NPR 7120.5 Revision E Rollout Agenda

• Opening Remarks	Dr. Mike Ryschkewitsch
• NPR 7120.5E Overview	Sandra Smalley
• *10 minute Break*	
• Cost and Schedule Reporting	Brian Card
• Independent Program Assessment	Dr. James Ortiz

NPR 7120.5 Rev. E Overview

GSFC Roll-Out

November 18, 2011

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Informational Briefing Pre- Decisional

Agenda

- Opening Remarks
- Background
- Objectives
- Schedule
- Version Comparison Summary
- Rev E Contents
- Major Topics of Change
- Additional Supporting Information
- Concluding Remarks

Background – Drivers for Change

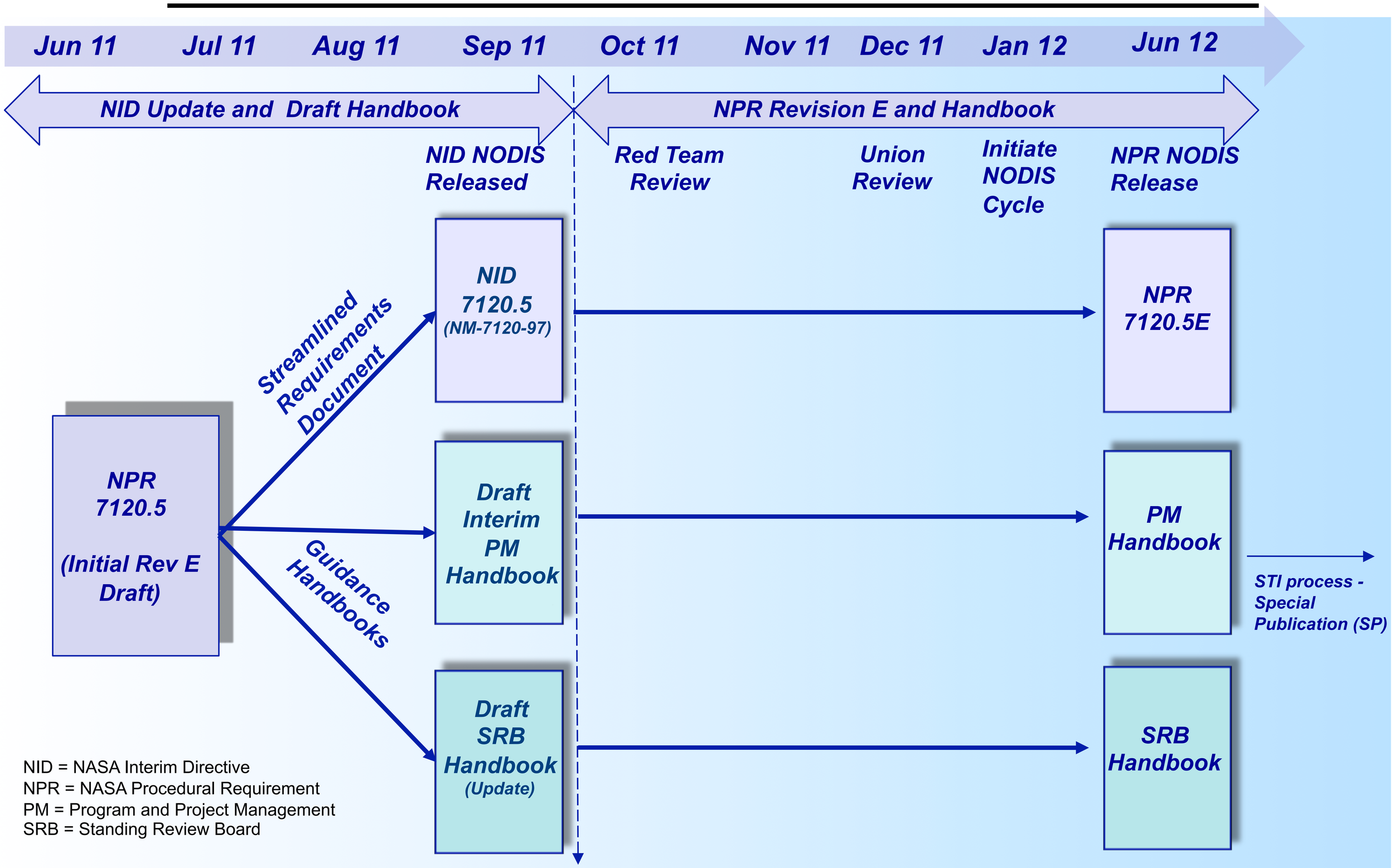
- Increased scrutiny with respect to project performance (cost/ schedule)
- Culture that focuses on technical delivery – sometimes at the expense of meeting cost and schedule commitments
- Lock-in budget profile in the form of a range at KDP B, sometimes without sufficient understanding of risk
- Some projects are allowed to proceed to the next phase due to external pressures without having sufficient maturity
- Do not always document project decisions, agreements and direction
- Environment necessitates affordability, agility and efficiency without increased risk

Improving program and project performance against internal and external commitments

Objectives for Streamlining

- Separate out the essential requirements from guidance
- Focus on objectives of Life Cycle Reviews (LCRs) and Key Decision Points (KDPs)
  - Establish & document clear objectives and management expectations.
  - Perform all work and produce products necessary to demonstrate program/project is ready to move to the next phase
  - Produce and communicate information necessary for informed decision making
  - Discussion with management to get agreement and document decisions, including tailoring
- Program and Project Managers (PM's) are empowered and accountable for reasoned compliance
- Centers are full partners
- Mission Directorate's and Centers: ensure reasoned compliance by proper tailoring, provide adequate resources, support the PM, and take corrective action when necessary

7120.5 - Schedule



Handbooks available on the Other Policy Documents tab in the OCE section in the NODIS library

7120.5 Comparison Summary

Rev D (Mar '07)	*NID (NM-7120-81) (Sep '09)*	*Initial Cut Draft Rev E (Jun ' 11)*	*NID (NM-7120-97)/Draft Rev E (Sep '11)*
♦ 94 pages ♦ 4 Chapters ♦ 9 Appendices	♦ 152 pages ♦ 4 Chapters ♦ 8 Appendices	♦ *233 pages* ♦ *4 Chapters* ♦ *14 Appendices*	♦ 105 pages ♦ 3 Chapters ♦ 8 Appendices
♦ Chapter 2 – Indicative Mood	♦ Chapter 2 – Indicative Mood	♦ *Chapter 2* – Indicative Mood	♦ All requirements converted to shall statements
♦ Chapter 4 – Program and Project requirements by phase	♦ Chapter 4 – Program and Project requirements by phase	♦ *Chapter 4 – Program and Project requirements by phase, plus product maturity matrices* ♦ *Appendix L – expected maturity state tables*	♦ No Chapter 4 ♦ Now overarching requirement statements for Program/Project requirements by phase, e.g. • LCRs • Expected maturity state • Product maturity matrix
♦ No Compliance Matrix	♦ No Compliance Matrix	♦ *No Compliance Matrix*	♦ Compliance Matrix

Program/Project Management (PM) Handbook

Draft NPR 7120.5 Revision E Contents

- **Preface**
- **Chapter 1. Introduction**
  - 1.1 Key Policy Changes in this NPR
  - 1.2 Background
  - 1.3 Overview of Management Process
  - 1.4 Strategic Acquisition and Partnering Process
  - 1.5 Document Structure
- **Chapter 2 NASA Life Cycles for Space Flight Programs and Projects**
  - 2.1 Programs and Projects
  - 2.2 Program and Project Life Cycles
  - 2.3 Program and Project Oversight and Approval
  - 2.4 Approving and Maintaining Program and Project Plans, Baselines, and Commitments
- **Chapter 3 Program and Project Management Roles and Responsibilities**
  - 3.1 Governance
  - 3.2 Roles and Responsibilities
  - 3.3 Technical Authority
  - 3.4 Process for Handling Dissenting Opinions
  - 3.5 Principles Related to Tailoring Requirements
- APPENDIX A - Definitions
- APPENDIX B - Acronyms
- APPENDIX C - Program and Project Requirements by Phase
- APPENDIX D - Formulation Authorization Document Template
- APPENDIX E - Project Formulation Agreement Template
- APPENDIX F - Program Commitment Agreement Template
- APPENDIX G - Program Plan Template
- APPENDIX H - Project Plan Template

Major Topics of Change – NPR 7120 NID/Rev E

- Tailoring
- Compliance Matrix
- Applicability
- Center documentation to implement 7120.5
- Maturity Matrices
- Formulation Agreement
- Baseline Policy
- Confidence Level and Joint Confidence Level
- EVM
- Role of Center Director
- Threat Assessment
- Industrial Base/Supply Chain Management
- Program Entrance to Implementation
- Engineering Technical Authority
- Integrated Center Management Council
- One-Step and Two-Step Life Cycle Review
- Terms of Reference Template

Tailoring

- All programs and projects are unique - 7120 is expected to be tailored
  - Requirements in 7120 were written to address complex Category 1 projects (expect less tailoring on large complex projects and more on small low risk projects)
- Rationale for the requirement should be well understood when tailoring
  - Some requirements are “Not Tailorable” (e.g. externally mandated requirements) – they require approval from the requirement owner if they must be tailored
- Tailoring approach is to be documented in the compliance matrix early in the life cycle and attached to the appropriate plan (Formulation, Program, Project)
  - Deviations and waivers may be submitted when tailoring is not captured in the compliance matrix and plan
- Approvals and concurrences from the CD, MD and owner of the requirement (when not delegated) are to be obtained

Tailoring Principles

- **Process is streamlined and simplified but the principles remain unchanged**

Current and former versions of 7120 require:

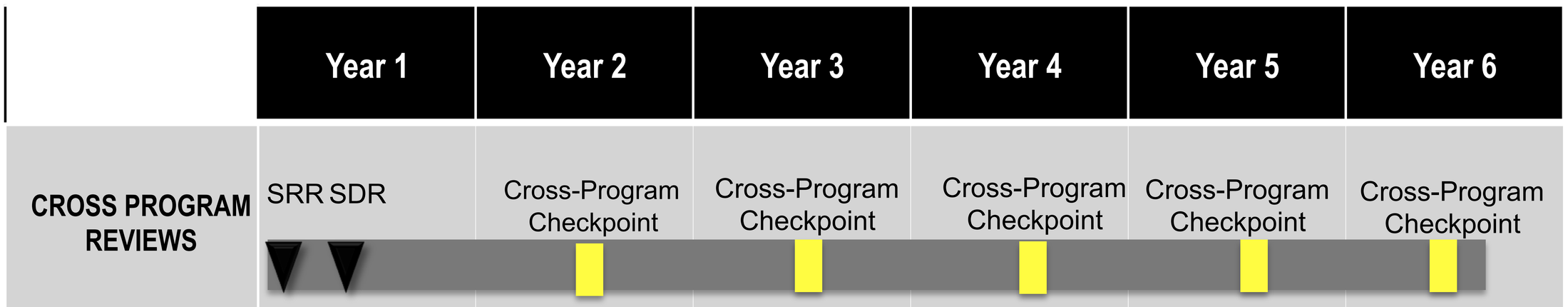
- **a. The organization at the level that established the requirement approves the request for tailoring of that requirement unless this authority has been formally delegated elsewhere. The organization approving the tailoring disposition consults with the other organizations that were involved in the establishment of the specific requirement and obtains the concurrence of those organizations having a substantive interest.**
- **b. The involved management at the next higher level is informed in a timely manner of the request for tailoring of a prescribed requirement.**

Examples of HEO Tailoring

- **ESD has simplified the review process by combining Programmatic and SRB reviews**

- **ESD has implemented Programs and over-laid a cross program function**

- **The cross program function has tailored 7120**



Compliance Matrix

- The Compliance Matrix documents whether and how the program or project complies with the requirements of NPR 7120.5.
- All of the NPR 7120.5 requirements and the organizations/ individual responsible for the action are listed.
- When a requirement is tailored or determined not to be applicable, the matrix includes the rationale for such a determination.
- The completed Compliance Matrix is appended to the Formulation Agreement for projects in Formulation and the Program Plan or Project Plan for programs or projects entering or in Implementation

Compliance Matrix (cont)

- **NASA Chief Engineer delegates authority to the Center Directors and the Director of JPL for dispositioning requests for relief to NPR 7120.5 requirements, except as noted:**
  - **Whether requirements can be tailored or not is defined in the Compliance Matrix**
  - **Requests for relief of non-tailorable requirements must be approved by the NASA Chief Engineer and the owner of the requirement as designated in the Compliance Matrix.**
  - **May be submitted with the Program Plan, Formulation Agreement or Project Plan as part of the normal approval process, provided the required documentation is completed and signatures obtained in accordance to the NPR and delegation authority specified in the delegation letter**

Compliance Matrix (example)

Para #	Requirement Statement	MDAA	Center	PM	Ones Not Tailor -able	Rationale for Tailoring, Comments, Decisions, Location of Documentation
2.2.4	The program or project and an independent Standing Review Board (SRB) shall conduct the LCRs in figures 2-2, 2-3 and 2-4 (except for the Mission Concept Review (MCR), Flight Readiness Review (FRR), Mission Readiness Review (MRR), and all post-launch reviews unless requested by the Decision Authority)[1].			A	NT	
2.2.4.1	The Conflict of Interest (COI) procedures detailed in the *NASA Standing Review Board Handbook* shall be strictly adhered to.	A	A	A	NT	
2.2.4.2	The Independent Program Assessment Office (IPAO), or equivalent, shall document the requirements for the portion of the LCR conducted by the SRB in the Terms of Reference (ToR), for which there is a template in the *NASA Standing Review Board Handbook*.	A	A	A	NT	
2.2.4.3	The program or project manager, the SRB chair and the center director (or designated Technical Authority representative) shall mutually assess the programs or projects expected readiness for the LCR and report any disagreements to the decision authority for final decision.		A	A	NT	
2.2.5	In preparation for these LCRs, the program or project shall document the results of their Formulation or Implementation activities (described in the NASA Program and Project Management Handbook) prior to the LCR and generate the appropriate documentation per Appendix C tables -1 through C-4 of this NID to NPR 7120.5D, NPR 7123.1, and Center practices as necessary to demonstrate that the program's or project's definition and associated plans are sufficiently mature to execute the follow-on phase(s) with acceptable technical, safety and programmatic risk.			A	NT	
	Items from Product Maturity Tables C-1 Through C-4 to be complied with	**Com-ply**	**Com-bined With**	**NA**		**Rationale**
Tabl C-1	**Table C-1 Tightly Coupled Program Milestone Products Maturity Matrix**					
Tabl C-1	1. Program Plan [Baseline at SDR]					
Tabl C-1	1.a. Mission Directorate requirements and constraints [Baseline at SRR]					
Tabl C-1	1.b. Traceability of program-level requirements on projects to the Agency strategic goals and Mission Directorate requirements and constraints [Baseline at SDR]					
Tabl C-1	1.c. Documentation of driving ground rules and assumptions on the program [Baseline at SDR]					

Applicability

- **Applicable to all current and future NASA space flight programs and projects, including**
  - **Spacecraft, launch vehicles, instruments developed for space flight programs and projects, research and technology developments funded by and to be incorporated into space flight programs and projects,**
  - **Critical technical facilities specifically developed or significantly modified for space flight systems, highly specialized IT acquired as a part of space flight programs and projects, and ground systems that are in direct support of space flight operations.**
  - **Reimbursable space flight programs/projects performed for non-NASA sponsors and to NASA contributions to space flight programs and projects performed with international partners.**
- **For existing programs and projects, the requirements of this NPR are applicable to the program/project[1]s extant phase and to phases yet to be completed as determined by the responsible Mission Directorate, approved by the the NASA Chief Engineer (or delegate) and concurred by the Decision Authority.**
- **The above plans will be submitted within 60 days of the effective date of this NPR.**

Center Documentation for Implementing 7120.5

- **NASA Centers shall develop Center documentation to implement the requirements of 7120.5.**

- **Centers will be requested to provide a schedule and plan for implementation**

Maturity Matrices

- **Describe the Expected Maturity State to be achieved by each program and project at each life cycle review and KDP**
  - **The objectives of each LCR and KDP**
  - **The specific review elements and review criteria needed to determine the program's or project's level of maturity**
  - *NPR - Tables 2-2, 2-3 & 2-4*
  - *PM Handbook – additional details in Appendix L*

- **The required products and control plans and level of maturity for each life cycle review and KDP**
  - **Entries are included for Headquarters and Program Products; Project Technical Products; and Project Management, Planning, and Control Products**
  - *NPR – Appendix C, Tables C-1, C-2, C-3, & C-4*
  - *PM Handbook- Tables 4-1, 4-2, 4-3 & 4-4*
- **The term "baseline" means put under configuration control**

Expected Maturity State *(example)*

NID Table 2-4

KDP Review	Associated Lifecycle Review	LCR Objectives	Overall Expected Maturity State at KDP
KDP A	MCR	To evaluate the feasibility of the proposed mission concept(s) and its fulfillment of the program's needs and objectives; to determine whether the maturity of the concept and associated planning are sufficient to begin Phase A.	Overall KDP A Expected Maturity: Project addresses critical NASA need; proposed mission concept(s) is feasible; associated planning is sufficiently mature to begin Phase A, and the mission can likely be achieved as conceived.
KDP B	SRR	To evaluate whether the functional and performance requirements defined for the system are responsive to the program's requirements on the project and represent achievable capabilities.	Overall KDP B Expected State: Proposed mission/system architecture is credible and responsive to program requirements and constraints including resources; and the maturity of the project's mission/system definition and associated plans is sufficient to begin Phase B; and the mission can likely be achieved within available resources with acceptable risk.
	MDR	To evaluate the credibility and responsiveness of the proposed mission/system architecture to the program requirements and constraints, including available resources; to determine whether the maturity of the project's mission/system definition and associated plans are sufficient to begin Phase B.	
	SDR	To evaluate the credibility and responsiveness of the proposed mission/system architecture to the program requirements and constraints, including available resources; to determine whether the maturity of the project's mission/system definition and associated plans are sufficien	
KDP C	PDR	To evaluate the completenes technical & cost/schedule ba to assess compliance of the requirements; to determine if begin Phase C.	

Detailed in PM Handbook

KDP Review	Associated Lifecycle Review	LCR Objectives	Expected Maturity State by Review Criteria						Overall Expected Maturity State at KDP
			Agency Strategic Goals	Management Approach	Technical Approach	Budget and Schedule	Resources Other Than Budget	Risk Management	
KDP A	MCR	To evaluate the feasibility of the proposed mission concept(s) and its fulfillment of the program's needs and objectives; to determine whether the maturity of the concept and associated planning are sufficient to begin Phase A.	The proposed Project has merit, is within the Agency/Program scope, and initial objectives and requirements are appropriate.	The Project FAD and Formulation Agreement are ready for approval and the management framework is in place; key interfaces and partnerships have been identified; and appropriate plans for Phase A are in place.	One or more technical concepts and attendant architectures that respond to mission needs are identified and appear feasible. Driving technologies, engineering development, payload, heritage hardware and software needs and risks have been identified.	Credible risk-informed options exist that fit within desired schedule and available funding profile.	Infrastructure and unique resource needs, such as special skills or rare materials, have been identified and are likely available.	The driving risks associated with each identified technical concept have been identified; approaches for managing these risks have been proposed and are adequate.	Overall KDP A Expected Maturity: Project addresses critical NASA need and can likely be achieved as conceived.
KDP B	SRR	To evaluate whether the functional and performance requirements defined for the system are responsive to the program's requirements on the project and represent achievable capabilities.	Project requirements reflect program requirements and constraints, and are responsive to mission needs.	Project documentation is appropriately mature to support conceptual design phase and preliminary acquisition strategy is defined.	Conceptual design documented; spacecraft architecture baselined; functional and performance requirements have been defined, and the requirements will satisfy the mission.	Credible preliminary cost and schedule range estimates and associated confidence levels are supported by a documented BOE and are consistent w/ driving assumptions, risks, system requirements, design options, and available funding.	Preliminary staffing and essential infrastructure requirements have been identified and documented; preliminary sources have been identified.	Significant mission, technical, cost and schedule risks have been identified; viable mitigation strategies have been defined; a preliminary process and resources exist to effectively manage or mitigate them.	Overall KDP B Expected State: Proposed systems are feasible within available resources with acceptable risk.

Product Maturity Tables *(examples)*

NID Table C-3

Products	Pre-Phase A KDP A	Phase A KDP B		Phase B KDP C
	MCR	SRR	SDR/MDR	PDR
Project Technical Products[1]				
1. Concept Documentation	Baseline	Update	Update	Update
2. Mission, Spacecraft, Ground, and Payload Architectures	Preliminary mission and spacecraft architecture(s) with key drivers	Baseline mission and spacecraft architecture, preliminary ground and payload architectures. Classify payload(s) by risk per NPR 8705.4.	Update mission and spacecraft architecture, baseline ground and payload architectures	Update mission, spacecraft, ground and payload architectures
3. Project-Level, System and Subsystem Requirements	Preliminary project-level requirements	Base and leve		
4. Preliminary Design Documentation				
5. Operations Concept	Preliminary	Preli		
6. Technology Readiness Assessment Documentation	Initial	Upd		
7. Engineering Development Assessment Documentation	Initial	Upd		

NID Table C-4

NPR 7120.5 Project Plan—Control Plans (see template in Appendix F for control plan details)	Pre-Phase A	Phase A KDP B		Phase B KDP C
	MCR	SRR	SDR/MDR	PDR
1. Acquisition Plan	Preliminary	Baseline	Update	Update
2. Technical, Schedule, and Cost Control Plan	Approach for managing schedule and cost during Phase A***	Preliminary	Baseline	Update
3. Safety and Mission Assurance Plan		Baseline	Update	Update
4. Risk Management Plan	Approach for managing risks during Phase A***	Baseline	Update	Update
5. Technology Development Plan	Baseline	Update	Update	Update
6. Systems Engineering Management Plan	Preliminary	Baseline	Update	Update
7. Information Technology Plan		Preliminary	Baseline	Update

Formulation Agreement (New)

- The Formulation Agreement is prepared by the project as a response to the FAD, encompasses work conducted during formulation

- Part of increased emphasis on Formulation in Rev. E to support improved performance during Implementation (and against commitments)

- Reinforces discipline in formulation processes to ensure that critical conversations take place between the Mission Directorate, Program, and Project during formulation, including review of detailed work plans and negotiation of appropriate resource allocations to enable the work

- Establishes and documents technical and acquisition work that must be conducted during Formulation and defines the schedule and phased funding requirements during Phase A and Phase B for that work

Formulation Agreement (Cont.)

- Documents milestones for delivery of Project Plan, Control Plans, flow down of requirements, mission concept, mission scenario and architectures and provides rationale for any differences from NPR 7120.5E requirements

- Identifies spacecraft and ground systems design trade studies planned during Phases A and B

- Identifies major technical, acquisition, cost, and schedule risks to be addressed during Phase A and Phase B

- Documents risk mitigation plans and associated schedule, funding requirements during Phases A and B, and expected progress at KDP B and KDP C

- Provides schedules for life cycle reviews and system and subsystem-level reviews to be held during Phases A and B

Baseline Policy –

Life Cycle Cost Definition

- **Life Cycle Cost is the total cost of ownership over the planned life cycle from Formulation (excluding Pre-Phase A) through Implementation (excluding extended operations).**
  - **Applicable from Phases A – F**
  - **Includes Launch Vehicle**
  - **Indirect costs added by HQ (if appropriate)**
  - **Reflects cost, schedule, and risk**
  - **May include cost of technology demonstrations added to the mission**

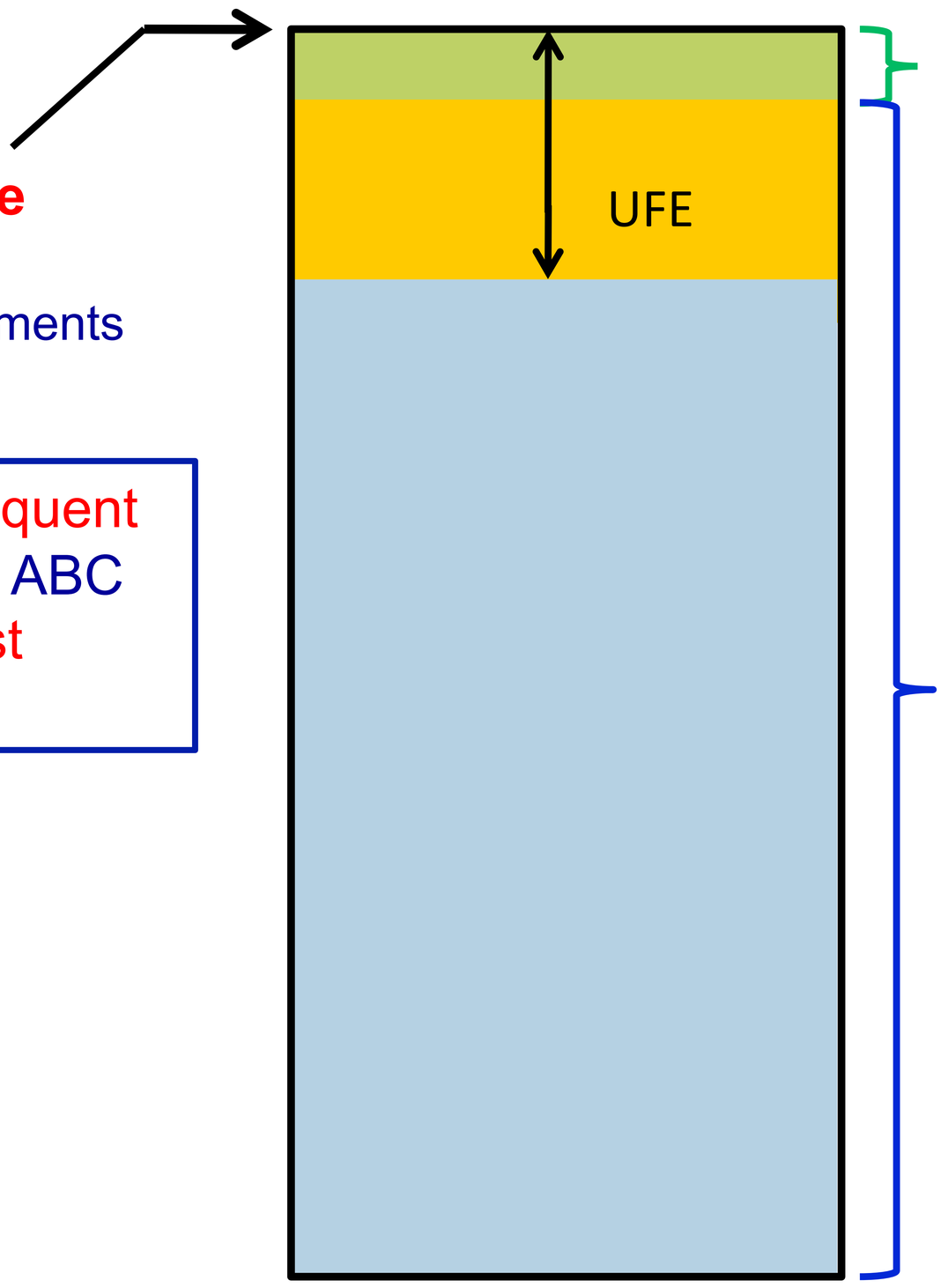
7120 Definition: The total of the direct, indirect, recurring, nonrecurring, and other related expenses incurred, or estimated to be incurred, in the design, development, verification, production, deployment, prime mission operation, maintenance, support, and disposal of a project including closeout, but not extended operations.

Baseline Policy –

Project – Simplified Cost Agreements at KDP C

Agency Baseline Commitment
- External Commitments

At KDP C and subsequent ABC rebaselines the ABC and the life cycle cost estimate are equal.



