NASA

NASA/SP-20230001306

Standing Review Board Handbook

National Aeronautics and Space Administration
NASA Headquarters
Washington, D.C. 20546

February 2023

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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 C updates the Revision B version of the *SRB Handbook* published in 2016 to incorporate updates to *NASA Procedural Requirements (NPR) 7120.5F, NASA Space Flight Program and Project Management Requirements*. These updates include:

- Changing the Dissenting Opinion process to the Formal Dissent process, which retains the current process augmented with an expedited escalation path.
- Updates to requirements for establishing an Agency Baseline Commitment (ABC) and for performing Joint Cost and Schedule Confidence Level (JCL) analyses for tightly coupled programs.
- Additional requirements for performing a JCL analysis for single-project programs and projects over $1B Life-Cycle Cost (LCC).
- Use of initial capability cost estimates instead of LCC estimates in specific, identified instances for single-project programs and projects that plan continuing operations and production, including integration of capability upgrades, with an unspecified Phase E end point. These single-project programs and projects define an initial capability during Phase A and develop an initial capability cost that establishes the ABC at Key Decision Point (KDP) C. Initial capability is the first operational mission flight (or as defined in the KDP B Review Plan) and is documented in the KDP B Decision Memorandum. Initial capability cost includes operations cost for the initial capability. The Phase E cost estimate for continuing operations and production is established separately as part of the Operational Readiness Review (ORR) and KDP E for the 5 years after initial capability and subsequently updated and documented annually for the next 5-year period. Upgrades during Phase E that meet the Agency criteria for a major project for external reporting are treated as projects for the purposes of establishing their own development ABC outside the Phase E cost estimate. The Phase E cost estimate is updated to include production and operations costs associated with these upgrades. Development, production, and operations costs of other (i.e., non-major) upgrades are included in the Phase E cost estimate. (See *NPR 7120.5*, Sections 2.4.1.5 and 2.4.1.6 and the *NASA Space Flight Program and Project Management Handbook* (*PM Handbook*), Section 5.5.4 for additional information.) The scope of the SRB's assessment with respect to initial capability, Phase E cost estimate, and major upgrades for these single-project programs and projects is defined in the Terms of Reference (ToR).

This handbook is consistent with the *PM Handbook* issued by the Chief Program Management Officer (CPMO) on behalf of the NASA Associate Administrator and with *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 Life-Cycle Review (LCR) process. This

handbook also provides review guidance and best practices to effectively administer and satisfy the program and project review requirements established in *NPR 7123.1C, 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 ToR.

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 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 or project's review needs. Any adjustments should be documented in the ToR.

NPR 7120.5 assigns responsibility for the independent reviews performed by SRBs to the Mission Directorates (MDs) with support from the Centers. The MDs are responsible for independent reviews of all programs, all Category 1 projects, and Category 2 projects with an LCC greater than or equal to $365 million. These reviews are Agency-level reviews. Host Centers are responsible for independent reviews of Category 3 projects and Category 2 projects with an LCC less than $365 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.

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 how 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 supplement the core chapters with examples and templates for the products identified and reference material.

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 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 (ToR) 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 *NASA Policy Directive* (*NPD) 1000.0, NASA Governance and Strategic Management Handbook*.

The traceability matrix of the SRB-specific requirements in *NPR 7120.5* is provided 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. The Convening Authorities are responsible for approving the ToR, the SRB chair, and SRB membership, and are the management officials who receive the briefings and documented results of the SRB.

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

NPR 7120.5 requires SRBs to conduct specific LCRs. The SRBs are convened by NASA senior management officials called Convening Authorities.

1.3 Applicability of the Handbook

This handbook focuses on the Agency-level 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 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 SRB Purpose

1. The 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 Analysts and the Review Manager can be SRB members.
2. For Agency-level reviews, the Review Manager and programmatic analysts are assigned by the MDs and Centers with assistance from the Office of the Chief Financial Officer (OCFO) for programmatic analysts. 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 SRB Roles and Responsibilities

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 MD collaborates with the Centers and OCFO 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 MD 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, and it lists the SRB's stakeholders and the role of the 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 a review that provides an assessment of a program 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 or project's progress, issues, risks, and status. An LCR that occurs at the end of a life-cycle phase is complete when the governing Program Management Council (PMC) and Decision Authority complete their assessment, make the decision to authorize a program or project to progress to the next life-cycle phase, and sign the Decision Memorandum.

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

The standing nature of SRBs provides a strong advantage in terms of continuity and familiarity with the program 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 manner 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 are normally 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

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 7120.5* 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 C of *NPR 7120.5* provides information on tailoring *NPR 7120.5* requirements and on obtaining and documenting approval for tailoring. Appendix E of the *NASA Space Flight Program and Project Management Handbook* (*PM Handbook*) contains additional information on 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.*

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. Each of the program types has a specific life cycle. There are three categories of projects: Category 1, Category 2, and Category 3. All projects have the same life cycle. Specific expected program and project maturity states for each review are 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. SRB participation in the LCR of each type of program and project is summarized in Table 2-1. LCRs that immediately precede Key Decision Points (KDPs) are shown in blue.

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 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 some 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:

- Civil Service Consensus Board (CS),
- Civil Service Consensus Board with Expert Support (CS2), and
- 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.

NASA prefers CS or CS2 boards since 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.

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 (i.e., academia, industry, government, and nonprofit organizations) enable NASA to consistently produce accurate and objective assessments of its programs and projects.

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)

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

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.

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.

SRB members must be free of personal, organizational, and positional conflicts of interest.

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 (OGE) Form 450 (Confidential Financial Disclosure Report) or Standard Form 278 (Executive Branch Personnel Public Financial Disclosure Report), as applicable, on file with NASA (or available to NASA) prior to being considered for SRB membership. These forms must be updated annually.

The responsible Center Office of Chief Counsel (OCC),[3a] including the OCC of the NASA Office of Jet Propulsion Laboratory (JPL) Management and Oversight (NOJMO), or the NASA Headquarters (HQ) Office of the General Counsel (OGC) will identify disqualifying personal and positional conflicts of interest in accordance with the relevant laws and regulations governing standards of ethical conduct.[3b] A civil servant must not participate in any SRB activity until the responsible OCC or OGC 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 or OGC informs the MD that a person cannot serve on the SRB due to a personal or positional conflict of interest, the MD may:

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[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]a The OCC at the primary Center leading a project (i.e., where the project office is located) or OGC for NASA Headquarters (HQ) will typically serve as the responsible legal office for conducting positional and financial conflict clearance reviews for civil servants nominated to serve on an SRB as well as coordinating on organizational conflict of interest issues involving nominated contractor consultant SRB members. For JPL-led projects, the OCC at the NOJMO will serve as the responsible legal office for such reviews. When a Center hosts both the program office and leads projects under the program, coordination between the MD and OGC should take place to determine whether responsibility for conflict clearance reviews should occur at the primary Center/NOJMO OCC or HQ OGC.

[3]b See 18 United States Code (U.S.C.) § 208 and "Standards of Ethical Conduct for Employees of the Executive Branch" contained in 5 CFR (Code of Federal Regulations) part 2635, as supplemented by 14 CFR part 1207.

- 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, or Center seeks to pursue a divestiture or waiver, the MD must coordinate the action with the responsible legal office, or the Center must coordinate with the local OCC. When 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 1900.3C, Ethics Program Management*, Paragraph 3.4.3. The appropriate authority must submit the waiver request to the OGC for concurrence and then to the NASA Administrator for final signed approval before the civil servant participates in any SRB activity.

3.2.2 Contractor Conflict of Interest Screening

To the extent consistent with contractual requirements, the Contracting Officer 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.

3.2.2.1 Organizational Conflicts of Interest

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 that organizational conflicts of interest are avoided, neutralized (e.g., through the use of the Limitation of Future Contracting clause (NASA FAR Supplement 1852.209-71)), mitigated (e.g., through firewalls, nondisclosure agreements (NDAs), use of a non-conflicted subcontractor, etc.) or waived in accordance with FAR 9.5.

3.2.2.2 Personal Conflicts of Interest

The CO is also responsible for screening all proposed contractor employees and consultants for personal conflict of interest concerns, and for coordinating with the Center/NOJMO OCC or HQ OGC assigned attorney, where necessary. The CO must review the submitted Contractor Conflict of Interest Disclosure form (Appendix D) to ensure the form has been completed in its entirety

[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.

and that the certification and NDA are signed. Where the form reveals no conflicts of interest (i.e., all boxes are checked "No" and comments do not reveal potential conflicts), the CO's review of the Disclosure form completes the review: no additional review or signature by Agency counsel is required. If a potential issue is revealed by the disclosure (i.e., one or more boxes are checked "Yes" and/or comments reveal a potential conflict), Agency counsel's advice must be sought and counsel will make recommendations on all potential issues, including whether the contractor should be permitted to serve on the SRB.

