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CONSTELLATION PROGRAM PLAN, ANNEX 4: STANDING REVIEW BOARD COORDINATION PLAN FOR LIFE CYCLE REVIEWS

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REVISION AND HISTORY PAGE

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ACKNOWLEDGEMENT

This document was developed as a joint effort between the Office of the Chief Engineer (OCE), Exploration Systems Mission Directorate (ESMD), Independent Program Assessment Office (IPAO), Constellation Program (CxP), Ares, Orion, Mission Operations (MO), Ground Operations (GO) and EVA project offices, the Johnson Space Center (JSC) Engineering Directorate (ED) and Office of Analysis and Assessment (OAA), and other NASA centers as listed below.

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1.0 INTRODUCTION

The NPR 7120.5D, NASA Space Flight Program and Project Management Requirements, introduces the concept of a single review team called a Standing Review Board (SRB) to conduct all independent reviews throughout the Program and projects' life cycle. The concept integrates the existing comprehensive Independent Review Team (IRT) (7120 type) reviews with the more technically-focused life cycle SRB (NPR 7123, Systems Engineering Procedural Requirements) reviews. There are three reasons for conducting Independent Life Cycle Reviews: first, the Program/project to receive independent assurance that they are implementing according to Agency policy, and using best practices for effective results; second, NASA senior management needs to understand that the Program/project is on the right track, is performing according to plan, and that externally-imposed impediments to its success are being removed; and third, the Agency needs to provide our external stakeholders assurance we are compliant with our commitments. Benefits of the new SRB approach include providing senior management with a single independent review and lowering the burden of multiple independent reviews imposed on Programs and projects. The Exploration Systems Mission Directorate (ESMD) is using the Independent Program Assessment Office (IPAO) to organize SRBs per NPR 7120.5 and to conduct independent reviews of the Constellation Program (CxP) and projects.

1.1 PURPOSE

The purpose of this document is to enhance review quality and efficiency through the development of common definitions and processes for an integrated SRB approach and by maintaining a standard of uniformity in the process and products of independent reviews on the Constellation Program and associated projects. This will ensure that the Program, projects, Decision Authorities (DAs), and Technical Authorities (TAs) benefit from consistent, efficient, and value-added review processes and resulting review products.

1.2 SCOPE

This plan is developed as a tool to help coordinate the SRB conducted Life Cycle Reviews (LCRs) for the Constellation Program and projects (Orion, Ares, Mission Operations, Ground Operations and Extravehicular Activity [EVA] Systems) as identified in CxP 70003, Constellation Program Plan, Paragraph 3.6, External Assessments. This plan was developed by participants in the review process including the Constellation Program and projects, participating NASA field centers, ESMD, Office of the Chief Engineer (OCE), and Program Analysis and Evaluation (PA&E) office. This plan will be updated as required following each LCR. These reviews are being conducted according to NPRs 7120.5 and 7123.1. The Constellation Program is considered as a

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tightly coupled Program per NPR 7120.5, paragraph 2.1.3, and the related projects are classified as Category 1 as defined in NPR 7120.5D, paragraph 2.1.4.

1.3   CHANGE AUTHORITY/RESPONSIBILITY

Proposed changes to this document shall be submitted by a Constellation Program Change Request (CR) to the Constellation Control Board (CxCB) for consideration and subsequent coordination of stakeholders as required by the change.

All such requests will adhere to the Constellation Program Configuration Management (CM) Change Process.

The appropriate NASA Office of Primary Responsibility (OPR) identified for this document is the office of Constellation Program Planning and Control (PP&C).

2.0   DOCUMENTS

2.1   APPLICABLE DOCUMENTS

The following documents include specifications, models, standards, guidelines, handbooks, and other special publications. The documents listed in this paragraph are applicable to the extent specified herein.

NPR 7120.5D
March 6, 2007 to
March 6, 2012

NASA Space Flight Program and Project Management Requirements

NPR 7123.1A
March 13, 2006 to
March 13, 2011

NASA Systems Engineering Processes and Requirements

2.2   REFERENCE DOCUMENTS

The following documents contain supplemental information to guide the user in the application of this document.

CxP 70003

Constellation Program Plan (CxPP)

SRB Handbook
Final Version 1.0

Standing Review Board Handbook

3.0   STANDING REVIEW BOARD

3.1   STANDING REVIEW BOARD ROLE

The SRB's role is to conduct independent reviews of the Constellation (Cx) Program and projects at the life cycle milestones specified in the appropriate life cycle figure per NPR 7120.5D. The SRB independently assesses the Program/project as a whole including the relevant programmatic and institutional authority elements as the Program/project prepares to meet its life cycle milestone requirements. The SRB review provides expert assessment of the technical and programmatic approach, emerging designs against plans, risk posture, and progress against the Program/project baseline. The SRB also includes assessing the adequacy of the Agency institutional support including the support from Centers and whether the proper technical standards, processes, and practices are being applied. A significant benefit to the Program/project is that preparation for the milestone review requires the Program/project to examine its progress holistically against specific criteria for each milestone. This permits both the development team as well as the SRB to see how well the work holds together and examine the assumptions and analyses that support the conclusion the Program/project has reached regarding its maturity and readiness to proceed.