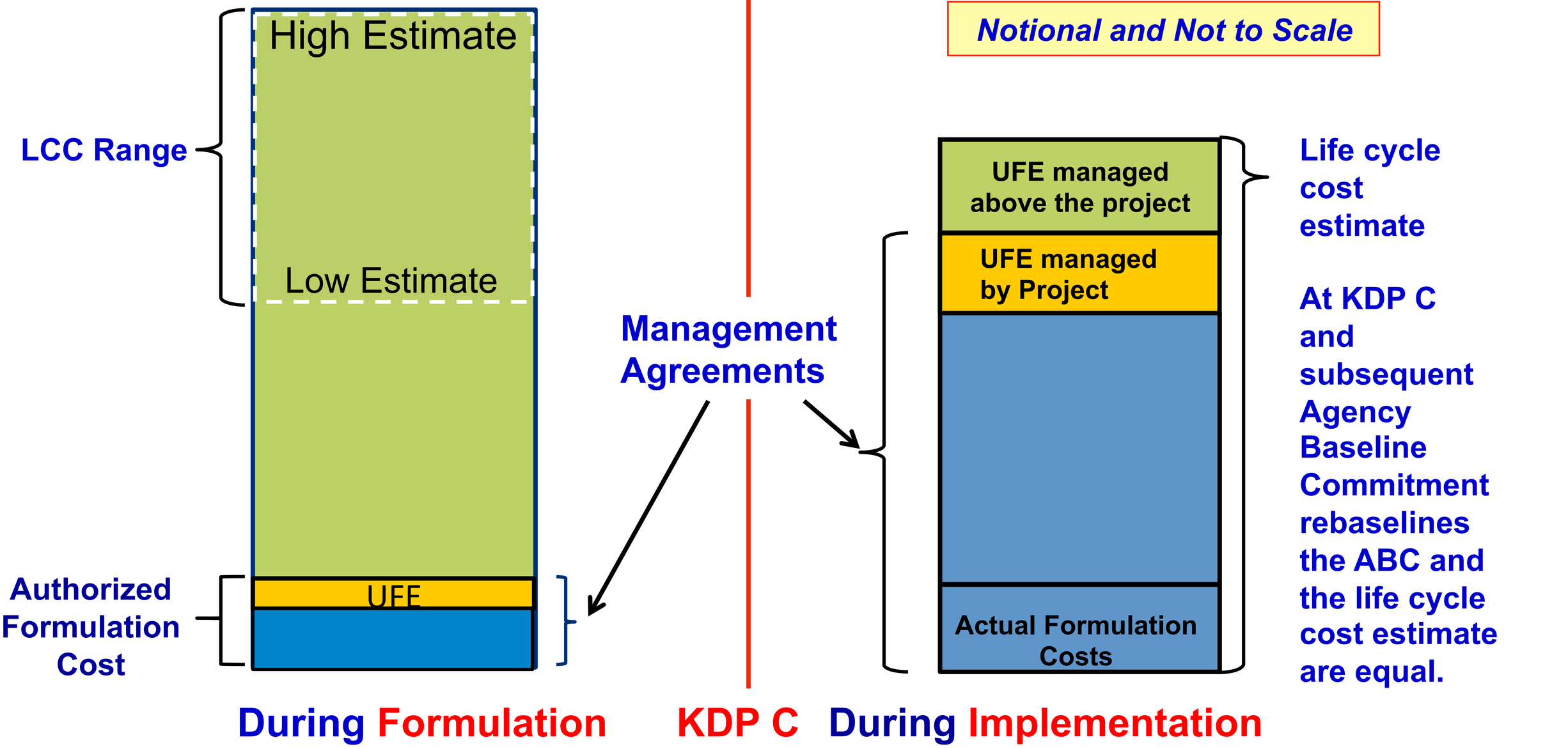
This UFE is managed above the Project.

Management Agreement
- Managed by Project Manager

Not to Scale

Baseline Policy –

Project Life Cycle Cost Agreements and Commitments



Five –year budget run out and schedule estimates are reported to Congress. If a project signs a contract > $50 M, LCC range is reported to OMB. For selected projects, LCC and schedule ranges are reported to GAO

From this point, Congress, OMB and GAO get detailed cost and schedule information. All changes are tracked back to the ABC.

Baseline Policy –

Management Agreement (MA)

- The parameters and authorities over which the program or project manager has management control

- The PM is accountable for compliance with the terms of their Management Agreement and has the authority to manage within the agreement.

- View as a contract between the Agency and the PM.

- A significant divergence from the Management Agreement must be accompanied by an amendment to the Decision Memorandum *.

- To be discussed on a future slide

Baseline Policy –

Unallocated Future Expenses (UFE) - Definition

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

Baseline Policy –

PUTTING THE TERMS TOGETHER

FROM A COST PERSPECTIVE

Management Agreement (MA) *(Includes Project UFE)* **+ Program/MD UFE = Life Cycle Cost (LCC)**

- Occurs throughout Project Life Cycle
- MA includes Project Managed UFE and Schedule Margin
- Reflects the integration of cost, schedule, and risk

Baseline Policy –

Decision Memorandum

Decision Memorandum is issued at each KDP and amended when there is a significant divergence as determined by the Project Manager, the Program Manager, Mission Directorate, or Decision Authority

It summarizes the Program or Project Plan and documents:

- **The constraints and parameters within which the Agency, the program manager, and the project manager will operate and any additional actions resulting from the KDP. (including LCC, Management Agreement, schedule, and JCL…etc.) .**

The signed Decision Memorandum becomes part of the Program or Project Plan.

Baseline Policy –

Decision Memorandum

- **Signed by the DA with required concurrences from:**

Chief, SMA	Chief H& M Officer (if needed)
Chief Engineer	Chief Financial Officer
Evaluation Director/IPCE	Center Directors
MDAA	Program Manager
Project Manager and Principal Investigator (when applicable)	

- **The NASA AA approves all external agency baseline commitments for projects with a LCC > $250M.**
- **The NASA Administrator approves agency baseline commitments for all programs and Category 1 projects with LCC >$1 billion**
- **The KDP is completed when the Decision Memorandum has been signed by the DA**
- **Any significant divergence from the Decision Memorandum by the project budget (by year) or funding (by year) must be accompanied by changes in content, cost estimate (by year, including UFE), and/or schedule (including schedule margin) required to maintain a JCL consistent with the most recent Decision Memorandum.**

Baseline Policy –
Contents of Decision Memorandum (Simplified)

NASA [Agency/Directorate] Program Management Council
Project KDP Decision Agreement

- **Summary:** Brief Description of Council meeting outcome

- **Decision:** Summary of the Program Management meeting agreements/decisions, parameters, actions, and constraints approved and within which the Agency and the Program/ Project Manager will operate and the extent to which changes in plans may be made without additional approval. This includes a summary of the project content and acquisition strategy, along with attached supporting data for the cost and schedule information provided in Tables 1 and 2.

Baseline Policy –
Decision Memorandum - Excerpt

KDP B

Table 1: KDP B Preliminary Cost & Schedule Estimate

	Management Agreement[1]	Total[2]
Cost (Phase B only)		[If there is no UFE this will be the same as the MA]
KDP C Planned Date		
Schedule – Target [LRD, IOC, or FOC]		[Schedule to be a range]
Years/Months of Operations - Target		
Confidence Level (Cost)		
Confidence Level (Schedule)		
Cost - Target	[If applicable]	[LCCE Range]

Table 2: Phased Cost Estimate

	KDP A Costs	Phasing by year					BTC[4]
		FY n	FY n+1	FY n+2	FY n+3	FY n+4	
Management Agreement							
Total							

Amendment

Table 1: Formulation Replan Amendment - Preliminary Cost & Schedule Estimate

	Management Agreement[1]		Total[2]	
	From	To	From	To
Cost (Phase A or B)				
KDP Event Planned Date				
Schedule – Target [LRD, IOC, or FOC]				
Years/Months of Operations - Target				
Confidence Level (Cost)				
Confidence Level (Schedule)				
Cost -Target	[If applicable]			

Actions: [Include this section if there are any actions to report.]
Action number: [Specify who has the action and the date or milestone for completion of the actions; include any additional direction on these actions.]

Baseline Policy –

Agency Baseline Commitment

- **For all projects and Tightly Coupled Programs, the life cycle cost estimate (and other parameters) at KDP C is the Agency's Baseline Commitment (ABC) for that Project or Program.**
- **The ABC is documented in the Decision Memorandum.**
- **The NASA AA approves the ABC for all projects with a life cycle cost estimate > $250 million.**
- **The ABC is the baseline against which the Agency's performance is measured during Implementation.**

Agency Baseline Commitment – Rebaseline

- The ABC may be changed (rebaselined) if one of the following occurs:
  - (1) The estimated development cost exceeds the Agency Baseline Commitment development cost by 30 percent or more and Congress has re-authorized the project; or
  - (2) The NASA AA judges that events external to the Agency make a rebaseline appropriate; or
  - (3) The NASA AA judges that there has been a change to the project scope or the tightly coupled program or project has been interrupted.
- The Decision Memorandum contains the ABC and is amended at a rebaseline.

Baseline Policy –

Agency Baseline Commitment

- **A Rebaseline Review is conducted when an ABC is rebaselined.**

- **The monthly review processes, including the Baseline Performance Review (BPR), are used by the Decision Authority to determine when and whether a program or project needs to be rebaselined.**

Baseline Policy –

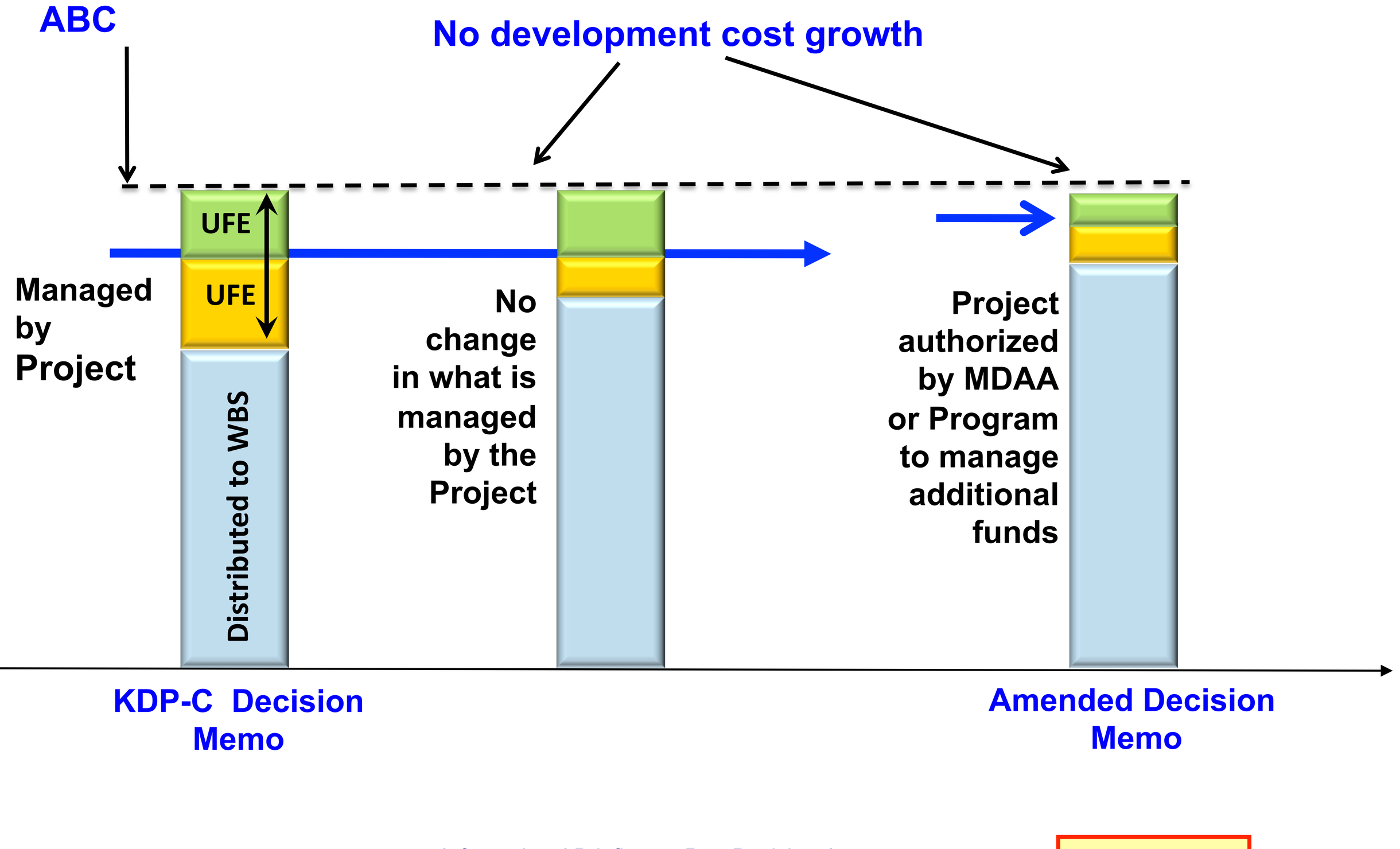
Development Cost Definition

- Includes all project costs from authorization to proceed to Implementation (KDP C) through operational readiness at the end of Phase D. (Source: Draft 7120.5 Rev. E)

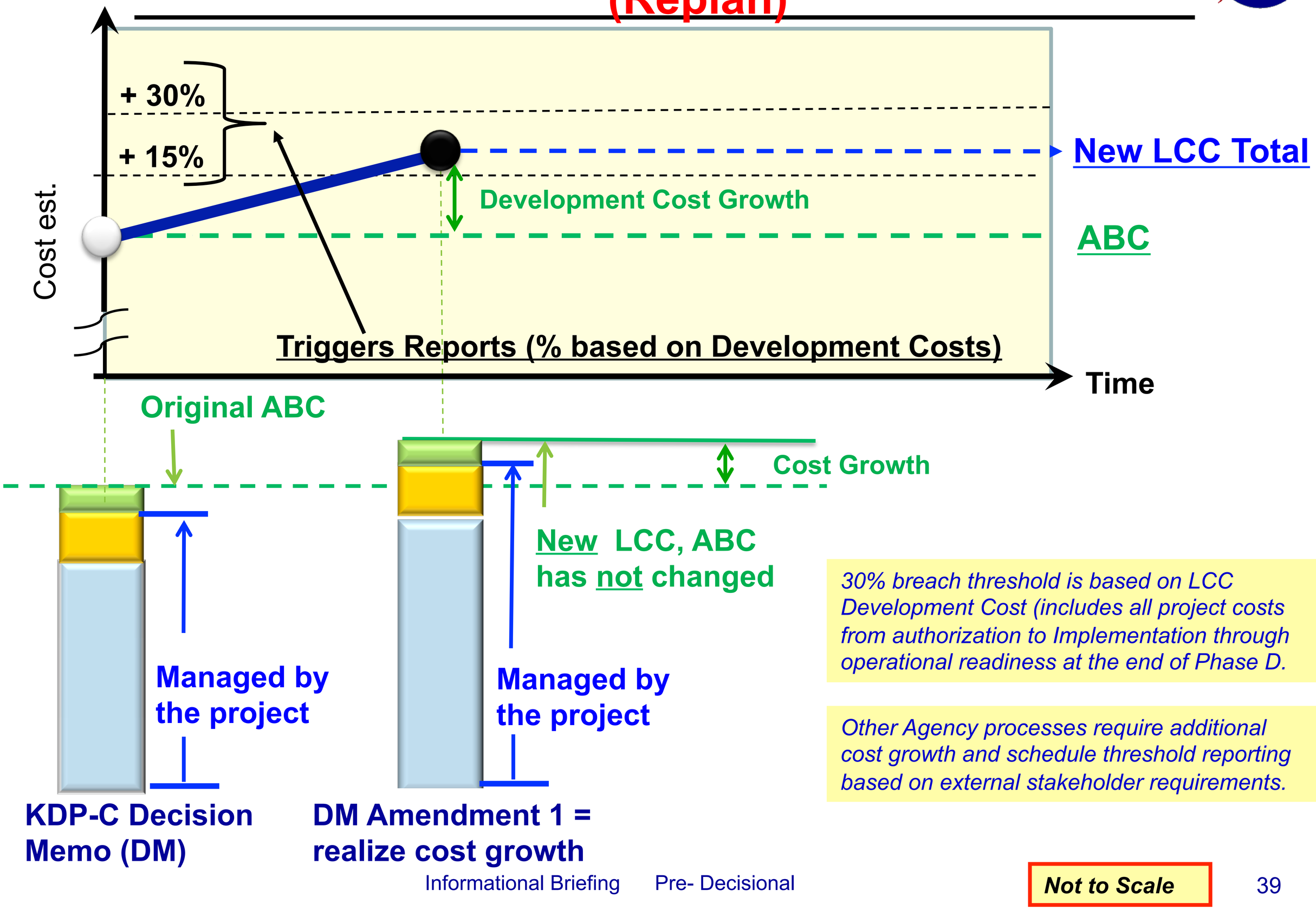
REPLANNING

- **Replanning - The process by which a program or project updates or modifies it plans. (Source: Draft 7120.5 Rev. E)**
  - **Replanning can occur anytime during the Life Cycle Phase between key decision points (KDPs)**
  - **May be as simple as project receives additional UFE from the Program or Mission Directorate**
  - **Includes any significant re-phasing of costs by year**
  - **May involve changes to the project content, schedule, cost or risk posture**

UFE REPLAN


ABC
No development cost growth
UFE
UFE
Managed by Project
Distributed to WBS
No change in what is managed by the Project
Project authorized by MDAA or Program to manage additional funds
KDP-C Decision Memo
Amended Decision Memo

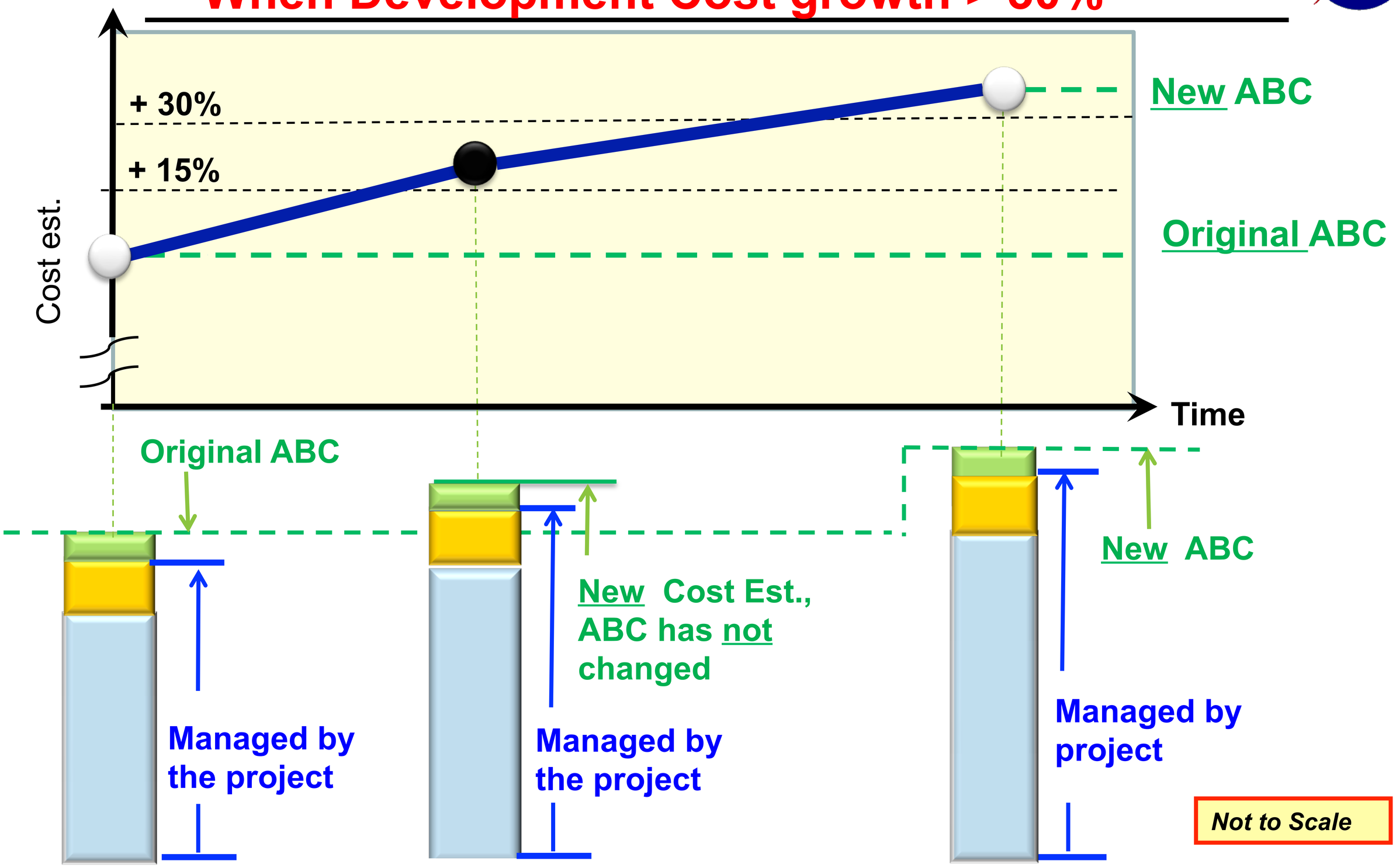
COST GROWTH
(Replan)



30% breach threshold is based on LCC Development Cost (includes all project costs from authorization to Implementation through operational readiness at the end of Phase D.

Other Agency processes require additional cost growth and schedule threshold reporting based on external stakeholder requirements.

REBASELINE (NEW DEAL WITH CONGRESS)
When Development Cost growth > 30%



Confidence Level and Joint Confidence Level (JCL)

- Confidence Levels are established by a probabilistic analysis.
- A Joint Confidence Level is defined as the probability that development cost will be equal to or less than the targeted cost AND the schedule will be equal to or less than the targeted schedule date.

  Example:

  A 70 percent confidence level is the point on the joint development cost and schedule probability distribution where there is a 70 percent probability that the program or project will be completed at or lower than the estimated amount and at or before the projected schedule.

Tightly Coupled Programs, Single-Project Programs and Projects (> LCC $250 M)

- **KDP 0 & KDP B** - provide a a range of cost and a range for schedule at KDP 0/KDP B with a **confidence level** established by a probabilistic analysis and based on identified resources by FY.

  (**Separate analysis of cost and schedule**, each with an associated confidence level, meets the requirement. A **Joint Confidence Level** is not required but may be used at KDP 0/ KDP B.)

- At **KDP 1 / KDP C**, generate a cost loaded schedule probability calculation that meet cost, schedule and **JCL**.
- JCL - probabilistic analysis of the coupled cost and/or schedule to measure the likelihood of completing all remaining work including mitigating risks and conducting operations prior to phase E

The $250 Million LCC includes the launch vehicle.

Tightly Coupled Programs, Single-Project Programs and Projects (> LCC $250 M)

- **Applicable programs and projects are budgeted to a 70 percent joint cost and schedule confidence level or the level approved by the Decision Authority.**

- **Funding is to be consistent with the Management Agreement.**

Loosely Coupled and Uncoupled Programs

- These programs are not required to develop program cost and schedule confidence levels.
- These programs provide an analysis that provides a status of the program risk posture that is presented as each new project reaches KDP B and C or the program or a project is rebaselined.
- Projects in these programs with an expected life cycle cost in excess of $250 million follow the project rules for tightly coupled programs, single-project programs and projects.

Mission Directorates – Joint Confidence Level

- **MD's shall ensure funding for these programs and projects are consistent with the Management Agreement and in no case less than the equivalent of a 50 percent joint confidence level.**

Periodic Checks

- As part of the PPBE process, the responsible MDAA reviews programs and projects and confirms to the Decision Authority that the current baseline life cycle cost estimates continue to support the approved JCLs and Agency Baseline Commitments.

- The monthly review processes, including the BPR, are used to help the Decision Authority determine when and whether a program or project needs to have a JCL recalculated or to be rebaselined.

Earned Value Management (EVM)

- Planning begins during project Formulation.
- EVM is applied in phases C and D to projects with an estimated life cycle cost >$20 million and to Phase E modifications, enhancements, or upgrades with an estimated cost > $20 million.
- EVM system complies with the guidelines in ANSI/EIA-748 and is described in the Project Plan.
- EVM system requirements are flowed down to applicable suppliers. (NFS 1834 is applied to contractors.)
- Projects will conduct an integrated review of project baselines as part of their preparations for KDP C to ensure: (1) work is linked with cost, schedule and risk and (2) systems are in place to conduct EVM.
- Project EVM reporting begins no later than 60 days after the start of Phase C. Contract EVM reporting begins no later than 90 days after contract award.

Role of Center Director

Center Director responsible for institutional authority and for the execution of programs and projects assigned to the center

- **Institutional Authority Role: ensures that their Center program/project teams accomplish their goals in accordance with the prescribed requirements and the Agency's and Center's procedures and processes**
- **Role in Program/Project Execution:**
  - **Establish and maintain ongoing processes and forums, including the Center Management Council to monitor the status and progress of programs and projects at their Center and to provide a summary status at the BPR and other suitable venues**
  - **Periodically review programs and projects to ensure they are performing in accordance with their Center's and the Agency's requirements, procedures, processes, etc.**
  - **Supports the program and projects by providing needed Center resources, providing support and guidance to programs and projects in resolving technical and programmatic issues and risks, monitoring the technical and programmatic progress of programs and projects to help identify issues as they emerge, and proactively work with Mission Directorates, programs, projects and other Institutional Authorities to find constructive solutions to problems**
  - **Improves the Program and Project Management capability of the Center, participating in the Agency's Program Project Management Board, existing Working Groups (EVM Working Group, Cost Analysis Working Group, Systems Engineering Working Group, and soon-to-be chartered, Program , Planning, and Control (PP&C) Working Group), and other opportunities for professional and organizational development based on lessons learned and best practices.**

Threat Assessment (New)

Requirement in 7120.5, listed in Appendix C, descriptions referenced in the P/p Plan Templates:

- **Threat summaries - developed for programs and document the threat environment that a NASA space system is most likely to encounter as it reaches operational capability. These documents contain Top Secret/ Sensitive Compartmented Information and are the basis for establishing threat levels that the program office will use to develop survivability strategies and risk avoidance or mitigation measures.**
- **Protection plans - written for projects (in collaboration with the project's Mission Systems Engineer) to identify the critical nodes and single points-of-failure in a space systems architecture. Protection measures and survivability strategies are recommended to the project management team to mitigate vulnerabilities and enhance the resilience of the mission. These documents also contain critical technical information for use by the DoD and the Intelligence Community to aide in defending civil space assets.**
- **Threat summaries and protection plans are developed for the P/p by a core team of experts with proper clearances.**
- **Security plans are developed for the P/p by the P/p and describe the plans for ensuring security, technology protection and emergency response**

Threat Assessment (New)

- Does not require that every Program or Project Manager hold a security clearance
- Informed decisions by Agency leadership will be made regarding acceptance and mitigation of risks
- Program/Project manager will build approved risk mitigations into the design during the formulation process to minimize costs

Industrial Base/Supply Chain Management (New)

- **Industrial Base – Capabilities residing in either the commercial or government sectors required to design, develop, manufacture, launch, and service the program or project.**
  - Encompasses related manufacturing facilities, supply chain operations and management, a skilled workforce, launch infrastructure, research and development, and support services.

- **Supply Chain - Specific group of suppliers and their interrelationships that is necessary to design, develop, manufacture, launch, and service the program or project.**
  - Encompasses all levels within a space system including providers of raw materials, components, subsystems, systems, systems integrators, and services.

Industrial Base/Supply Chain Management (New)

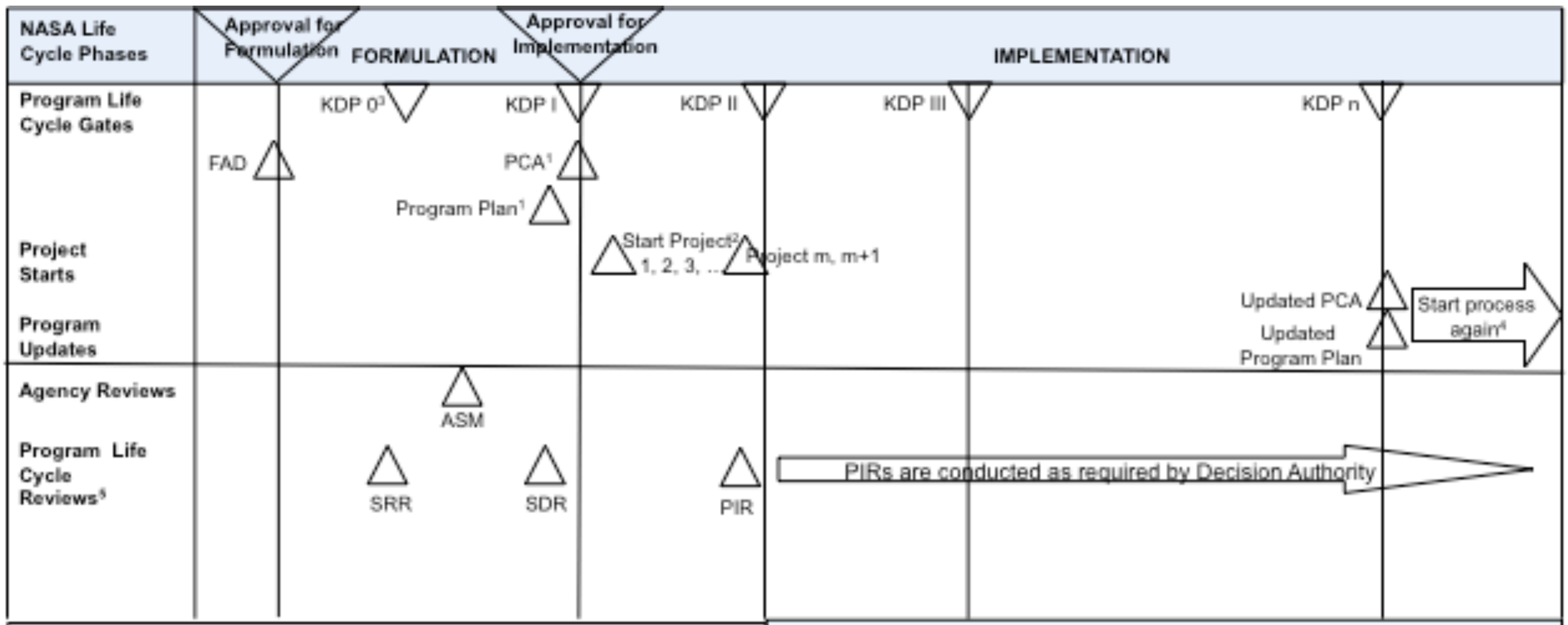
- **During Formulation: Assess the relevant industrial base and supply chain to ensure program or project success –** (Chapter 1, Overview of Management Process,
  - **Identification of potential critical and single-source suppliers needed to design, develop, produce, support, and, if appropriate, restart an acquisition program or project, in the context of the life cycle of the project under consideration.** Appendices G & H, Program/Project Plan Templates)

Program Entrance into Implementation

- All programs now enter the Implementation phase at KDP I.