When evaluating whether a potential contractor personal conflict of interest arising from a financial interest in an entity involved in the program/project under review, the CO and Center/NOJMO OCC or HQ OGC assigned attorney shall take into consideration the dollar value of such personal financial interest in question as it relates to a proposed member or consultant's ability to provide independent, objective input to the SRB. The $15,000 *de minimis* exemption amount applicable to civil servant financial conflicts of interest serves as a guide when assessing proposed contractor SRB member personal financial conflict of interest matters. In cases where the salary interest or market value of the asset (i.e., publicly traded stock or bond holding) is $15,000 or less (as calculated in the aggregate based on the market value of all holdings of the contractor employee, their spouse, and their minor children), a determination may be reached that the financial interest does not require disqualification of an individual from serving because the financial interest is *de minimis* and not of sufficient magnitude to jeopardize the proposed contractor employee or consultant's ability to provide independent, objective input.

In evaluating potential personal conflicts of interest, Agency counsel may recommend mitigation measures such as firewalls, company-specific or entity-specific recusals (i.e., recusal from reviewing or providing input on the work products of a specific entity involved in the program/project) or other restrictions that limit the role of a proposed contractor to specific areas in which the contractor's ability to provide independent judgment or input is not affected or unlikely to be affected by a particular financial interest.

When the local Center/NOJMO OCC or HQ OGC assigned attorney recommends that an individual contractor employee or consultant not serve on an SRB due to a personal conflict of interest, the MD 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. (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 Center/NOJMO OCC or HQ OGC determines a personal conflict of interest exists.)

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. An SRB may not include a civil servant whose supervisory chain is within the chain of command for programmatic-level decisions made at the program or project level. The SRB Convening Authority is responsible for assessing and determining positional conflicts of interest for civil servants.

Civil servants who work at a Center/NOJMO/HQ where a program or project is located may serve as an SRB member only if they and the Center/NOJMO/HQ organization in which they work have no direct responsibility for supporting the program or project under review. As it relates to positional conflicts of interest, direct responsibility for supporting a program or project under review does not include the general institutional support a Center/NOJMO/HQ provides to a program or project except when the civil servant is employed within the Mission Directorate institutionally supporting the program or project (see next paragraph). Where no positional conflict of interest is identified, review and signature of this determination by the Center/NOJMO OCC or HQ OGC counsel is not required.

A civil servant employed within a Mission Directorate institutionally supporting the program or project, and who is and whose supervisory chain is outside the chain of command for programmatic-level decisions at the program or project level, may serve as a member of an SRB only when the SRB Convening Authority makes a written determination that:

- The service of the individual on the SRB is necessary due to the scientific, technical, or programmatic expertise that the individual brings to the SRB that cannot be obtained through the expertise of any other SRB members or SRB member candidates. The written determination must specifically address the expertise needed and why other SRB members or available candidate members cannot provide the expertise needed; and
- The individual and the individual's supervisory chain is not located within the chain of command for programmatic-level decisions made at the program or project level.

The SRB Convening Authority and other personnel may consult with the Center/NOJMO OCC or HQ OGC where a program or project is located for guidance on applicability of this section.

Having SRB members and consultants-to-the-board who have no serious 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 NASA and from external sources including such communities as the Department of Defense (DoD), industry, academia, and other Government agencies. When looking internally within NASA, 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 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 provides important 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 Review Manager can be a board member. When forming the SRB, an important aspect is determining the "right size" of the membership that can 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 organizations internal to NASA that are defined by the NASA governance model to be independent of the program or project. These mission support organizations 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 (OSMA), the NASA Safety Center, Center Safety and Mission Assurance organizations, the Office of the Chief Engineer (OCE), the Office of the Chief Health and Medical Officer (OCHMO), the NASA Engineering and Safety Center (NESC), 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.

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

[2]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

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

[4]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

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. The SRB chair must not be from the implementing Center or institution.

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[5]. The nomination can come from any of the Convening Authorities. Usually, more than one candidate is considered. All Convening Authorities can 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 the Convening Authorities. If the Convening Authorities cannot reach agreement, the Decision Authority makes the selection.

For Agency-level reviews, the SRB chair nomination is facilitated by the MD and Centers with the Convening Authorities. The MD processes the approved nominee through legal and procurement to complete the necessary steps for bringing the nominee on board. The MD sends a formal approval letter to the Convening Authorities for their electronic signatures and concurrences (as required) 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*

[5] The Convening Authorities include the NASA Associate Administrator, Mission Directorate Associate Administrator, and Center Director, who provide signature approval of the ToR that includes SRB membership. Other Convening Authorities are the NASA Chief Engineer and NASA Chief Financial Officer, who provide concurrence with these products. Concurrence means that these organizations are actively engaged in the discussions and are coordinated by personnel from these organizations embedded within the Mission Directorates with no formal signatures being required. Reference the NASA White Paper "NASA Independent Assessment Principles and Approach," approved at the May 18, 2016 Agency PMC (APMC) meeting.

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 (PM Handbook)*, the *NASA Systems Engineering Handbook*, and this handbook. The Review Manager may serve on the SRB as a discipline expert.

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

3.4.2.2 Approval

The MD, or Center per MD coordination and approval, 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.

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 NASA Office of the Chief Financial Officer (OCFO) (for programmatic analyst nominations) in accordance with *NPR 7120.5*. The SRB chair and Review Manager, in collaboration with the program or project manager and the Mission Directorate 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 or project's Work Breakdown Structure (WBS), giving special attention to the program or project's risk areas. When considering subject matter experts to support the SRB, the best-case scenario for optimizing team size is 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 and/or functional support organization candidates from both non-host Centers and the host Center.

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

For Agency-level reviews, the OCFO, OCE, and Centers are available to assist the MDs as needed to identify subject matter experts to expedite the search for qualified candidates who meet the necessary requirements.

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 concur and 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 that he/she determines are needed to support the 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, replacing the Review Manager and the programmatic analyst only needs the responsible Mission Directorate's approval (in consultation with OCFO for programmatic analysts) before distributing the results to the other Convening Authorities as updated information. Voting SRB programmatic support must not be from the implementing Center or institution.

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 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.

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

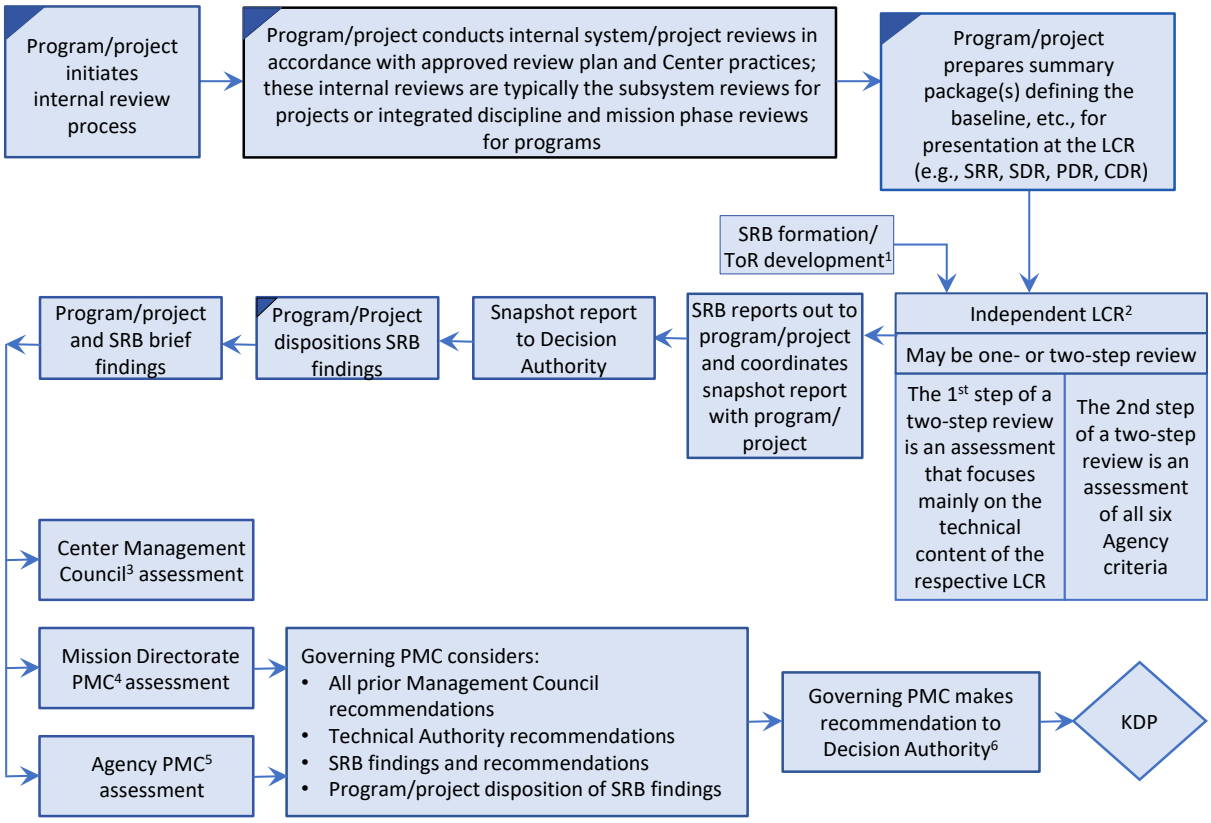
4 Life-Cycle Review Process

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 to the next life-cycle phase at a Key Decision Point (KDP).

