements*, NPR 7123.1, *NASA Systems Engineering Processes and Requirements*, *Space Flight Program and Project Management Handbook,* and the *Standing Review Board* (*SRB) Handbook*.

1.1.3 In case of a conflict between the SRB Handbook and this ToR, this ToR takes precedence.

1.2 Scope

This ToR covers all SRB reviews for the entire life cycle of the [Program/project name]. Appendices are used when necessary to provide, for future reviews, details that may not be contained in the original ToR. *{In particular, these appendices provide the details that are <u>not</u> a part of NPR 7120.5 and/or NPR 7123.1.}*

1.3 Applicable Documents

For all documents, applicable or reference, the ToR is referenced to the document version extant on the approval date or the latest authorized draft version. The following documents include procedural requirements, specifications, and other special publications. The documents listed in this paragraph are applicable to the extent specified herein. Each LCR will be conducted under the most recently approved version of a listed document unless otherwise stipulated. In those situations where the most recently approved version is not used, the pertinent version is specified in this list.

1. NPR 7120.5, *NASA Space Flight Program and Project Management Requirements.*
2. NPR 7123.1, *NASA Systems Engineering Processes and Requirements*.
3. NPD 1000.5, *Policy for NASA Acquisition*.
4. NPR 7120.8, *NASA Research and Technology Program and Project Management Requirements*. *{Only retain if used}*
5. NPR 8000.4, *Agency Risk Management Procedural Requirements*.
6. *{List any other specific documents you used}*

1.4 Reference Documents

The following documents include guidelines, handbooks, and center-specific publications. Unless otherwise specified, the most recently approved version of a listed document will be used for reference during the review.

1. SP-2013-02-026-HQ, *Standing Review Board Handbook*
2. *NASA Space Flight Program and Project Management Handbook*
3. [Insert list of reference documents, e.g., *Jet Propulsion Laboratory Institutional Project Review Plan; or*
4. *Goddard Space Flight Center Review Plan*; or
5. *Marshall Space Flight Center Review Plan*; or
6. *Ames Research Center Review Plan*; or
7. *Cost and Schedule Handbooks*, etc.]

2.0 [PROGRAM / PROJECT NAME] DESCRIPTION AND GOVERNANCE

2.1 The [Program/project name] [Program or project] is an [assigned mission or Announcement of Opportunity] [Program or Project] within the [program name] *{if this ToR is written for a program, provide Center, division, and Mission Directorate information}*, which is managed by [program name] Program Office at [Center name] for the [division name] Division of the [directorate name] Mission Directorate ([xxMD]) of NASA.

2.2 [Program/project name] is [hosted] {for a Program} [managed] {for a project} for NASA by the [Center name]. [Program/project] primary goal is [key objectives of the mission: also brief description of Program/project].

2.3 The [project name] has been designated a Category [1, 2 or 3] project by NASA. The governing Program Management Council (PMC) is the [APMC for Category 1, MDPMC for Category 2 & 3]. The [project name] project has been designated a Class [A, B, C, or D] mission in accordance with NASA procedural requirements.

2.4 Prior to the Readiness Assessment, the [Program or project] Manager determines if the review is a one-step review or a two-step review.

2.5 The agenda for any LCR is mutually agreed to by the Program/project, Program Executive, SRB chair, Review Manager (RM), Center representative, S&MA TA, and Engineering Technical Authority (ETA) (and/or designated representative).

2.6 The review must address any special requirements specified by the Convening Authorities (CA)s or Decision Authority (DA) documented in Section 5.0 of this document.