The SRB is advisory to the Program/project and the convening authorities (see Appendix C) and does not have authority over any Program/project content. When appropriate, it may offer recommendations to improve performance and/or reduce risk. The SRB outputs are briefed to the Program/project under review prior to being reported to the next higher level of management. Required Independent Cost Analysis (ICAs)/Independent Cost Estimates (ICEs) and schedule-risk assessments will be developed internally within the SRB and reconciled with the Program/project prior to the Program Management Council (PMC) review.

To accomplish the SRB's responsibilities they are expected to attend the Program/project-level review meetings, and subsets of the SRB are expected to attend the subsystem and peer reviews leading up to the final Program/project-level review. SRB participation in Program/project activities between life cycle reviews will generally be on an exception basis as specified in the appropriate Terms of Reference (ToR) addendum. This limited participation between major milestones ensures that the SRB will provide a fresh, unbiased, and independent view of the work performed by the Program/project. The SRB remains intact, with the goal of having the same core membership for the duration of the Program or project, although it may be augmented over time with specialized reviewers as needed. By having independent experts conduct these reviews, the Program, projects, and convening authorities are provided a unique view that we may have overlooked as a consequence of our close involvement with the ongoing Program/project work.

3.2   SRB FORMATION

The initiation and formation of the SRBs for the Cx Program and projects is accomplished in accordance with requirements specified in NPR 7120.5. The SRB protocols for Constellation are as shown in Table 3.2. These are derived from Table 2-3 of NPR 7120.5. It should be noted that the Constellation projects are classified as Category 1 and therefore Table 3.2-1 denotes those protocols accordingly. (Human space flight projects are classified as Category 1 as defined in NPR 7120.5D, Paragraph 2.1.4.)

TABLE 3.2-1 SRB PROTOCOLS

		Decision Authority		Technical Authority		Associate Administrator, PA&E
		NASA AA	MDAA	NASA CE	Center Director	
Establish SRB, Develop ToR. Approve Chairperson, RM, and Other Board Members	Programs	Approve	Approve	Approve		Approve
	Category1 Projects	Approve	Approve	Concur	Approve	Approve

3.3   SRB MEMBER SELECTION AND APPROVAL

The SRB chairperson, with support from the Review Manager (RM), works with the convening authorities (or their representatives) to organize the review board and submit the names of proposed board members for approval/concurrence. SRB members are selected based on competency, current or recent experience as a practitioner, and independence, with emphasis on competency. SRB members must be independent (do not directly work for or make decisions relative to) of the Program and project and some members (approximately half) must be independent of the Center(s) having a significant role/responsibility on the Program or project. Board members are also chosen based on their objectivity and their ability to make a broad assessment of the implementation of the Program/project that employs numerous engineering and other disciplines.

The process starts with the Chair developing a list of required areas of technical expertise along with potential candidate members and organizational sources for acquiring the expertise. The RM facilitates the nomination process with other convening authorities. The RM next facilitates approvals/concurrence from the convening authorities and prepares and submits the SRB membership nomination approval letter.

Once approved, adjustments to the membership will be made by the SRB chair in consultation with the Review Manager, Mission Directorate representative (usually the Program Executive) and, for projects, the Center Director's Technical Authority representative. Adjustments generally occur to replace departing members or to adjust

membership to meet specific life cycle review needs. The Review Manager will notify the Convening Authorities (CAs) of membership changes to permit the CAs to engage in the change decision process, if desired.

3.4   SRB COMPOSITION

When forming the SRB the Chairperson should consider using Civil Servants and look for representation of non-host Centers on multi-Center projects. The SRB should be as diverse as possible with representation from the Civil Servants (CS) workforce (human and robotic space flight expertise, NASA Engineering and Safety Center [NESC], etc.), industry, academia, and non-NASA agencies where appropriate.

The SRB should have expertise spanning the technical disciplines required to effectively review the projects. SRB chairs also have the capability to augment the SRB capabilities with additional "non-member" support as required in order to fulfill the SRB's mission. Every SRB will have a Chair, RM, IPAO Cost Analyst and other members with specific technical disciplines determined by the project scope and complexity. The SRB Handbook provides additional guidance regarding SRB membership and selection.

3.5   SRB FUNDING

The IPAO will pay for the SRB Chairs, Review Managers, Cost Analysts, and other programmatic SRB staff. The Exploration Systems Mission Directorate will be accountable to provide funding for all other members of the SRBs. The Program and projects shall not contract for the members. The costs associated with these efforts will be developed and captured as part of the annual budget process.

