



National Aeronautics and
Space Administration

SMD Standing Review Board Process

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Objectives:

1. Inform PAC on NASA/SMD Standing Review Board (SRB) processes
2. Describe NASA Life Cycle Reviews (LCRs) and SRB insertion points
3. Discuss Psyche IRB finding on SRB process
4. Discuss SRB process improvements

NASA Standing Review Boards (SRBs):

❖ What is an SRB?:

- Advisory bodies responsible for conducting LCRs
- Provide objective expert judgment to Convening Authorities (CAs)
- Comprised of technical and programmatic experts
- Independent from the Program/Project under review with no conflict of interest
- Help ensure appropriate program and project management oversight continuity in order to increase the likelihood of mission success

❖ SRB Purpose:

1. The LCR Convening Authorities (CAs) 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.

References:

SMD SRB Implementation Guide, SPD-43 – SRB Board Selection and Approval, in accordance with the SRB Handbook NASA/SP-2016-3706
NASA 7120.5 NASA Space Flight Program and Project Management
NASA 7123.1 NASA Systems Engineering Processes and Requirements
SMD Large Mission Study Report

SRB Authority:

	Decision Authority		Technical Authority		CFO
	NASA AA	MDAA*	NASA CE*	Center Director(s)	
Programs	Approve	Approve	Concur	Approve	Concur
Cat 1 Projects	Approve	Approve	Concur	Approve	Concur
Cat 2 Projects		Approve	Concur	Approve	Concur
Cat 3 Projects		Approve**		Approve	Concur

*NASA CE=NASA Chief Engineer, MDAA = Mission Directorate Assoc. Administrator

**SMD AA delegates DA to Division Directors for Class D projects

Convening Authorities Depend on Project Category

SRB Roles & Responsibilities:

- The *SRB Chair* is a leader and recognized expert with relevant spaceflight program experience.
- The *SRB Review Manager* manages the content and schedule of work performed by the SRB along with writing the Terms of Reference (ToR) and ensuring appropriate and consistent implementation of NASA policy and processes for LCRs.
 - The *Terms of Reference (ToR)* is an agreed to document that defines the scope of the SRB, schedule, ground rules for conduct and the membership.
- 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.
- A *Deputy Chair* is chosen often to provide consistency across the lifecycle, increase diversity and provide mentorship. The Dep. Chair must also be approved by the CAs.
- For each Agency-level review, the Mission Directorate collaborates with the Centers and OCFO to develop a budget addressing civil servant and contractor travel, labor, and procurement costs.
- The SRB briefs SMD leadership on its preliminary findings at the conclusion of each LCR and shall present at the Management Councils (CMC, APMC, DPMC).

SRBs are Technical & Programmatic Experts, Independent of the Project

Forming an SRB:

1. Program Executive (PE) initiates the process and requests a RM from the implementing Center once LCRs are ready to begin
2. RM coordinates with stakeholders to identify SRB candidates for Chair/Dep. Chair
 - SRB Skills Database
 - *Must be approved by the CAs / Decision Authority*
 - In place prior to Mission Concept Review
3. RM coordinates with PE, Chair, Dep. Chair to establish SRB membership
 - *Must be approved by the CAs*
4. Membership codified in ToR
 - SRBs should be comprised of members representing diverse skillsets, backgrounds and viewpoints.
5. Change process for SRB membership
 - Must be approved and documented by the CAs

SRBs Thoughtfully Chosen and Approved by CAs

NASA Life Cycle Reviews:

NASA Life-Cycle Phases	Approval for Formulation			Approval for Implementation				
	FORMULATION			IMPLEMENTATION				
Life-Cycle Phases	Pre-Phase A: Concept Studies	Phase A: Concept & Technology Development	Phase B: Preliminary Design & Technology Completion	Phase C: Final Design & Fabrication	Phase D: System Assembly, Integration & Test, Launch & Checkout	Phase E: Operations & Sustainment	Phase F: Closeout	
Life-Cycle Gates	KDP A	KDP B	KDP C	KDP D	KDP E	KDP En ⁸	KDP F	
Program/Project Documents	FAD	FA Preliminary Program/Project Plan(s) ¹	PCA ¹ Program/Project Plan(s) ¹			Updated PCA Updated Program/Project Plan	Final Archival of Data	
Agency Reviews Program/Project Life-Cycle Reviews ^{2,5}	MCR	SRR MDR/SDR ASM ⁶	PDR	CDR/PRR ³ SIR	ORR FRR/MRR LRR, SMSR	PLAR CERR ⁴ PIR ⁸	DR DRR	
Other Reviews								
Supporting Reviews		Peer Reviews, Subsystem PDRs, Subsystem CDRs, and System Reviews						
Reflights ⁷						End of Flight PFAR		
		Re-enters life cycle as appropriate based on upgrade needed after flight.						

FOOTNOTES

1. Program Plans and PCAs are baselined at KDP C. These are reviewed and updated, as required, to ensure program content, cost, and budget remain consistent. Program and Project Plans may be combined if approved by the MDAA.
2. Flexibility is allowed to the timing, number, and content of reviews as long as the equivalent information is provided at each KDP and the approach is fully documented in the Program/Project Plan(s).
3. PRR needed for multiple system copies. Timing is notional. PRR is not an SRB review.
4. CERRs are established at the discretion of Program Offices.
5. Life-cycle review objectives and expected maturity states for these reviews and the attendant KDPs are contained in Table 2-5.
6. Timing of the ASM is determined by the MDAA or AA, as compliant with NPD 1000.5 and may take place at any time during Phase A.
7. Placement of arrows is notional. See Section 2.2.4.3 for more guidance on reflights.
8. Once the program is in operations, PIRs are conducted as required by the Decision Authority. KDP En follows the PIRs, i.e., KDP E2 would follow the first PIR, etc.
9. SAR generally applies to human space flight.