2.7 For a two-step review, the first step of the review addresses the technical adequacy of the [Program's or project's] technical approach, and establishes the technical baseline taking into consideration cost and schedule. The second step of the review occurs no later than six months after the first step of the review and addresses all criteria identified in NPR 7120.5 and the success criteria in NPR 7123.1. The second step review is referred to as the independent integrated LCR assessment. Both reviews are conducted by the SRB and chaired by the SRB chair. {If agreement is different, specify the agreement on the chairs}

2.8 For a one-step review, the review is an independent review conducted by the SRB and chaired by the SRB chair.

2.9 {Retain only if this applies} There are cases, particularly for human space flight projects, where the project uses the LCR to make formal decisions to complete the project's technical work and align it with the budget and schedule. In these cases the project manager may co-chair the LCR since the project manager is using this forum to make project decisions, and the SRB will conduct the independent assessment concurrently. The SRB chair is in total control of the SRB and can interact with the presenters as needed to obtain all information needed to make a full assessment of the [Program/project name] health and status.

3.0 LIFE-CYCLE REVIEW CONDUCT

3.1 The LCRs for the [Program/project name] are conducted in accordance with NPR 7120.5, NPR 7123.1, NPD 1000.5, Center practices *{include Center Practices only if applicable}*, the *SRB Handbook*, and special requirements in this ToR (see Section 5.0). Any approved waivers and deviations to NPR 7120.5 are identified in Section 9.0.

3.2 The SRB performs its assessment against LCR objectives and Expected Maturity States defined in NPR 7120.5, Space Flight Program and Project Management Handbook, and NPR 7123.1. All approved requirement changes and additional requirements listed in Section 5.0 and waivers and deviations listed in Section 9.0 are integrated into the assessment criteria.

3.3 Special LCR requirements from the CAs or the [Program/project name] are identified in Section 5.0.

4.0 SRB PARTICIPANTS APPROVAL AND SRB OPERATIONS

4.1 The selection of SRB members and consultants-to-the-board is conducted in accordance with the *SRB Handbook*. The Conflict of Interest component is addressed in both NPR 7120.5 and the *SRB Handbook.* The SRB operations are conducted in accordance with NPR 7120.5 and the *SRB Handbook.*

4.2 The skills matrix in attachment 2 presents a complete list of individuals approved to participate on any SRB associated with the [Program/project name]. The biography for each individual is provided in attachment 1. The SRB skills matrix identifies the primary and secondary skills of the individuals covering the SRB chair, Review Manager, SRB members, and consultants-to-the-board. The signing of this ToR is approval of these individuals for participation on the [Program/project name] SRB.

4.3 In accordance with procedures for determining SRB members' and consultants-to-the-board's suitability for service, the following actions have been taken: civil servants have been vetted for personal and positional conflict of interest (COI) and no

conflicts were identified; contractors acting as SRB members or consultants-to-the-board have been vetted for both organizational conflict of interest (OCI) and personal conflict of interest (PCI) by their respective contracting officers/legal offices and have been certified as being free from conflict or have an approved waiver. Contractors have signed nondisclosure agreements. Based on the composition of the proposed SRB, the review process is conducted as a [insert board type, i.e., consensus board (CS), consensus board with consultant-to-the-board support board (CS2) or non-consensus board (NC)].

4.4 Standard program or project data and information required for the programmatic assessment are listed in section 7.0, Table 7-1 with required timelines for their delivery to the SRB.

4.5 LCR assessment criteria are identified in NPR 7120.5, NPR 7123.1, and the PM Handbook. The SRB products are specified in the *SRB Handbook*.

4.6 For Agency-level SRBs, after the readiness assessment and prior to an individual LCR, the SRB chair sends an email to the Director of the Independent Program Assessment Office (IPAO) stating his/her conclusions and approval/disapproval of the Program/project's readiness-to-proceed. The IPAO Director then sends an email to the CAs containing the following information:

1. Attendees at the Readiness Assessment
2. Results of the readiness assessment.
3. LCR specific information (as required)
4. Agenda of the upcoming LCR.
5. LCR timeline.
6. List of SRB members and consultants-to-the-board that will participate in the LCR.

For Center-level SRBs – The SRB chair follows the process and practice defined by the Center for reporting his readiness assessment.

4.7 The Operational Readiness Review (ORR) is the last LCR that is conducted by the SRB. All LCRs post ORR are institutionally (i.e., center) convened reviews. The SRB will be disbanded and charge codes/task orders for all SRB members and consultants-to-the-board (except the chair) will be closed. The SRB chair will be kept on contract through the launch of [Program/project name].