3.6   TERMS OF REFERENCE (ToR)

The SRBs for the Program and the related projects will be governed by a single ToR that describes the Program-wide independent review approach, the charter of each of the SRBs, how they will operate, and how the ToR will be updated. The ToR will have two major components; the Program-wide ToR, and individual Addendums that cover each Program and project life cycle review (e.g., an Orion SDR Addendum). The ToR and the LCR Addendums will be jointly developed and approved/concurred per Table 2-3 of NPR 7120.5D. The Program-wide ToR is written simultaneously with the membership selection process once for the life of a Program or project. It identifies all milestone reviews in the life cycle that the SRBs are being formulated to conduct including a notional schedule. Agreed upon methodology for maintaining SRB insight into project and Program technical activities will be documented in the ToR. An example would be an SRB member attending subsystem design reviews. The Program-wide ToR also describes any special assessments to be completed (e.g., Probability Risk Assessment [PRA], Human Rating assessment, etc.). Updates to the ToR will require approval by the Convening Authorities.

The Addendums are written for a specific life cycle review and includes specific entrance and exit/success criteria for that review as documented in NPR 7123.1 and the Program/project requirements as documented in Chapter 4 of NPR 7120.5. They also include any Center or ESMD review requests. A list of deliverables (documents requested) and products (reports e.g., verbal and text) are specified in each Addendum ToR. The Addendum should also include a schedule of review events. Draft Addendums for the next LCR should be developed following completion of the previous LCR and approved no later than 3 months prior to the scheduled start of the review. If specific SRB participation is expected prior to 3 months before the next LCR, the Addendum must be approved in time to support this participation.

4.0   LIFE CYCLE REVIEW PROCESS

The Program and projects conduct internal reviews as a part of the LCRs. This is accomplished as part of the normal systems engineering work processes of the Program/project as defined in NPR 7123.1 and NPR 7120.5. The Cx Program and projects will keep the SRB informed of these internal events and will include the members of the SRB in the conduct of the internal LCRs as mutually determined. This shall facilitate the exchange of technical and Program management scope, implementation, and performance information. The reviews are conducted under documented Agency and Center review processes. Programs and projects are required to document in their Program and Project Plans their approach to conducting Program/project internal reviews and how they will support the independent life cycle reviews. Consistent with these processes and plans, the SRB conducts its independent review as chartered in its Terms of Reference (ToR). The Program/project will notify the SRB Chair and Review Manager of the LCRs at least 120 days prior to each review so that the Addendum can be developed and approved 3 months prior to the review. The CxP LCR template is as shown in Appendix D.

4.1   LIFE CYCLE REVIEW INPUTS

Program and project technical review entrance and success criteria are contained in NPR 7123.1 Appendix G. Each project and the Program will make these products listed in the entrance criteria and other documents listed in the ToR available to the review team at the onset of the LCR activity or as the documents become available. The project will also make available additional materials as agreed-to between the project and the SRB team, as necessary for the conduct of the review. Any deviations from the entrance criteria specified in NPR 7123.1 will be approved by the Designated Governing Authority for the project per NPR 7123.1, Section 2.3.

Project documents will be provided to the Review Manager electronically (i.e., the Windchill archival system). The Review Manager will provide documents to SRB members electronically (i.e., the Process-Based Mission Assurance [PBMA] Web facility).

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4.2   ASSESSMENT AND SUCCESS CRITERIA

Assessment and success criteria for the LCR are identified in NPRs 7120.5 and 7123.1 respectively. The assessment success criteria are identified in Chapter 2.5 of NPR 7120.5 and the technical success criteria are identified in Appendix G of NPR 7123.1.

4.3   REVIEW ACTIVITIES

Preparation for the milestone review requires the Program/project to examine its progress holistically against specific criteria for each milestone. This permits both the development team as well as the independent review team to assess how the work holds together and examine the assumptions and analyses that support the conclusion the Program/project has reached regarding its maturity and readiness to proceed.

To accomplish both of the above needs, the Constellation Program and projects will include in their milestone review sufficient information on the design and its rationale so that both the project personnel and the SRB can see the whole story to ensure that the work leading up to the final Project Board meetings is informed by this view. If approached in this manner, a typical agenda for a milestone Kickoff review might be as follows:

a.   Purpose of review and charge to SRB

b.   Project overview and status

c.   System engineering and status

   1.   Requirements and Verification and Validation (V&V) plans

   2.   Trade studies

   3.   Technical margins

d.   Work Breakdown Structure (WBS)-level 2 design state and status for each area

   1.   System design

   2.   Key requirements

   3.   Trade studies

   4.   Technology readiness

   5.   Acquisition strategy and long lead

   6.   Logistics and facilities

   7.   Challenges and risks

e. Integrated system (e.g., power) state and status for each area

f. Integration and Test

g. Safety and Mission Assurance (S&MA)

h. Human-rating

i. Risk

j. Schedule

k. Cost

l. Wrap-up

Depending on the depth of the kick-off presentations, additional briefing(s) may be needed to address the changes in the design and/or requirements as a result of decisions made by the project as it closes its work for the milestone. These could be included as part of the project's Board meeting or could follow the project's Board, as appropriate to the situation.