The Standing Review Board (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.

The 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.



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 that occurs at the end of the life-cycle phase is complete when the Governing PMC and the Decision Authority complete their assessment.

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

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 LCRs 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 signatories and by others whose

concurrence is required. 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 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 concurrence and approval. The ToR is developed before any LCR occurs.

For **tightly coupled programs**, subject to review and approval by the Convening Authorities, separate ToRs may not be 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 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 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 by 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.

The SRB chair develops his/her individual assessment of the program 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.

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 7120.5F*, Appendix I
Products maturity matrix	*NPR 7120.5F*, Appendix I
Expected maturity state overall at KDP reviews and specific LCRs	*NPR 7120.5F*, Tables 2-3–2-6
Maturity tables (with review criteria details)	*NASA Space Flight Program and Project Management Handbook*, Appendix E

4.3 Life-Cycle Review Methods

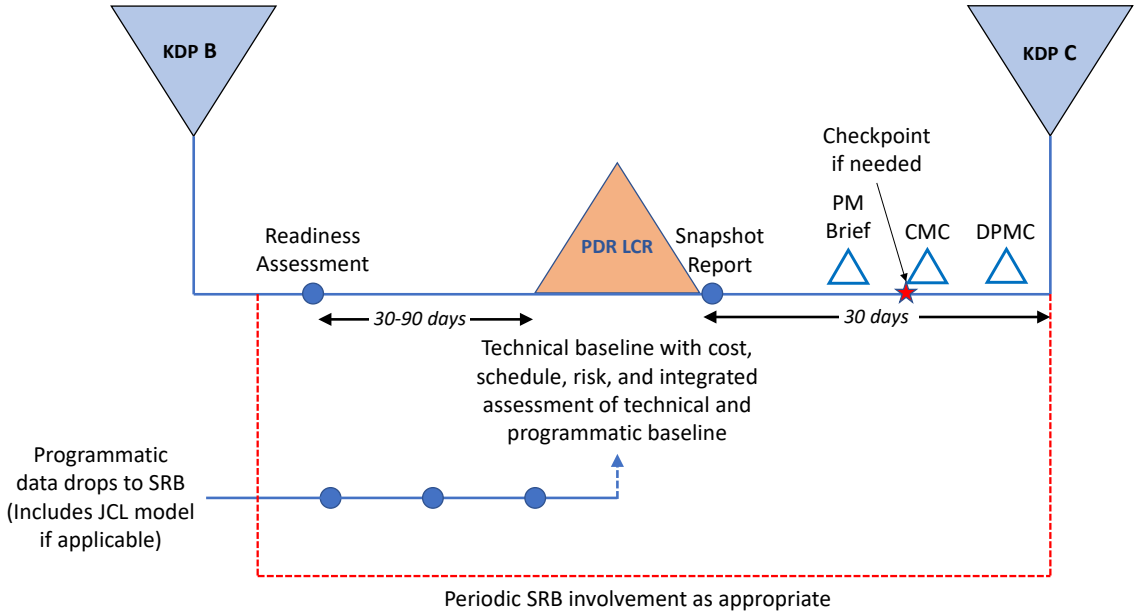
All LCRs must assess both the program or project's technical maturity and its alignment with the Agency's six assessment criteria identified in *NPR 7120.5, NASA Space Flight Program and Project Management Requirements*, Section 2, and described in Section 5.1 of this handbook. Reviews are conducted 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 = Directorate Program Management Council, JCL = Joint Cost and Schedule 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.

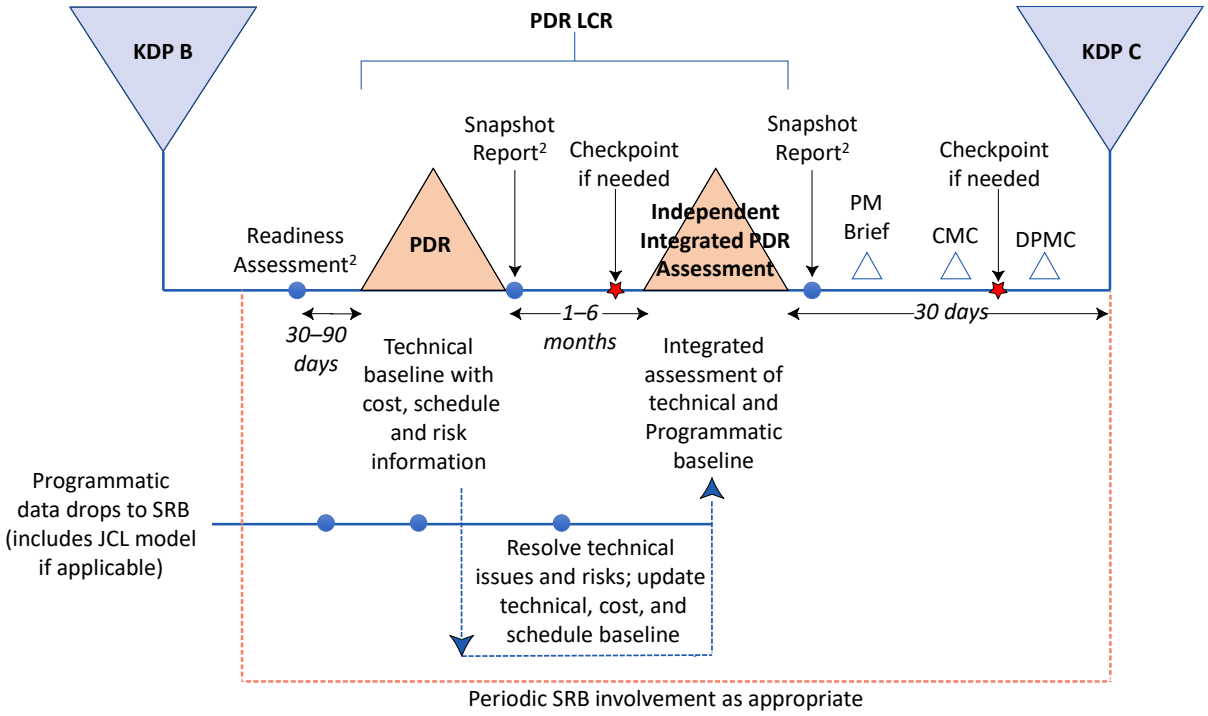
Figure 4-2 One-Step PDR Life-Cycle Review Overview

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 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 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. Except in special cases, 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 = Directorate Program Management Council, JCL = Joint Cost and Schedule 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 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 (PMC).

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 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 preparatory 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 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 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 prior to the kick-off meeting for the SRB chair and Review Manager on best practices and tools that are applicable to the specific review.

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.

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 program executive or designee typically briefs the SRB on his/her expectations and discusses the SRB process at a high level. The SID 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 web accessible document library established by the MD or program/project, 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

4.7.1 SRB Planning Session

Approximately six months in advance of the site review, it is beneficial to conduct an SRB planning session for the review that includes the program or project management, the SRB chair, the Review Manager, and the lead programmatic analyst. 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 and allow for a more streamlined data delivery process.

4.7.2 SRB Programmatic Analysis

The programmatic assessment of the program or project's progress relative to the schedule and cost is a component in all reviews. The SRB programmatic analysis is performed prior to the site review. Analysis results are briefed 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.

4.7.3 Data Access and Release Timelines

Before the site review, data access and two data deliveries of programmatic data are required to allow for preparatory analyses by the SRB. Using best practices, the following data access and release timelines were established to meet the SRB briefing schedule:

- Access to existing programmatic data: 100 days prior to the site review.
- First formal data delivery: 60 days prior to the site review.
- Final data delivery: 20 days prior to the site review.