5.0 SPECIAL/ADDITIONAL REQUIREMENTS, SUCCESS CRITERIA AND ASSESSMENT PRODUCTS

{The authorizing documentation for these changes is essential.
List the additions and the requestor in the sections below and provide the authorizing information in an attachment to this ToR.}

5.1 General additions (entrance criteria, success criteria, etc.) requested by the CAs.

[Change description] [Change requestor's name]

5.2 Any additions documented in the [Program/project name] [Program/project] plan.

[Change description] [Change requestor's name]

6.0 LIFE-CYCLE REVIEW PLANNING

The SRB conducts independent reviews at the life-cycle milestones defined in NPR 7120.5. Table 6.1 lists the LCRs requiring an independent review by the SRB.

Table 6-1. Listing of Life-Cycle Reviews *{projects}*

Life-Cycle Review	Review Date*
Mission Definition Review (MDR)/System Requirements Review (SRR) KDP-B	Feb 2022
Preliminary Design Review (PDR) KDP-C	Feb 2023
Critical Design Review (CDR)	Feb 2024
System Integration Review (SIR) KDP-D	Feb 2025
Operations Readiness Review (ORR)	Feb 2026

*Note: Review dates are estimates and subject to change.

{*Or*}

Table 6-1. Listing of Life-Cycle Reviews *{Programs}*

Life-Cycle Review	Review Date
Program Approval Review (PAR) KDP 0/I	Feb 2022
Program Implementation Review 1* (PIR) KDP-II	*

* Subsequent PIRs/KDPs will be conducted as required by the APMC.

7.0 STANDARD PROGRAM/PROJECT LIFE-CYCLE REVIEW DELIVERABLES TO THE SRB

7.1 The cost, schedule, technical, and risk data required to support an SRB programmatic assessment is required at three points: data access and then two data deliveries as shown in Table 7-1. Data access is for the program/project to provide existing data to the SRB to help inform and educate the SRB members. This enables the SRB to provide early feedback on the health of the schedule and cost data, which allows the program/project an opportunity to correct any potential problems areas before the site review. The first data delivery is the preliminary data required for the SRB assessment, including the delivery of any applicable preliminary models. The second data delivery is the final set of data for the SRB assessment before the site review. The data requested is intended to be that used by the program/project in doing their

planning and implementation and should not necessitate developing separate, new deliverables for the SRB.

7.2 All other data are to be provided no later than 20 days prior to the site review.

Table 7-1. Life-Cycle Review Data Deliveries *{Projects or tightly-coupled Programs}*

Item	Content	Timeline
Data Access*	Existing Program/project management documentation (ref. NPR 7120.5E, Tables I-2 - I-6), including working technical baseline description; project risk list, matrix and mitigation plans; Work Breakdown Structure (WBS), WBS dictionary; Master Equipment List; Equipment Power Consumption List; software lines of code, Integrated Master Schedule (IMS); cost estimate and planning budget by year and phase; staffing requirements and plans; and infrastructure requirements.	100 calendar days prior to LCR**
Data Delivery 1*	Preliminary delivery of data formally required for the review, including Basis of Estimates (BOEs) for cost and schedule, a cost and schedule range estimate or functional Joint cost and schedule Confidence Level (JCL) model and analysis schedule (if required for LCR) and supporting data (as applicable), and/or any updates that have been made to the risk list, matrix, cost estimate, budget and schedule.	60 calendar days prior to LCR**
Data Delivery 2*	Final range estimate or JCL model and analysis schedule (if range/JCL required) and/or any updates that have been made to the risk list, matrix, cost estimate, budget, schedule and P/p documents.	20 calendar days prior to LCR**

* The list of the programmatic cost and schedule data for each independent LCR is found in the SRB Handbook.
** For two-step LCRs, the timeline is with respect to the second step of the independent LCR.