- Previously, single-project programs entered implementation at KDP II. Neither Revision D nor the NID were clear concerning when tightly coupled programs were approved for implementation (KDP I or KDP II).

Figure 2-2 The NASA Program Life Cycle (Uncoupled and Loosely Coupled)



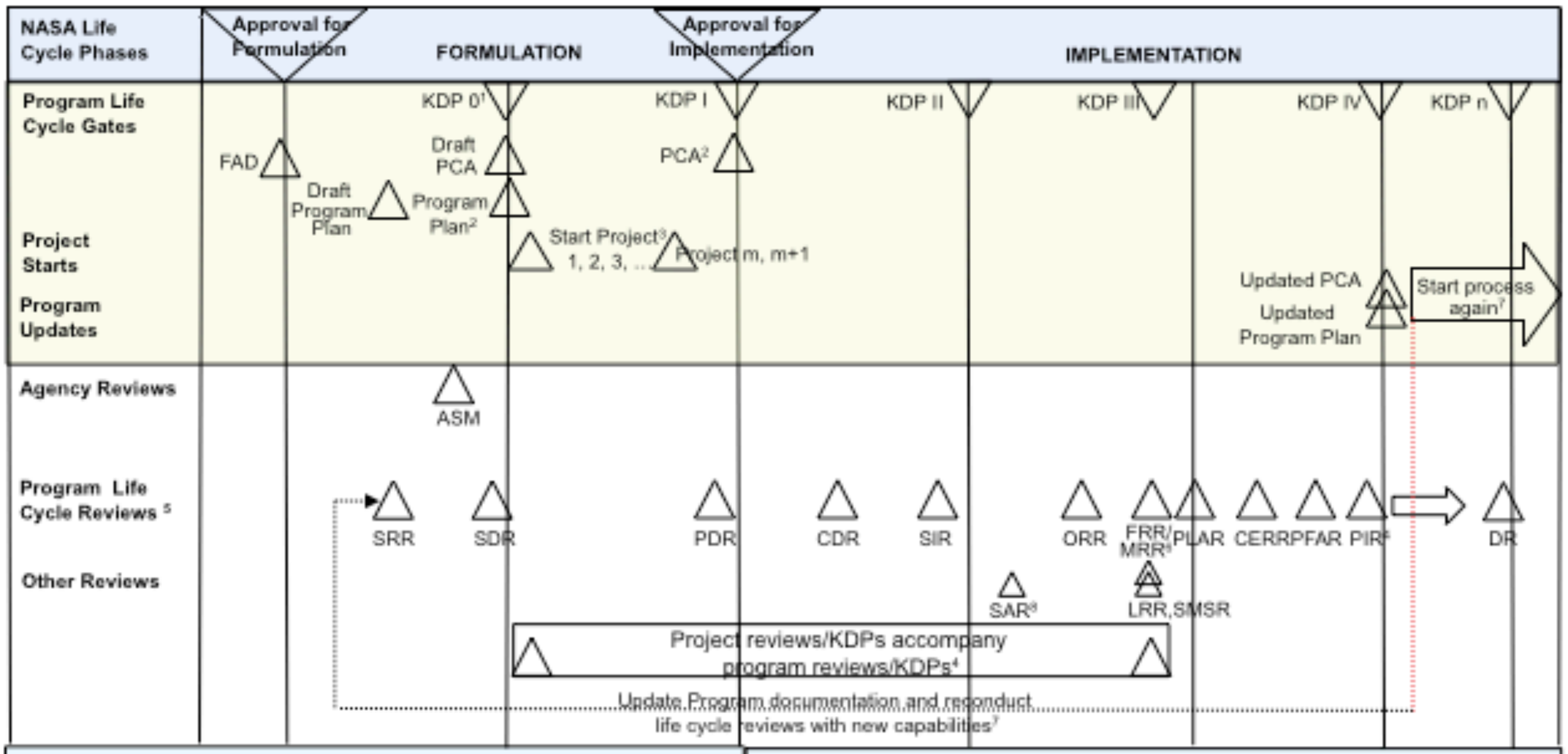
FOOTNOTES

1. Program Plans are baselined at SDR, and PCAs are baselined at KDP I. These are reviewed and updated, as required, to ensure program content, cost, and budget remain consistent.
2. Projects, in some instances, may be approved for Formulation prior to KDP I. Initial project pre-Formulation generally occurs during program Formulation.
3. KDP 0 may be required by the Decision Authority to ensure major issues are understood and resolved prior to formal program approval at KDP I.
4. When programs evolve and/or require upgrades (e.g., new program capabilities), the life cycle process will be restarted when warranted, i.e., the program's upgrade will go through Formulation and Implementation steps.
5. Life cycle review objectives and expected maturity states for these reviews and the attendant KDPs are contained in Table 2-3.

ACRONYMS

ASM—Acquisition Strategy Meeting
FAD—Formulation Authorization Document
KDP—Key Decision Point
PCA—Program Commitment Agreement
PIR—Program Implementation Review
SDR—System Definition Review
SRR—System Requirements Review

Figure 2-3 The NASA Program Life Cycle (Tightly Coupled)



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1. KDP 0 may be required by the Decision Authority to ensure major issues are understood and resolved prior to formal program approval at KDP I.
2. Program Plans are baselined at SDR, and PCAs are baselined at KDP I. These are reviewed and updated, as required, to ensure program content, cost, and budget remain consistent.
3. Projects are usually approved for formulation prior to KDP I.
4. Tightly coupled program reviews generally differ from other program types because they are conducted to ensure the overall integration of all program elements (i.e., projects). Once in operations, PIRs are conducted as required by the Decision Authority.
5. Life cycle review objectives and expected maturity states for these reviews and the attendant KDPs are contained in Table 2-4.
6. The KDP E decision is made at the conclusion of FRR for human space flight and the MRB for robotic space flight. These meetings constitute the PMC meetings. The FRR/ MRR/MRB are part of a series of events shown in the NASA Program and Project Management Handbook leading to approval to launch.
7. When programs evolve and/or require upgrades (e.g., new program capabilities), the life-cycle process will be restarted when warranted, i.e., the program's upgrade will go through Formulation and Implementation steps.
8. SAR only applies to human space flight.

ACRONYMS

ASM—Acquisition Strategy Meeting
CDR—Critical Design Review
CERR—Critical Events Readiness Review
DR—Decommissioning Review
FAD—Formulation Authorization Document
FRR—Flight Readiness Review
KDP—Key Decision Point
LRR—Launch Readiness Review
MRB—Mission Readiness Briefing
MRR—Mission Readiness Review
ORR—Operational Readiness Review

Oversight - Role of Program/Project Level Engineering Technical Authority (ETA)

- **ETA leads and manages the engineering functions, including systems engineering, design, development, sustaining engineering, and operations.**

Allowed in 2009 NID…Now the default approach

- **To support TA independence and maintain an effective check and balance system**
  a. The Engineering Technical Authority cannot be the decision maker on a board or panel that provides relief to a derived requirement. This provision does not preclude such an Engineering Technical Authority from chairing preliminary boards that provide input to the change or control board.
  b. As a minimum, two Engineering Technical Authorities (e.g., the PCE and the applicable LDE) must agree with the action to accept a change to or a waiver or deviation from a Technical Authority requirement.

a. & b. are the same as in the NID

Oversight - Center Director TA Role in Program

- **The flow of Technical Authority for programs was changed to match that for projects.**

Technical Authority originates with the Administrator and is formally delegated to the NASA AA and then to the NASA Chief Engineer for Engineering TA; the Chief, Safety and Mission Assurance for SMA TA; the Chief Health and Medical Officer for Health and Medical Technical Authority; and then to the Center Directors.

This change is part of Rev. E's emphasis on the broad role of the Center Director in the oversight of programs and projects on assigned to their Center.

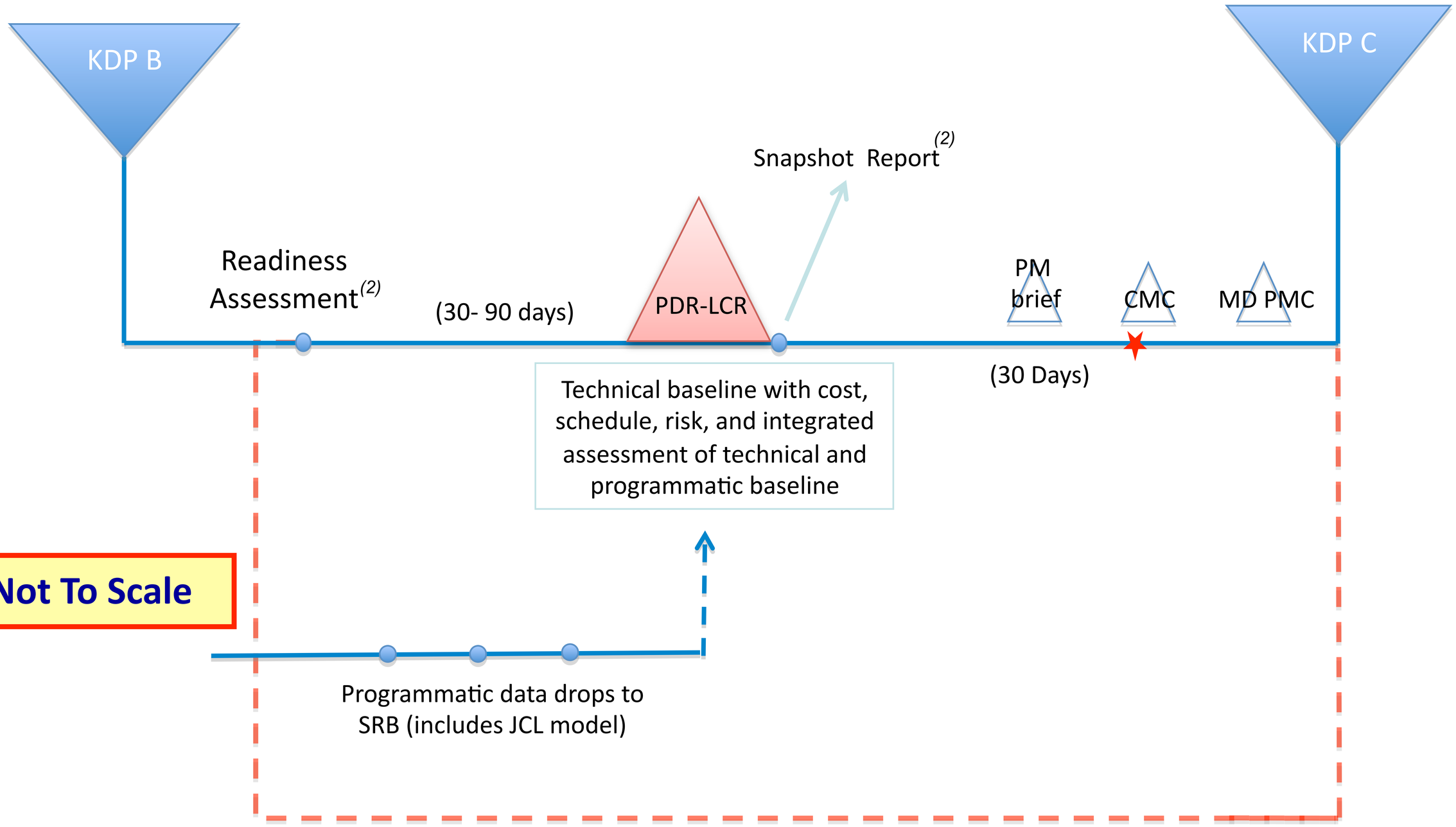
Oversight - Integrated Center Management Council

- For tightly coupled programs and generally for any project under development at multiple Centers
- Includes the Center Director (or representative) from each Center responsible for management of a project within the program and each Center with a substantial program development role
- Chaired by the Center Director (or representative) responsible for program management

One-Step and Two-Step Life Cycle Reviews

- Rev. E introduces/recognizes the concept of one-step and two-step life cycle reviews.
- Any life cycle review (LCR) may be accomplished in a single step.
- In some LCRs an interval of time is required in which the implications of technical baseline decisions are assessed, and cost estimates and confidence levels are developed. The inherent two step nature of such a review is accommodated by the Two-Step Review.
- The two steps combined are referred to collectively by the name of the life cycle review (e.g., PDR).

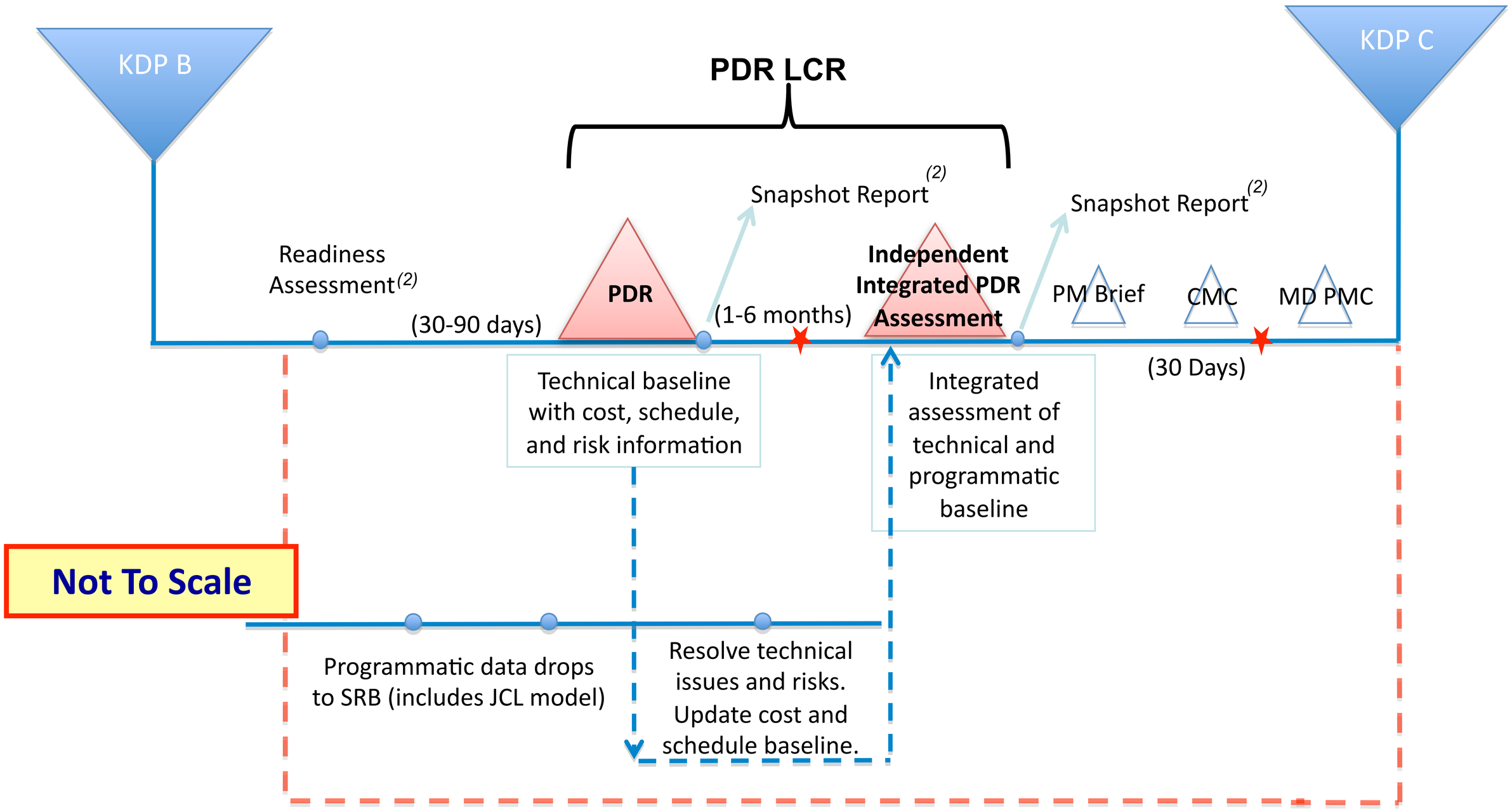
One-Step[1] PDR
Life Cycle Review Overview (Example)



FOOTNOTES:

1. A one- or two-step review may be used for any life cycle review.
2. The SRB Handbook provides information on the readiness assessment, snapshot reports ,and checkpoints associated with life cycle reviews.

Two-Step[1] PDR
Life Cycle Review Overview (Example)



FOOTNOTES:

1. A one- or two-step review may be used for any life cycle review.
2. The SRB Handbook provides information on the readiness assessment, snapshot reports, and checkpoints associated with life cycle reviews.

Terms of Reference Template

The SRB Handbook includes a standard template for SRB reviews which will reduce the time and effort associated with establishing the agreed upon terms of reference for a life cycle review.

Additional Supporting Information

- **Human and Robotic Space Flight Flow Charts of Review Process in Preparation for Launch**
- **Project Decommissioning**
- **Standard WBS**

All three topics are included as appendices in the PM Handbook with additional information

Human Spaceflight
Review Process in Preparation for Launch

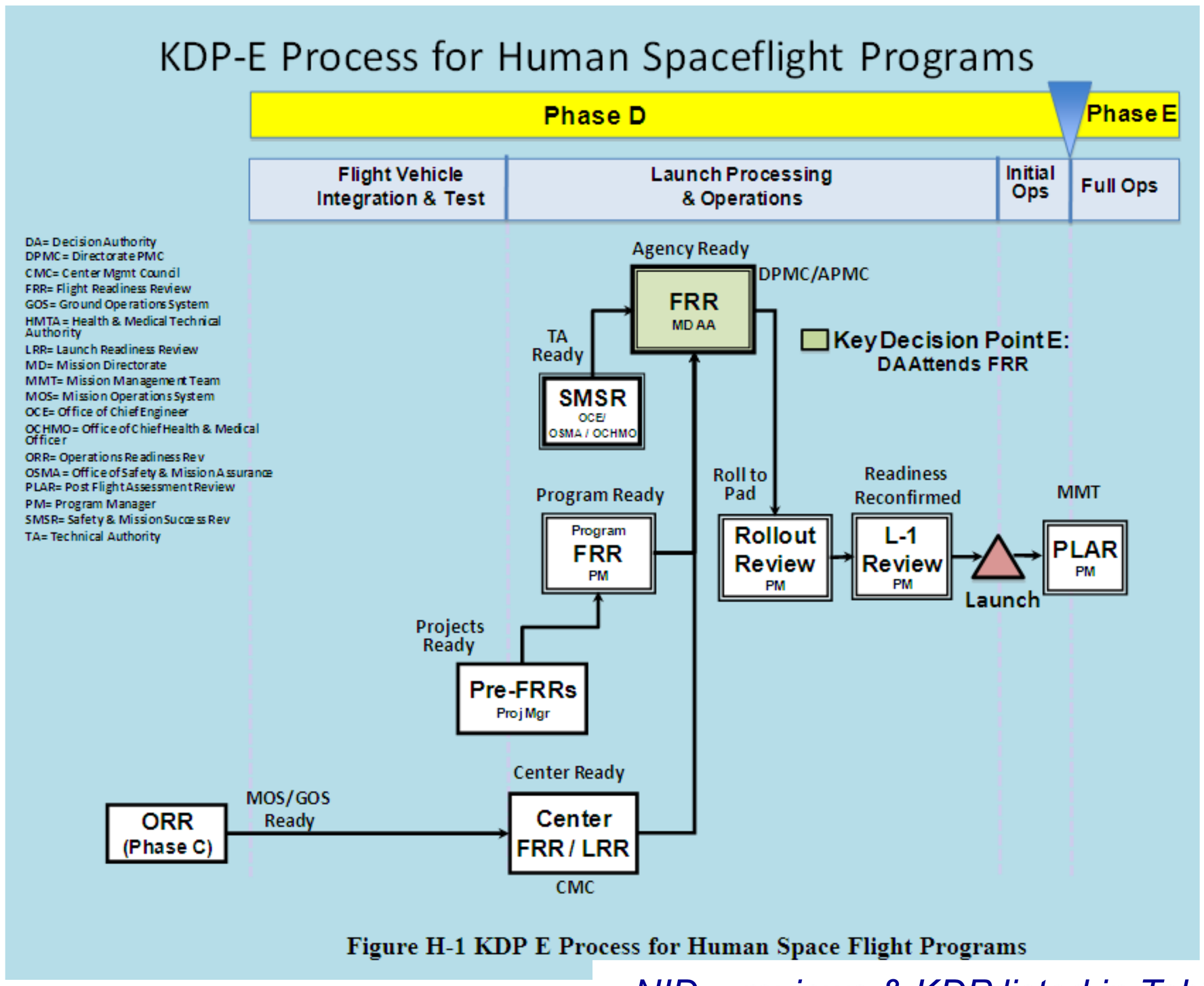


Figure H-1 KDP E Process for Human Space Flight Programs

- *NID – reviews & KDP listed in Table 2-4*
- *PM Handbook – flow and details in Appendix H*

Robotic Spaceflight
Review Process in Preparation for Launch

KDP-E Process for Robotic Spaceflight Programs

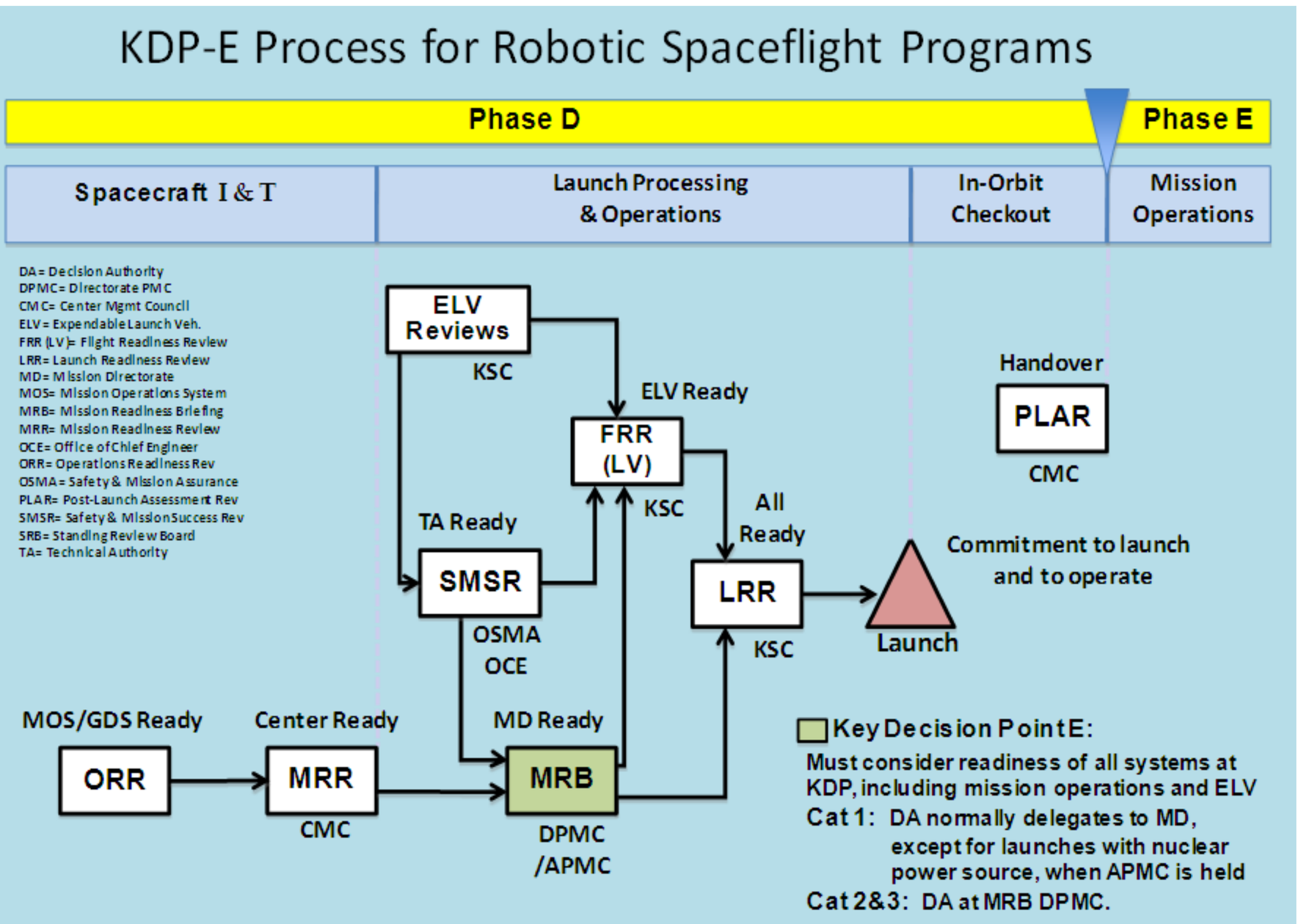


Figure H-2 KDP E Process for Robotic Space Flight Programs

- *NID – reviews & KDP listed in Table 2-4*
- *PM Handbook – flow and details in Appendix H*

Project Decommissioning

Decommissioning Review (DR) Disposal Readiness Review (DRR)

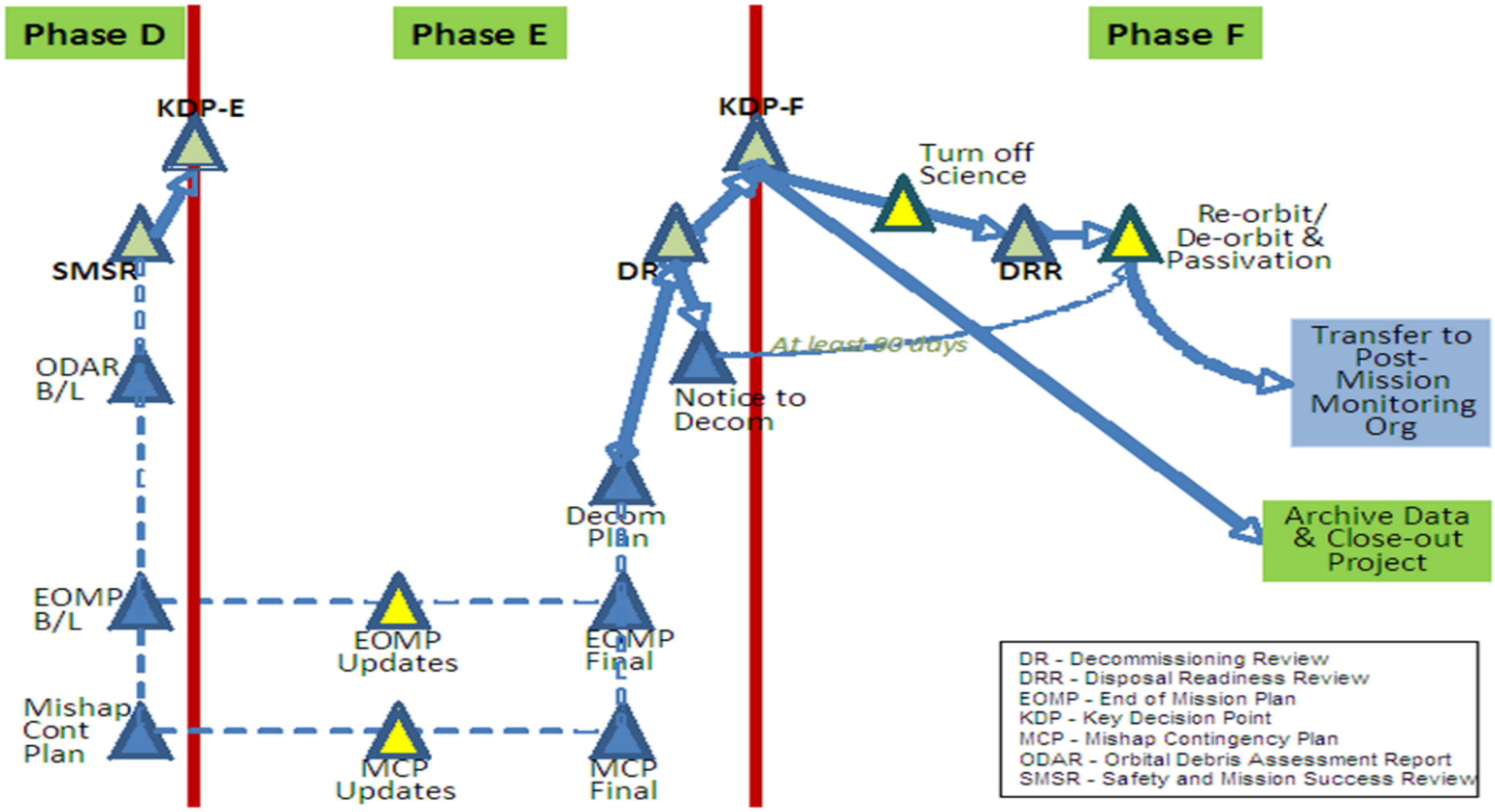
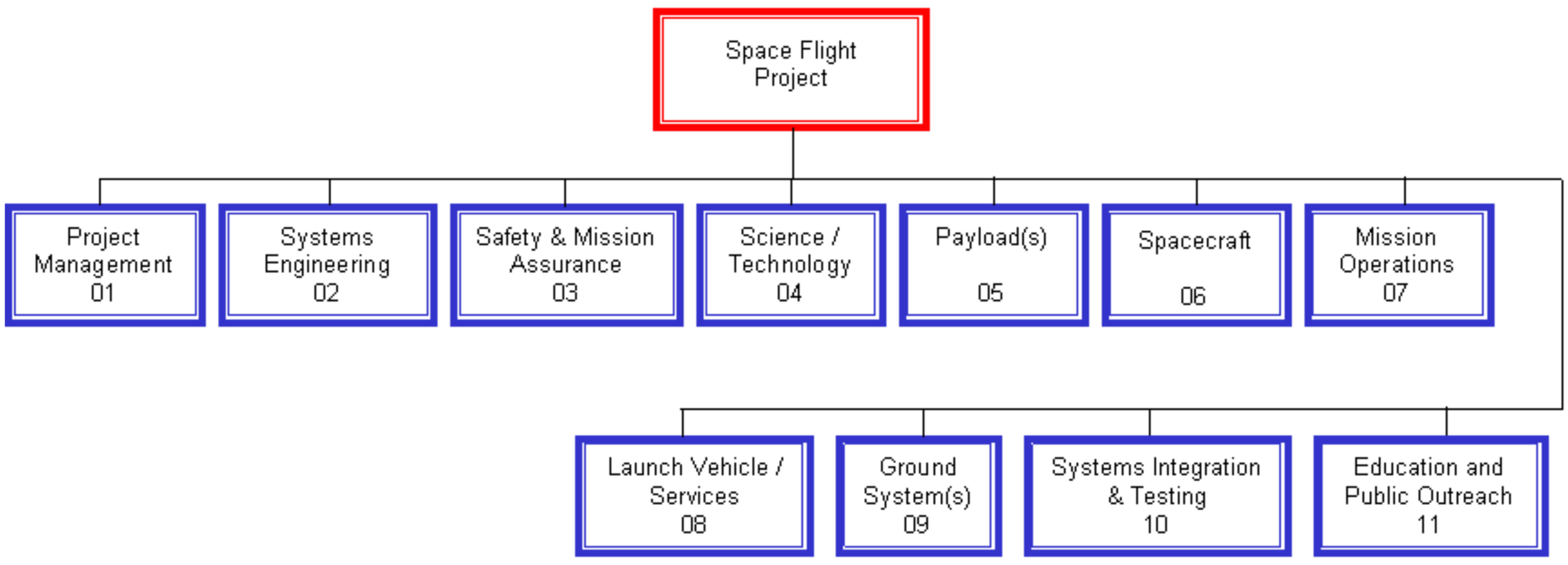


Figure L-1 Spacecraft Disposal Process Flow

- *NID – DR and DRR listed in Table 2-4*
- *PM Handbook – flow in Appendix N*

Approved 7120 Series Standard WBS



WBS Issues

- Ineffective communication between the project/ engineering community and the RMO community has led to duplication of effort and misalignment of the WBS for program/project management purposes verses reporting requirements
- RMO's are incentivized to establish WBS based on financial reporting requirements which in turn may not reflect technical management needs
- Product oriented WBSs are a recognized best practice within program and project management and are necessary to assess performance
- The program/project should "own" his/her WBS and play an active role in establishing it
- The WBS should be reflected in SAP (at least at the level to which financials are to be managed)
- Better collaboration is needed between the RMOs and the Project Offices
- There is also a lack of understanding across the Agency as to the existence of the standard structure and which structure between flight and technology development their project should use
- Assistance is available within OCE and OCFO to support getting the proper WBS completed at all levels. Contact Rob Woods (Robert.E.Woods@Nasa.gov) if you have questions.