ACRONYMS

ASM—Acquisition Strategy Meeting	MRR—Mission Readiness Review
CDR—Critical Design Review	ORR—Operational Readiness Review
CERR—Critical Events Readiness Review	PCA—Program Commitment Agreement
DR—Decommissioning Review	PDR—Preliminary Design Review
DRR—Disposal Readiness Review	PFAR—Post-Flight Assessment Review
FA—Formulation Agreement	PIR—Program Implementation Review
FAD—Formulation Authorization Document	PLAR—Post-Launch Assessment Review
FRR—Flight Readiness Review	PRR—Production Readiness Review
KDP—Key Decision Point	SAR—System Acceptance Review
LRR—Launch Readiness Review	SDR—System Definition Review
MCR—Mission Concept Review	SIR—System Integration Review
MDAA—Mission Directorate Associate Administrator	SMSR—Safety and Mission Success Review
MDR—Mission Definition Review	SRB—Standing Review Board
	SRR—System Requirements Review

▲ Red triangles represent life-cycle reviews that require SRBs. The Decision Authority, Administrator, MDAA, or Center Director may request the SRB to conduct other reviews.

- SRB involvement for each LCR is dependent on the ToR and the type of mission, classification and whether competed or directed.
- LCRs in Red require SRB involvement.

Independent Review Board (IRB) vs. SRB:

- Commissioned when the CAs have concerns with an aspect(s) of the project.
- An IRB is a team of experts intended to evaluate specific concerns.
- The IRB is independent of the project and the SRB, however, for continuity purposes 1-2 members of the SRB are assigned to the IRB.
- While the SRB follows the project through its lifecycle, the IRB scope and duration is finite, with a final report to the CAs as the product.

IRBs Augment SRB Review, but Focus on a Specific Concern

PAC December Meeting Finding Regarding SRB Processes:

- **Finding:** *For the scientific community, the Psyche launch postponement and consequent delay of VERITAS has resulted in a crisis in confidence in NASA and loss of trust in the institutions that support NASA missions. Of particular concern to the PAC, and discussed in the Psyche IRB report, is that critical issues impacting flight readiness were not identified sooner in the SRB review process. The PAC appreciates NASA's transparency and understands that internal reviews of NASA processes relevant to the Psyche postponement are ongoing and looks forward to a report on those findings in the future.*
- **Recommendation:** *The PAC supports the IRB recommendations on the SRB review process, including that NASA/SMD should strengthen the SRB process to ensure that the timing of SRB inputs is well-matched to project stages, serious issues impacting critical factors are identified, and responses to concerns are thoroughly reviewed. In particular, the PAC emphasizes the importance of ensuring that "red" and "green" status codes are not averaged to "yellow" to reduce the severity of a score.*

Psyche SRB Chair's Feedback on Process Improvements:

- SRB was challenged as they were in and out of project involvement over the lifecycle
 - Present at LCRs but not in the day-to-day involvement between reviews
 - Need a balance of SRB involvement to allow project to continue to make good progress
- Concerns were raised at PDR (March 2019) and then again at CDR (May 2020)
 - Risk of missing LRD was elevated at System Integration Review in Dec. 2020
 - Risk realized in April 2022
- What the SRB is doing differently now:
 - More frequent touch points and statusing with the project
 - Weekly reports are now being delivered to the SRB by the project
 - Holding quarterly reviews with the implementing center
 - SRB invited to Monthly Management Reviews (MMRs)
 - SRB now invited to Risk Reviews
 - Weekly meetings with SRB Chair, PE and Mission Manager (MM)
 - Scheduled March 21-23 Psyche IRB Follow Up
 - SRB invited and involved

Psyche SRB Implementing Lessons Learned

SMD SRB Process Improvements:

- *SMD Large Mission Study* report showing SRBs being formed too late in a project life cycle to influence key early decisions.
 - Recommendation for SRB membership to contain fewer technical specialists and more members who could focus on big picture issues.
- *SMD SRB Implementation Plan* developed before the Psyche IRB commissioned.
 - SMD had already begun looking at SRB engagement prior to Psyche.
 - The finding was a natural progression to what we had already started.
- Holding *SMD SRB Community of Practice Quarterlies*:
 - Foster open and transparent dialogue between SRB chairs and SMD leadership
 - Discuss lessons learned, best practices, suggestions for improvements
 - Increased cadence from Bi-Annually to Quarterly
- Reviewed Psyche findings and looked across portfolio to determine if systemic
- Ensuring Centers and SRBs have access and engagement that they need
- Deeper Dive Snapshot Reviews after LCRs

SMD has Leaned Forward to Improve SRBs

Agency SRB Process Improvements:

- Agency looking across the board to apply SRB lessons learned of how independent reviews are formed and conducted
- The Chief Program Management Office (CPMO) will be bringing together the NASA independent assessment community on a recurring basis to generate dialogue, foster knowledge transfer, shed light on areas of success and areas of challenge, and identify opportunities for improvement.
- CPMO holding Road Shows at each Center and discussing strengthening Standing Review Boards as a CPMO Focus Area
- Surveying the broader independent assessment community for a deeper understanding of the salient challenges on the minds of community members.
- Developing model/sample Life Cycle ToR documents.
- Holding deeper dive Agency level Snapshot Reviews after LCRs

Strengthening SRBs one of CPMO Focus Areas



Thank You