NOAA/NESDIS

NESDIS-PR-1223.1

NESDIS PROJECT MILESTONES PROCEDURAL REQUIREMENTS

December 2020

COMPLIANCE IS MANDATORY

Prepared by:
U.S. Department of Commerce
National Oceanic and Atmospheric Administration (NOAA)
National Environmental Satellite, Data, and Information Service (NESDIS)

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Table of Contents

Table of Figures

Table of Tables

1. Introduction

1.1. Purpose

This document establishes a common, minimal set of National Environmental Satellite, Data, and Information Service (NESDIS) Project decision and technical milestones as directed by NESDIS-PD-1110.1, NESDIS Systems Engineering and Project Management Policy, for planning, controlling, and monitoring Projects. Implementation of a common set of milestones will ensure that a Project's development is reviewed at predefined stages in its lifecycle using a common set of criteria. The Project decision milestones and technical milestones defined in this document apply to all NESDIS Project types, whether they use an iterative or waterfall development model.

- The Project decision milestones are those at which the Milestone Decision Authority (MDA) for the Project makes an explicit decision on whether to proceed with the Project. These milestones focus on schedule execution, budget execution, and likelihood of meeting a validated mission need.
- The technical milestones provide an independent assessment of the status and progress of the Project development. These focus on the technical status of the Project.

These milestones support a Project's development plan. A Project's milestones are captured in its Project Management Plan (PMP) as defined in NESDIS PR-1210.1, NESDIS Project Management Procedural Requirements. The PMP will include how a Project will meet the milestones, as well as any tailoring of these milestones allowed by this document.

These milestones are designed to support the unique needs of NESDIS. As such, even though the milestones in this document have leveraged much from the National Aeronautics and Space Administration (NASA) and Department of Defense (DOD) criteria and generally align with these familiar milestones, they have been altered to accommodate the broader set of NESDIS development items outside of flight and ground hardware (H/W)/software (S/W).

Figures within this Procedural Requirements (PR) document are intended to be notional, not prescriptive. This Project milestones PR flows down from NESDIS-PR-1210.1, Project Management Procedural Requirements, as shown in Figure 1.