Delivery timelines may be adjusted if agreed to by all parties during the SRB planning session with the program or project and well in advance of the first programmatic access.

Because the data access and first formal 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 as a normal part of the design maturation process.

4.7.3.1 Access to Existing Programmatic Data

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.

Access to existing programmatic data commences 100 days prior to the site review when the data are posted on the document library for the SRB to review. Depending on the LCR, it is understood that, in many cases, these data may be in a preliminary format. 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 could change before subsequent data deliveries and/or the review.

Data products include: 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; the Technical, Schedule, and Cost Control Plans; the Risk Management Plan; the Work Breakdown Structure (WBS), the time-phased budget allocation by WBS, and the WBS dictionary; cost (Unallocated Future Expenses (UFE)) and schedule margins and their basis; and Earned Value Management (EVM) data for contracts requiring EVM.

Additionally, other documents that are useful include: past status reports, the Master Equipment List (MEL) and mass properties report, the Power Estimate List (PEL), and metrics for software lines of code.

Early access to data 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 SRB chair in evaluating whether the program or project meets the criteria for the readiness assessment milestone.

4.7.3.2 First Formal Data Delivery

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, any updates to the data products mentioned in Section 4.7.3.1 should be re-posted to the document library. Additionally, the following should be formally delivered and posted to the document library: an updated risk list; an updated IMS and an analysis schedule if a range estimate or Joint Cost and Schedule Confidence Level (JCL) analysis is being performed; and the cost estimate.

As soon as these data are received, the SRB will begin programmatic and risk analysis and SRB risk meetings. 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.

4.7.3.3 Final Data Delivery

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

The final data delivery occurs 20 days prior to the site review. Any updates to the data products mentioned in sections 4.7.3.1 and 4.7.3.2 should be posted to the document library. 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 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.

4.8 Site Review

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.

The site review is the formal, independent review of the program or project by the SRB for the LCR.

4.8.1 Preparing 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 (ETA), the Safety and Mission Assurance Technical Authority

(S&MA TA), 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 (TA), 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 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

Program and project life cycles and the KDPs within these life cycles are central to the program and project management process. At a KDP, 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)).

Because the SRB provides essential information to the Decision Authority for making a KDP determination, it is critical in conducting an effective review for the SRB to understand what information the Decision Authority needs to make the decision. The standard needs and any special needs of the Decision Authority in support of the KDP must be understood and incorporated into the ToR.

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

4.10 Late Life-Cycle Reviews

The Operational Readiness Review (ORR) is the last LCR the SRB routinely conducts.[6] The ORR is conducted like any other LCR, except that the SRB chair reports the ORR's results at the Mission Readiness Review (MRR)/DPMC/APMC (robotic space flight) or the Flight Readiness Review (FRR) (human space flight).

After the ORR, the SRB is dissolved (although it may be reconstituted at the request of the Convening Authorities) and all SRB members and consultants-to-the-board conclude their activities except the SRB chair and Review Manager, who are retained through launch. The SRB chair represents the SRB regarding the results of the ORR assessment in briefings after the ORR that lead to KDP E. On other items, the SRB chair provides his/her personal opinion/views since the SRB has been dissolved (unless it is reconstituted at the request of the Convening Authorities).

After the ORR, the Centers generally conduct the LCRs and do not use an SRB. These reviews include the Safety and Mission Success Review (SMSR) and the PLAR. Center practices are followed for Center-convened reviews. The Center is responsible for assembling the review team. The Center must procure (contract and fund) 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 before 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 coordinated between the SRB and the program or project 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.

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

4.11 Special Reviews Conducted by the SRB

Per *NPR 7120.5*, the Decision Authority can request that the SRB lead other LCRs or special reviews. The process followed for these reviews is the same as for other reviews 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 that the SRB lead other LCRs or special reviews.

The special review focuses on a specific topic or set of issues. Examples of situations that may prompt a special review include:

- Long periods of time (as determined by the Decision Authority) between LCRs, between an LCR and the subsequent scheduled KDP, and between KDPs.
- Key junctures in the life cycles of major programs, projects, or missions.
- Key aspect(s) of programs, projects, or missions of particular interest to the Agency.

Examples of other circumstances that may warrant a special review include:

- Unanticipated changes to the program or project's baseline.
- Trends indicating the program or project is not meeting technical, cost, or schedule requirements.
- Issues maturing an enabling technology.

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 conducting the review. The sanctioned governing document is typically a ToR or a Memorandum of Understanding (MOU) that 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 include 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 listed in *NPR 7120.5 F,* Section 2.4.1.8. The Decision Authority decides if the SRB or another body will conduct the rebaseline review. The review is conducted like a KDP C LCR using the requirements, content, and expectations for that review.

Per *NPR 7120.5*, when a single-project program (regardless of LCC or initial capability cost) or project with an estimated LCC or initial capability cost greater than $250M is rebaselined, a JCL

is calculated and evaluated as a part of the rebaselining approval process. Tightly coupled, loosely coupled, and uncoupled programs provide an analysis of the program's risk posture when a constituent project's Agency Baseline Commitment (ABC) is rebaselined. (For additional detail on rebaseline reviews, see the *PM Handbook*, Section 5.5.5.1.)

5 Standing Review Board Products

The Standing Review Board (SRB) is charged with the responsibility of making an independent assessment of the program 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 or project's technical and programmatic approach, risk posture, progress relative to the baseline, and readiness to progress further in the life cycle.

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. The SRB is responsible for establishing a review level that meets the requirements of the Terms of Reference (ToR) and enables the SRB to determine whether 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.
- Pro-activeness and balance. In assessing the Program/project (P/p) plans at each LCR, SRBs are not limited to assess P/p plans as presented but should also assess whether in the view of the SRB the current P/p plans could be further strengthened to improve P/p performance. Areas where the SRBs could provide appropriate recommendations to strengthen the P/p plans while maintaining balance of alignment to safety and mission success include any de-scope opportunities for requirements or tests; any alternative testing approaches; or any enhanced risk mitigation including investigating any further opportunities to strengthen technical, cost, or schedule performance.
- Awareness between LCRs. While the SRB is on standby between LCRs, the Review Manager is responsible for maintaining contact with the program or project and coordinating with the SRB chair regarding informational materials that may be provided to the SRB team outside of the LCRs. Examples are presentation material from periodic reviews such as quarterly reviews, risk reviews, and major decisional change boards. Between LCRs, SRB team members will attend the program or project's internal meetings or reviews only when such attendance is coordinated with the Review Manager, the SRB chair, and the program or project.
- Ownership of programmatic analyses. The SRB owns 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. The SRB must receive programmatic data (as described in Section 4.7) within the required timeframes so that it has an opportunity to provide feedback to the program or project prior to a

review. The program or project then has the opportunity to make any necessary data adjustments rather than receiving a notification that it does not meet requirements.

5.1 Assessment Criteria

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. All SRB-conducted LCRs use these criteria 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.

At the LCR, the SRB assesses the program 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 are in NPR 7120.5 and the PM Handbook.

These assessment criteria help establish 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).

A three-level metric scale, sometimes referred to as a "stop-light" assessment, is standard for SRB success criteria evaluations: successful (green), partially successful (yellow), or unsuccessful (red). For each of the Agency's six criteria, the SRB provides an assessment and 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 or project's life cycle is likely to be unacceptable later. The SRB uses its expertise to evaluate the program or project, considering life-cycle stage or other circumstances 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 presented 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*.

Table 5-1 Example of Program Assessment Guidance

Criteria	Program Assessment Metrics		
	Successful	**Partially Successful**	**Unsuccessful**
Alignment with and contributing to Agency strategic goals	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	Requirements/architecture exist, consistent with program/Agency goals; project concepts exist for the requirements/architecture that are driving near-term technology investments; key external interfaces/needs are defined.	Requirements/architecture are notional and not always consistent with Agency goals; future mission concepts are inadequate for planning guidance; external needs are poorly defined.	Requirements/architecture do 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 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 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]

Criteria	Program Assessment Metrics		
	Successful	**Partially Successful**	**Unsuccessful**
	The Program IMS 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 are delivered electronically. If logical relationships between projects exist, they are linked within the Program IMS. The program and project critical paths are identifiable within the analysis/Program IMS. 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 Program IMS. Program costs are mapped to the Program IMS. The analysis/Program IMS follows government best practices and is green on schedule health check. Program has and is following a Program Schedule Management Plan. The SRB is able to use the Program IMS for risk identification and schedule and risk analysis of program risks.	The program analysis schedule or Program IMS 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 are delivered electronically. The program and project critical paths are partially identifiable. If logical relationships between projects exist, they are partially linked within the Program IMS. 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 Program IMS. Program costs are partially mapped to the Program IMS. The analysis/Program IMS attempts to implement government best schedule practices but is yellow on health check. The program has but is not following a Program Schedule Management Plan. The SRB is able to use the Program IMS for risk identification and preliminary schedule and risk analysis of program risks.	The program analysis schedule or Program IMS 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 Program IMS. The analysis/Program IMS 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 Plan. The SRB is not able to use the Program IMS 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.