The work of the SRB can be made more efficient if supported by and integrated with the Program, projects, Mission Directorates, and Center's internal evaluations noted above. If lower-level assessments of the work being performed (e.g., internal review of the parachute design, thermal design, etc.) are conducted, the results of theses assessments can be flowed up to the SRB or the SRB can be invited to participate in them. Many of the system/discipline level topics above might be satisfied by this approach, although the SRB will need to review how well these areas hold together at the top level.

During the review it is expected that the SRB will have technical questions. To facilitate getting the questions answered with the least impact to Program and project staff, the SRB and the Program/project will designate single Points of Contact (POC) to facilitate this process. The Program/project and SRB POCs will be identified in the formulation ToR.

Following the LCR board meeting the SRB will conduct a site review during which the project will brief the SRB on any changes or significant deltas to the project baseline presented during the LCR kick-off. The Program/project will provide information to show how the Program/project's documentation maps to the entrance criteria for the LCR. The SRB may request splinter sessions where necessary.

The SRB will write Requests for Action (RFAs) as appropriate during their participation in the internal LCR. The SRB RFA process can be part of the existing Center process for those Centers that have this in place; other Centers will need to develop a closed-loop process to track, disposition, and close RFAs. The SRB chairperson must concur

with the closure of RFAs. If the SRB Chair and the RFA initiator cannot agree on closure, a minority opinion shall be reported. RFA status from previous reviews will be evaluated as a part of each following review.

Following the site review the SRB Chair will hold a post-review caucus with SRB members to organize top issues and additional concerns, determine preliminary consensus, and report writing assignments. They will then conduct an oral debrief (by the Chair/RM) with Program/project manager and host Center Technical Authority (TA). Other participating Centers may participate in this briefing. The purpose of this briefing is to vet the SRB's findings before they are formally reported in order to ensure that they are based on accurate data.

An integrated schedule of the Cx Program and projects key review activities including reporting will be maintained by the Cx Program Planning and Control Office on the Constellation Management Information System (CMIS), which can be accessed through the Windchill System.

4.4   ISSUE RESOLUTION

Infrequent circumstances may arise when a disagreement (such as a RFA submittal/resolution) occurs between the SRB and Program/project (e.g., the Program/project objects to a request from the SRB as a result of anticipated impacts to the Program or project). Every effort should be made first to resolve the issue between the SRB (Chair and Review Manager) and the Program/project (PM or designee). If the issue cannot be resolved it is elevated to the next higher level of programmatic and Independent Review management and the Technical Authority, where appropriate, for resolution. Resolution should be attempted at successively higher levels until resolved. Final adjudication of the issue will be made in the Office of the Administrator. Figure 4.4-1 illustrates the appeal path.
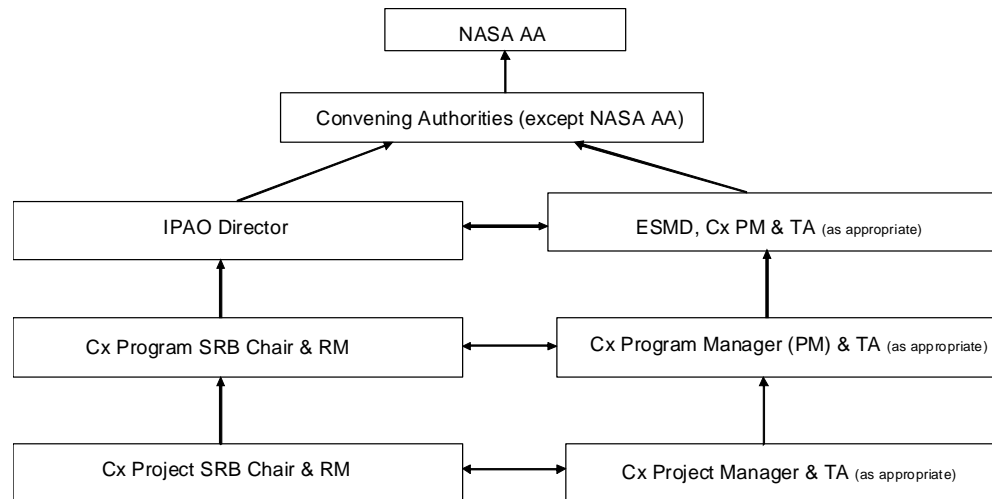
FIGURE 4.4-1 SRB AND CONSTELLATION PROGRAM/PROJECT DISAGREEMENT ADJUDICATION PATH

4.5 REPORTING

The review team will produce a detailed written report and briefing of its proceedings, findings, and recommendations with the purpose of enhancing mission success. The report will be issued within 30 days of the site review or as specified in the ToR. The SRB written report will be in accordance with the Standing Review Board Handbook, (an example of the SRB final report template is provided in the SRB Handbook). The report is for official NASA use only, and must be kept internal to the Agency to preserve the technical credibility of the results. Dissenting opinions of SRB members must be captured in a minority report and included in the final report. Positive findings and best practices will be identified, in addition to any issues/recommendations. The report and briefing will provide details of quantitative and qualitative assessments completed by the team.