Concluding Remarks

- The focus of Rev. E changes have been on supporting improved program/project performance against internal and external commitments and aligning policy with the experience acquired in the 2½ years since the former NID was issued.
- Also emphasizes tailoring in recognition of Agency's need to be more agile with current budget environment
- The new NID reflects the culmination of above efforts
- The NPR Rev E is expected to to posted for formal NODIS review in mid-January.

BACKUP

Frequently Asked Questions

Q. When do we re-baseline projects?

A. Re-baselines are limited to cases in which

- Development cost has grown by 30% or
- Decision Authority judges external events or changes in scope require a re-baseline.
- Note: Every change to a project's cost or schedule estimate is not a rebaseline

- Key Point: After reaching 30%, must rebaseline but not until after Congress reauthorizes the project through legislation.

Frequently Asked Questions

Q. How is UFE treated in cost reporting?

A. All UFE, whether managed by the project or its MD, is included in the project's baseline cost commitment.

- Release of UFE by the MD to the project does not show up as cost growth in Congressional or OMB reporting.
- Cost growth only reported if it becomes clear project will require more funding than provided for by all UFE—project managed and MD managed—combined.

Frequently Asked Questions

Q. What is the External Corrective Action Report ?

A. Describes steps being taken to control cost and schedule.

- Required by Section 1203 of the 2010 NASA Authorization Act.
- Tied to Agency level GAO High Risk Corrective Action Plan
- Filed each year (in April) after a project has breached on cost or schedule.

Frequently Asked Questions

Q. What is NASA doing to improve performance?

A. Changing policy, analysis and reporting

- **Cost estimates**
  - **Including UFE in the project baseline and cost estimate**
  - **Joint cost and schedule (JCLs) analysis to include integrated, resource-loaded schedules**
  - **Develop CADRes to capture cost estimates at defined lifecycle reviews**
- **Managing project performance**
  - **Cost & schedule assessments and tracking**
  - **Agency Baseline Performance Review assessments**
  - **EVM**
- **Providing training**
  - **PM Challenge, Master's Forums, APPEL**

Cost & Schedule Assessment and Reporting

NPR 7120.5 Roll Out

Brian Card presenting on behalf of:
Director of Strategic Investments (SID)
Cynthia Lodge
NASA HQ OCFO

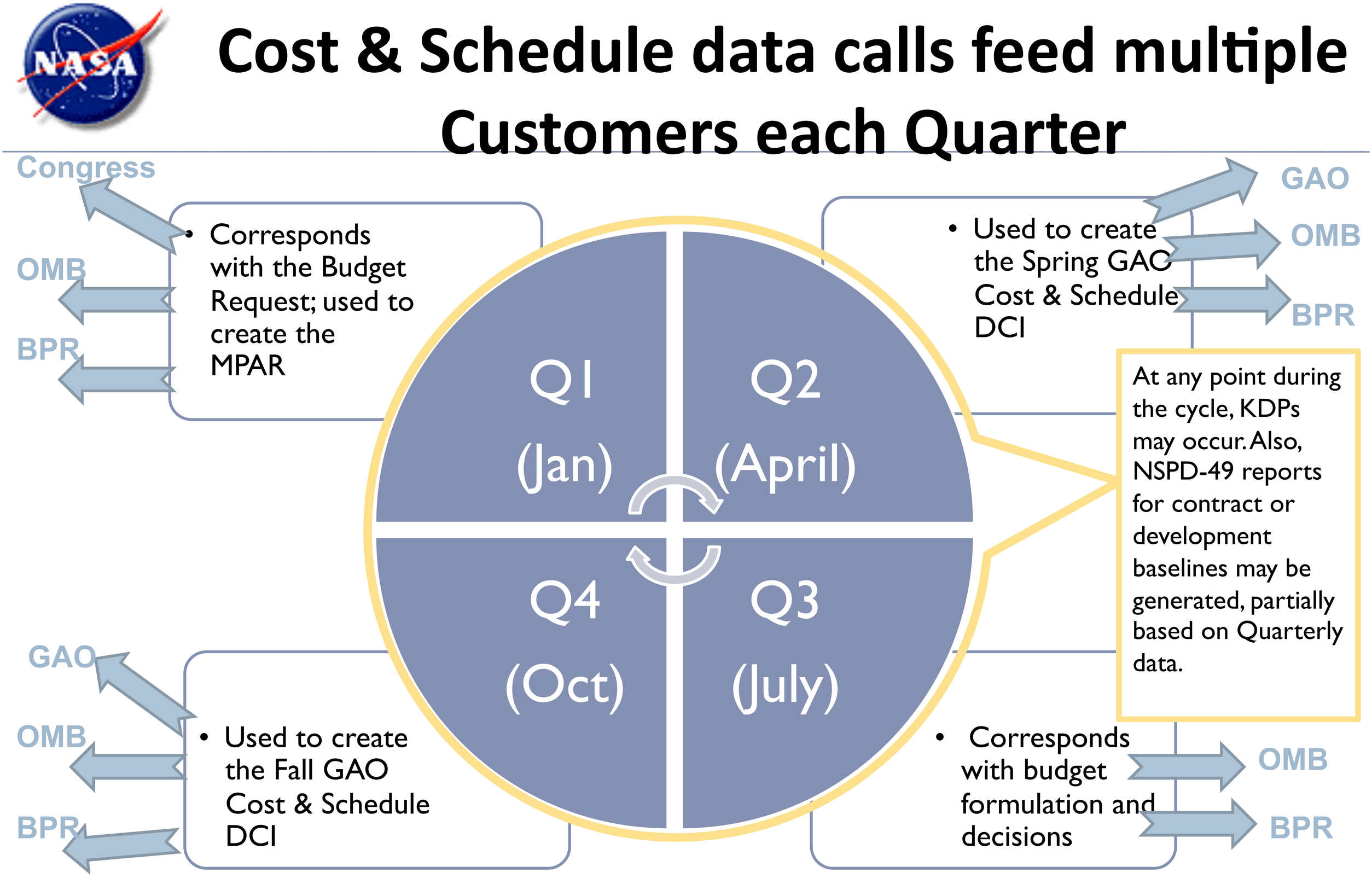
Discussion

- External Stakeholders and Reporting requirements
  - Frequency of reporting and types of data being reviewed
- NASA's Performance
  - A look at helpful Metrics to indicate trends and early warning of project issues
- How NASA manages this reporting
  - Documenting decisions and supporting data
  - Maintaining a common set of data in a database

Why all the 7120 Requirements

- NASAs inability to control cost and schedule growth
  - JWST, CxP, MSL growth cited in several provisions establishing new reports.
  - A 2004 GAO finding that "**NASA lacks discipline in cost estimation."**
  - **Multiple Operating Plans** per year to address cost growth or phasing.
- Based on past Performance NASA is required to report to OMB, Congress and GAO routinely on Project cost and schedule.
  - All appropriations since FY 2008 have included direction for GAO to "Identify and gauge the progress and potential risks associated with selected NASA acquisitions."

Cost & Schedule data calls feed multiple Customers each Quarter



External Stakeholders
Cost and Schedule Reporting

- Congress and OMB
  - Baseline plan at KDP-C; cost and schedule growth thereafter.
  - Reasons for changes to plan. (Congress asking to improve this reporting.)
  - Any replans
  - Any contracts with development content during formulation
- OMB only
  - Quarterly updates on cost and schedule performance with explanation of change
  - Changes in contract value for contracts with development content during formulation.
- GAO
  - Audits of projects in implementation and projects in formulation with contracts that exceed $50 million.
  - EVM: GAO has requested specific data products to use for their assessment of NASA's EVMS. Examples of the data products include: EVM contract performance reports, IBR reports, IMS, schedule risk analysis, risk management plans, and contract data requirements documents.

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Data Elements Reported to GAO

Reporting Year

Element	2008	2009	2010	2011	Frequency
Design Stability	X	X	X	X	Annual + Updates
Critcal Technologies	X	X	X	X	Annual + Updates
Heritage Technologies		X	X	X	Annual + Updates
Software Complexity			X	X	Annual
Quality Parts Issues			X	X	Annual
MPAR Baseline	X	X	X	X	Semi-annual
ARRA Funding			X	X	Semi-annual
KDP-B Est. LCC Range	X	X	X	X	Semi-annual
KDP-C Baseline			X	X	As Occurs
ICEs			X	X	As Occurs
JCLs			X	X	As Occurs
Cost Reserves			X	X	Semi-annual
Key Milestones	X	X	X	X	Semi-annual
Basic Information	X	X	X	X	Semi-annual
Award Fee Strucuture		X	X	X	Semi-annual
EVM (CPR Formats)			X	X	Monthly
FAD/PCA	X	X	X	X	As Occurs
Project Plan	X	X	X	X	As Occurs
Control Plans	X	X	X	X	As Occurs
PDR/CDR Packages	X	X	X	X	As Occurs
CADRes			X	X	As Occurs
SRB Reports			X	X	As Occurs
MSR Presentations			X	X	Monthly

External Requirements: Frequently Asked Questions

Q. What are the threshold levels?

Base-line	Projects Included	Trigger	Threshold	Who Receives	Reports Required
KDP-C	> $75M LCC	Life Cycle Cost	10%	Congress	Notification (only requirement to $75M)
	> $250M LCC	Develop-ment Cost (Phase C-D)	15%	Congress OMB	Notification Threshold Report Analysis of Alternatives Corrective Action Report
			30%	Congress	Rebaseline after legislated authorization to continue
		Key Schedule Milestone	6 months	Congress OMB	Notification Threshold Report Analysis of Alternatives Corrective Action Report
Pre KDP-C (when contract is signed)	$250M LCC & > $50M w/ dev contract	Average Contract Value	15%	Congress OMB	Notification Threshold Report

External Requirements: Frequently Asked Questions

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Pre KDP-C (when contract is signed)	$250M LCC & > $50M w/ dev contract	Average Contract Value	15%	Congress OMB	Notification Threshold Report

Externally reported:
In Congressional Justification Book

2012 President's Budget Request

Table 1: MPAR Summary and Confidence Levels

Project	Base Year	Confidence Level[1]	Development Cost Est. ($M)		Cost Change (%)	Key Milestone[2]	Key Milestone		Schedule Change (months)	Cost Change > 15%[3]	Schedule Change > 6 Mo[3]	Factors Contributing to Breaches since 2009 MPAR	
			Base	2010			Base	2010				Internal	External
Aquarius	2007	75%[5]	$193	$223	16	LRD	Jul-09	Jan-11	18	X	X		Additional delays by international partner.
Glory	2009	N/A[6]	$259	$339	31	LRD	Jun-09	Nov-10	17	X	X	Current estimates reflect decision to replace spacecraft computer after failure.	
GPM	2010	70%	$555	$555	0	LRD	Jul-13	Jul-13	0				
GRAIL	2009	70%	$427	$427	0	LRD	Sep-11	Sep-11	0				
Juno	2009	70%	$742	$742	0	LRD	Aug-11	Aug-11	0				
JWST	2009	JCL in-process	$2,581	$2,710	5	LRD	Jun-14	Jun-14	0				
LDCM[4]	2010	70% (JCL)	$583	$583	0	LRD	Jun-13	Jun-13	0				
MMS[4]	2010	70% (JCL)	$857	$857	0	LRD	Mar-15	Mar-15	0				
MSL	2010	70% (JCL)	$1,720	$1,720	0	LRD	Nov-11	Nov-11	0				
NPP	2006	N/A[7]	$593	$725	22	LRD	Apr-08	Sep-11	41	X	X		
RBSP	2009	70%	$534	$534	0	LRD	May-12	May-12	0				
SDO	2006	N/A[7]	$624	$667	7	LRD	Aug-08	Feb-10	18		X		
SOFIA	2007	JCL in-process	$920	$1,097	19	FOC	Dec-13	Dec-14	12	X	X		
TDRS-K,L[4]	2010	75%	$209	$209	0	LRD	Dec-13	Dec-13	0				

Cost or schedule breaches since most recent baseline with Congress

Internal Stakeholders and Assessments

- Throughout the execution year the programs and institutional areas are assessed for their performance to technical, cost, schedule and programmatic activities. This assessment is presented routinely in the Agency's monthly Baseline Performance Review.
  - The assessments include evaluating project EVM (Cost and Schedule) data, risks, trends and program portfolios
  - Provides better **insight to mitigate issues earlier** in the process,
  - Assessments form decisions for the upcoming PPBE budget formulation.
- The Strategic Investments Division analyzes, tracks and reports cost and schedule performance from the plans established at each KDP or replan. All analysis and reports are shared with the requisite MD.
  - Rigorous documentation of changes provide consistent, reliable data which allows for clearer understanding and diagnosis of program issues. This knowledge supports improvement initiatives, tools, processes, etc., for better execution in the future.

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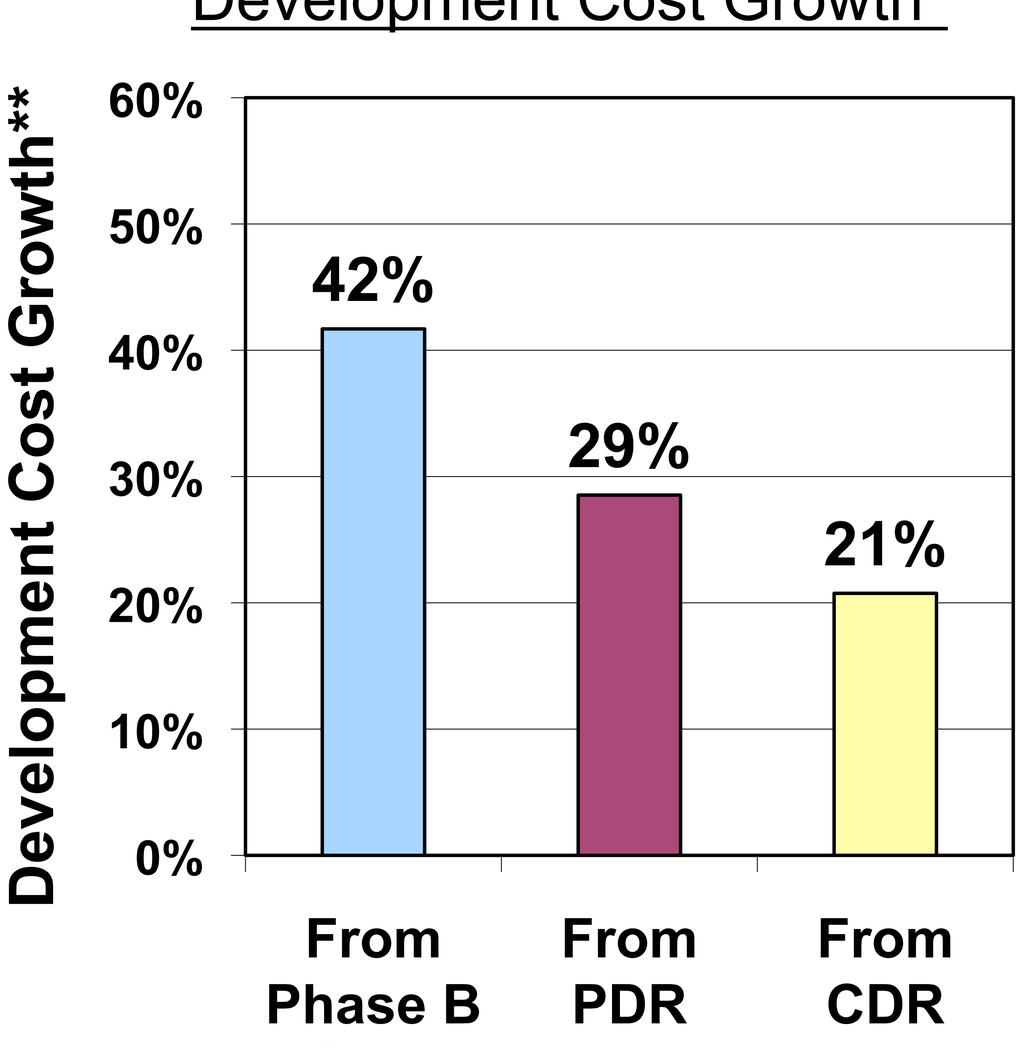
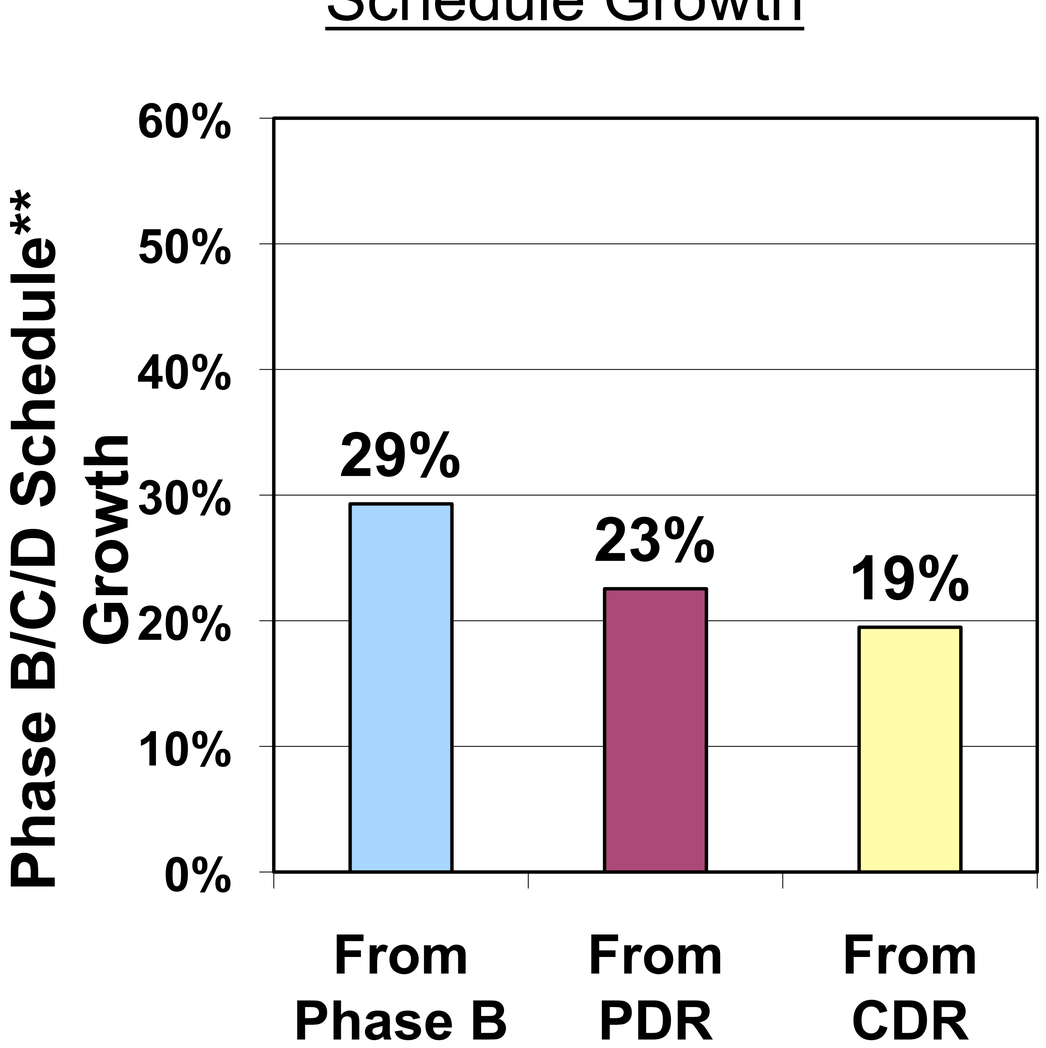
Cost & Schedule Growth Summary – Combined 30 Mission Growth Average Over & Above Reserves

Development Cost Growth*



Schedule Growth

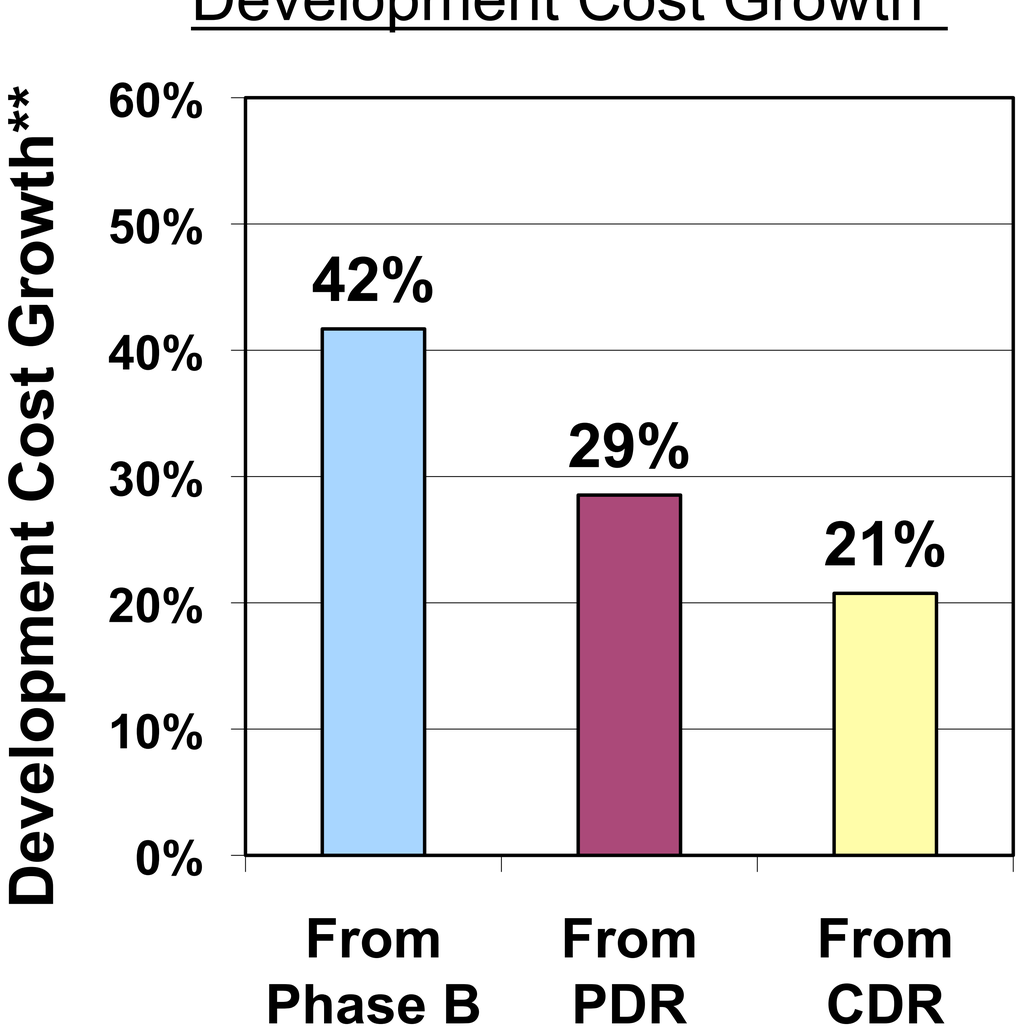


* Development cost represents Phase B/C/D cost including reserves but not including launch vehicle cost

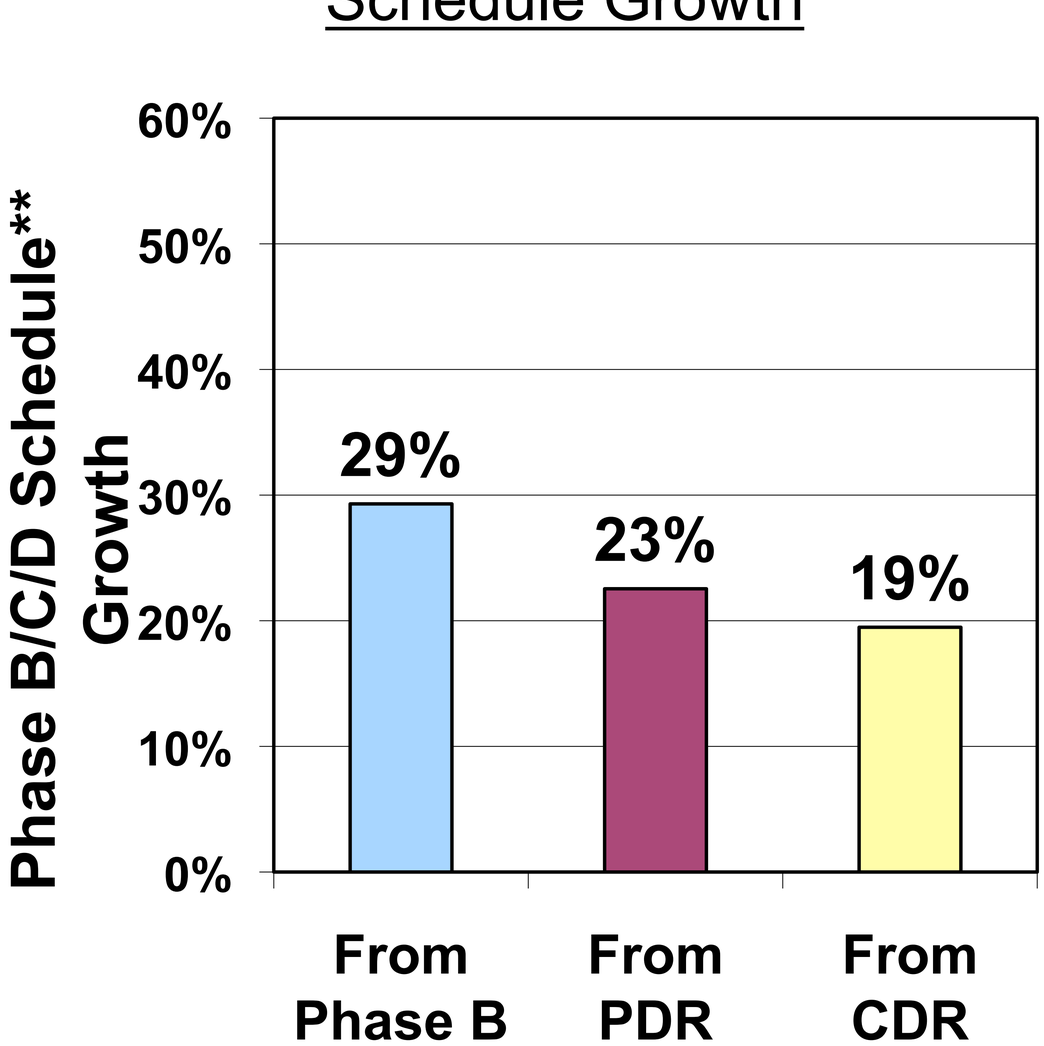
** Although the agency does not formally commits until KDP-C, we analyzed growth from KDP-B to help understand early issues that might contribute to growth from KDP-C