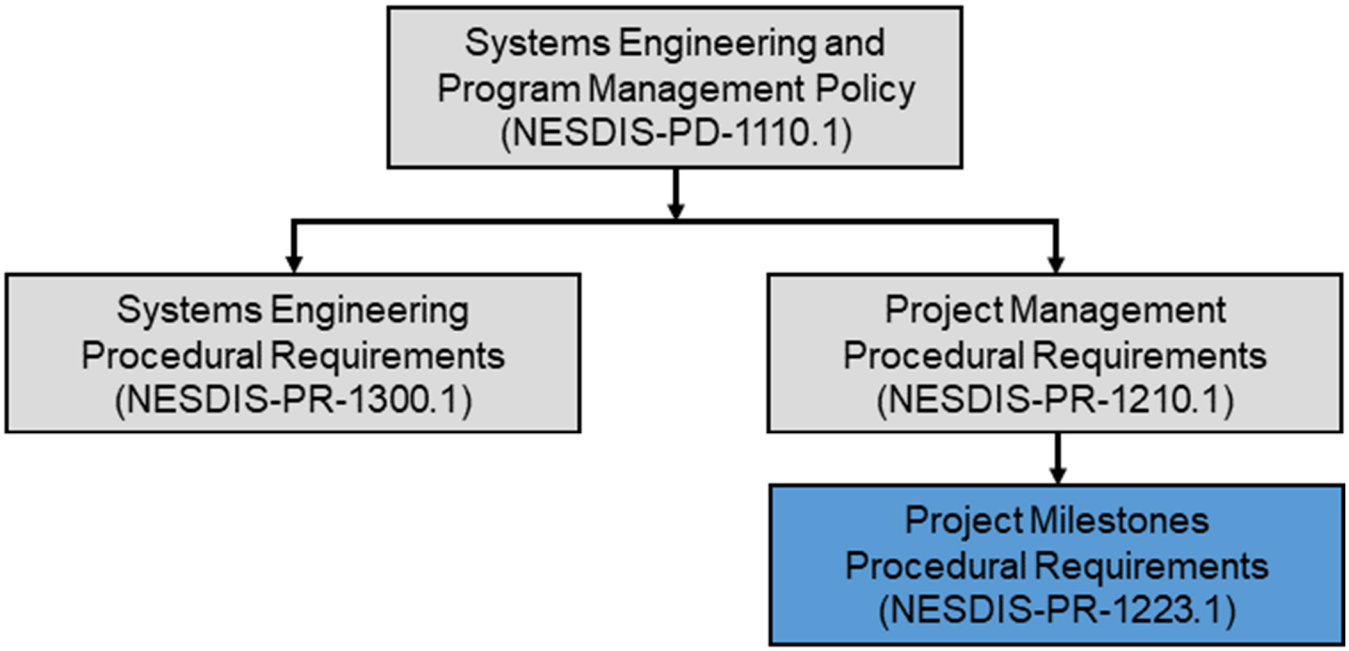

Figure 1: Hierarchy of Related Documents

1.2. Applicability

a. This PR applies to all NESDIS Offices (as defined in Appendix A). This PR applies to NESDIS employees and NESDIS support contractors that use NESDIS processes for NESDIS technical work. This PR applies to other contractors, grant recipients, or parties to agreements only to the extent specified or referenced in the appropriate contracts, grants, or agreements.

b. The requirements enumerated in this document are applicable to all Projects (as defined in Appendix A). In this document, readers should treat the term “Project” in the widest sense, to include Projects, Programs, and major initiatives. For existing Projects, the Director of the Office of Systems Architecture and Advanced Planning (OSAAP) may approve requests for variance allowing continuation of current practices.

c. Projects deemed high profile by the Milestone Review Board (MRB) per Department Administrative Order (DAO) 208-16 shall meet Department of Commerce (DOC) processes and requirements for Program Milestones as stipulated in DAO 208-16 and the National Oceanic and Atmospheric Administration (NOAA) Program Management Council (PMC)-Agency Program Management Council (APMC) Terms of Reference (TOR) instead of the processes described in this document.

d. The requirements in this document apply to all Project lifecycle models including iterative; however, the majority of this document refers to a waterfall lifecycle model. A mapping between the waterfall and iterative criteria are provided in Section 7.

e. NOAA collaborates with many domestic and international stakeholders to fulfill its mission. NESDIS Offices may tailor the requirements of this PR or follow a major

stakeholder's approved set of milestones. Any tailoring must be documented in the Project's PMP, which is approved by OSAAP, NESDIS management, and the MDA.

f. In this PR, all mandatory actions (i.e., requirements) are identified by the symbol "[REQ]" to unambiguously define requirements. Requirements are also captured in the Requirements Matrix in Appendix C. The Requirements Matrix takes precedence if any discrepancies exist between the narrative and the Matrix with respect to identifying requirements. The terms "shall" and "must" are not used to specify mandatory actions because they can be interpreted as legally binding terminology, which removes all agency discretion and can create a potential liability problem for NOAA/NESDIS.

1.3. Authority

NESDIS-PD-1110.1, NESDIS Systems Engineering and Project Management Policy

1.4. Applicable Documents

a. NESDIS-PD-1110.1, NESDIS Systems Engineering and Project Management Policy.
b. NESDIS-PR-1210.1, NESDIS Project Management Procedural Requirements.
c. NESDIS-PR-1220.1, NESDIS Project Approval Procedural Requirements.
d. NESDIS-HBK-1221.1, NESDIS Work Breakdown Structure Handbook.
e. NESDIS-PR-1300.1, NESDIS System Engineering Procedural Requirements.
f. Department of Commerce Scalable Acquisition Project Management Guidebook (2015).
g. DAO 208-16 Acquisition Project Management.
h. NOAA Administrative Order (NAO) 216-108 Requirements Management.
i. TOR for the NOAA PMC/Joint NOAA-NASA APMC, June 7, 2018.

1.5. Project Categories and Milestone Decision Authorities

There are three Project categories within NOAA. These are defined in the NOAA PMC/Joint APMC TOR. The definitions are replicated in Table 1. The guidance for assigning the MDA for each category of NOAA Project is given in DAO 208-16. NESDIS-PD-1110.1, NESDIS Systems Engineering and Program Management Policy, and the supporting PR documents and handbooks establish the policies and processes for managing oversight of all Projects executed within NESDIS. A summary of reporting lines for NESDIS Projects is shown in Table 2.

Table 1: Project Categories

Program, Project, Activity Characterization	Category 1	Category 2	Category 3
National Significance	High	Medium	Low
Impact to NOAA's Mission	High	Medium	Low

Program, Project, Activity Characterization	Category 1	Category 2	Category 3
Visibility	International/Public	National/Academic	Agency/Special Interest
Annual Obligation Authority (AOA)	>$75M	$20M–$75M	<$20M
Lifecycle Cost	>$250M	$100M–$250M	<$100M
Asset Years (Lifetime)	>10 years	5–10 years	<5 years
Complexity	High	Medium	Low
Coordination Level	Significant cross-cutting efforts required between international entities, national agencies, and commercial	Cross-cutting efforts required between agencies and Line Offices	Limited to a single line or functional office within NOAA

Table 2: Summary of Reporting Lines for NESDIS Projects

Program Type	MDA
Category 1 DOC Designated High Profile Programs/Projects (pre-Milestone 3)	Deputy Secretary of Commerce or designee
Remaining NOAA Category I	NOAA Administrator or designee
NOAA Category II	NESDIS AA or designee
NOAA Category III	NESDIS AA or designee

2. Roles and Responsibilities

2.1. Director, Office of Systems Architecture and Advanced Planning

[REQ-001] OSAAP ensures compliance with this PR.