{*Or*}

Table 7-1. Life-Cycle Review Data Deliveries *{Uncoupled and Loosely Coupled Programs}*

Item	Content	Timeline
Data Access*	Existing Program/project management documentation (ref. NPR 7120.5E, Tables I-1), including working technical baseline description; program risk list, matrix and mitigation plans; WBS, WBS dictionary; IMS; cost estimate and planning budget by year and phase; staffing requirements and plans and infrastructure requirements.	100 calendar days prior to LCR**
Data Delivery 1*	Preliminary delivery of data formally required for the review, including BOEs for cost and schedule and supporting data (as applicable); and/or any updates that have been made to the risk list, matrix, cost estimate, budget and schedule.	60 calendar days prior to LCR**
Data Delivery 2*	Final budget and schedule and supporting data (as applicable) and/or any updates that have been made to the risk list, matrix, cost estimate, schedule and P/p documents.	20 calendar days prior to LCR**

* The list of the programmatic cost and schedule data for each independent LCR is found in the SRB Handbook.
** For two-step LCRs, the timeline is with respect to the second step of the independent LCR.

8.0 CONTACT LIST

Table 8-1. Contact List

Representing	Name	Title	Affiliation	Email
Standing Review Board		SRB Chairperson		
Standing Review Board		Review Manager		
Program Office		Program Manager		
Program Office		Program Executive		
Project		Project Manager		
Engineering Technical Authority		Engineering Technical Authority		
Health and Medical Technical Authority		Health and Medical Technical Authority		
Safety and Mission Assurance Technical Authority		Safety and Mission Assurance Technical Authority		
SRB Point of Contact		Program/ Project Office		

9.0 APPROVED WAIVERS AND DEVIATIONS

*{List in this section all waivers and deviations to assessment criteria and review process**. Include the official documentation (copy) authorizing each waiver and deviation in Attachment 3 to this ToR.** Changes in listings and /or attachments do not constitute a change to this ToR and do not require approval or signatures.}*

[Waiver or deviation description] [Requestor's Name]

Terms of Reference for the Life-Cycle Reviews
of the [Program or Project Name]

Attachment 1. SRB Membership and Biographies

Upon approval of the ToR, the following list of individuals shall become the source from which members and consultants-to-the-board are selected to support [Program/project name] SRB for the LCRs. Additional individuals can be added to the list through future revisions to the ToR or through joint approval by the CAs through IPAO-facilitated email exchange with the appropriate representatives from each organization included in the distribution. Any additional individuals who are approved are added to the established NASA-approved list from which review-specific SRB members and consultants-to-the-board are selected by the [Program/project name] SRB chair (not to exceed 12 members at each review whenever possible). The selected members and consultants-to-the-board for any upcoming review will be published in the readiness assessment email prepared by the IPAO Director to the Convening Authorities of the [project name] SRB in advance of the review.

The chair and Review Manager were approved by letter dated [month day, 20XX].

The following individuals' biographies for the [Program/project name] SRB are provided below. The individuals are approved with the signing of this ToR.

{Include only what is applicable if any}
The original SRB members and consultants-to-the-board were approved {select which is appropriate} [with the original ToR] [by the SRB approval letter] dated [XXX]. Since that approval, a new {select which is appropriate} [individual] [RM] was approved by the change approval letter dated XXX. All initial approval letters and change approval letters are located in the IPAO.

SRB Members Biographies

Mr. Adam Public, Center Name, SRB Chair

Mr. Public has over 35 years of experience as a developer. During his career he has served several positions on Voyager and as Spacecraft Systems Engineering Section Mission Manager (SSESMM). Mr. Public has received several NASA awards, including the NASA Service Medal.

Mr. Public received his Bachelor of Science in Aerospace Engineering from State University and his Master of Science in Aerospace Engineering from a University in California.

Dr. Susan Jackson, Center Name, Instrument Systems

Dr. Jackson has 25 years of experience in spacecraft and instrument systems. She is currently working in the Systems Office as a Review Assistant. She worked for the Project supporting the Space Environment In-Situ Suite (SEISS) instruments for technical design calibration testing. She also led the Group to produce the simulated data satellite.