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. UFE and schedule margin 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 Cost and Schedule Confidence Level, IMS = Integrated Master Schedule, UFE = Unallocated Future Expenses, WBS = Work Breakdown Structure.

[1] Single-project programs (regardless of LCC or initial capability cost) develop a JCL at KDP C. Single-project programs with LCC or initial capability cost of $1B or over also develop high and low values for cost and schedule with corresponding JCL values at KDP B, update their KDP C JCL at CDR, and update their JCL at KDP D if current development costs exceed development ABC cost by 5 percent or more.

Table 5.2 Example of Project Assessment Guidance

Criteria	Project Assessment Metrics		
	Successful	**Partially Successful**	**Unsuccessful**
Alignment with and contributing to Agency strategic goals	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 managemen t 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.	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.	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.

Criteria	Project Assessment Metrics		
	Successful	**Partially Successful**	**Unsuccessful**
	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.	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 margins are consistent with preliminary project schedule risk analysis/range estimate/JCL results.	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.

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 Cost and Schedule Confidence Level, UFE = Unallocated Future Expenses, WBS = Work Breakdown Structure.

[1] Projects with LCC or initial capability cost over $250M develop a JCL at KDP C. Projects with LCC or initial capability cost of $1B or over also develop high and low values for cost and schedule with corresponding JCL values at KDP B, update their KDP C JCL at CDR, and update their JCL at KDP D if current development costs exceed development ABC cost by 5 percent or more.

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

One of the first assessments the SRB performs in the program or project life cycle is the alignment of program or project requirements with Agency needs, goals, and objectives, and the 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 evaluates 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, including the effectiveness of the program or project's use of Leading Indicators. 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, single-project programs, and tightly coupled programs as opposed to uncoupled or loosely coupled programs; therefore, each is addressed separately in Sections 5.1.3.1 and 5.1.3.2.

5.1.3.1 Technical Assessments for 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 7123.1C* Appendix G. A NASA Center may have its own 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 in coordination with the SRB chair, the Review Manager, and the program or project manager. Each assessment should 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 KDP I. The specific contents are then periodically reexamined during Program Implementation Reviews (PIRs) performed as directed by the Decision Authority in accordance with *NPR 7120.5*. The PIR assessments are conducted at a higher level and thus at a less-detailed level of engineering than assessments for project reviews.

The Program Plan should typically cover a decade to demonstrate the program's strategy for pursuing Agency needs, goals, and objectives. Project conceptual definitions within the plan should be sufficiently detailed to support technical and programmatic development plans within the program. The technical assessment 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 PIR.

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

An Independent Cost Analysis (ICA) is an independent analysis of program or project resources. It is comprehensive, qualitative, and broad in scope.

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 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 in development project estimating, the program 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 (EVM) data are used to generate an ICA.

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.

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.

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 (ICE) developed by a different methodology than the program or project for comparison with the Program or Project

Plan. ICEs 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 and to 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, NASA Schedule Management Handbook

Each program and project is responsible for implementing Government best schedule practices. as outlined in the *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), if required, continues to generate valid data and support program or project objectives throughout the program 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.

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's 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.

5.1.4.4 Cost and Schedule Range Estimate Assessments

Single-project programs with an estimated Life-Cycle Cost (LCC) or initial capability cost under $1B and projects with an estimated LCC or initial capability cost greater than $250M and under $1B that fall under the requirements of *NPR 7120.5* (Section 2.4.3) provide a range of cost and a range for schedule at KDP B for all content related to the Agency Baseline Commitment (ABC). 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 Confidence Level (JCL) is not required but may be used.

Single-project programs and projects with an estimated LCC or initial capability cost greater than or equal to $1B develop a JCL and provide a high and low value for cost and schedule with the corresponding JCL value (e.g., 50 percent, 70 percent).[7] The JCL is informed by a probabilistic analysis of development cost and schedule duration.[8] The JCL measures the likelihood of completing all remaining work at or below the budgeted levels and on or before the planned completion of Phase D.

The SRB is responsible for evaluating the submitted program or project cost and schedule range estimates or 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 cost and schedule ranges or JCL and evaluate their impact.

5.1.4.5 Joint Cost and Schedule Confidence Level Assessments

At KDP C, single-project programs (regardless of LCC) and projects with an estimated LCC or initial capability cost greater than $250M that fall under the requirements of *NPD 1000.5* and *NPR 7120.5* (Section 2.4.3) develop a cost-loaded schedule and perform a risk-informed probabilistic analysis that produces a JCL. The JCL at KDP C 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.

At Critical Design Review (CDR), single-project programs and projects with an estimated LCC or initial capability cost greater than or equal to $1B update their KDP C JCL and communicate

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[7] This requirement is not applicable to two-step Announcement of Opportunity missions due to acquisition down-selection serving as KDP B.

[8] The methodology for JCL analysis at KDP B is not limited to a probabilistic analysis of the coupled cost and schedule specified for KDP C. Other parametric and bivariate methodologies may be applied.

the updated JCL values for the ABC and Management Agreement to the Agency PMC (APMC) for informational purposes.

At KDP D, single-project programs and projects with an estimated LCC or initial capability cost greater than or equal to $1B update their JCL if current reported development costs have exceeded the development ABC cost by 5 percent or more and document the updated JCL values for the ABC and Management Agreement in the KDP D Decision Memorandum.

When a single-project program (regardless of LCC or initial capability cost) or project with an estimated LCC or initial capability cost greater than $250M is rebaselined, a JCL is calculated and evaluated as a part of the rebaselining approval process.

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 and can be either Government or privately held.

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 responsible for executing a Risk Management 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 the *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 (RIDM) and Continuous Risk Management (CRM).

RIDM informs systems engineering decisions through better use of risk and uncertainty information in selecting alternatives and establishing baseline 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.

RIDM concerns the use of risk information to assist in the decision process for key decisions.

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 manage Implementation risks more effectively by focusing the CRM process on the baseline performance requirements emerging from the RIDM process.

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

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

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 adequately manage all significant threats to its success.

In support of the independent programmatic analysis, the SRB will engage in discussions regarding the assessment of project risks and uncertainty starting at the SRB kick-off meeting or no later than the 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,* Appendix I present the maturity expectations for the program or project's control plans and milestone products for each LCR. *NPR 7120.5* Tables 2-3 through 2-5 present the LCR objectives and KDP expected maturity states for each LCR and KDP. The *PM Handbook,*

Appendix E 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 and tables to guide their assessment of program or project fulfillment of the Agency's six assessment criteria.

NPR 7120.5 and the PM Handbook have specific maturity expectations for the program and project products and control plans for each LCR.

5.3 NPR 7123.1 Entrance and Success Criteria

NPR 7123.1C Appendix G describes the best practices and expectations 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 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 progress further in the life cycle. This assessment supports the Agency's technical assessment criterion described in Section 5.1.3.

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

NPR 7123.1 provides guidance on each of the entrance and success criteria for each of the program or project LCRs. As an example, Appendix F of this handbook provides an example of *NPR 7123.1* success criteria for a LCR mapped to the six *NPR 7120.5* assessment criteria addressed in Section 5.1.

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" who 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 chair of the Center's independent internal review team and the program or project's representative typically discuss each RFA and reach agreement on its merit for official acceptance as an RFA. The RFA initiator must agree 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 progress the program or project through the life cycle 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 progressing the program or project through the life cycle. 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. Although the SRB is not responsible for determining whether a delta review is necessary, the SRB may include a delta review 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 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 through the life cycle.

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

5.5 SRB Member Product

SRB members provide the Review Manager and the SRB chair with individual written assessments. The required format for the assessments is the Individual Member Independent Report (IMIR) and score card. 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 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 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 final SRB product is the SRB management briefing package with annotated notes, including charts from the independent programmatic analysis.

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.

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. For all programs and Category 1 projects, the governing PMC is the Agency PMC (APMC). For all Category 2 and 3 projects, the governing PMC is the Directorate PMC (DPMC).