Cost & Schedule Growth Summary – Combined 30 Mission Growth Average Over & Above Reserves

Development Cost Growth*



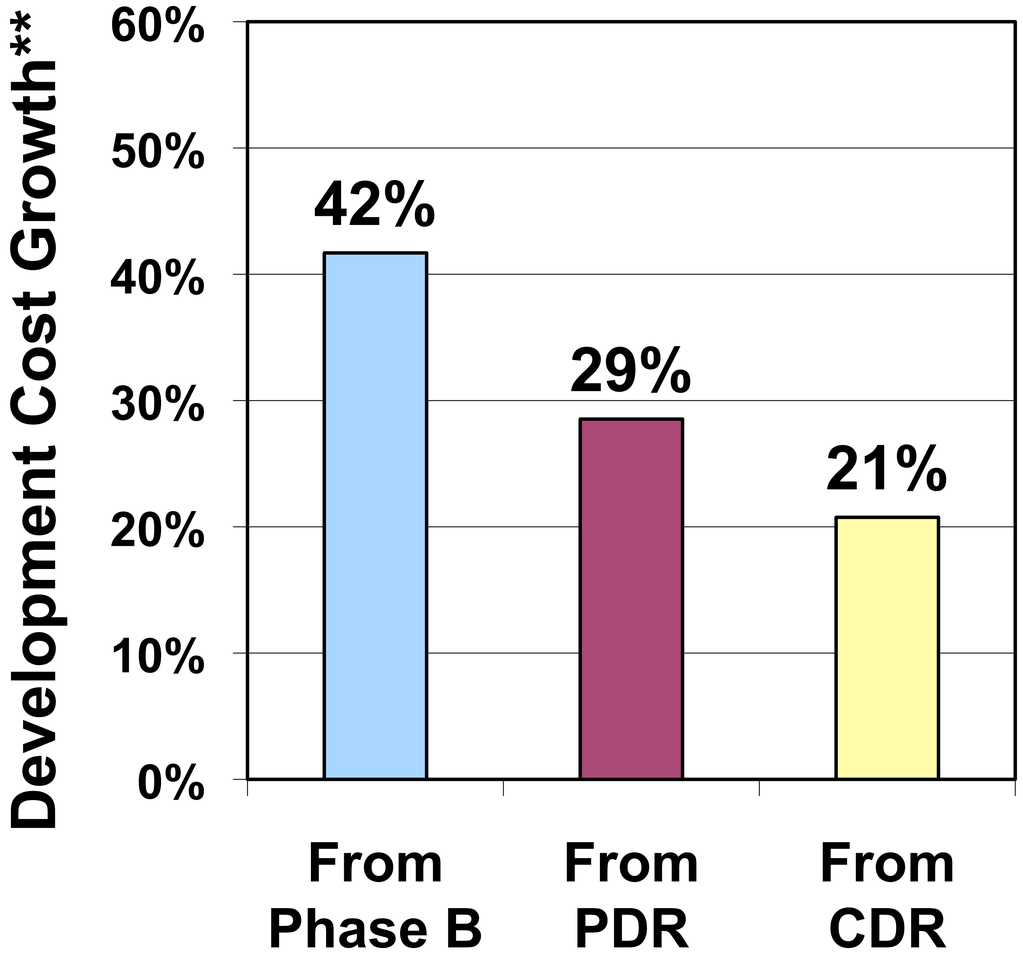
Schedule Growth

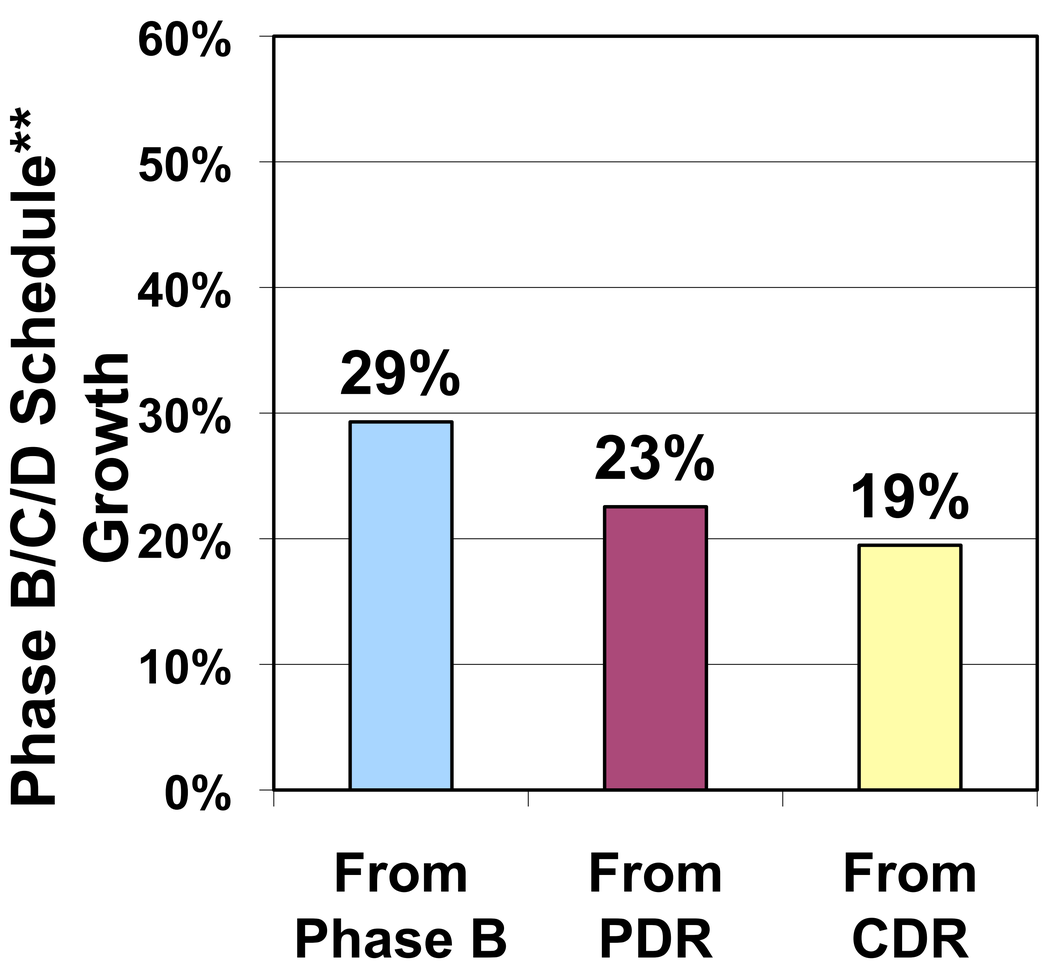


* Development cost represents Phase B/C/D cost including reserves but not including launch vehicle cost

** Although the agency does not formally commits until KDP-C, we analyzed growth from KDP-B to help understand early issues that might contribute to growth from KDP-C

Cost & Schedule Growth Summary – Combined 30 Mission Growth Average Over & Above Reserves





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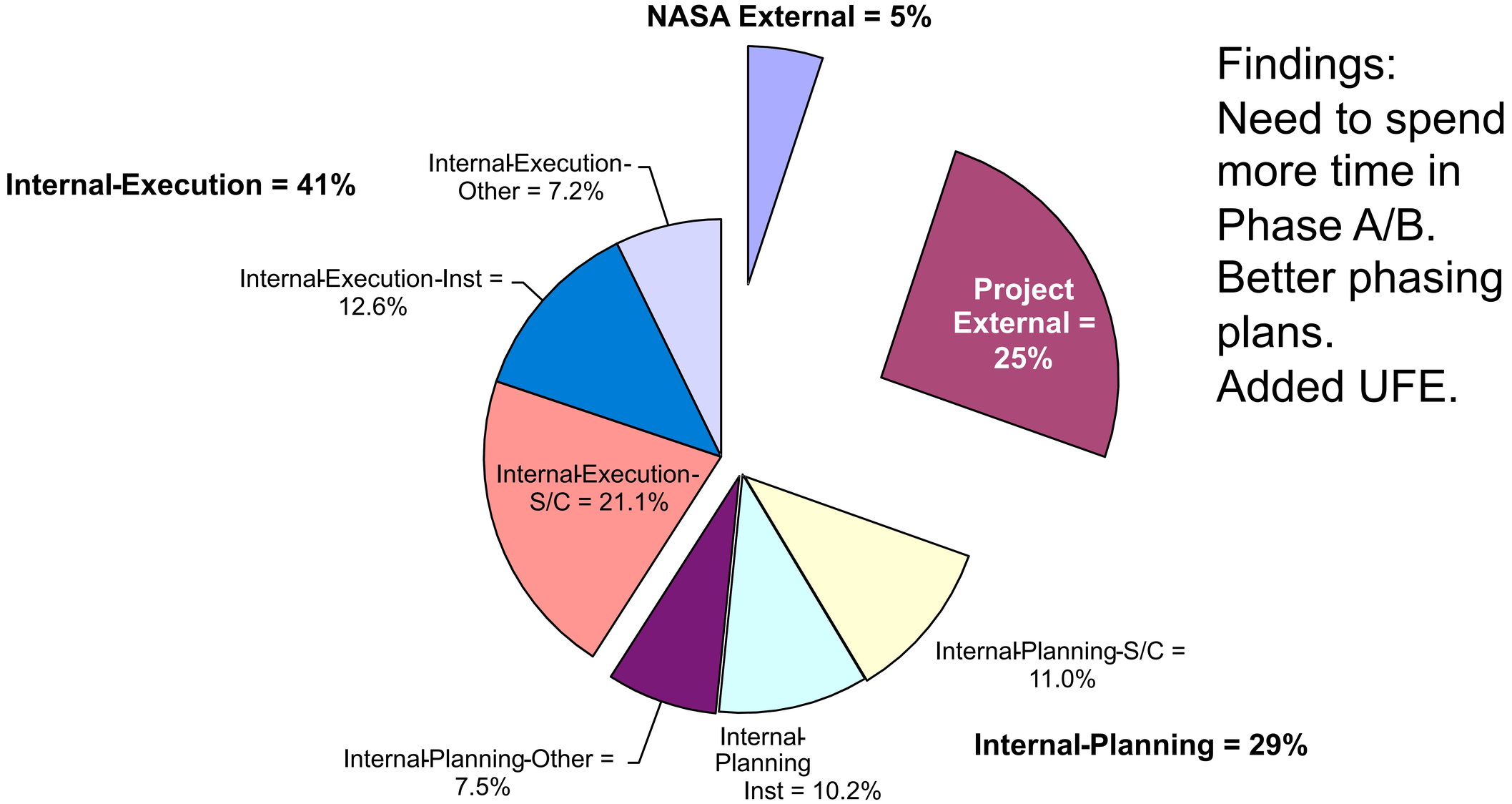
EoC Allocation Summary for 30 Completed Missions

As a Percentage of Total Cost Change (from project CBEs)



Findings:
Need to spend more time in Phase A/B.
Better phasing plans.
Added UFE.

5% External to NASA (OMB and Congress directed e.g. TIRS instrument for LDCM
25% External to the Project (HQ directed, e.g. realigning budget to other projects)
29% Relative to Project Planning (Risk realized but not planned)
41% Relative to Project Execution

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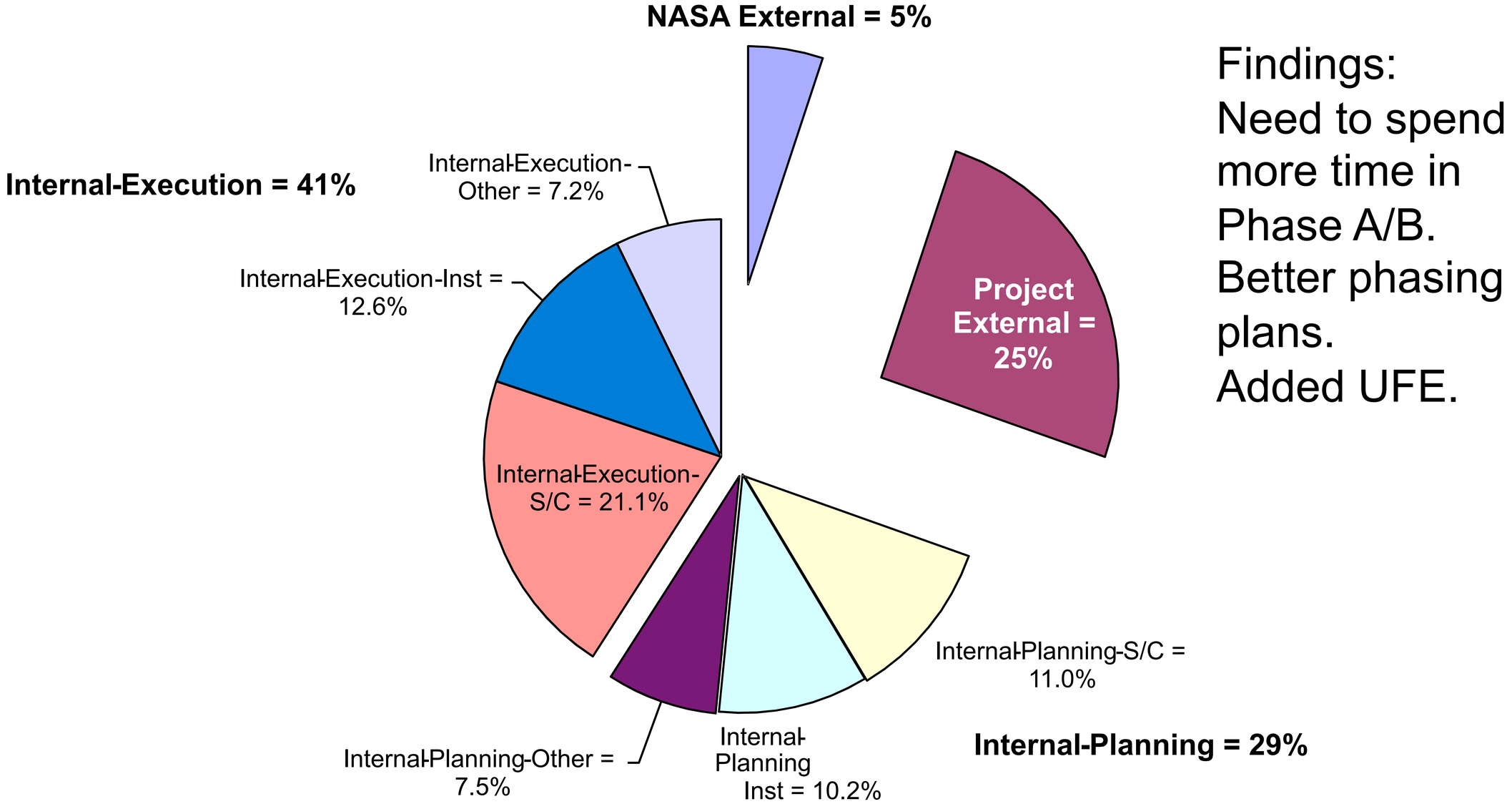

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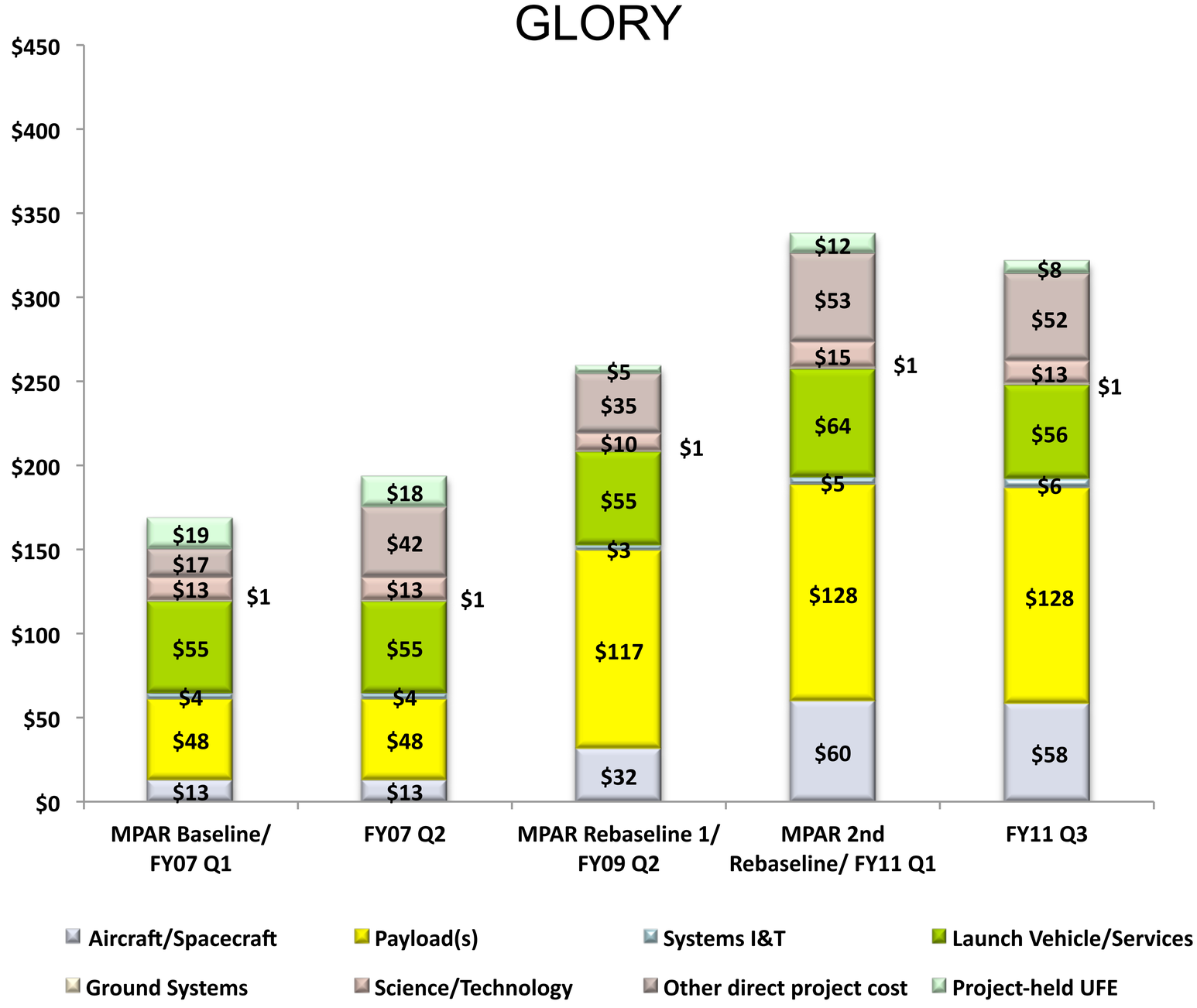
41% Relative to Project Execution

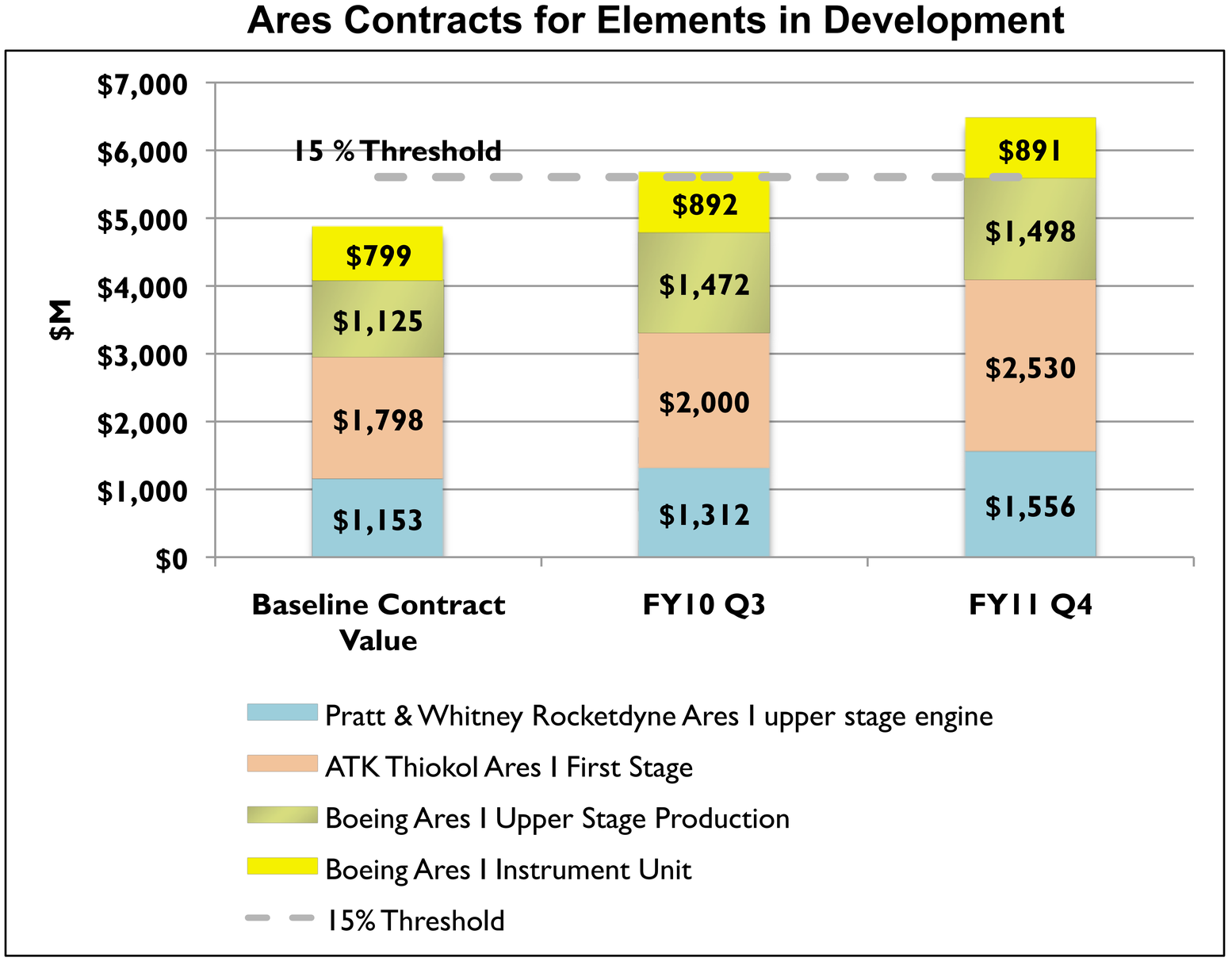
Example:
Development Cost Tracking by WBS

- Breakout available for projects in development above $250 million LCC for KDPs, re-plans, budgets, quarterly updates.
- In this GLORY example, 1.7X growth in instrument cost clearly dominates the cost story.
- Impact of project launch delays are seen in other direct project costs.
- Contract closeout, failure investigation, and award fee determinations are ongoing as of the FY 11 Q3 snapshot.



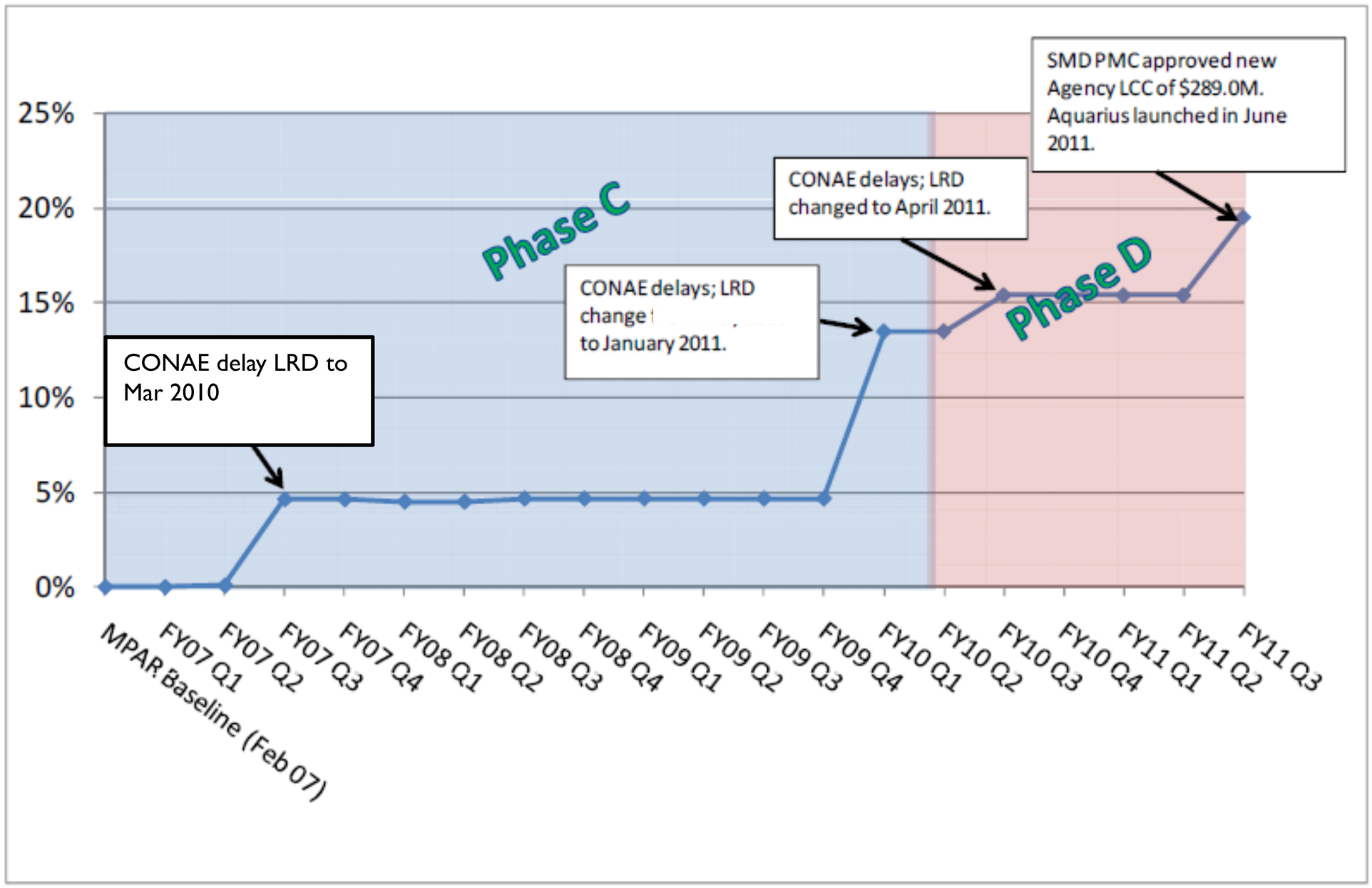
Example:
Ares Quarterly Contract Value Tracking

- Reflects growth in contract values from baseline reported in formulation to OMB in August 2007 (adjusted for historical errors in reporting).
- In Q3 FY 2010 cost growth exceeded 15%.
- The NSPD 49 Breach Report was sent to OMB for contract cost growth in March 2011
- Primary driver of recent growth was the schedule slip to 2015. % change from Baseline 33%.