OSAAP will review and approve the PMPs for all NESDIS Projects where the NESDIS Assistant Administrator (AA) or higher authority is the MDA.

[REQ 002] The OSAAP Director will ensure a Standing Review Board (SRB) is appointed for all Projects where the NESDIS AA or higher authority is the MDA that provides an independent, NESDIS-level assessment of technical milestones.

2.2. NESDIS Office Directors

[REQ-003] NESDIS Office Directors establish policies, processes, and procedures to execute the requirements of this PR.

[REQ 004] If the NESDIS AA designates an Office Director as the MDA, then that Office Director is responsible for establishing the SRB per Section 2.3.

NESDIS Office Directors will review and approve the Project PMP and other key documents generated by Projects under their purview to ensure consistent deliverables at common stages of the Project's development lifecycle.

2.3. Standing Review Board

Prior to Mission Concept Review (MCR), an SRB will be established for each Project. The SRB is a NESDIS entity that is responsible for determining if the Project has met the success criteria for each technical milestone. The SRB members will be independent of the Project and the Project reporting chain and, where feasible, should remain as members for the life of the Project for consistency. The SRB will always have an End-User representative as a member to validate the Project continues to meet user needs and interfaces. The SRB will always have a representative from operations as a member to verify the Project meets operational needs and interfaces. With the Project Manager (PM), the SRB chair will determine Project readiness to hold each technical milestone review. The SRB chair is also responsible for reporting to the MDA the result of each technical milestone review.

2.4. Project Manager

[REQ-005] The PM will develop the milestone plan and deliver the program decision milestone reviews and technical milestone reviews in accordance with the requirements of this PR and as documented in the PMP.

[REQ-006] The PM will allocate adequate resources to meet the requirements of this PR commensurate with the scope, size, and complexity of the Project.

3. Program Decision Milestones

A Program Decision Milestone is the event at which the MDA determines the readiness of a Program/Project to progress to the next phase of its life cycle. At each Program Decision Milestone, the MDA assesses the Project against the following principles:

1. Alignment with a defined mission need,
2. Adequacy of management approach,
3. Adequacy of technical approach,
4. Adequacy of the cost and schedule estimates and funding strategy,
5. Adequacy and availability of resources other than budget, and
6. Adequacy of the risk management approach.

The Program Decision Milestones for DOC Mission Critical, DOC high-profile, and NOAA Category I Projects follow the framework in the DOC Scalable Acquisition Project Management Guidebook. The Program Decision Milestone definitions and the program phases from this guidebook are shown in Figure 2.

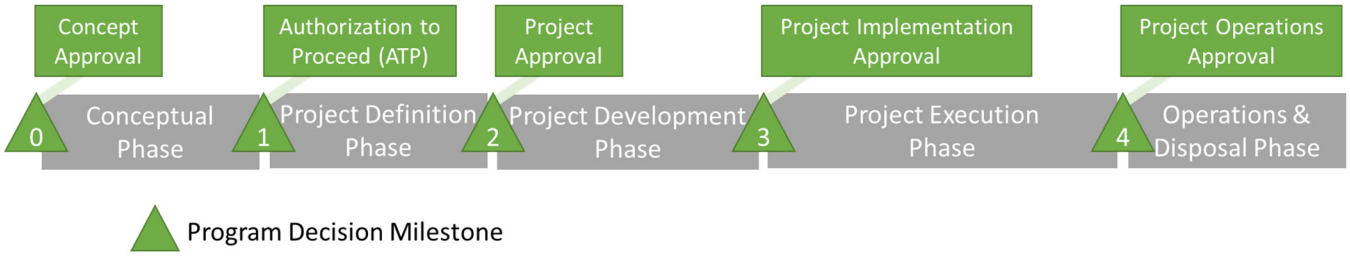

Figure 2: The DOC Project Management Framework

Tailoring of the Category 1 Program Decision Milestones and Project phases for NOAA Category II and Category III Projects is acceptable. Any proposed tailoring of these decision milestones and Project phases will be documented in the Project's PMP and therefore subject to the approval of the appropriate Office Director and MDA per the requirements in this PR document.