Three products are presented in the report.

a. Individual strengths and weaknesses

    1. Strengths

    2. Issues (highest level)

    3. Concerns (lower level - may not be shared with all levels of reporting)

b. Global rating of project status

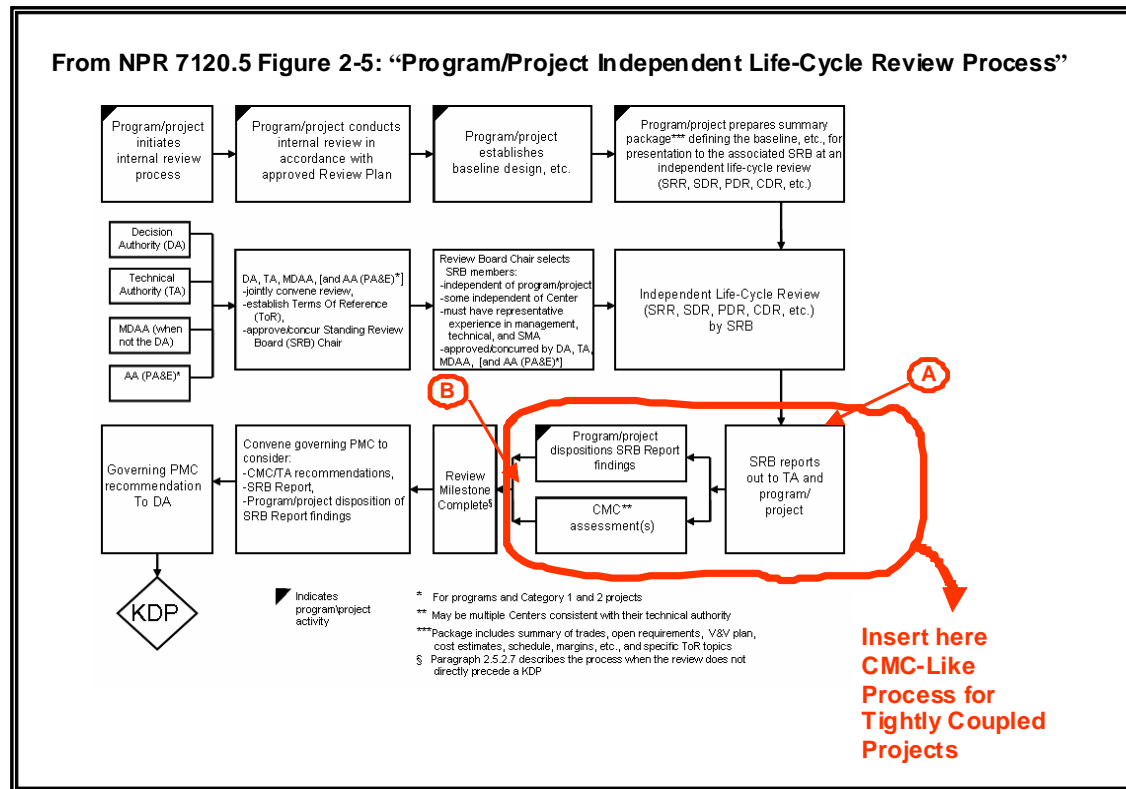c. Any Center/Directorate review specific success criteria (optional)

The SRB should be prepared to make an overall pass/fail recommendation to the ESMD Program Management Council and Agency Program Management Council (APMC) if requested.

When the report and summary briefing are completed, the SRB will brief the results to the Program/project manager and the host Center Technical Authority. The report will then be distributed to the Center Management Council (CMC) for their review. The SRB's review results are next briefed to an integrated CMC which is coordinated by the host Center. For non-Key Decision Point (KDP) reviews the results will be briefed up to the ESMD PMC. They may also be briefed to the APMC if requested. All KDP reviews are briefed to the APMC. This process is illustrated in Figure 4.5-1.

Since the results of the SRB's work are advisory only, the SRB's reports and briefings are predecisional and incomplete without the final decisions made by the project, Program, center, and decision authorities. The SRB will add an addendum to their report that documents the final decisions and outcomes for each LCR so that the final report represents the final outcome of the LCR. Once completed, the SRB Review Manager will distribute the report, including the various briefings, to the Agency leadership in accordance with NPR 7120.5.