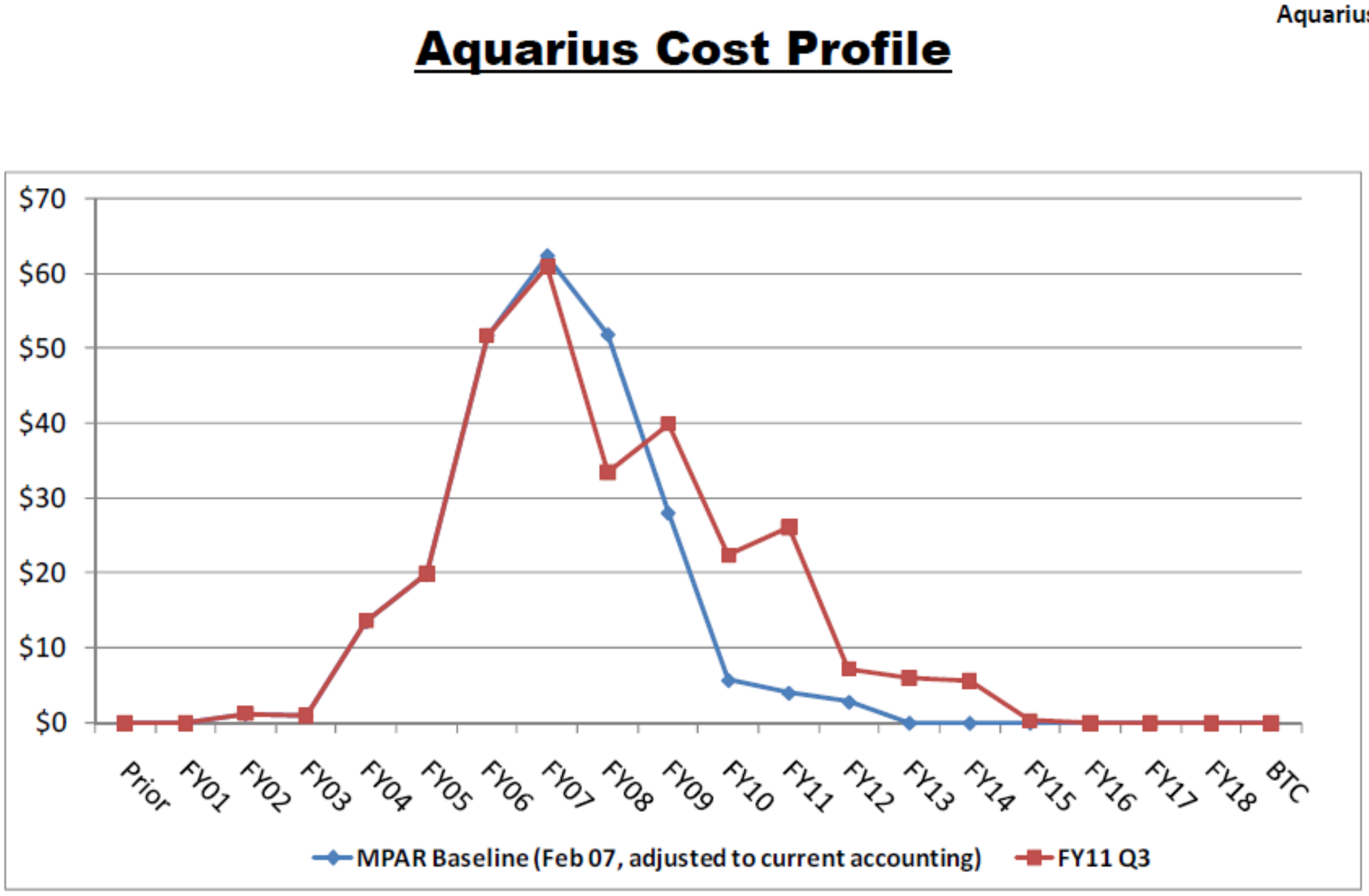
Example:
Tracked Cost Growth

Aquarius LCCE % Growth Compared to Baseline



Example:
Tracked Cost Phasing

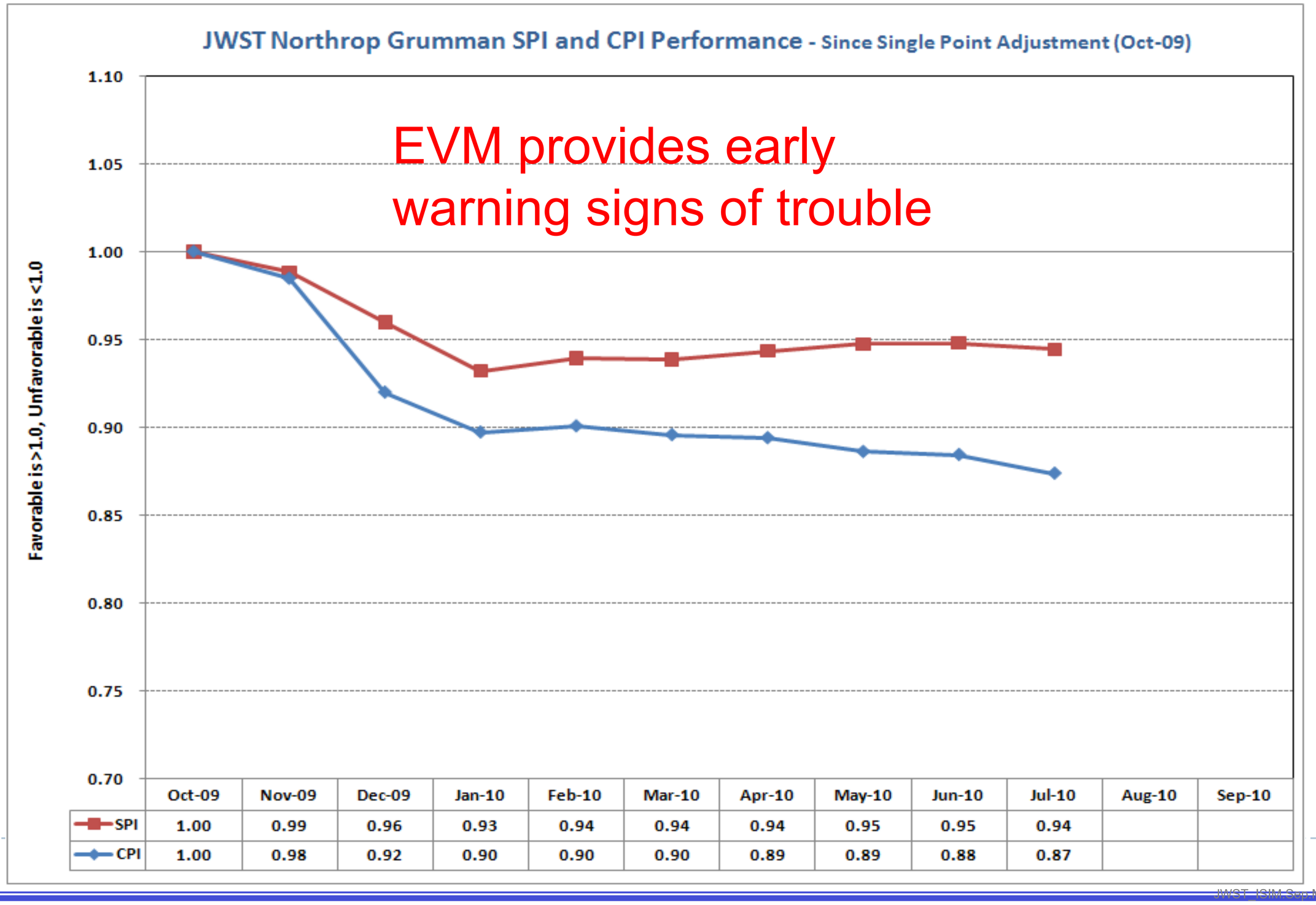
- Documents change in project funding profile compared to approved cost plan.
- Partial project funding "bathtubs" in FY 08 and FY 10 due to partner delays caused funds to shift from plan.
- This chart can be built with any mix of cost estimate and budget snapshot.



EVM TREND ANALYSIS

James Webb Space Telescope Project

STATUS AS OF: 07/31/2010



EVM TREND ANALYSIS

James Webb Space Telescope Project

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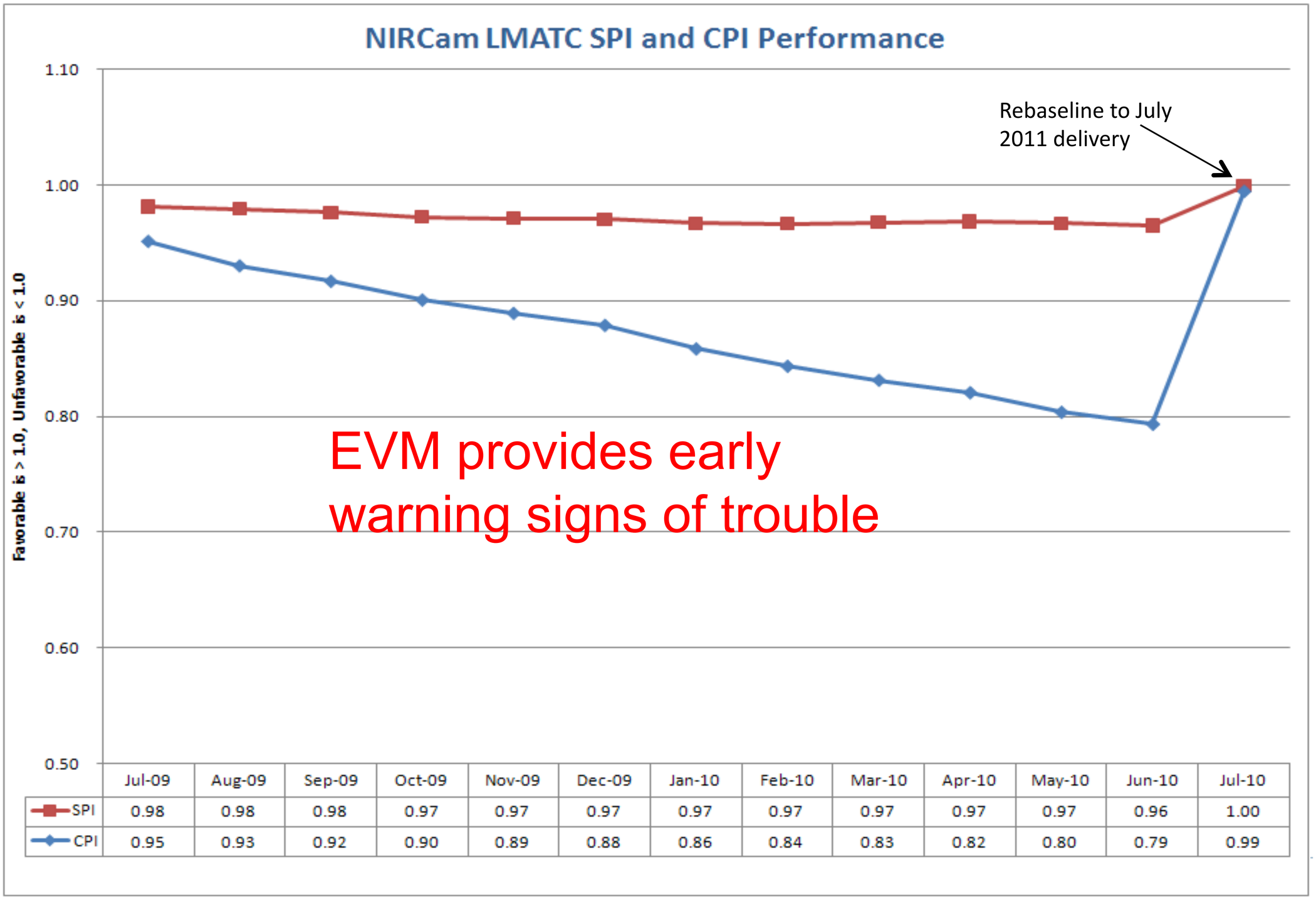


	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10
SPI	0.98	0.98	0.98	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.96	1.00
CPI	0.95	0.93	0.92	0.90	0.89	0.88	0.86	0.84	0.83	0.82	0.80	0.79	0.99

What's changed to Improve Estimates?

- Policy and adherence to requirements
- Parametric Analysis KDP-B, JCL for KDP-C
- Project-specific determination of unallocated future expenses (UFE) to achieve 70% confidence, rather than one-size-fits all reserves.
- Risk-informed phasing of UFE by year.
- Integrated schedules
- Resource loaded schedules
- Instead of SRB and Project providing a different cost estimate, only the Project produces the cost estimate and SRB assesses it.
- Knowledge that the project should produce a cost estimate not an estimate based on budget available.
- Better integration of the technical and programmatic

How NASA manages this reporting

- Linked to Agency policies
  - NPR 7120 KDPs
  - NPD 1000.5 JCL and UFE policy
- Single, standardized data tracking for all reports
  - Project-managed costs
    - By Formulation, Development, and Operations
    - By WBS element (e.g., spacecraft, payload)
    - Project-managed UFE (i.e., reserves, contingency)
    - By budget category (Procurement, Labor, CoF)
  - MD-managed costs
    - MD- or Program-managed UFE
  - OCFO-managed costs
    - 'Legacy' indirect costs, such as Center M&O or Corporate M&O, from FY2004 to FY2007

KDP-C Documentation

KDP-C Decision Memo
Baseline LCC
Baseline Development Cost
Baseline Key Schedule Milestone

- Top level signed memo.
- Ensures all parties agree to the baseline commitments the Agency is making.
- Distinguishes UFE (and schedule margin) managed by MD.

KDP-C Report (narrative)
Purpose, Deliverables, LCC, WBS, Risk, Acquisition Strategy, etc.

- Provides the details for the Baseline commitments to OMB/Congress.
- This content updated annually In Congressional Justification (MPAR).

KDP-C Supporting Data (spreadsheet)
Supporting Cost Data
Supporting Schedule Milestones

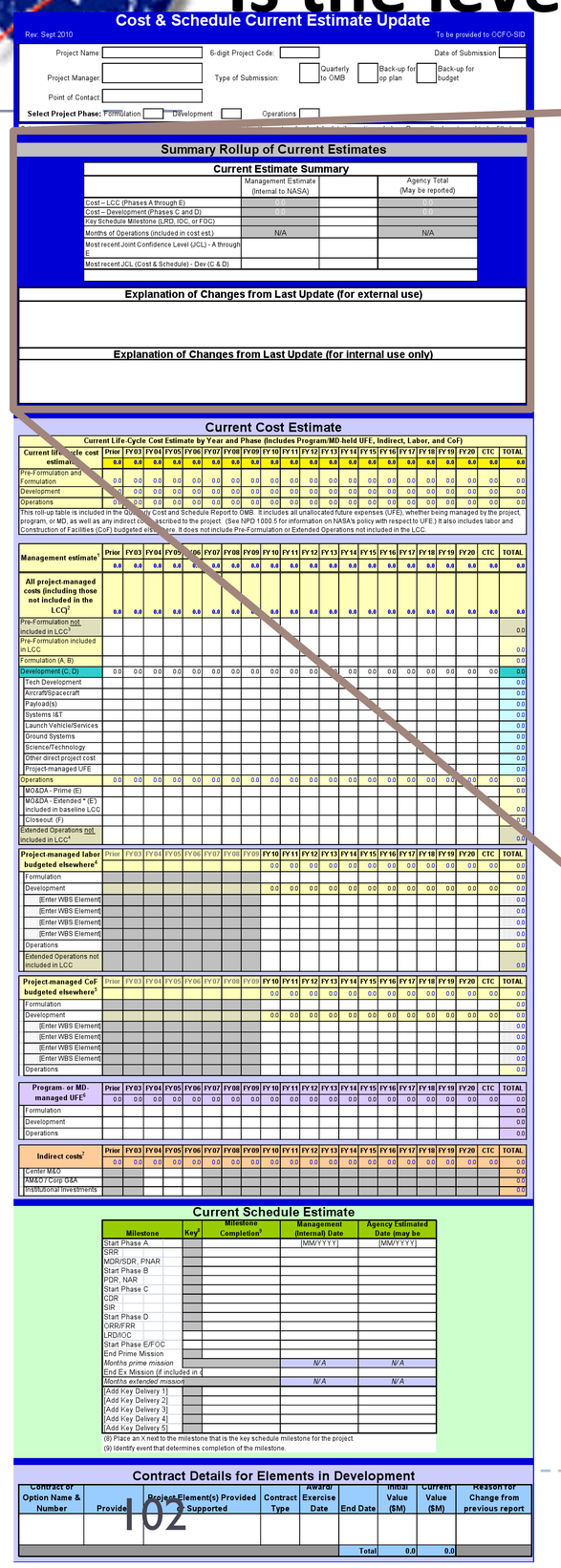
- Provides starting point for % changes in Current Estimate Reports.
- Same spreadsheet is used for quarterly updates. Our office reviews datasheets with MDs to ensure complete & accurate.
- Verified submissions are in a relational database to facilitate trend reporting & analysis.

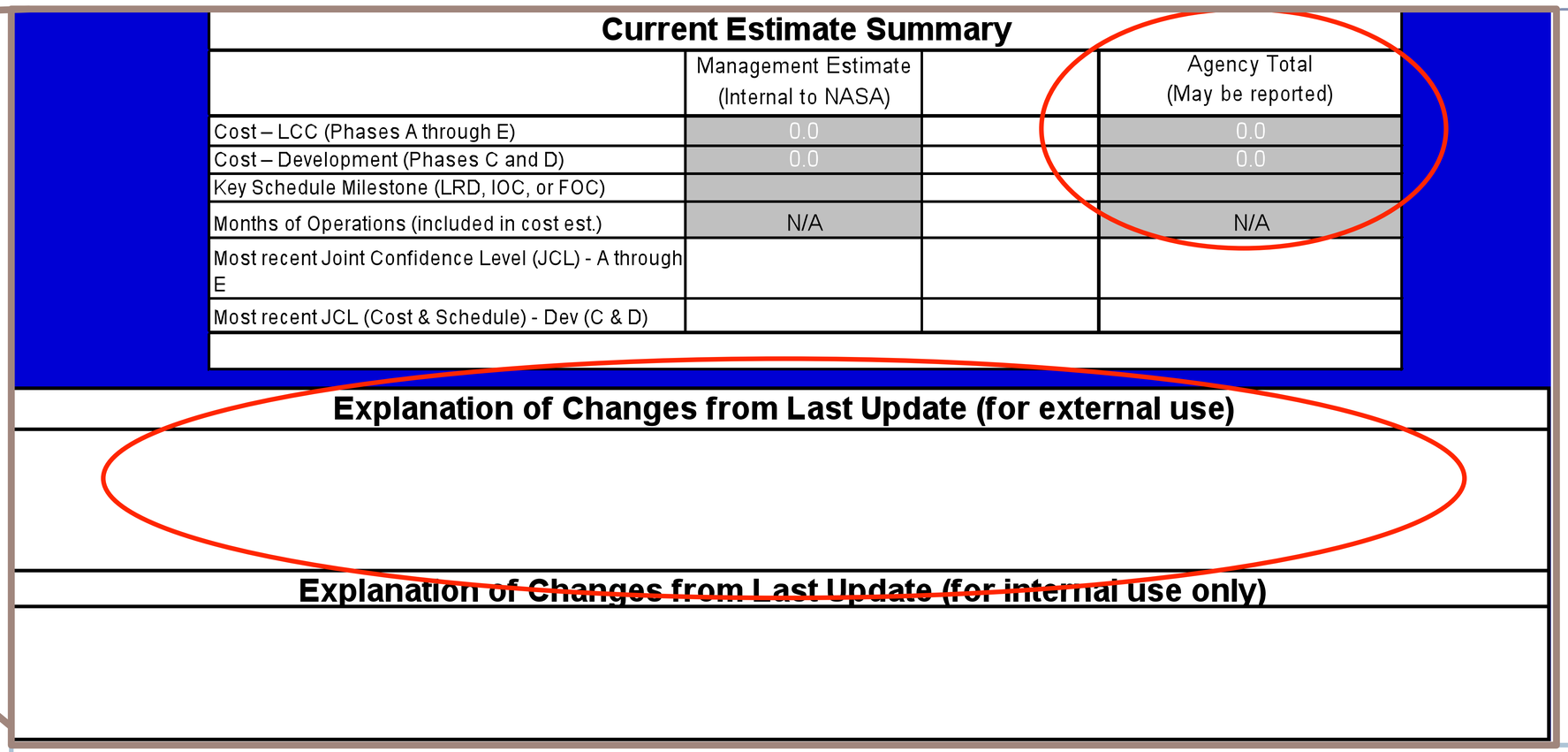
Frequently Asked Questions

Q. Why is it necessary to show the level of detail in the Cost & Schedule Quarterly datasheet?

A. Refer to next charts

Is the level of detail in the C&S Quarterly template necessary?





Current Estimate Summary

	Management Estimate (Internal to NASA)		Agency Total (May be reported)
Cost – LCC (Phases A through E)	0.0		0.0
Cost – Development (Phases C and D)	0.0		0.0
Key Schedule Milestone (LRD, IOC, or FOC)			
Months of Operations (included in cost est.)	N/A		N/A
Most recent Joint Confidence Level (JCL) - A through E			
Most recent JCL (Cost & Schedule) - Dev (C & D)			

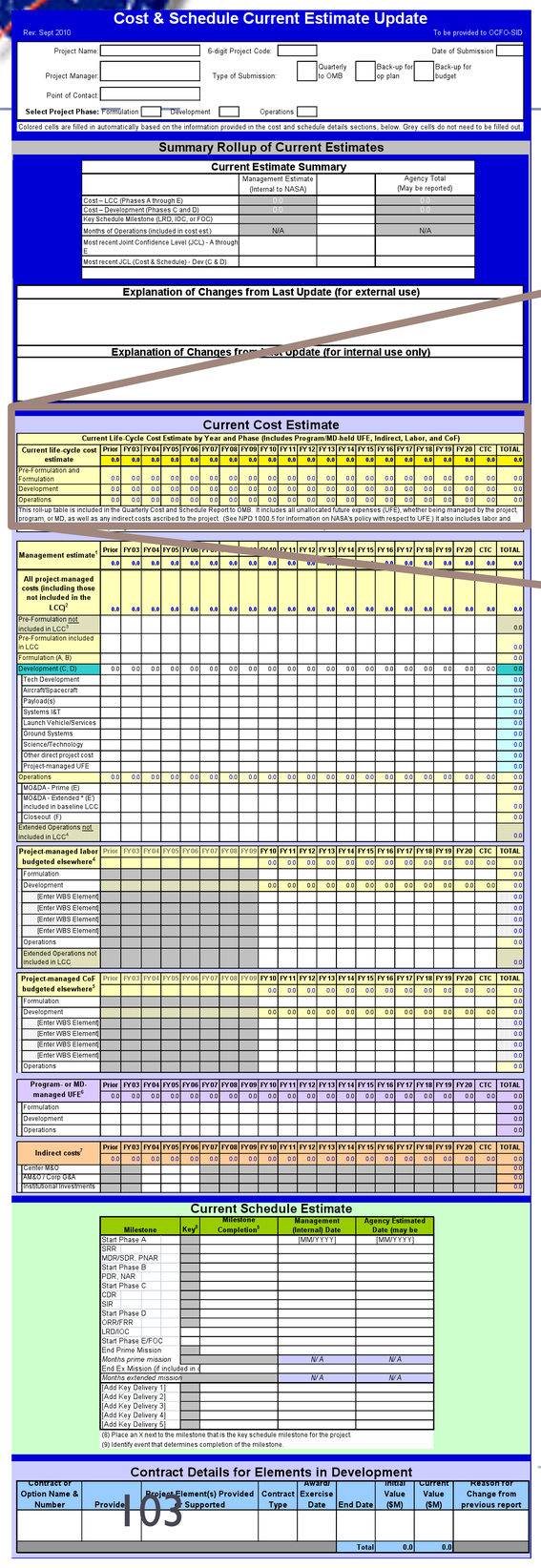
Explanation of Changes from Last Update (for external use)

Explanation of Changes from Last Update (for internal use only)

The Agency LCC Total, Agency Development Cost Total, Key Schedule Milestone Date (External), and Explanation of Changes (External) are all reported Quarterly to OMB. This data also informs NSPD-49 Baseline Reports.

The Development Cost data is monitored; 15% growth over the baseline triggers notification to Congress, and 30% triggers a rebaseline.

Is the level of detail in the C&S Quarterly template necessary?



Cost & Schedule Current Estimate Update

Rev: Sept 2010 — To be provided to OCFO-SID

Project Name: | 6-digit Project Code: | Date of Submission:
Project Manager: | Type of Submission: Quarterly to OMB / Back-up for op plan / Back-up for budget
Point of Contact:
Select Project Phase: Formulation ___ Development ___ Operations ___

Colored cells are filled in automatically based on the information provided in the cost and schedule details sections, below. Grey cells do not need to be filled out.

Summary Rollup of Current Estimates

Current Estimate Summary

	Management Estimate (Internal to NASA)		Agency Total (May be reported)
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Most recent JCL (Cost & Schedule) - Dev (C & D)			

Explanation of Changes from Last Update (for external use)

Explanation of Changes from Last Update (for internal use only)

Current Cost Estimate

Current Life-Cycle Cost Estimate by Year and Phase (Includes Program/MD-held UFE, Indirect, Labor, and CoF)

Current life-cycle cost estimate	Prior	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pre-Formulation and Formulation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Development	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

This roll-up table is included in the Quarterly Cost and Schedule Report to OMB. It includes all unallocated future expenses (UFE), whether being managed by the project, program, or MD, as well as any indirect costs ascribed to the project. (See NPD 1000.5 for information on NASA's policy with respect to UFE.) It also includes labor and

Management estimate	Prior	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All project-managed costs (including those not included in the LCC)[2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pre-Formulation not included in LCC[3]																					0.0
Pre-Formulation included in LCC																					0.0
Formulation (A, B)																					0.0
Development (C, D)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tech Development																					0.0
Aircraft/Spacecraft																					0.0
Payload(s)																					0.0
Systems I&T																					0.0
Launch Vehicle/Services																					0.0
Ground Systems																					0.0
Science/Technology																					0.0
Other direct project cost																					0.0
Project-managed UFE																					0.0
Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
M&A - Prime (E)																					0.0
M&A - Extended * (E) included in baseline LCC																					0.0
Closeout (F)																					0.0
Extended Operations not included in LCC[4]																					0.0

Project-managed labor budgeted elsewhere[4]	Prior	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	CTC	TOTAL
									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formulation																					0.0
Development									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
Operations																					0.0
Extended Operations not included in LCC																					0.0

Project-managed CoF budgeted elsewhere[5]	Prior	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	CTC	TOTAL
									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formulation																					0.0
Development									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
Operations																					0.0

Program- or MD-managed UFE[6]	Prior	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formulation																					0.0
Development																					0.0
Operations																					0.0

Indirect costs[7]	Prior	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Center M&O																					0.0
DM&O / Corp G&A																					0.0
Institutional Investments																					0.0

Current Schedule Estimate

Milestone	Key[8]	Milestone Completion[9]	Management (Internal) Date	Agency Estimated Date (may be
Start Phase A			[MM/YYYY]	[MM/YYYY]
SRR				
MDR/SDR, PNAR				
Start Phase B				
PDR, NAR				
Start Phase C				
CDR				
SIR				
Start Phase D				
ORR/FRR				
LRD/IOC				
Start Phase E/FOC				
End Prime Mission				
Months prime mission			*N/A*	*N/A*
End Ex Mission (if included in c				
Months extended mission			*N/A*	*N/A*
[Add Key Delivery 1]				
[Add Key Delivery 2]				
[Add Key Delivery 3]				
[Add Key Delivery 4]				
[Add Key Delivery 5]				

(8) Place an X next to the milestone that is the key schedule milestone for the project.
(9) Identify event that determines completion of the milestone.

Contract Details for Elements in Development

Contract or Option Name & Number	Provider	Project Element(s) Provided / Supported	Contract Type	Award/ Exercise Date	End Date	Initial Value ($M)	Current Value ($M)	Reason for Change from previous report
					Total	0.0	0.0	

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Pre-Formulation and Formulation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Development	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1

2

1. The current and baseline phasing by Fiscal Year are reported Quarterly to OMB. This data is also used to develop the annual Budget Request, MPAR, and NSPD-49 Reports, if appropriate.

2. The current and baseline totals for Formulation, Development, and Operations are reported twice annually to the GAO as part of the "Quick Look" audit.

Is the level of detail in the C&S Quarterly template necessary?

Cost & Schedule Current Estimate Update

Rev: Sept 2010 — To be provided to OCFO/SID

Project Name: | 6-digit Project Code: | Date of Submission:

Project Manager: | Type of Submission: Quarterly to OMB; Back-up for op plan; Back-up for budget

Point of Contact:

Select Project Phase: Formulation; Development; Operations

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Explanation of Changes from Last Update (for internal use only)

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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pre-Formulation and Formulation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Development	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

This roll-up table is included in the Quarterly Cost and Schedule Report to OMB. It includes all unallocated future expenses (UFE), whether being managed by the project, program, or MD, as well as any indirect costs ascribed to the project. (See NPD 1000.5 for information on NASA's policy with respect to UFE.) It also includes labor and

Management estimate[1]	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All project-managed costs (including those not included in the LCC)[1]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pre-Formulation not included in LCC[3]																					0.0
Pre-Formulation included in LCC																					0.0
Formulation (A, B)																					0.0
Development (C, D)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tech Development																					0.0
Aircraft/Spacecraft																					0.0
Payload(s)																					0.0
Systems I&T																					0.0
Launch Vehicle/Services																					0.0
Ground Systems																					0.0
Science/Technology																					0.0
Other direct project cost																					0.0
Project-managed UFE																					0.0
Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MO&DA - Prime (E)																					0.0
MO&DA - Extended * (E) included in baseline LCC																					0.0
Closeout (F)																					0.0
Extended Operations not included in LCC[4]																					0.0

Project-managed labor budgeted elsewhere[4]	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formulation																					0.0
Development									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[Enter WBS Element]																					0.0
Operations																					0.0
Extended Operations not included in LCC																					0.0

Program- or MD-managed UFE[6]	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formulation																					0.0
Development																					0.0
Operations																					0.0

Contract costs[7]	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Center M&O																					0.0
AM&O / Corp O&A																					0.0
Institutional Investments																					0.0

Current Schedule Estimate

Milestone	Key[8]	Mission Completion[9]	Management (Internal) Date	Agency Estimated Date (may be
Start Phase A			[MM/YYYY]	[MM/YYYY]
SRR				
MDR/SDR, PNAR				
Start Phase B				
PDR, NAR				
Start Phase C				
CDR				
SIR				
Start Phase D				
ORR/FRR				
LRD/IOC				
Start Phase E/FOC				
End Prime Mission				
Months prime mission			N/A	N/A
End Ex Mission (if included in C				
Months extended mission			N/A	N/A
[Add Key Delivery 1]				
[Add Key Delivery 2]				
[Add Key Delivery 3]				
[Add Key Delivery 4]				
[Add Key Delivery 5]				

(8) Place an X next to the milestone that is the key schedule milestone for the project.
(9) Identify event that determines completion of the milestone.