For Category II and III Projects, the MDA may wish to use the SRB to support in reviewing Milestone artifacts or establish a separate MRB. In either instance, the MRB will need to be staffed by members independent of the Project and should retain the same membership throughout the life of the Project for consistency.

The requirements for Milestone 0 and Milestone 1 are defined in NESDIS-PLN-1220.1, Project Initiation and Approval Plan, and should be executed per the requirements of that Plan.

Readers familiar with the NASA Project Life Cycle phases and Key Decision Point (KDP) milestone definitions can see the mapping of Phases A–F and KDPs A–F to the DOC Project Management Framework in Appendix E, NASA Project Milestone Definitions.

[REQ-007] Each Program Decision Milestone will be scheduled based upon Project preparedness for that milestone as determined by the relevant decision forum illustrated in Figure 2.

[REQ-008] The PM will seek a Milestone Decision Memorandum from the MDA after each Program Decision Milestone.

The Milestone Decision Memorandum will include approval for the Project to transition to the next phase and direct the Project's way forward, including necessary procurement authorities, specific phase exit criteria, and other directed actions. In the case where a Project is not approved to go to the next phase, the Milestone Decision Memorandum will contain information on how to proceed. This will include specific instructions on required activities and timelines for Program Decision Milestone reconsideration. See Appendix F for an example Milestone Decision Memorandum.

3.1. Milestone 0: Concept Approval

All new NESDIS Projects will complete a Pre-Formulation Phase as described in NESDIS-PLN-1220.1, NESDIS Project Initiation and Approval Plan. Milestone 0 occurs in the middle of the Pre-Formulation Phase. The purpose of this Program Decision Milestone is to validate that:

- There is a capability need,
- There are validated initial requirements associated with that need,
- There is a viable concept to meet that need, and
- There is sufficient justification to apply resources to study the concept in more detail.

The required information/documentation for this initial concept study is described in NESDIS-PLN-1220.1, NESDIS Project Initiation and Approval Plan, and summarized in REQ-033 below. The MDA at Milestone 0 either approves the start of a detailed concept study or cancels the concept study efforts.

[REQ-033] At Milestone 0, the Project will provide the following information and documentation: initial requirements, Analysis of Alternatives (AoA), preliminary Concept of Operations (ConOps), and rough order of magnitude (ROM) cost and schedule.

3.2. Conceptual Phase and Milestone 1: Authorization to Proceed

Between Milestone 0 and Milestone 1, a Project is in the Conceptual Phase of Pre-Formulation. This phase is also described in NESDIS-PR-1220.1. The focus of this phase is to define Project-level requirements, a schedule and budget with sufficient detail for an independent cost estimate (ICE) to be performed, a ConOps, and a Management Plan. The Milestone 1 products that are required in this phase are listed below. The Project Pre-Formulation phase ends with the Authorization to Proceed (ATP) milestone, Milestone 1. This is similar to NASA’s KDP-A. The MDA, in granting ATP to the Project, will be satisfied when the mission need is justified, resource estimates are reasonable, concept and implementation plan are feasible, risks are understood, and if funding and resources support the Project.

[REQ-009] At Milestone 1, the Project will provide the following information and documentation:

- ROM Budget with sufficient margin;
- Preliminary Integrated Master Schedule (IMS) with milestones shown and sufficient margin;
- Work Breakdown Structure (WBS), down to at least Level 2;
- ICE;
- Preliminary Project team structure, including internal and external participants;
- Project-level Requirements;
- ConOps;
- Acquisition Strategy (if required);
- Preliminary PMP; and
- High-level risks and issues.

3.3. Project Definition Phase and Milestone 2: Project Approval

Between Milestone 1 and Milestone 2, the Project is in the Project Definition Phase. In this phase, the Project team develops the Level 2 requirements, refines the Acquisition Strategy into an Acquisition Plan (if required), defines the system architecture, updates the risk assessment, develops the PMP, and establishes the cost and schedule baselines for the Project. At Milestone 2, the MDA verifies that the Project planning satisfies NESDIS, NOAA, and DOC guidance, and gives approval to proceed to the Project Development Phase. This milestone is similar to NASA KDP-B.

[REQ-010] At Milestone 2, the Project will provide the following information and documentation:

- Updated baseline Budget with sufficient margin;
- Updated baseline IMS with milestones shown and sufficient margin;
- WBS with sufficient detail for adequate tracking;
- ICE;
- Updated baseline PMP;
- Requirements derived below Project level as needed;
- ConOps;
- Preliminary System Architecture;
- Acquisition Plan update; and
- Project risks and issues update.