Distribution of SRB reports, external to the independent review process in NPR 7120.5, can only be made by the appropriate NASA authorities. As an example, PA&E is the agency interface with OMB and may release the SRB report to them. However as noted above, any release of SRB work must be accompanied by the decision material, so that the final outcome is included. Therefore, only the final SRB report with the decision addendum should be released.

**Reporting Process for Constellation Project
Life Cycle Milestone Review**
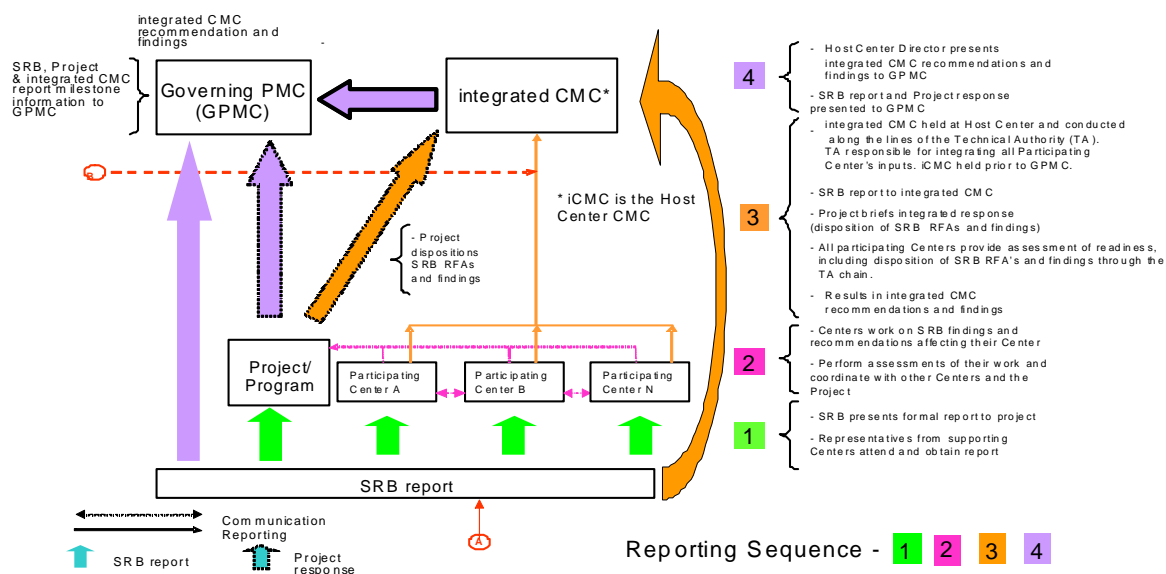
FIGURE 4.5-1 PROGRAM/PROJECT INDEPENDENT LIFE CYCLE REVIEW PROCESS

4.6   REPORT FORMAT

The reporting format for each project will be consistent in order to effectively communicate the SRB's finding and recommendations. The template for the SRB report is provided in the SRB Handbook.

4.7   BRIEFING FORMAT

The briefing will model the written report's format. PMC protocol has been successful with point-counter-point style briefings on each issue/recommendation between the reviewer and the reviewed. The final Agency briefing will include Program/project responses to SRB recommendations and a recommendation from the TA on the Program/project's readiness to proceed into the next life cycle phase.

4.8   REVIEW PROCESS IMPROVEMENT

Actions for SRB review process improvements will be captured initially following completion of the CxP PPAR. A meeting will be scheduled by the CxP SRB Review Manager following each Program KDP to determine best practices and areas for improvement in order to continually improve the independent review function for the CxP and other tightly coupled programs. This meeting will be scheduled to occur within 30 days following the review milestone completion. The improvements will be captured in this plan and the ToRs. Invited participants will include representatives from the following:

a.   Each SRB Chair and Review Manager

b.   Each CxP Project and the Program

c.   Exploration Systems Mission Directorate (ESMD)

d.   Office of the Chief Engineer (OCE)

e.   Office Program Analysis and Evaluation (PA&E)

f.   Office of Safety and Mission Assurance (OSMA)

g.   NASA Engineering and Safety Center (NESC)

h.   The TA from each participating Center

i.   Office of the Chief Health and Medical Officer (OCHMO)

j.   Inputs will also be sought from the convening authorities.