Contract Details for Elements in Development

Contract or Option Name & Number	Provider	Project Element(s) Provided or Supported	Contract Type	Award/ Exercise Date	End Date	Initial Value ($M)	Current Value ($M)	Reason for Change from previous report
					Total	0.0	0.0	

104

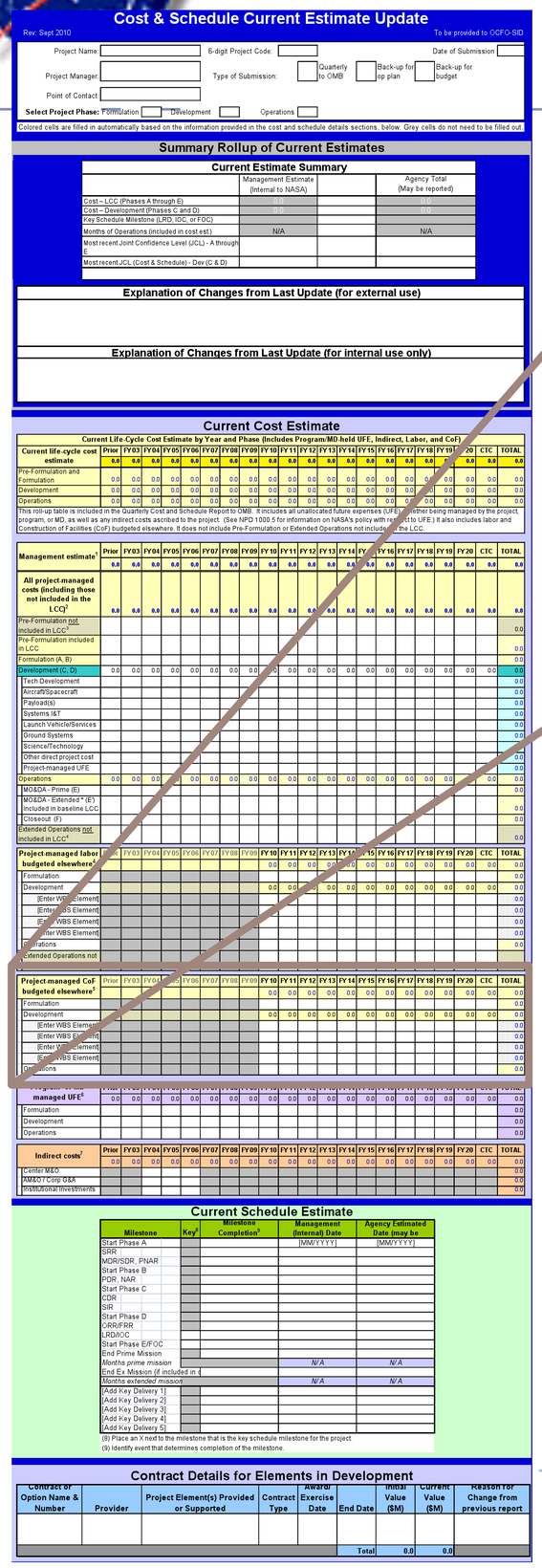
1

2

1. The Development WBS totals are reported in MPAR and NSPD-49 Project Development Reports.

2. Shifts in WBS elements, Labor, and MD UFE are used in analysis and reported at the BPR.

Is the level of detail in the C&S Quarterly template necessary?



Cost & Schedule Current Estimate Update

Rev: Sept 2010 — To be provided to OCFO-SID

Project Name: | 6-digit Project Code: | Date of Submission:
Project Manager: | Type of Submission: Quarterly to OMB / Back-up for op plan / Back-up for budget
Point of Contact:
Select Project Phase: Formulation ___ Development ___ Operations ___

Colored cells are filled in automatically based on the information provided in the cost and schedule details sections, below. Grey cells do not need to be filled out.

Summary Rollup of Current Estimates

Current Estimate Summary

	Management Estimate (Internal to NASA)		Agency Total (May be reported)
Cost – LCC (Phases A through E)			
Cost – Development (Phases C and D)			
Key Schedule Milestone (LRD, IOC, or FOC)			
Months of Operations (included in cost est.)	N/A		N/A
Most recent Joint Confidence Level (JCL) - A through E			
Most recent JCL (Cost & Schedule) - Dev (C & D)			

Explanation of Changes from Last Update (for external use)

Explanation of Changes from Last Update (for internal use only)

Current Cost Estimate

Current Life-Cycle Cost Estimate by Year and Phase (Includes Program/MD-held UFE, Indirect, Labor, and CoF)

Current life-cycle cost estimate	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pre-Formulation and Formulation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Development	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

This roll-up table is included in the Quarterly Cost and Schedule Report to OMB. It includes all unallocated future expenses (UFE), whether being managed by the project, program, or MD, as well as any indirect costs ascribed to the project. (See NPD 1000.5 for information on NASA's policy with respect to UFE.) It also includes labor and Construction of Facilities (CoF) budgeted elsewhere. It does not include Pre-Formulation or Extended Operations not included in the LCC.

Management estimate	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All project-managed costs (including those not included in the LCC)[2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pre-Formulation not included in LCC[3]																					0.0
Pre-Formulation included in LCC																					0.0
Formulation (A, B)																					0.0
Development (C, D)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tech Development																					0.0
Aircraft/Spacecraft																					0.0
Payload(s)																					0.0
Systems I&T																					0.0
Launch Vehicle/Services																					0.0
Ground Systems																					0.0
Science/Technology																					0.0
Other direct project cost																					0.0
Project-managed UFE																					0.0
Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MO&DA - Prime (E)																					0.0
MO&DA - Extended * (E') included in baseline LCC																					0.0
Closeout (F)																					0.0
Extended Operations not included in LCC[4]																					0.0

Project-managed labor budgeted elsewhere[5]	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formulation																					0.0
Development									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
Operations																					0.0
Extended Operations not																					

Project-managed CoF budgeted elsewhere[5]	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formulation																					0.0
Development									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
Operations																					0.0

managed UFE[5]																					
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formulation																					0.0
Development																					0.0
Operations																					0.0

Indirect costs[7]	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Center M&O																					0.0
AM&O / Corp G&A																					0.0
Institutional Investments																					0.0

Current Schedule Estimate

Milestone	Key[8]	Milestone Completion[9]	Management (Internal) Date	Agency Estimated Date (may be
Start Phase A			[MM/YYYY]	[MM/YYYY]
SRR				
MDR/SDR, PNAR				
Start Phase B				
PDR, NAR				
Start Phase C				
CDR				
SIR				
Start Phase D				
ORR/FRR				
LRD/OC				
Start Phase E/FOC				
End Prime Mission				
Months prime mission			*N/A*	*N/A*
End Ex Mission (if included in L				
Months extended mission			*N/A*	*N/A*
[Add Key Delivery 1]				
[Add Key Delivery 2]				
[Add Key Delivery 3]				
[Add Key Delivery 4]				
[Add Key Delivery 5]				

(8) Place an X next to the milestone that is the key schedule milestone for the project
(9) Identify event that determines completion of the milestone.

Contract Details for Elements in Development

Contract or Option Name & Number	Provider	Project Element(s) Provided or Supported	Contract Type	Award/ Exercise Date	End Date	Initial Value ($M)	Current Value ($M)	Reason for Change from previous report
					Total	0.0	0.0	

Project-managed CoF budgeted elsewhere[5]	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formulation																					0.0
Development									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
Operations																					0.0

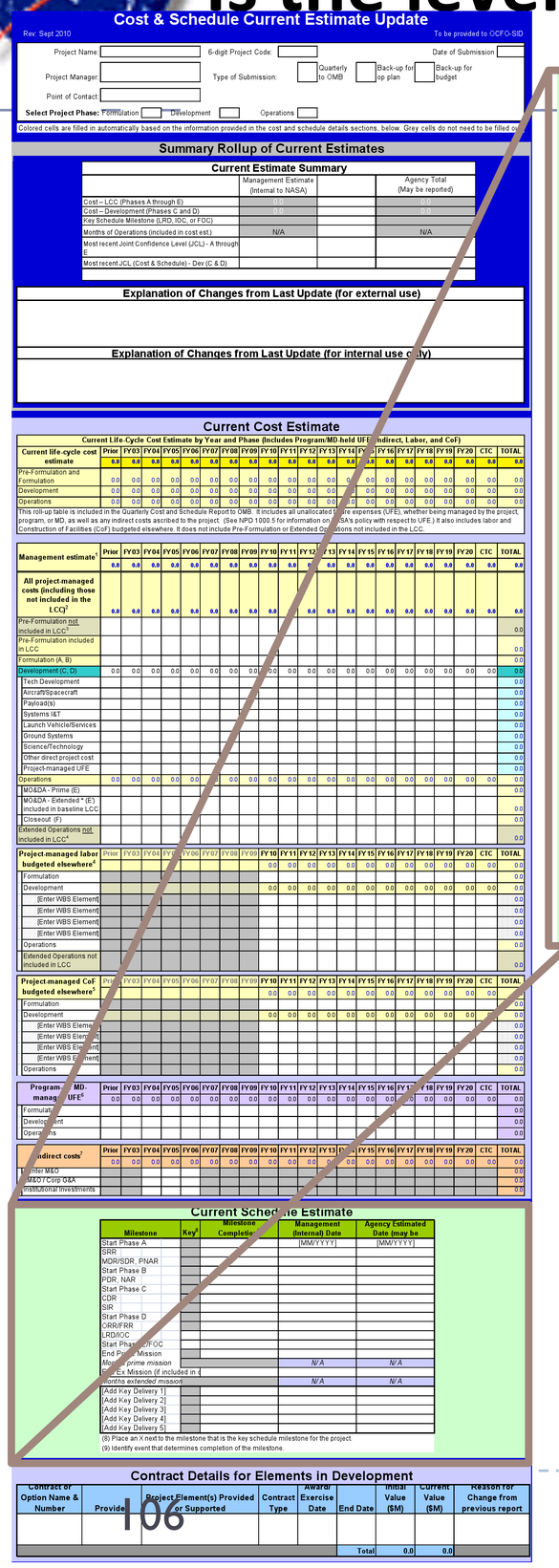
Project-managed CoF budgeted elsewhere[5]	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formulation																					0.0
Development									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
Operations																					0.0

Project-managed CoF budgeted elsewhere[5]	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formulation																					0.0
Development									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
Operations																					0.0

(5) Please provide the CoF numbers here that are specific to the project and must be included in the LCC, but are appropriated in the CECR (Construction and Environmental Compliance and Restoration) line item.

Construction of Facilities included in project LCCE is captured as part of the project's quarterly cost and schedule reporting.

Is the level of detail in the C&S Quarterly template necessary?


Cost & Schedule Current Estimate Update

Rev: Sept 2010 — To be provided to OCFO-SID

Project Name: | 6-digit Project Code: | Date of Submission:

Project Manager: | Type of Submission: Quarterly to OMB; Back-up for op plan; Back-up for budget

Point of Contact:

Select Project Phase: Formulation Development Operations

Colored cells are filled in automatically based on the information provided in the cost and schedule details sections, below. Grey cells do not need to be filled ou

Summary Rollup of Current Estimates

Current Estimate Summary

	Management Estimate (Internal to NASA)		Agency Total (May be reported)
Cost – LCC (Phases A through E)	TBD		TBD
Cost – Development (Phases C and D)	TBD		TBD
Key Schedule Milestone (LRD, IOC, or FOC)			
Months of Operations (included in cost est.)	N/A		N/A
Most recent Joint Confidence Level (JCL) - A through E			
Most recent JCL (Cost & Schedule) - Dev (C & D)			

Explanation of Changes from Last Update (for external use)

Explanation of Changes from Last Update (for internal use only)

Current Cost Estimate

Current Life-Cycle Cost Estimate by Year and Phase (Includes Program/MD-held UFE, Indirect, Labor, and CoF)

Current life-cycle cost estimate	Prior	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pre-Formulation and Formulation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Development	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

This roll-up table is included in the Quarterly Cost and Schedule Report to OMB. It includes all unallocated future expenses (UFE), whether being managed by the project, program, or MD, as well as any indirect costs ascribed to the project. (See NPD 1000.5 for information on GAA's policy with respect to UFE.) It also includes labor and Construction of Facilities (CoF) budgeted elsewhere. It does not include Pre-Formulation or Extended Operations not included in the LCC.

Management estimate[1]	Prior	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All project-managed costs (including those not included in the LCC)[2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pre-Formulation not included in LCC[3]																					0.0
Pre-Formulation included in LCC																					0.0
Formulation (A, B)																					0.0
Development (C, D)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tech Development																					0.0
Aircraft/Spacecraft																					0.0
Payload(s)																					0.0
Systems I&T																					0.0
Launch Vehicle/Services																					0.0
Ground Systems																					0.0
Science/Technology																					0.0
Other direct project cost																					0.0
Project-managed UFE																					0.0
Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MO&DA - Prime (E)																					0.0
MO&DA - Extended * (E') included in baseline LCC																					0.0
Closeout (F)																					0.0
Extended Operations not included in LCC[4]																					0.0

Project-managed labor budgeted elsewhere[4]	Prior	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	CTC	TOTAL
									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formulation																					0.0
Development									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
Operations																					0.0
Extended Operations not included in LCC																					0.0

Project-managed CoF budgeted elsewhere[5]	Prior	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	CTC	TOTAL
									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formulation																					0.0
Development									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
Operations																					0.0

Program/MD-managed UFE[6]	Prior	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formulation																					0.0
Development																					0.0
Operations																					0.0

Indirect costs[7]	Prior	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Center M&O																					0.0
M&O / Corp G&A																					0.0
Institutional Investments																					0.0

Current Schedule Estimate

Milestone	Key[8]	Milestone Completion[9]	Management (Internal) Date	Agency Estimated Date (may be
Start Phase A			[MM/YYYY]	[MM/YYYY]
SRR				
MDR/SDR, PNAR				
Start Phase B				
PDR, NAR				
Start Phase C				
CDR				
SIR				
Start Phase D				
ORR/FRR				
LRD/IOC				
Start Phase E/FOC				
End Prime Mission				
Months prime mission			*N/A*	*N/A*
End Ex Mission (if included in cost)				
Months extended mission			*N/A*	*N/A*
[Add Key Delivery 1]				
[Add Key Delivery 2]				
[Add Key Delivery 3]				
[Add Key Delivery 4]				
[Add Key Delivery 5]				

(8) Place an X next to the milestone that is the key schedule milestone for the project.
(9) Identify event that determines completion of the milestone.

Contract Details for Elements in Development

Contract or Option Name & Number	Provider	Project Element(s) Provided or Supported	Contract Type	Award/ Exercise Date	End Date	Initial Value ($M)	Current Value ($M)	Reason for Change from previous report
					Total	0.0	0.0	

106

Current Schedule Estimate

Milestone	Key[8]	Milestone Completion[9]	Management (Internal) Date	Agency Estimated Date (may be reported)
Start Phase A			[MM/YYYY]	[MM/YYYY]
SRR				
MDR/SDR, PNAR				
Start Phase B				
PDR, NAR				
Start Phase C				
CDR				
SIR				
Start Phase D				
ORR/FRR				
LRD/IOC				
Start Phase E/FOC				
End Prime Mission				
Months prime mission			*N/A*	*N/A*
End Ex Mission (if included in cost)				
Months extended mission			*N/A*	*N/A*

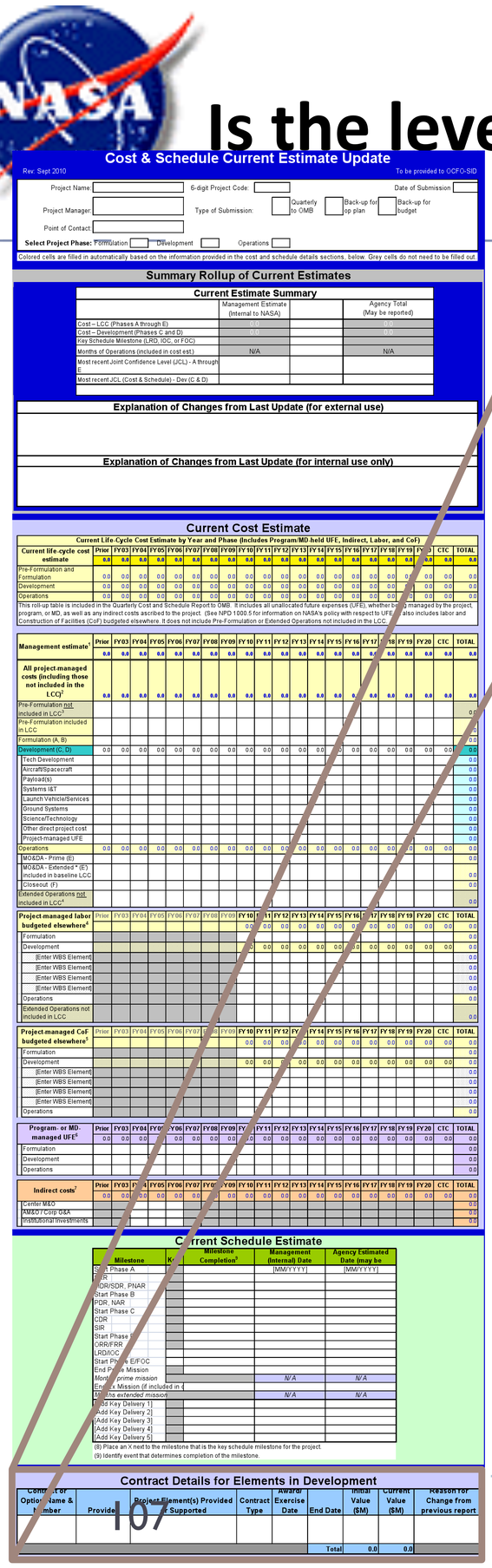
1

2

1. All relevant project Milestone dates are reported twice annually to the GAO. A sub-set are reported in the Budget, MPAR, OMB Quarterly Reports, and NSPD-49 Reports.

2. Management Dates have not historically been reported externally; however, the GAO has requested insight into Internal v. External schedule information.

Is the level of detail in the C&S Quarterly template necessary?



Cost & Schedule Current Estimate Update

Rev: Sept 2010 — To be provided to OCFO-SID

Project Name | 6-digit Project Code | Date of Submission
Project Manager | Type of Submission: Quarterly to OMB; Back-up for op plan; Back-up for budget
Point of Contact
Select Project Phase: Formulation | Development | Operations

Colored cells are filled in automatically based on the information provided in the cost and schedule details sections, below. Grey cells do not need to be filled out.

Summary Rollup of Current Estimates

Current Estimate Summary

	Management Estimate (Internal to NASA)		Agency Total (May be reported)
Cost – LCC (Phases A through E)	0.0		0.0
Cost – Development (Phases C and D)	0.0		0.0
Key Schedule Milestone (LRD, IOC, or FOC)			
Months of Operations (included in cost est.)	N/A		N/A
Most recent Joint Confidence Level (JCL) - A through E			
Most recent JCL (Cost & Schedule) - Dev (C & D)			

Explanation of Changes from Last Update (for external use)

Explanation of Changes from Last Update (for internal use only)

Current Cost Estimate

Current Life-Cycle Cost Estimate by Year and Phase (Includes Program/MD-held UFE, Indirect, Labor, and CoF)

Current life-cycle cost estimate	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pre-Formulation and Formulation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Development	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

This roll-up table is included in the Quarterly Cost and Schedule Report to OMB. It includes all unallocated future expenses (UFE), whether borne/managed by the project, program, or MD, as well as any indirect costs ascribed to the project. (See NPD 1000.5 for information on NASA's policy with respect to UFE.) It also includes labor and Construction of Facilities (CoF) budgeted elsewhere. It does not include Pre-Formulation or Extended Operations not included in the LCC.

Management estimate	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All project-managed costs (including those not included in the LCC)[2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pre-Formulation not included in LCC[3]																					0.0
Pre-Formulation included in LCC																					0.0
Formulation (A, B)																					0.0
Development (C, D)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tech Development																					0.0
Aircraft/Spacecraft																					0.0
Payload(s)																					0.0
Systems I&T																					0.0
Launch Vehicle/Services																					0.0
Ground Systems																					0.0
Science/Technology																					0.0
Other direct project cost																					0.0
Project-managed UFE																					0.0
Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MO&DA - Prime (E)																					0.0
MO&DA - Extended * (E) included in baseline LCC																					0.0
Closeout (F)																					0.0
Extended Operations not included in LCC[4]																					0.0

Project-managed labor budgeted elsewhere[4]	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
Formulation																					0.0
Development									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
Operations																					0.0
Extended Operations not included in LCC																					0.0

Project-managed CoF budgeted elsewhere[4]	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
Formulation																					0.0
Development									0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
[Enter WBS Element]																					0.0
Operations																					0.0

Program- or MD-managed UFE[5]	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Formulation																					0.0
Development																					0.0
Operations																					0.0

Indirect costs[7]	Prior	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	CTC	TOTAL
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Center M&O																					0.0
SMD/Corp G&A																					0.0
Institutional Investments																					0.0

Current Schedule Estimate

Milestone	Key[8]	Milestone Completion[9]	Management (Internal) Date	Agency Estimated Date (may be
Start Phase A			[MM/YYYY]	[MM/YYYY]
SRR				
MDR/SDR, PNAR				
Start Phase B				
PDR, NAR				
Start Phase C				
CDR				
SIR				
Start Phase D				
ORR/FRR				
LRD/IOC				
Start Phase E/FOC				
End Prime Mission				
Months prime mission			*N/A*	*N/A*
End Ext Mission (if included in C				
Months extended mission			*N/A*	*N/A*
[Add Key Delivery 1]				
[Add Key Delivery 2]				
[Add Key Delivery 3]				
[Add Key Delivery 4]				
[Add Key Delivery 5]				

(8) Place an X next to the milestone that is the key schedule milestone for the project.
(9) Identify event that determines completion of the milestone.

Contract Details for Elements in Development

Contract or Option Name & Number	Provider	Project Element(s) Provided or Supported	Contract Type	Award/ Exercise Date	End Date	Initial Value ($M)	Current Value ($M)	Reason for Change from previous report
					Total	0.0	0.0	

Contract Details for Elements in Development

Contract or Option Name & Number	Provider	Project Element(s) Provided or Supported	Contract Type	Award/ Exercise Date	End Date	Initial Value ($M)	Current Value ($M)	Reason for Change from previous report
					Total	0.0	0.0	

Contract values are reported Quarterly to OMB. This data is also used for NSPD-49 Contract and Project Baseline Reports.

Take Away

In a time of reduced budgets, having an expectation of successful performance and a set of standards to measure progress is extremely important so that when we communicate performance we have a common language, a common set of data and a common measure of success……Dollars are way too scarce for poor performance to be perpetuated

Back up slides

GAO Audits

- 'Quick Look' Audit
  - Annual audit initiated by Congress in 2008 Appropriations Act.
  - Includes all projects in implementation with LCC ≥ $250M and those in formulation with development contracts ≥$50M
  - Project Staff interview annually; Contractors may also be interviewed
  - Annual data collection
    - Contract, technical performance, design status, and software metrics collected from project staff
    - Cost ranges are provided during formulation.
    - GAO is given both the Congressional baseline and, if different, the project's KDP-C baseline, as well as amount and phasing of UFE
    - Monthly status reports are now being provided to GAO.
- 'High Risk' Audit
  - Bi-annual update on corrective actions to improve acquisition management (project & contract management)
  - Semi-annual update on cost & schedule performance of projects approved for development since 2008.
  - Additional metrics being added in 2011 addressing implementation of newer policies (e.g., CADRes, JCL, mass /power margin).

Frequently Asked Questions

Q. When do we re-baseline projects?

A. Re-baselines are limited to cases in which

- Development cost has grown by 30% or
- Decision Authority judges external events or changes in scope require a re-baseline.
- Note: Every change to a project's cost or schedule estimate is not a rebaseline

- Key Point: After reaching 30%, must rebaseline but not until after Congress reauthorizes the project through legislation.

Frequently Asked Questions

Q. How is UFE treated in cost reporting?

A. All UFE, whether managed by the project or its MD, is included in the project's Agency Baseline Commitment.

- Release of UFE by the MD to the project does not show up as cost growth in Congressional or OMB reporting.
- Cost growth only reported if it becomes clear project will require more funding than provided for by all UFE—project managed and MD managed—combined.

Frequently Asked Questions

Q. What is the External Corrective Action Report ?

A. Describes steps being taken to control cost and schedule.

- Required by Section 1203 of the 2010 NASA Authorization Act.
- Tied to Agency level GAO High Risk Corrective Action Plan
- Filed each year (in April) after a project has breached on cost or schedule.

Frequently Asked Questions

Q. What is NASA doing to improve performance?

A. Changing policy, analysis and reporting

- Cost estimates
  - Including UFE in the project baseline and cost estimate
  - Joint cost and schedule (JCLs) analysis to include integrated, resource-loaded schedules
  - Develop CADRes to capture cost estimates at defined lifecycle reviews
- Managing project performance
  - Cost & schedule assessments and tracking
  - Agency Baseline Performance Review assessments
  - EVM
- Providing training
  - PM Challenge, Master's Forums, APPEL

Independent Assessment Policy Update

James N. Ortiz, Ph.D.
Director, Independent Program Assessment Office

NPR 7120.5 Roll Out

November , 2011

Objective

- Provide the project management community with:
  - An overview of changes to the Agency independent review process to align with the recent updates to NPR 7120.5
  - Status and forward plan for updates to the SRB Handbook

Background

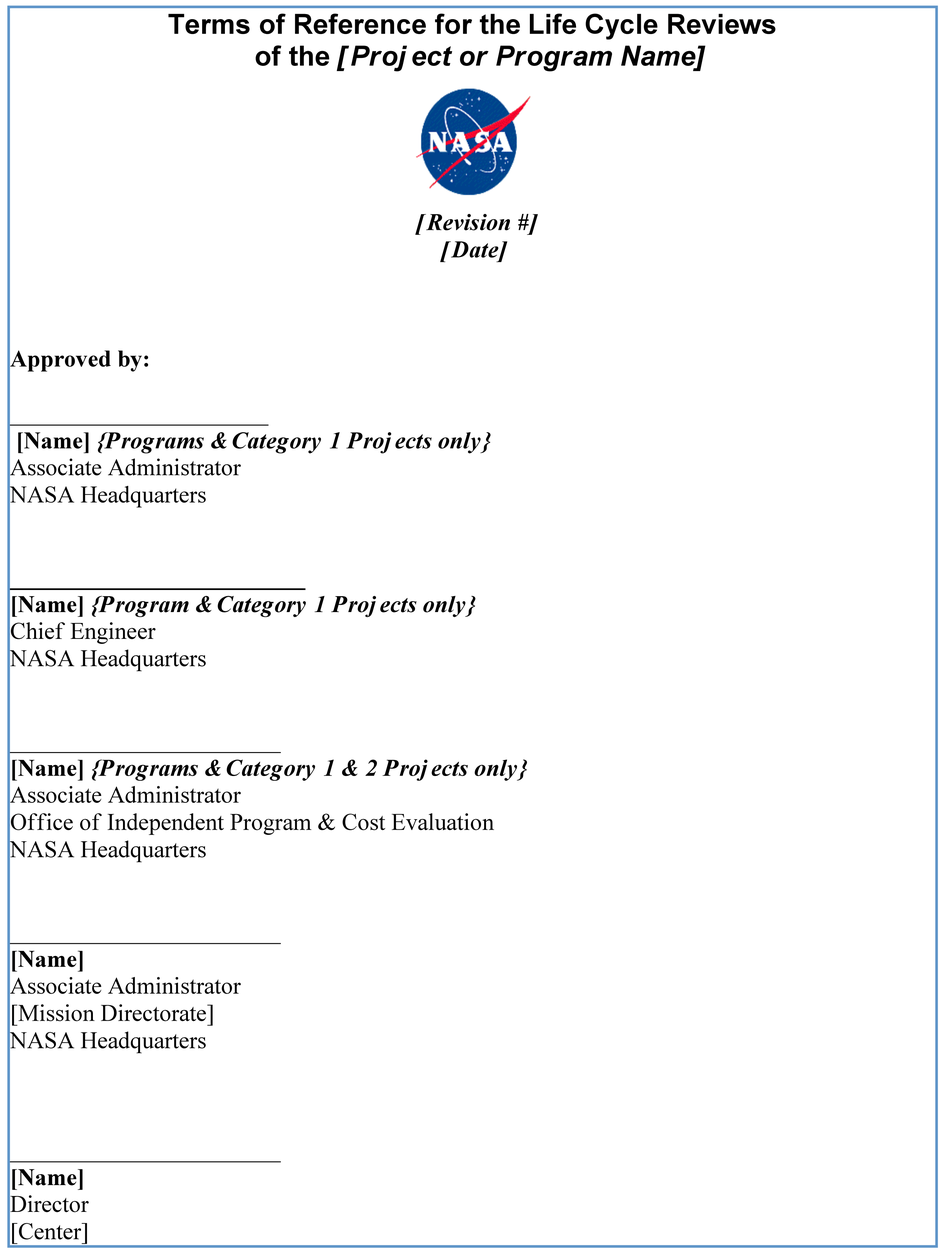
- Majority of changes to independent reviews in latest policy update resulted from Pause and Learn (PAL) process improvement activities with Mission Directorates, Centers, SRB Chairs, and Convening Authorities
- These changes improve the efficiency and effectiveness of the independent review process
- IPAO conducted early pilots of selective portions of these changes to reduce implementation risk
- SRB advisory role remains unchanged
- SRB Handbook provides detailed guidance and expected practices

Contents

- Independent Review Changes
  - Standard Terms of Reference (ToR)
  - Updates to Convening Authority (CA) approvals
  - Updates to list of SRB-led Reviews
  - SRB Composition and Balance
  - Readiness Assessment
  - 1 & 2- Steps Reviews
  - Lifecycle Review Process
  - SRB assessment using expected maturity states
  - SRB configuration options
- SRB Handbook update
- Backup
  - Frequently Asked Questions

Terms of Reference (TOR) Template

- Standard TOR template cover all reviews in the life cycle (avoids multiple versions for each review).
- Consolidates the SRB team approval as part of the same document
- Includes pointers to the criteria and expected products in NPRs to streamline content and to avoid errors in interpretation
- Includes standard timelines for product deliveries to SRB
- "All electronic" review and approval process to improve timeliness