3.4. Project Development Phase and Milestone 3: Project Implementation Approval

After Milestone 2 approval, the Project is in the Project Development Phase. This phase focuses on implementing the acquisition plan, finalizing the system design, and implementing any technology development activities. The requirements are flowed to the degree that would allow for procurement activities. The Project develops acquisition documentation such as

Statements of Work (SoWs) and Technical Requirements Documents. As in every phase, the Project risks are evaluated and mitigated as appropriate. At Milestone 3, the MDA approves proceeding with detailed design and production activities. Milestone 3 is similar to NASA KDP-C.

[REQ-011] At Milestone 3, the Project will provide the following information and documentation:

- Baseline budget with sufficient margin;
- Baseline IMS with milestones shown and sufficient margin;
- Baseline cost and schedule execution status;
- WBS, down to lowest level required;
- PMP execution status and any requested changes;
- Requirements flow-down completion status;
- Technical and programmatic changes since last decision milestone;
- Acquisition Plan execution status; and
- Project risks and issues update.

3.5. Project Execution Phase and Milestone 4: Project Operations Approval

After Milestone 3, the Project enters the Project Execution Phase. This phase includes finalizing the system design, building the system, and verifying the system meets the requirements. During this phase the Project team adjusts the cost/schedule baseline as required, monitors contract execution, manages the Project risks, and facilitates the required technical milestone reviews. This is the critical phase for the technical development of the Project. Milestone 4 is the Project Operations Approval Milestone. It is similar to NASA KDP-E At this milestone, the MDA approves the new system as part of the NESDIS operational activities.

[REQ-012] At Milestone 4, the Project will provide the following information and documentation:

- Baseline budget with sufficient margin;
- Baseline IMS, with milestones shown and sufficient margin;
- Baseline cost and schedule execution status;
- PMP execution status and any requested changes;
- Requirement verification results;
- System performance evaluation;
- Technical and programmatic changes since last decision Milestone;
- Acquisition Plan execution status;
- Project risks and issues update; and
- End-user confirmation that system meets needs and user is ready to operate.

After Milestone 4, the system enters into the Operations and Disposal phase. There are no further DOC program decision milestones in the lifecycle of the system. This PR provides a

decommissioning technical review to provide the MDA the ability to determine a Project's readiness to end its operational service.

4. Technical Milestone Reviews

Technical milestone reviews are presented by the Project team to the SRB. At these reviews, the SRB evaluates the review content against the exit criteria to ensure that the Project is making appropriate progress to successfully meet the relevant mission need per the baseline schedule. The full set of standard technical milestone reviews, mapped to the standard Program Decision Milestones, is shown in Figure 3. PMs are encouraged to tailor the technical milestone reviews to the needs of their Project. Tailoring means combining reviews to reduce the effort needed, not deleting reviews entirely. Some larger Projects will require all of these reviews and possible lower-level subsystem reviews that roll up to each technical milestone review. Smaller Projects may want to combine two or more technical milestone reviews into a single review. Any technical milestone reviews that are combined must still meet the exit criteria of all included reviews. Any tailoring of the technical milestone reviews must be documented in the PMP and approved by the MDA.

[REQ-013] At a minimum, each Project must have at least one technical milestone review in each phase of the Project.