APPENDIX A
ACRONYMS AND ABBREVIATIONS
AND GLOSSARY OF TERMS

A1.0 ACRONYMS AND ABBREVIATIONS

AA	Associate Administrator
APMC	Agency Program Management Council
ARC	Ames Research Center
CA	Convening Authority
CM	Configuration Management
CMC	Center Management Council
CMIS	Constellation Management Information System
CxCB	Constellation Control Board
CR	Change Request
CS	Civil Servant
Cx	Constellation
CxP	Constellation Program
CxPP	Constellation Program Plan
DA	Decision Authority
DFRC	Dryden Flight Research Center
DPMC	Designated Program Management Council
ED	Engineering Directorate
ESMD	Exploration Systems Mission Directorate
EVA	Extravehicular Activity
GO	Ground Operations
GPMC	Governing Program Management Council
GRC	Glenn Research Center
ICA	Independent Cost Analysis
ICE	Independent Cost Estimate
IPAO	Independent Program Assessment Office
IRT	Independent Review Team
JSC	Johnson Space Center

KDP   Key Decision Point
KSC   Kennedy Space Center

LaRC   Langley Research Center
LCR   Life Cycle Review

MDAA   Mission Directorate Associate Administrator
MDPMC   Mission Designated Program Management Council
MO   Mission Operations
MSFC   Marshall Space Flight Center

NASA   National Aeronautics and Space Administration
NESC   NASA Engineering and Safety Center
NPR   NASA Procedural Requirement

OAA   Office of Analysis and Assessment
OCE   Office of the Chief Engineer
OCHMO   Office of the Chief Health and Medical Officer
OMB   Office of Management and Budget
OSMA   Office of Safety and Mission Assurance
OPR   Office of Primary Responsibility

PA&E   Program Analysis and Evaluation
PBMA   Process-Based Mission Assurance
PE   Program Executive
PM   Program Manager
                Project Manager
PMC   Program Management Council
POC   Point of Contact
PP&C   Program Planning and Control
PRA   Probability Risk Assessment

RFA   Request for Action
RM   Review Manager

S&MA   Safety and Mission Assurance
SRB   Standing Review Board

TA   Technical Authority
TBD   To Be Determined

TBR   To Be Resolved
ToR   Term of Reference

V&V   Verification and Validation

WBS   Work Breakdown Structure

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A2.0 GLOSSARY OF TERMS

Term	Description
None	

APPENDIX B
OPEN WORK

B1.0   TO BE DETERMINED

Table B1-1 lists the specific To Be Determined (TBD) items in the document that are not yet known. The TBD is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBD item is numbered based on the section where the first occurrence of the item is located as the first digit and a consecutive number as the second digit (i.e., **<TBD 4-1>** is the first undetermined item assigned in Section 4 of the document). As each TBD is solved, the updated text is inserted in each place that the TBD appears in the document and the item is removed from this table. As new TBD items are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBDs will not be renumbered.

TABLE B1-1 TO BE DETERMINED ITEMS

TBD	Section	Description
None		

B2.0   TO BE RESOLVED

Table B2-1 lists the specific To Be Resolved (TBR) issues in the document that are not yet known. The TBR is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBR issue is numbered based on the section where the first occurrence of the issue is located as the first digit and a consecutive number as the second digit (i.e., **<TBR 4-1>** is the first unresolved issue assigned in Section 4 of the document). As each TBR is resolved, the updated text is inserted in each place that the TBR appears in the document and the issue is removed from this table. As new TBR issues are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBRs will not be renumbered.

TABLE B2-1 TO BE RESOLVED ISSUES

TBR	Section	Description
None		

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APPENDIX C
DEFINITIONS

(NPR 7120.5D)

Agency Program Management Council (Agency PMC) - 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.

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

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

Center Management Council (CMC) - The council at a Center that performs oversight of Programs and projects by evaluating all Program and project work executed at that Center.

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

Convening Authority - The management official(s) responsible for convening a Program/project review, establishing the Terms of Reference, including review objectives and success criteria, appointing the SRB chair, concurring in SRB membership, and receiving documented results of the review.

Decision Authority - The Agency's responsible individual who authorizes the transition of a Program/project to the next life cycle phase.

Independent Cost Analysis (ICA) - An independent analysis of Program resources (including budget) and financial management associated with the Program content over the Program's budget horizon, conducted by an impartial body independent from the management or advocacy chain of the Program. ICA includes, but is not limited to, the assessment of cost estimates, budgets, and schedules in relation to the Program and its constituent projects' technical content, performance, and risk. ICAs may include Independent Cost Estimates (ICEs), assessment of resource management, distribution and planning, and verification of cost-estimating methodologies. (ICAs are not life cycle cost 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 Programs/projects when a life cycle ICE is not warranted.)

Independent Cost Estimate (ICE) - An independent project cost estimate prepared by an office or other entity that is not under the supervision, direction, advocacy, or control of the project (or its chain of command) that is responsible for carrying out the development or acquisition of the Program/project. An ICE is bounded by the 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.

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

Mission Directorate Program Management Council (MDPMC) - The senior management group, chaired by an Mission Directorate Associate Administrator (MDAA) or designee, responsible for reviewing project formulation performance, recommending approval, and overseeing implementation of Category 2 and 3 projects according to Agency commitments, priorities, and policies.