5.8 Briefings

Briefings capture a summary of the LCR process, highlight SRB findings and recommendations, and 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 to communicate the SRB's high-level findings regarding the program 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 Mission Directorate Review of SRB Management Briefing Package

The SRB chair and the Review Manager prepare the SRB management briefing package, coordinating with the SRB program analyst(s). The Mission Directorate conducts an initial review of the package to ensure that it has a clear and concise message and complies with Agency policies. Participants receive a copy of the package 24–48 hours prior to the review.

5.8.3 SRB Briefing to Program or Project and CMC

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 (TA), 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 recommendations on passing the program or project into the next life-cycle phase; and
- all SRB recommendations including those proposed to mitigate issues and concerns.

The SRB chair presents the briefing to the CMC or to an integrated CMC if multiple Centers are involved with the program or project.

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.

5.8.4 SRB Briefing to the DPMC

All program and project reviews are presented to the DPMC, which is the governing PMC and the highest reporting level for Category 2 and Category 3 projects. Additionally, the highest reporting level for programs and Category 1 projects at non-KDP LCRs is the DPMC. The timelines and procedures for the reporting of these program and Category 1 project non-KDP LCRs should be similar in nature to those for reporting programs and Category 1 projects to the APMC. (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 program and Category 1 project LCRs that immediately precede a KDP are briefed to the APMC; however, the NASA Associate Administrator and the APMC reserve the right to request briefings on any program or 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. The Decision Memorandum is described in *NPR 7120.5* and the *PM Handbook*. (For additional guidance, see the "Key

Decision Point (KDP) Meeting and Decision Memorandum (DM) Guidance" direction to the APMC Membership dated September 22, 2015.)

5.10 Response, Recommendation, and Decision (RRD) Package

For Agency-level review, RRD packages are the official record of the LCRs conducted by the SRBs and kept by the MDs. The Review Manager will prepare an RRD package that documents the total LCR. This is a summary package of existing LCR materials. The MDs retain 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 Program Management Council (PMC), Mission Directorate (MD), 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) 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 (ASM). A decision-making forum where senior Agency Management reviews and approves program and project acquisition strategies. The ASM focuses on considerations such as impacting the Agency workforce, maintaining core capabilities, make-or- buy decisions, supporting Center assignments, potential partnerships, and risk. (See *NPD 1000.5* for more information on ASMs.)

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 to 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 Associate Administrator 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 Non-Consensus (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 Formal Dissent process.

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

Approval (for Implementation). The acknowledgment by the Decision 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 BoE 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, Budget Formulation* and *NPR 9470.1, Budget Execution* for other related financial management terms and definitions.)

Categorization. A means of establishing Agency expectations of Program/Project Managers (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 2.1.3 of *NPR 7120.5F* 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 technical and management process applying appropriate processes, resources, and controls to establish and maintain consistency between product configuration information and the product throughout the product life cycle.

Conflict of Interest (COI). 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 decisions are affected by a personal interest; a conflict of interest implies only the potential for bias, not the 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 (ToR), 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 (CADRe). A three-part document required for tightly coupled programs, loosely coupled programs, single-project programs, and projects (regardless of Category or Class) that provides critical data to assist NASA in developing high fidelity cost and schedule estimates for new NASA projects. CADRe consists of Part A "Narrative" and Part B "Technical Data" in tabular form, provided by the program or project using existing program or project material. The program or project team produces the project life-cycle cost (LCC) estimate, schedule, and risk identification which is appended as Part C. For single-project programs and projects that plan continuing operations and production, including integration of capability upgrades, with an unspecified Phase E end point, the initial capability cost plus the current Phase E cost estimate is used instead of the LCC.

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 his or her authority.

Decision Memorandum. The document that summarizes the decisions made at Key Decision Points (KDPs) or as necessary in between KDPs. The decision memorandum includes the Agency Baseline Commitment (ABC) (if applicable), Management Agreement cost and schedule, Unallocated Future Expenses (UFE), and schedule margin managed above the project, as well as Life-Cycle Cost (LCC) and schedule estimates, as required. For single-project programs and projects that plan continuing operations and production, including integration of capability upgrades, with an unspecified Phase E end point, the initial capability cost plus the current Phase E cost estimate is used instead of the LCC.

Directorate Program Management Council (DPMC). The forum that evaluates all programs and projects executed within a Mission Directorate (MD) and provides input to the MD Associate Administrator. For programs and Category 1 projects, the MD Associate Administrator carries forward the DPMC findings and recommendations to the Agency Program Management Council (APMC).

Earned Value Management (EVM). A project management approach 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 with objective performance measurement techniques, 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 Work Breakdown Structure (WBS) elements).

Earned Value Management System. The integrated set of policies, processes, systems, and practices that meet an organization's implementation of EIA-748. This integrated management system and its related subsystems 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 Life-Cycle Reviews (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.

Formal Dissent. A substantive disagreement with a decision or action that an individual judges is not in the best interest of NASA and is of sufficient importance that it warrants a timely review and decision by higher-level management.

Formulation. The identification of how the program or project supports the Agency's strategic needs, goals, and objective; 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 (FAD). The document issued by the Mission Directorate Associate Administrator (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 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 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 Formulation Authorization Document (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 strategic needs, goals, and objectives.

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 (ICA). 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 an Independent Cost Estimate (ICE), assessment of resource management, distribution, and planning, and verification of cost-estimating methodologies. (ICAs are not LCC estimates 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.

Initial Capability. For single-project programs and projects that plan continuing operations and production, including integration of capability upgrades, with an unspecified Phase E end point, the initial capability is the first operational mission flight or as defined as part of the KDP B review plan. The scope of the initial capability is documented in the KDP B Decision Memorandum.

Integrated Master Schedule (IMS). A logic network-based schedule that reflects the total project scope of work, traceable to the Work Breakdown Structure (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 (JCL). 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. The JCL calculation includes consideration of the risk associated with all elements, whether they are funded from appropriations or managed outside of the project (e.g., risk impacts of a foreign contribution behind schedule, risk impacts of the launch vehicle). JCL calculations include content from the milestone at which the JCL is calculated through the completion of Phase D activities. (See the *NASA Cost Estimating Handbook* for more information on JCL.)

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 involves pre-program acquisition while the Implementation Phase involves program acquisition and operations. For projects, the Formulation Phase involves 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 (LCR). 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., Preliminary Design Review (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 (see Unallocated Future Expenses (UFE)), 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.

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

Preliminary (document context). Implies that the product has received initial review in accordance with Center best practices. The content is considered correct, though some to-be-determined (TBD) items 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 mission support organization that has a defined architecture and/or technical approach, requirements, funding level, and a management structure that initiates and directs one or more projects. A program implements a strategic direction that the Agency has identified as needed to accomplish Agency goals and objectives.

Program Commitment Agreement. The contract between the NASA Associate Administrator and the responsible Mission Directorate Associate Administrator that authorizes a program to transition from Formulation to Implementation.

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 Mission Directorate Associate Administrator, 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. Includes the Mission Directorates (MDs) 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, the program or project, and the principal investigator, if applicable. These include strategic scientific and exploration requirements, system performance requirements, safety 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 (LCC), 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 Mission Directorate (MD) Associate Administrator, if required.

Rebaselining. The process that results in a change to a project's Agency Baseline Commitment (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, NASA Policy for Safety and Mission Success*.)

Review Manager. The individual with the responsibility to ensure the objectivity, quality, integrity, and consistency of each assigned independent review. The Review Manager defines the scope of the review (with the Convening Authorities); facilitates the identification and approval of the chair and team members; participates 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; facilitates the review process; ensures that the scope of the review is fully exercised; and is 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 the potential for performance shortfalls that may be realized in the future with respect to achieving explicitly established and stated performance requirements. Performance shortfalls may be related to any one or more of the following mission execution domains: (1) safety, (2) technical, (3) cost, and (4) schedule. (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 Management. Risk management includes Risk-Informed Decision Making (RIDM) and Continuous Risk Management (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.

Risk-Informed Decision Making (RIDM). 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.

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

Stakeholder. An individual or organizational customer having an interest (or stake) in the outcome or deliverable of a program or project.

Standards. Formal documents that establish a norm, requirement, or basis for comparison, a reference point to measure or evaluate against. 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 and the entrance and success criteria in *NPR 7123.1*, the maturity matrices in the *PM Handbook*, and the life-cycle requirements in *NPR 7120.5*. (See the ToR Template in Appendix H.)