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

[Revision #]
[Date]

Approved by:

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

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

_____
[Name] ***{Programs & Category 1 & 2 Projects only}***
Associate Administrator
Office of Independent Program & Cost Evaluation
NASA Headquarters

_____
[Name]
Associate Administrator
[Mission Directorate]
NASA Headquarters

_____
[Name]
Director
[Center]

Updates to Convening Authorities Approvals

		Decision Authority		Technical Authority*		Associate Administrator, IPCE
		NASA AA	MDAA	NASA CE	Center Director***	
Establish SRB, Approve Terms of Reference (ToR) (See Appendix I). Approve Chairperson, RM, and Other Board Members	Programs	Approve	Approve	Approve	Approve	Approve
	Category 1 Projects	Approve	Approve	Concur	Approve	Approve
	Category 2 Projects		Approve	Concur	Approve	Approve**
	Category 3 Projects		Approve		Approve	

NASA Convening Authorities for Standing Review Board

- Changes to CA's include CD approval at the Program level and OCE concurrence for Cat 2 projects

Updates to SRB-led Reviews

- The program or project and an independent Standing Review Board (SRB) shall conduct the LCRs specified in figures 2-2, 2-3 and 2-4 of the NID with the following exceptions :

  - Mission Concept Review (MCR),
  - Flight Readiness Review (FRR)
  - Mission Readiness Review (MRR),
  - and all post-launch reviews unless requested by the Decision Authority

- The **last SRB-led review in the lifecycle** is the Operations Readiness Review (ORR) and at that point the SRB with the exception of the SRB chair and the Review Manager conclude their work
  - The SRB Chair and RM brief the results of the ORR to the MRB or equivalent

SRB Composition and Balance

- SRB members are competent, current, and independent from the management chain of the P/p, with membership balanced between the host Center and other organizations.
  - The CD needs SRB members with sufficient specific systems and technical expertise to ensure the project's detailed technical design and technical implementation is being executed in accordance with best Center practices.
  - The MDAA needs SRB members who focus on the ability to achieve the mission objectives within resource constraints, while evaluating the P/p from the Agency perspective rather than the Center perspective.
- The nomination and vetting process ensures these needs of the CA's are met
  - The nomination and vetting process includes a **balance assessment** performed by the Chair and the Review Manager to demonstrate the SRB is appropriately balanced
- This process also demonstrates to external stakeholders that the SRB is competent, current and independent

Readiness Assessment

- Performed to assess expected readiness to enter the lifecycle review
- Assessment is performed by the Project or Program Manager, the SRB Chair and the Center Director (or designated TA representative)
    - Assessment is performed 30 to 90 days prior to the LCR
    - Any disagreements are reported to the DA
    - Results are documented by the SRB Chair and the RM via email memo to IPAO Director
    - IPAO Director communicates to the CAs prior to the reviews
- Results of the Readiness Assessment
- Agenda for site review
- Timeline for reporting

Lifecycle reviews

- Agency Lifecycle Review process flow (shown on the following page) has been updated to include policy changes
- Agency policy allows flexibility to perform lifecycle reviews as a **1-step or 2-step LCRs** (see overview timelines on the following charts)
- Implementation guidance detailing key elements of LCR such as **readiness assessment**, **snap-shot reports**, **check points**, and **reporting timelines** are detailed in the SRB Handbook

Lifecycle Review Process

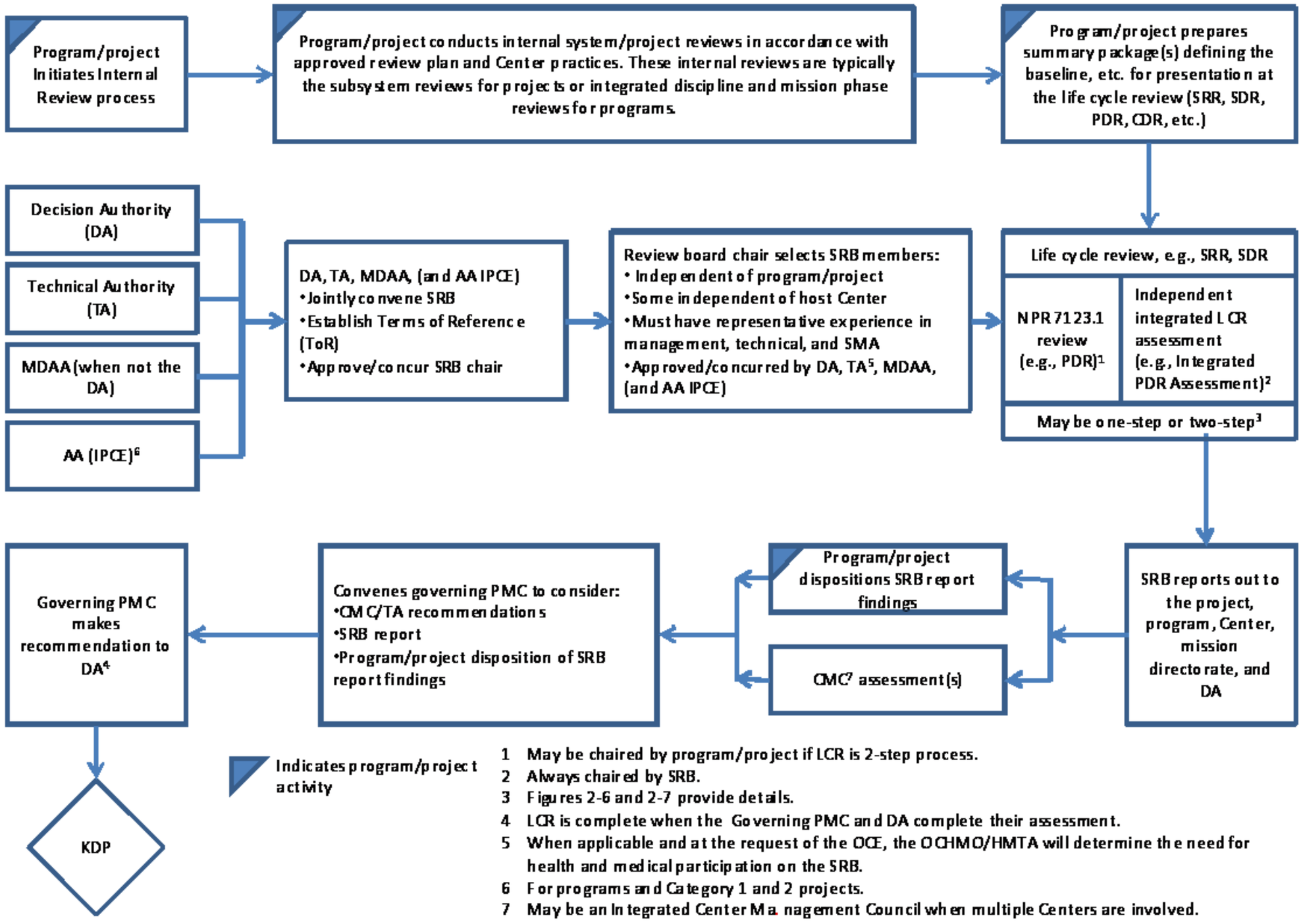


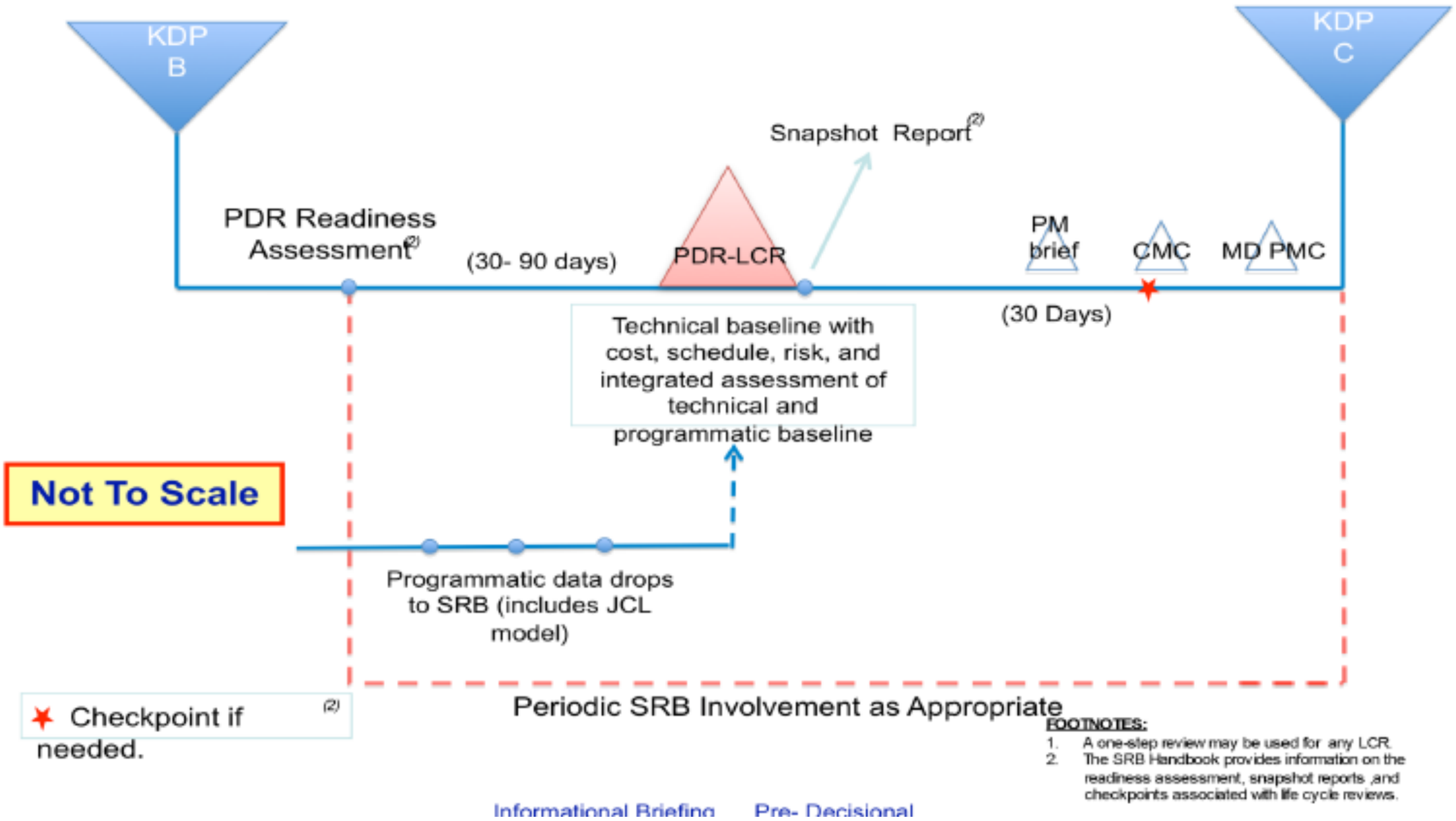
Figure 2-8 Program/Project Independent Life Cycle Review Process

Rationale for early adoption: Defines key steps in the review process

NASA Headquarters
Independent Program and Cost Evaluation

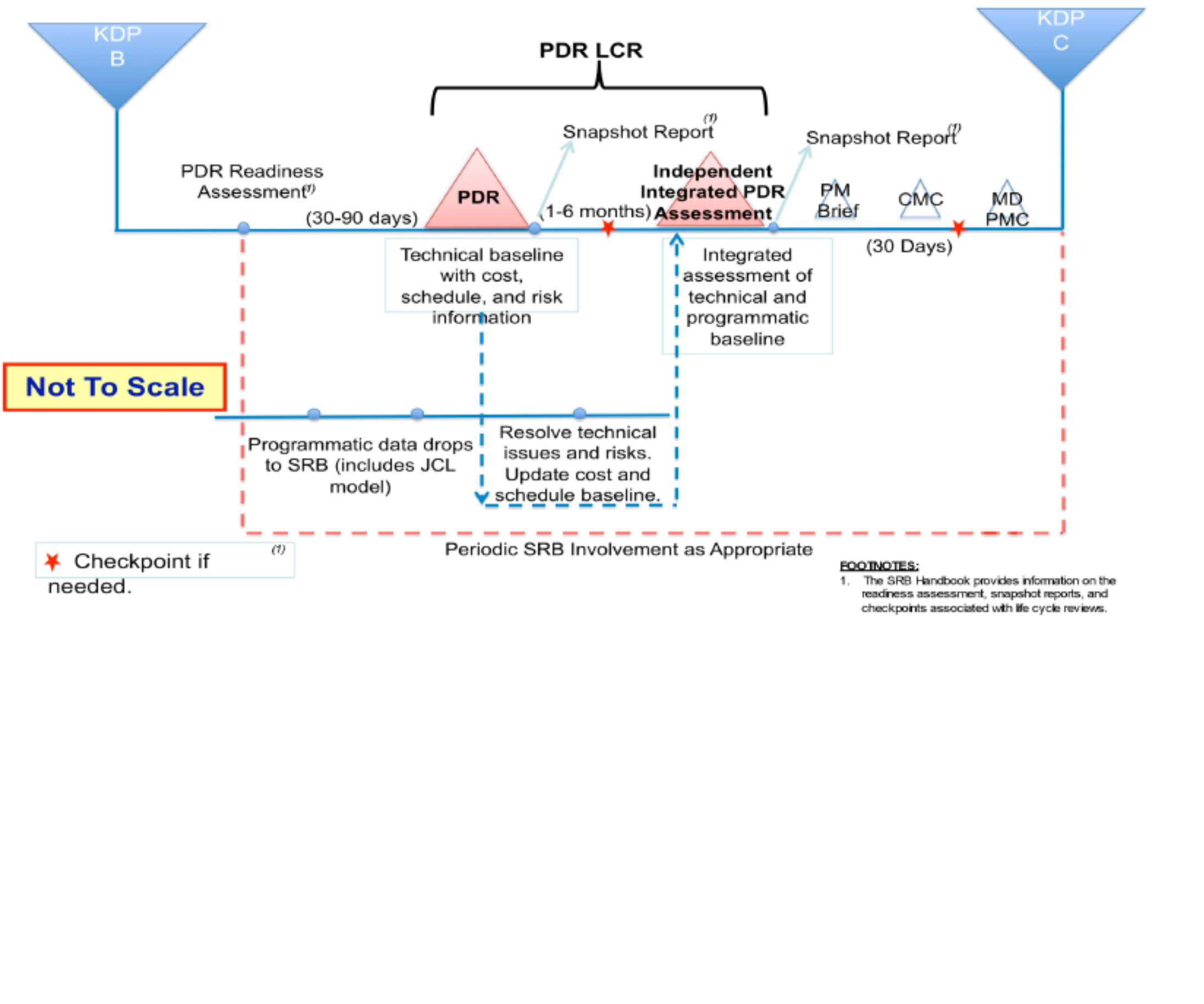
1-step LCR

One Step PDR
Life Cycle Review Overview (Example)



2-step LCR

Two Step PDR
Life Cycle Review Overview (Example)



NASA Headquarters
Independent Program and Cost Evaluation

Maturity State and SRB assessment

- **Responding to Agency policy emphasizing Maturity State-based criteria, SRBs will be providing their assessments based on the Maturity State requirements for each LCR and KDP per Tables 2-2,2-3, 2-4 on the NPR as further detailed in Appendix L of the PM Handbook (recognizing approved tailoring)**

KDP Review	Associated Lifecycle Review	LCR Objectives	Overall Expected Maturity State at KDP
KDP A	MCR	To evaluate the feasibility of the proposed mission concept(s) and its fulfillment of the program's needs and objectives; to determine whether the maturity of the concept and associated planning are sufficient to begin Phase A.	Overall KDP A Expected Maturity: Project addresses critical NASA need; proposed mission concept(s) is feasible; associated planning is sufficiently mature to begin Phase A, and the mission can likely be achieved as conceived.
KDP B	SRR	To evaluate whether the functional and performance requirements defined for the system are responsive to the program's requirements on the project and represent achievable capabilities.	Overall KDP B Expected State: Proposed mission/system architecture is credible and responsive to program requirements and constraints including resources; and the maturity of the
	MDR	To evaluate the credibility and responsiveness of the proposed mission/system architecture to the program requirements and constraints, including available resources; to c the maturity of the project's mission/system de associated plans are sufficient to begin Phase	
	SDR	To evaluate the credibility and responsiveness mission/system architecture to the program re constraints, including available resources; to c the maturity of the project's mission/system de associated plans are sufficient to begin Phase	
KDP C	PDR	To evaluate the completeness/consistency of technical & cost/schedule baselines developed to assess compliance of the preliminary desig requirements; to determine if the project is suf begin Phase C.	

NPR

PM Handbook

KDP Review	Associated Lifecycle Review	LCR Objectives	Expected Maturity State by Review Criteria						Overall Expected Maturity State at KDP
			Agency Strategic Goals	Management Approach	Technical Approach	Budget and Schedule	Resources Other Than Budget	Risk Management	
KDP A	MCR	To evaluate the feasibility of the proposed mission concept(s) and its fulfillment of the program's needs and objectives; to determine whether the maturity of the concept and associated planning are sufficient to begin Phase A.	The proposed Project has merit, is within the Agency/Program scope, and initial objectives and requirements are appropriate.	The Project FAD and Formulation Agreement are ready for approval and the management framework is in place; key interfaces and partnerships have been identified; and appropriate plans for Phase A are in place.	One or more technical concepts and attendant architectures that respond to mission needs are identified and appear feasible. Driving technologies, engineering development, payload, heritage hardware and software needs and risks have been identified.	Credible risk-informed options exist that fit within desired schedule and available funding profile.	Infrastructure and unique resource needs, such as special skills or rare materials, have been identified and are likely available.	The driving risks associated with each identified technical concept have been identified; approaches for managing these risks have been proposed and are adequate.	Overall KDP A Expected Maturity: Project addresses critical NASA need and can likely be achieved as conceived.
KDP B	SRR	To evaluate whether the functional and performance requirements defined for the system are responsive to the program's requirements on the project and represent achievable capabilities.	Project requirements reflect program requirements and constraints, and are responsive to mission needs.	Project documentation is appropriately mature to support conceptual design phase and preliminary acquisition strategy is defined.	Conceptual design documented; spacecraft architecture baselined; functional and performance requirements have been defined, and the requirements will satisfy the mission.	Credible preliminary cost and schedule range estimates and associated confidence levels are supported by a documented BOE and are consistent w/ driving assumptions, risks, system requirements, design options, and available funding.	Preliminary staffing and essential infrastructure requirements have been identified and documented; preliminary sources have been identified.	Significant mission, technical, cost and schedule risks have been identified; viable mitigation strategies have been defined; a preliminary process and resources exist to effectively manage or mitigate them.	Overall KDP B Expected State: Proposed systems are feasible within available resources with acceptable risk.

Allowable SRB Structures

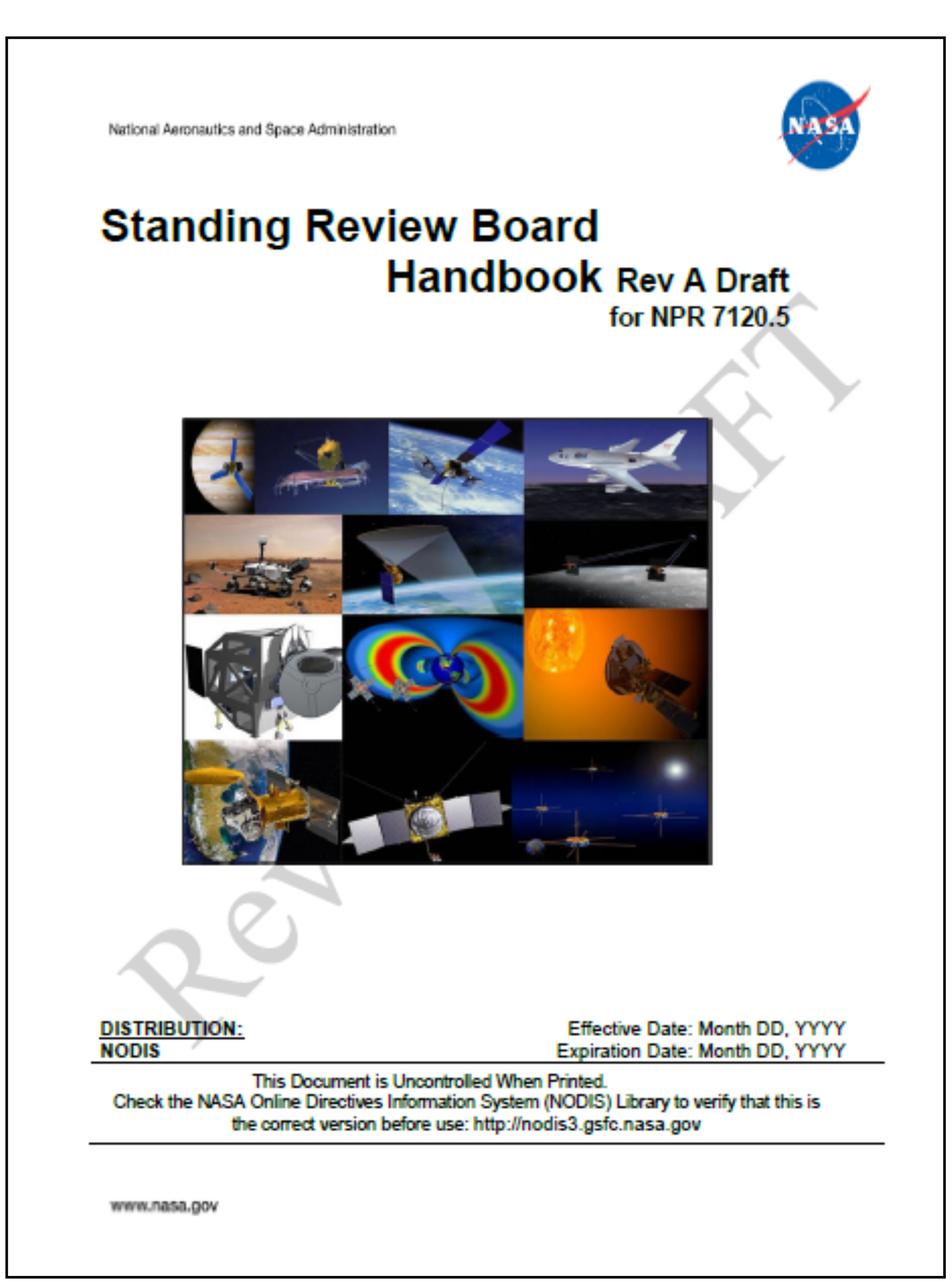
- These SRB structures are in place to address FACA

- Consensus (CS and CS2) boards are preferred

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 report and briefings with findings of fact and recommendations; RFAs (or equivalent) from individual members**; chair briefs report.	SRB produces report and briefings 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 report 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. CS ethics rules apply.	Apply independence standards to experts but allow some impairments, if approved.

* JPL review managers are not members and do not have a vote.
** Reports and RFAs can contain individual recommendations.
*** The minority report requirements do not abridge NASA's Dissenting Opinion process per NPD 1000.0.

SRB Handbook



- Initial version published on December 2009 aligned with NPR 7120.5D
- Updated in **draft** form to align with recent NID and draft PM Handbook
- Provides expanded guidance to include changes discussed in this briefing
- Rev A will be reviewed and published along with NPR 7120.5E and PM Handbook
- Content regarding Conflict of Interest (COI) has not changed
- Posted on NODIS linked to the NPR 7120.5 D NID and at the IPAO Web site at: http://www.nasa.gov/offices/ipce/ipao/library/index.html

SRB Handbook Rev A Contents

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Summary

- This briefing provided a status of recent changes to the Agency independent review process to align with recent changes to policy
- For additional information please feel free to contact me or visit the IPAO Website at: http://www.nasa.gov/offices/ipce/ipao/index.html

Back up

- Frequently asked questions

NASA Headquarters
Independent Program and Cost Evaluation

Frequently Asked Questions (FAQs) (1 of 6)

Q: What authority do SRBs have to direct programs and projects ?

A: SRBs are advisory and thus have no authority to direct programs and projects. SRBs provide findings and recommendations to the governing councils (CMCs, DPMCs and APMCs) and these councils have authority to direct programs and projects to implement any of the SRBs recommendations.

Q: How is the membership of SRBs determined ?

A: The SRB membership is approved by the Convening Authorities which include the Center Directors, the Mission Directorate AA, the Chief Engineer, the Director of Evaluation, and the Associate Administrator. The SRB chair is nominated by the Center (for project reviews) or by the Mission Directorates (for program reviews). The Review Manager is assigned by IPAO. The SRB chair and RM work with the Centers and the Mission Directorates to populate the team and recommend approval of the full SRB to the CAs based on a documented analyses that the SRB is appropriately balanced for competency, currency and independence.

Frequently Asked Questions (FAQs) (2 of 6)

Q: What is the readiness assessment and why is it done ?

A: The readiness assessment is an informal discussion between the SRB chair and the RM with the project or Program Manager and the Center representative to determine whether the data and products that support the review entry and exit criteria are expected to be available under the planned site review schedule. The assessment is done to help ensure the review activity is entered when all expected data and products are mature and available to support the site review or to discuss mitigations when that is not the case. Please note that the readiness assessment is not a pre-review of the data and products but a discussion of the readiness of those to support the site review.

Frequently Asked Questions (FAQs) (3 of 6)

Q: What is the snap-shot report and why is it needed ?

A: The snap-shot report (also known as the "quick-look" report or the "one-pager") is a teleconference to provide a summary of the major findings of the review to the Decision Authority (DA). The teleconference is scheduled between 24-48 hours after the site review and allows for an early discussion of the major findings of the review with an emphasis on any major items that could impact the readiness of the Project or program to proceed to the governing councils for approval. The discussion is documented in a one-pager (text) prepared and summarized by the SRB chair. The Program or project manager participates in the discussion and provides his/her views on the issues highlighted by the SRB. The CAs are also invited to participate in the telecon.

Q: What is the intent of "standing" with respect to standing review boards ?

A: The intent of a "standing" review board is to provide continuity in the engagement of the review team with the program or project by having the same review team perform all the SRB-led reviews in the lifecycle. Note that is NOT intended to have the SRB constantly engaged with the program or project between lifecycle reviews.

Frequently Asked Questions (FAQs) (4 of 6)

Q: What is standard TOR ?

A: The standard Terms of Reference (TOR) is a document that is used to outline the content and expectations for each review. The standard TOR consolidates into one document the content of TORs and the SRB nomination letter. The standard TOR also provides a template that relies more heavily on pointers to requirements in the NPRs and Center guidance to avoid duplication or interpretation errors. The standard TOR includes a template for the delivery of programmatic information in support of the reviews to ensure timely availability of programmatic analyses to support the SRB reporting. Another important feature of the standard TOR is that is designed to cover the full lifecycle of reviews for a Program or a project so in most cases it would need to be approved only once and modified only on an exception basis. The standard TOR along with the "all electronic" approval implemented by IPAO over the last year are significantly improving the timeliness of approval of this documentation.

Frequently Asked Questions (FAQs) (5 of 6)

Q: What criteria is used by the SRBs to assess Programs and projects ?

A: SRBs use the criteria specified in the Program Management and Systems Engineering NPRs (NPRs 7120.5 and 7123.1) in their assessment of Program and projects (with approved tailoring). With the publication of the latest NID to NPR 7120.5D, the emphasis has shifted from the broad six element criteria to a more explicitly defined set of "state maturity expectations " for each review in the lifecycle that shows how the six element criteria are to be satisfied at each life cycle review (detailed in the PM Handbook). Accordingly, SRBs are now using these state maturity expectations to guide their assessments.

Q: What is the function of the SRB Handbook?

A: The SRB Handbook provides the guidelines and conflict of interest requirements for the establishment and operation of the SRB. Because there are FACA requirements that must be met, the SRB Handbook provides the structure to ensure mandatory compliance with these and avoidance of Personal and Organizational Conflict of Interest (PCI/OCI) . It defines the three types of boards and how these are required to operate and report.

Frequently Asked Questions (FAQs) (6 of 6)

Q: What is the difference between the types of SRBs ?

A: There are three types of SRBs: Consensus (CS, all civil servants); consensus with consultants (CS2); and non-consensus (mostly consultants). **Consensus boards** are all civil servant members. The chair is responsible for leading the team to reach a consensus on the findings and recommendations. A minority opinion may be prepared if there is a member(s) who have a disagreement with the consensus. **Consensus with consultants** (CS2) SRB is comprised of civil servants as members and consultants (Civil servants or contractors) that are not part of the board but provide input to the board. When the chair is ready to form a consensus opinion, this must done apart from the consultants. A minority report from the members (not the consultants) is acceptable. A **non-consensus board (NC) board** is made up of civil servants and/or consultants (it can be all consultants). Board discussions are open and the chair receives inputs from all the members. The chair forms his/her opinion, not a consensus, based on inputs. An alternate opinion is available if a member strongly disagrees with the chair's report.

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7120 Road Show Conclusion

- 7120 processes are streamlined
- Appropriate rigor should be documented, approved and applied based upon size, complexity and risk
- Credibility must be rebuilt with stakeholders by improving NASA's performance against program/project commitments
- Programs and projects are empowered and accountable
- For additional information: http://nodis3.gsfc.nasa.gov/OCE_rep/OCE_list.cfm
- Ellen Stigberg leads development of Program/Project Management Policy (ellen.r.stigberg@nasa.gov)