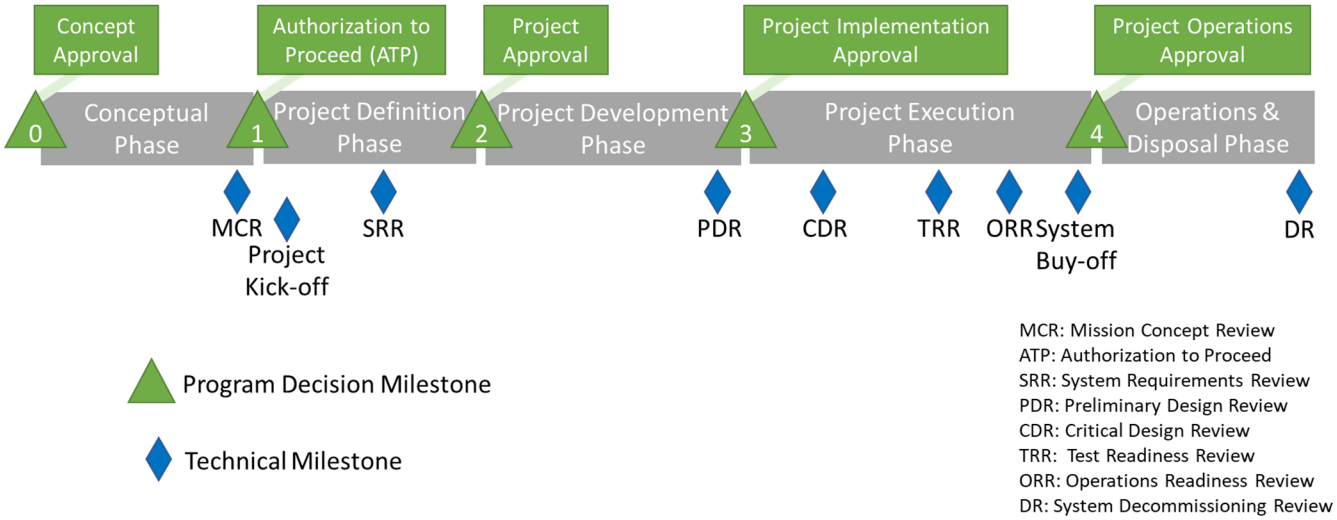

Figure 3: NESDIS Technical Milestones

[REQ-014] PMs are directly responsible for ensuring all required documentation and technical milestone review content are completed before holding a technical milestone review.

Required artifacts for each technical milestone review is provided in Section 6. Prior to the review, the SRB, in consultation with the PM, will review the artifact status and review content and be satisfied that the technical milestone review can go ahead with a high chance of success.

The technical milestone reviews in a given life-cycle phase provide essential information for the Program Decision Milestone. To support the MDA's determination of the readiness of a Project to progress to the next phase of the life cycle, the PM and SRB provide their assessments and recommendations to the MDA with supporting data, as necessary.

The following requirements are intended to be generic and applicable to the preparations for any technical milestone review. The technical milestone review timing and content in this document apply directly to Projects following the waterfall lifecycle model. For guidance on how to adapt the technical milestone reviews for Projects following an iterative or hybrid lifecycle model, see Section 7.

4.1. Technical Milestone Review Requirements

[REQ-015] Technical milestone reviews will be scheduled based upon Project preparedness for that event and ability to meet the technical milestone review exit criteria, as determined by the PM and the SRB Chair.

Technical milestone reviews cannot be held if the Project is undergoing a re-baselining exercise or other significant change. Note that PMs can decide to present updates to previously released documents from prior reviews if the ongoing development of the Project warrants updates to these previously approved documents. Sometimes a re-baselining may require a full or partial repeat of a technical review.

To allow the best possibility for a successful review, it is recommended that at least one calendar month notice of technical milestone review date, time, and location be provided to the SRB and all other review participants. The PM and/or SRB may reduce this time for smaller scope, shorter duration, or iterative lifecycle projects.

All Project documents and other materials that are part of a technical milestone review will be distributed and made available to reviewers at least 10 working days prior to the deadline for collecting review comments and responses. All pre-review technical milestone review comments will be collated and placed in a suitable location allowing the Project team and reviewers to access all review comments and dispositions. All pre-review technical milestone review comments will be dispositioned by the Project team, with dispositions available to all reviewers, at least 5 working days before the review.

[REQ-016] Any outstanding Project actions, review comments, and open changes from any previous technical milestones or reviews will be closed out to the SRB’s satisfaction or otherwise dispositioned before the upcoming milestone review period begins.

[REQ-017] Additions to any specific technical milestone review exit criteria beyond the generic requirements listed in Section 5 will be included in the PMP and approved by OSAAP, and the MDA.

4.2. Technical Milestone Review Closeout

[REQ-018] All technical milestone review artifacts, presentations, notes, minutes, comments, and documents updated following a technical milestone review, will be placed under configuration control in a location accessible to all review participants.

Requests for Action (RFAs) generated during a technical milestone review will be reviewed by the complete SRB and either rejected or turned into official action items. The PM will assign

action items to responsible parties for closure. Specific instances of not meeting technical review exit criteria will be documented by the SRB as liens.

[REQ-019] Action item and lien closure plans will be approved by the SRB.

[REQ-020] Technical reviews cannot be passed with liens in place.

If the SRB and MDA agree the project can proceed in a limited, low-risk fashion with liens in place, then the project will not get credit for passing the review until all liens are closed.

[REQ-021] The PM will issue a post-milestone review report within 15 working days of the conclusion of each technical milestone review including, at a minimum:

- List of materials (with version numbers) presented at the review (e.g., documentation, test artifacts, reports, risk matrix, and systems under test);
- Names of personnel attending the review;
- List of pre-review actions items closed during the review;
- List of post-review action items not closed out during the review;
- Any changes to the Project baseline resulting from the review; and
- A post-review plan with dates for closeout of action items and discrepancies.

[REQ-022] The SRB will produce a technical milestone review closeout report within 10 days of the review that will list, as a minimum:

- Names of SRB members in attendance;
- List of Review Item Discrepancies (RIDs) and action items raised during the review;
- SRB review of the OSAAP assessment of validation;
- SRB evaluation of Exit Criteria;
- SRB decision on whether the technical review is passed;
- If not passed, any liens against the technical milestone with closure plans; and
- Any SRB concerns not captured in an action item or RID.