Dr. Jackson received her Bachelor of Science in Design Engineering from Some University, her Master of Science in Design Engineering from a University in North Dakota, and her Doctorate of Design Engineering from the University of a State.

{Continue adding biographies until all members are included.}

Terms of Reference for the Life-Cycle Reviews
of the [Program or Project Name]

SRB Consultants-to-the-Board Biographies

Mr. Adam Public, ABD Company Name, Cryogenics

Mr. Public has over 35 years of experience as a developer. During his career he has served several positions on Voyager and as Spacecraft Systems Engineering Section Mission Manager (SSESMM). Before retiring from NASA, Mr. Public received several NASA awards, including the NASA Service Medal. Mr. Public is currently working for ABD Company as a Cryogenics Specialist. He is also an adjunct professor at his hometown's Community College. Mr. Public is a leader in the ….

Mr. Public received his Bachelor of Science in Aerospace Engineering from State University and his Master of Science in Aerospace Engineering from a University in California.

Dr. Anna Smith, XYZ Company Name, Verification and Validation

Dr. Smith has years of experience in verification and validation (V&V). She is currently working in the Office Group as a Reviewer. She worked for the Project supporting the Space Environment Suite (SIS) instruments for technical calibration testing. She also led the effort to produce the simulated data satellite.

Dr. Smith received her Bachelor of Science in Design Engineering from The State University, her Master of Science in Design Engineering from a University in Florida, and her Doctorate of Design Engineering from the a State Private College.

{Continue adding biographies until all consultants-to-the-board are included.}

Terms of Reference for the Life-Cycle Reviews
of the [Program or Project Name]

Attachment 2. SRB Skills Matrix

{List Chair first and RM second. List remaining members and consultants-to-the-board in alphabetical order by last name. There should only be one Primary person listed per skill area. This is a notional listing of skill areas and they should be tailored for your specific P/p's needs}.
To update SRB membership: {Insert a new member in alphabetical order by last name and highlight row in yellow. Insert the replacement directly below the replaced person; shade both rows in yellow; use the strikethrough feature on the replaced person. There should only be one Primary person listed per skill area. This is a notional listing of skill areas and they should be tailored for your specific P/p's needs.}

[Program/project] SRB Skills																								
Skill List: P – Primary S - Secondary																								
	Name Board Member/ Consultant-to-the-Board	**Affiliation**	**Chair Project Management**	**Review Manager**	**Project Management Requirements**	**Thermal Systems**	**Science/Instruments**	**Flight Dynamics, Navigation**	**Attitude Control Systems**	**Spacecraft Systems**	**FSW Systems**	**Electrical/Avionics**	**Ground Systems**	**Flight Dynamics**	**Mechanical/Mechanisms**	**Spacecraft Communications**	**Integration & Testing (I&T)**	**Operations**	**Plasma Astrophysics (Electric Fields & Waves)**	**Payload Systems**	**Mission Assurance**	**Cost/Schedule**	**GSFC SRM/Instrument Management**
1																								
2																								
4																								
5																								
6																								
8																								
9																								
Below are Consultants-to-the-Board – These are NOT SRB members																								
1																								
2																								
3																								
4																								
5																								

{Include this Attachment only if you have a Waiver or Deviation per Section 9.0; Attach a copy of the official documentation supporting each waiver and deviation}

Attachment 3. Waiver and Deviation Documentation

Reference Documents

NPD 1000.0A, NASA Governance and Strategic Management Handbook

NPD 1000.5B, Policy for NASA Acquisition

NPR 1900.3B, Ethics Program Management

NPR 7120.5E, NASA Space Flight Program and Project Management Requirements

NPR 7123.1B, NASA Systems Engineering Processes and Requirements

NPR 8000.4, Agency Risk Management Procedural Requirements

NASA/SP-2014-3705, NASA Space Flight Program and Project Management Handbook

NASA/SP-2010-3403, NASA Schedule Management Handbook

NASA/SP-2011-3422, NASA Risk Management Handbook