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 is to be achieved to successfully 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. Per *NPR 7123.1*, NASA systems engineering is a logical systems approach performed by multidisciplinary teams to engineer and integrate NASA's systems to ensure NASA products meet the customer's needs. Implementation of this systems approach will enhance NASA's core engineering capabilities while improving safety, mission success, and affordability. This systems approach is applied to all elements of a system (i.e., hardware, software, and human) and all hierarchical levels of a system over the complete program/project life cycle.

Technical Authority (TA). 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 NASA 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 documents. These requirements are the responsibility of the office or organization that established the requirement unless delegated elsewhere.

Terms of Reference (ToR). 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 (UFE). The portion of estimated cost required to meet a specified confidence level that has not been allocated to the specific project Work Breakdown Structure (WBS) subelements because the probabilistic estimate includes risks and uncertainties. (For additional information on UFE, see the *NASA Space Flight Program and Project Management Handbook*.)

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. The process of showing 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 requirements. Verification 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 or project's end product(s), structured according to the way the work will be performed and reflecting of the way in which program 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
APMC	Agency Program Management Council
ASM	Acquisition Strategy Meeting
ASP	Acquisition Strategy Planning (meeting)
BoE	Basis of Estimate
CA	Convening Authority
CADRe	Cost Analysis Data Requirement
CD	Center Director
CDR	Critical Design Review
CFR	(U.S.) Code of Federal Regulations
CMC	Center Management Council
CO	Contracting Officer
COI	Conflict of Interest
CPMO	Chief Program Management Officer
CRM	Continuous Risk Management
CS	Civil Service Consensus Board
CS2	Civil Service Consensus Board with expert support
DA	Decision Authority
DM	Decision Memorandum
DoD	Department of Defense
DPMC	(Mission) Directorate Program Management Council
ETA	Engineering Technical Authority
EVM	Earned Value Management
FAD	Formulation Authorization Document
FAR	Federal Acquisition Regulation
FRR	Flight Readiness Review
FRW	Flight Software
GSFC	Goddard Space Flight Center
HQ	NASA Headquarters
I&T	Integration and Testing
ICA	Independent Cost Analysis
ICE	Independent Cost Estimate
IMIR	Individual Member Independent Report
IMS	Integrated Master Schedule
JCL	Joint Cost and Schedule Confidence Level

JPL	Jet Propulsion Laboratory
KDP	Key Decision Point
LCC	Life-Cycle Cost
LCR	Life-Cycle Review
MD	Mission Directorate
MDAA	Mission Directorate Associate Administrator
MDR	Mission Definition Review
MEL	Master Equipment List
MOU	Memorandum of Understanding
MRR	Mission Readiness Review
NASA	National Aeronautics and Space Administration
NC	Non-Consensus Board
NDA	Non-Disclosure Agreement
NESC	NASA Engineering and Safety Center
NFS	NASA FAR Supplement
NOJMO	NASA Office of JPL Management and Oversight
NPD	NASA Policy Directive
NPR	NASA Procedural Requirements
OCC	Office of Chief Counsel
OCE	Office of the Chief Engineer
OCFO	Office of the Chief Financial Officer
OCHMO	Office of the Chief Health and Medical Officer
OCI	Organizational Conflict of Interest
OGC	Office of the General Counsel
OGE	(U.S.) Office of Government Ethics
OMB	(U.S.) Office of Management and Budget
ORR	Operational Readiness Review
OSMA	Office of Safety and Mission Assurance
PCI	Personal Conflict of Interest
PDR	Preliminary Design Review
PEL	Power Estimate List
PIR	Program Implementation Review
PLAR	Post-Launch Assessment Review
PM	Program or Project Manager
PMC	Program Management Council
P/p	Program / project
RFA	Request For Action

RIDM	Risk Informed Decision Making
RM	Review Manager
RRD	Response, Recommendation, and Decision
S&MA	Safety & Mission Assurance
SDR	System Definition Review
SF	Standard Form
SID	Strategic Investments Division
SIR	System Integration Review
S&MA	Safety and Mission Assurance
SMSR	Safety and Mission Success Review
SRA	Schedule Risk Analysis
SRB	Standing Review Board
SRM	Solid Rocket Motor
SRR	System Requirements Review
SSESMM	Spacecraft Systems Engineering Section Mission Manager
STAT	Schedule Test and Assessment Tool
TA	Technical Authority
TBD	To Be Determined
ToR	Terms of Reference
UFE	Unallocated Future Expenses
U.S.C.	United States Code
V&V	Verification and Validation
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, was issued with the Standing Review Board Handbook*, dated November 2009, and was updated in the* Standing Review Board Handbook *dated February 2023.*

The National Aeronautics and Space Administration

POLICY ON

STANDING REVIEW BOARD (SRB)

COMPOSITION, BALANCE, AND **CONFLICTS OF INTEREST**

December 2008[9]

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.

[9] This Policy has been implemented since December 2008, was issued with the Standing Review Board Handbook, dated November 2009, and was updated in the Standing Review Board Handbook dated February 2023.

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.

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 interests; 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

NASA Assistant Administrator for Procurement[10]. Waivers of FAR Subpart 9.5 on organizational conflicts of interest will be granted on a case-by-case basis when it is determined by the NASA Assistant Administrator for Procurement 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.

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.

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

The Decision Authority has the authority to approve a written determination that a contractor's expertise outweighs the contractor's personal conflict of interest when the local Center or NASA Office of Jet Propulsion Laboratory (JPL) Management and Oversight (NOJMO) Office of the Chief Council (OCC) or Headquarters (HQ) Office of the General Counsel (OGC) 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. Controlled Unclassified Information (CUI) as defined in NASA Procedural Requirement (NPR) 2810.7; 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[11]

There are special rules for employees of sponsors[12]. 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

[11] 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.

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

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 Mission Directorate 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 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[13] 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. Such a determination must specifically identify why the need for a particular expertise outweighs recusing the proposed member due to personal conflicts of interest.

The responsible Mission Directorate 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 Mission Directorate and the appropriate contracting officer in consultation with the local Center/NOJMO OCC or HQ OGC where the program or project being reviewed is located to determine the degree of conflict and to devise appropriate mitigation plans when such a plan is appropriate as determined by the contracting officer in consultation with the local OGC. 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 or

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[13] JPL will perform the Review Manager (RM) function for JPL-led projects. The RM functions that must be performed by a civil servant will be supported from the Program Office (when the Program Office is not JPL). If the Program Office is at JPL, RM functions will be performed by the NASA Headquarters Division.

personal conflict of interest 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 Mission Directorate 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

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

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 Formal Dissent 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						
NPR 7123.1C (PIR success criteria)	Assessment Criteria/*NPR 7120.5F*					
	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		

Program Life Cycle—Program Implementation Review						
NPR 7123.1C (PIR success criteria)	Assessment Criteria/*NPR 7120.5F*					
	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
For technology development programs, technologies have been identified that are ready to be transitioned to another project or to an organization outside the Agency.		P	S	S		
Spectrum-related aspects have been concurred to by the responsible Center spectrum manager.			P			

Note: P = Primary, S = Secondary.

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

NPR Para #	*NPR 7120.5F* Requirement Statement	Reqmnt Owner	Delegated	MD AA	CD	PM	Comply?	SRB Reqmnt	*SRB Handbook* Rev C
2.2.5	Program or project managers and an independent Standing Review Board (SRB) shall conduct the System Requirements Review (SRR), System Definition Review (SDR)/ Mission Definition Review (MDR), Preliminary Design Review (PDR), Critical Design Review (CDR), System Integration Review (SIR), Operational Readiness Review (ORR), and PIR LCRs in figures 2-2, 2-3, 2-4, and 2-5.	OCE	No			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.	OGC	No	A	A	A		Yes	Section 3.2
2.2.5.2	The portion of the LCRs conducted by the SRB shall be convened by the Convening Authorities in accordance with Table 2-2.	OCE	No	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 (ETA) representative) shall mutually assess the programs or project's expected readiness for the LCR and report any disagreements to the Decision Authority for final decision.	OCE	No		A	A		Yes	Section 4.2
2.3.5	Following each LCR, the independent SRB chair and the program or project manager shall brief the applicable management councils on the results of the LCR to support the councils' assessments.	OCE	No	A	A	A		Yes	Sections 5.7 and 5.8

Note: This table includes excerpts from the Compliance Matrix in Appendix C of *NPR 7120.5F*, *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 7120.5F* may have implied requirements that are applicable to the SRB as well.