[REQ-023] Following each technical milestone review, the SRB and the Project will brief the MDA on the results of the technical milestone review.

5. Technical Milestone Reviews

This section provides requirements for the technical milestone reviews for NESDIS Projects. PMs may tailor these technical milestone reviews as needed to successfully execute the Project. This tailoring can involve adding additional reviews or combining reviews, but there must be at least one technical milestone review per mission phase. The technical milestone review tailoring, including exit criteria, must be documented in the PMP and approved by OSAAP and the MDA.

PMs may propose alternative but equivalent technical milestone reviews to align with a major Project stakeholder or partner milestones, as long as the equivalency between the partner's and NESDIS technical milestone review is described, and a similar documentation set is delivered.

5.1. Mission Concept Review

The Mission Concept Review (MCR) precedes the ATP Milestone 1.

The MCR is used to evaluate the feasibility of the Project concept and its ability from a technical requirements, budget, and schedule perspective to fulfill NESDIS-level needs and objectives. The concept is assessed for feasibility, specifically that the preliminary PMP is sufficiently mature to begin the Project Definition Phase, and that the Project can successfully be achieved as conceived within the schedule, budget, and technical constraints identified.

The SRB is established prior to this review (see Section 2.5). If the concept passes the MCR, it is submitted to the MDA for ATP Milestone 1.

[REQ-024] The MCR will cover the review topics and meet the exit criteria in Table 3.

Table 3: Mission Concept Review Criteria

Topic	Information to Present	Exit Criteria
Project ConOps	Project ConOps defined in sufficient detail to support development of acquisition plans and establish Project feasibility	The ConOps is feasible and addresses the identified mission need.
Schedule	Initial WBS to Level 2 with schedule allocated to each element	The execution of the Project is feasible given the planned schedule.
ICE	The results of the ICE	The ICE validates the Project budget.
Preliminary PMP	Preliminary PMP	All aspects of the Project development are defined at a preliminary level including acquisition plans, in-house

Topic	Information to Present	Exit Criteria
		development plans, international or interagency agreements, and preliminary risks.
Project-level requirements	Requirements reflecting the scope of the Project	The Project has a comprehensive set of performance requirements.

5.2. Project Kick Off

The purpose of the Kick Off (KO) milestone review is to demonstrate to the SRB that the implementation team understands the Project requirements, ConOps, schedule, and budget, and has the resources to execute per the PMP.

[REQ-025] The KO milestone review will cover the review topics and meet the exit criteria in Table 4.

Table 4: Project Kick Off Criteria

Topic	Information to Present	Exit Criteria
Project milestones	All program decision and technical milestones and associated deliverables for each phase of the planned Project	All program decision and technical milestones are defined, with clear content and exit criteria.
Project-level requirements	Requirements reflecting the scope of the Project	The Project has a comprehensive set of engineering requirements, which meet the tests for well-formulated requirements: all requirements are clear, validated, necessary, unique, verifiable, and achievable.
System architecture and ConOps	System architecture description and system ConOps description	System Architecture and ConOps show that the proposed system can meet the Project-level requirements and have sufficient detail to be used to derive lower-level requirements.

Topic	Information to Present	Exit Criteria
Project Team and their roles and responsibilities	Team roles and responsibilities, team structure, and lines of reporting (organization chart)	All roles and responsibilities are defined and agreed to.
SoWs/Technical Task Agreements (TTAs)	Summaries of all SoWs/TTAs	SoWs/TTAs cover all aspects of the Project as required and are signed by participating entities, including internal NESDIS stakeholders.
Work Breakdown Structure defined to Level 2	WBS Level 2 or further, clearly identifying all task owners, with cost and schedule allocations for each line item	WBS is complete to Level 2 and logically organized; all team members have roles identified on WBS. Project schedule is defined and achievable. Project cost is allocated appropriately.
Project processes	The management and engineering processes that will apply to the Project	All processes are defined, using established NESDIS processes wherever possible.
International Agreements and commercial contracts	Summary of any International Agreements, or partnerships as appropriate	International Agreements, and/or external partnerships are identified

5.3. System Requirements Review Milestone

The System Requirements Review (SRR) evaluates the functional and performance requirements defined for the system and ensures that the selected concept will satisfy the mission. At the SRR, the Project should have external and internal interfaces defined, requirements flowed to the subsystem level, a cost and schedule baseline, and risks identified with closure plans funded as part of baseline budget. Successful completion of the SRR baselines the Project requirements.

[REQ-026] The Project will meet all applicable SRR review activities and exit criteria defined Table 5.