Program - A strategic investment by a Mission Directorate or Mission Support Office 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 defines a strategic direction that the Agency has identified as critical.

Project - A specific investment identified in a Program Plan having defined requirements, a life cycle cost, a beginning, and an end. A project yields new or revised products that directly address NASA's strategic needs.

Standing Review Board (SRB) - The entity responsible for conducting independent reviews of the Program/project per the life cycle requirements. The SRB is advisory and is chartered to objectively assess the material presented by the Program/project at a specific review.

Technical Authority - The individual who specifically maintains technical responsibility over establishment of, changes to, and waivers of requirements in a designated area.

Terms of Reference (ToR) - A document specifying the nature, scope, schedule, and ground rules for an independent review or independent assessment.
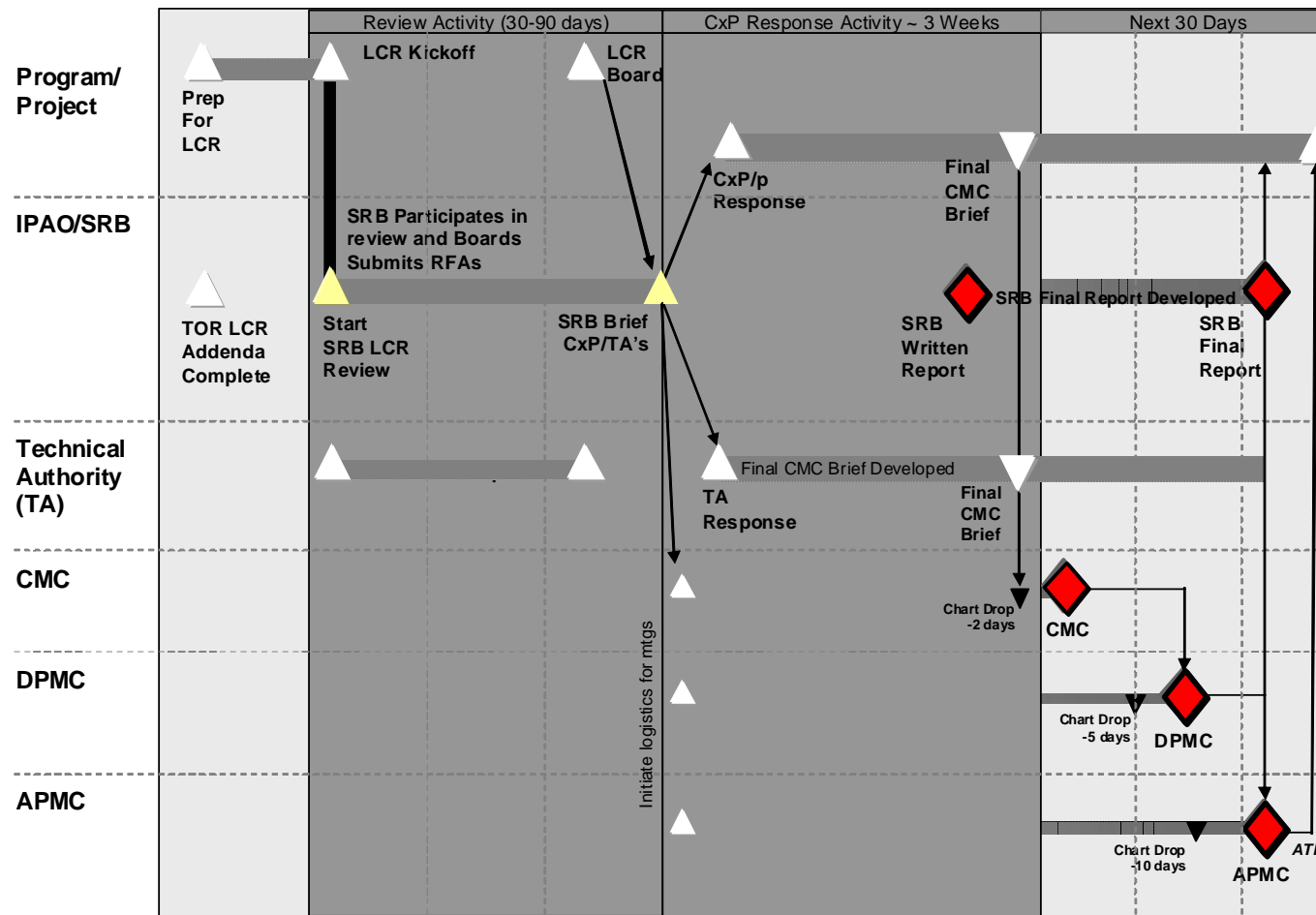
APPENDIX D
CONSTELLATION PROGRAM LIFE CYCLE REVIEW TEMPLATE

FIGURE D-1 CxP LIFE CYCLE REVIEW TEMPLATE