H Terms of Reference Template

Notes to Users of This Template

- 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 4.0.)
- This template is designed with sufficient generality to be used for both programs and projects.
- This template may be adapted to fit the special circumstances of the program or project.
- Statements in curly brackets and italics {*italics*} are explanatory notes or reminders and are not intended to be a part of the final ToR.
- Statements in straight brackets [xxx] are fields to be filled in.
- For single-project programs and projects that define an initial capability and plan continuing operations and production, including integration of capability upgrades, with an unspecified Phase E end point, the description/governance section should clearly identify the program or project's scope to be assessed, i.e., initial capability, capability upgrade(s), or both. Subject to review and approval by the Convening Authorities, separate SRBs and/or separate ToRs may be used for the initial capability and each capability upgrade. When separate SRBs are structured for the initial capability and each capability upgrade and a single ToR is being used, the applicable sections of the template would need to be expanded to accommodate this.
- For tightly coupled programs and their projects, separate ToRs may not be required for each project. Subject to review and approval by the Convening Authorities, the projects may be listed with the program under the description/governance section and the program ToR may include the projects' life-cycle reviews.
- For tightly coupled programs and their projects, subject to review and approval by the Convening Authorities, separate SRBs for each project may not be required, i.e., there can be one SRB for a tightly coupled program and its projects.
- For tightly coupled programs and their projects, when separate SRBs are structured for the program and each of the projects and a single ToR is being used for the program and its projects, the applicable sections of the template would need to be expanded to accommodate this.
- For loosely coupled or uncoupled programs, the projects under the program typically have separate ToRs.
- For single-project programs, there is a single ToR.
- A Program Implementation Review (PIR) appendix is added to the initial ToR when the NASA AA or MDAA requests a PIR.
- 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.

- 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.
- The Convening Authorities include the NASA Associate Administrator, Mission Directorate Associate Administrator, and Center Director who provide signature approval of the ToR that includes SRB membership. Other Convening Authorities are the NASA Chief Engineer and NASA Chief Financial Officer who provide concurrence with these products. Concurrence means that these organizations are actively engaged in the discussions and are coordinated via personnel from these organizations embedded within the Mission Directorates with no formal signatures being required. Reference the NASA White Paper "NASA Independent Assessment Principles and Approach" approved at the May 18, 2016 APMC meeting.

Approved by:

_____

[Name]

Associate Administrator, [Designated] Mission Directorate

NASA Headquarters

_____

[Name]

Center Director

[Center Name]

_____

[Name] ***{Programs & Category 1 Projects only}***

NASA Associate Administrator

NASA Headquarters

Document Change Log

Document Version	Date	Prepared by	Change Summary

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*, the *NASA 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.

NPR 7120.5, *NASA Space Flight Program and Project Management Requirements.*

NPR 7123.1, *NASA Systems Engineering Processes and Requirements*.

NPD 1000.5, *Policy for NASA Acquisition*.

NPR 7120.8, *NASA Research and Technology Program and Project Management Requirements*. *{Only retain if used}*

NPR 8000.4*, Agency Risk Management Procedural Requirements*.

NASA Space Flight Program and Project Management Handbook

{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.

NASA/SP-tbd, *Standing Review Board Handbook*

[Insert list of reference documents, e.g.,
Jet Propulsion Laboratory Institutional Project Review Plan; or

Goddard Space Flight Center Review Plan; or

Marshall Space Flight Center Review Plan; or

Ames Research Center Review Plan; or

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, DPMC 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 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 policy requirements for assessment criteria and review processes in NPR 7120.5, NPR 7123.1, NPD 1000.5, and the SRB Handbook 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*, *NPR 7123.1*, and the *NASA Space Flight Program and Project Management Handbook*. 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 The SRB also assesses whether the P/p plans presented could be further strengthened to improve performance while maintaining the balance of alignment to safety and mission assurance success. Examples of areas where the SRBs could provide appropriate recommendations to strengthen the P/p plans while maintaining balance of alignment to safety and mission success include any de-scope opportunities for requirements or tests; any alternative testing approaches; or any enhanced risk mitigation including investigating any further opportunities to strengthen technical, cost, or schedule performance.

3.4 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 MD designee stating his/her conclusions and approval/disapproval of the Program/project's readiness-to-proceed. The MD designee then sends an email to the CAs containing the following information:

Attendees at the Readiness Assessment

Results of the readiness assessment.

LCR specific information (as required)

Agenda of the upcoming LCR.

LCR timeline.

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 and Single-Project Programs}*

Life-Cycle Review	Review Date*
System Requirements Review (SRR)	Feb 2021
Mission Definition Review (MDR)/System Definition Review (SDR) 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 *{Uncoupled and Loosely Coupled Programs}*

Life-Cycle Review	Review Date
System Requirements Review (SRR)/KDP 0	Feb 2021
System Definition Review (SDR) KDP I	Feb 2022
Program Implementation Review 1* (PIR) KDP II	*

* Subsequent PIRs/KDPs will be conducted as required by the NASA AA or MDAA.

{Or}

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

Life-Cycle Review	Review Date
System Requirements Review (SRR)	Feb 2021
System Definition Review (SDR) KDP 0	Feb 2022
Preliminary Design Review (PDR) KDP I	Feb 2023
Critical Design Review (CDR)	Feb 2024
System Integration Review (SIR) KDP II	Feb 2025
Operations Readiness Review (ORR)	Feb 2026
Program Implementation Review 1* (PIR) KDP IV	*

* Subsequent PIRs/KDPs will be conducted as required by the NASA AA or MDAA.

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 Single-Project Programs}*

Item	Content	Timeline
Data Access	Existing Program/project management documentation (ref. NPR 7120.5F, Tables I-4 and I-6,) and elsewhere, 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	100 calendar days prior to LCR*

	Master Schedule (IMS); cost estimate and planning budget by year and phase; staffing requirements and plans; and infrastructure requirements.	
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 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*

* For two-step LCRs, the timeline is with respect to the second step of the independent integrated LCR.

{*Or*}

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

Item	Content	Timeline
Data Access	Existing Program/project management documentation (ref. NPR 7120.5F, Tables I-1 and I-2) or elsewhere, 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*

* For two-step LCRs, the timeline is with respect to the second step of the independent integrated 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 policy requirements for assessment criteria and review processes in NPR 7120.5, NPR 7123.1, and NPD 1000.5, and in the SRB Handbook, Section 3.2.2 and Appendix C - SRB Composition, Balance and Conflict of Interest.* ***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]

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 MD-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 MD designee 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 MD.

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 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 Doctor of Design Engineering from the University of a State.

{Continue adding biographies until all members are included.}

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 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 Doctor of Design Engineering from a State Private College.

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

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**	**Human Systems Integration**	**Payload Systems**	**Mission Assurance**	**Cost/Schedule**	**Other SMEs, e.g., 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

I Reference Documents

18 United States Code (U.S.C.) § 201, et seq., Bribery of Public Officials and Witnesses (criminal conflict of interest statutes).

18 U.S.C. § 208, Acts Affecting a Personal Financial Interest.

5 CFR (Code of Federal Regulations) Part 2635, Standards of Conduct for Employees of the Executive Branch.

14 CFR Part 1207, Standards of Ethical Conduct for Employees of the Executive Branch.

48 CFR Subpart 9.5, Organizational and Consultant Conflicts of Interest (Federal Acquisition Regulation (FAR) organizational and consultant conflict of interest regulation).

48 CFR Subpart 1809.5, Organizational and Consultant Conflicts of Interest (NASA FAR Supplement (NFS) organizational and consultant conflict of interest regulation).

NPD 1000.0, NASA Governance and Strategic Management Handbook.

NPD 1000.5, Policy for NASA Acquisition.

NPR 1900.3, Ethics Program Management.

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

NPR 7120.7, NASA Information Technology Program and Project Management Requirements.

NPR 7120.8, NASA Research and Technology Program and Project Management Requirements.

NPR 7120.10, Technical Standards for NASA Programs and Projects.

NPR 7123.1, NASA Systems Engineering Processes and Requirements.

NPR 8000.4, Agency Risk Management Procedural Requirements.

NPD 8700.1, NASA Policy for Safety and Mission Success.

NPR 9120.1, Budget Formulation.

NPR 9170.1, Budget Execution.

NASA/SP-2016-6105, NASA Systems Engineering Handbook.

NASA/SP-2010-3403, NASA Schedule Management Handbook. See Schedule Management Handbook | NASA for the most recently updated version.

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

NASA/SP-20220009501, NASA Space Flight Program and Project Management Handbook.

NASA Cost Estimating Handbook. See Cost Estimating Handbook | NASA for the most recently updated version.

NASA Guidance, "Key Decision Point (KDP) Meeting and Decision Memorandum (DM) Guidance" direction to the APMC Membership dated September 22, 2015

NASA White Paper, "NASA Independent Assessment Principles and Approach," approved at the May 18, 2016 Agency PMC (APMC) meeting