Table 5: Project System Requirements Review Criteria

Topic	Information to Present	Exit Criteria
Project Requirements Baseline	All system and subsystem-level requirements (to a minimum of Level 3)	The System Requirements are signed off. All requirements are appropriately allocated to subsystems.
Data Management Plan (DMP)	The preliminary DMP for the Project, outlining how data will be ingested, managed, processed, and archived	DMP has been defined, and NESDIS elements such as NCEI, STAR and ACIO-S have jointly agreed to the concepts in the DMP.
System Architecture and Interface Control Documents (ICDs)	All intra- and inter-system interfaces, their design and implementation approaches, boundary conditions, and test plans	System architecture and interfaces are identified and understood.
Risk Management	All items in the Risk and Issues database, with appropriate risk mitigation activities	Confirm all risks are correctly identified with appropriate mitigation plans.
Acquisition Plan	The hardware and software acquisition plans for the system and subsystem designs	Confirm the acquisition plans provide the correct hardware and software at the right time, with the right functionality.

5.4. Preliminary Design Review

The Preliminary Design Review (PDR) demonstrates that the preliminary design meets all system requirements with acceptable risk and within the resource constraints and establishes the basis for proceeding with detailed design. It shows that the correct design options have been selected, interfaces have been identified, and verification methods have been described. The PDR should address and resolve critical, system-wide issues and show sufficient maturity for moving to the detailed design phase. At the PDR, any low TRL or risk reduction needs are complete as well as trade studies concluded.

[REQ-027] The Project will meet all applicable PDR review activities and exit criteria defined in Table 6.

Table 6: Preliminary Design Review Criteria

Topic	Information to Present	Exit Criteria
Project Requirements	All requirements and their	All requirements are

Topic	Information to Present	Exit Criteria
Baseline	flow-down/allocation to the lowest level	baselined to their lowest level, contain the traceability between high- and low-level requirements, and support the system design and implementation.
System Design and Interfaces	Preliminary System Design; all intra- and inter-system interfaces, their design and implementation approaches	System design will meet the requirements and mission needs with acceptable risk. ICDs are comprehensive and baselined, showing all internal and external data flows. Adequate technical margins and resources exist to complete development with available resources.
Operations Plan	The Operations and associated Use Cases, including all nominal and off-nominal or boundary system usage scenarios	Operations Plan is complete to a level to support system design and implementation.
Requirements Verification Plan	The Requirements Verification Plan, showing all requirements to appropriate level have associated verification method	Confirm the Requirements Verification Plan is complete.
Risk Management	All items in the Risk and Issues database, with appropriate risk mitigation activities	Confirm all risks are correctly identified with appropriate mitigation plans.
Technology Development and Long-lead Items	Any technology development activities; any long-lead items identified by the Project	Technical development activities are defined, planned, and meet the scheduled need with sufficient margin. Any long-lead items are identified and have an actionable plan.
Trade Studies	Any trade studies used to decide	The appropriate design decisions have been made

Topic	Information to Present	Exit Criteria
	implementation approaches for the Project.	following a comprehensive trade study, with the decision process documented.

5.5. Critical Design Review

The Critical Design Review (CDR) demonstrates that the maturity of the design is appropriate to support proceeding with full scale fabrication, assembly, integration, and test. CDR determines if the technical effort is on track to complete the system development, meeting mission performance requirements within the identified schedule and risk constraints. At successful completion of the CDR, the build-to baseline, production, and verification plans are approved. A successful review result also authorizes coding of deliverable software (according to the build-to baseline and coding standards presented in the review) and system qualification testing and integration.

[REQ-028] The CDR milestone review will contain the information and meet the exit criteria defined in Table 7.

Table 7: Project Critical Design Review Criteria

Topic	Information to Present	Exit Criteria
System and sub-system designs	All system and subsystem designs cross-referenced to requirements	Confirm the designs will meet requirements with adequate margins.
Schedule	The schedule baselines for the expected work to complete the remainder of the Project	The schedule presented is sufficient to complete the Project, with adequate margins.
Requirements Verification Plans	Verification traceability matrix exists	All high- and low-level requirements trace to an appropriate test or verification activity. Each test has clear pass/fail criteria.
Safety and Mission Assurance	Safety and Mission Assurance (e.g., reliability, maintainability, quality, etc.) processes	Adequate processes for mission assurance exist to support mission success.
System Assembly, Integration, and Test (AIT) Plans And Operations Plans	Preliminary plans for all assembly, integration and test activities; preliminary operations plans.	Confirm AIT and operations documentation supports the deployment, integration, testing, and operation of the system.

Topic	Information to Present	Exit Criteria
Risk Management	All items in the Risk and Issues database, with appropriate risk mitigation activities.	Confirm all risks are correctly identified with appropriate mitigation plans.

5.6. Test Readiness Review

At the Test Readiness Review (TRR) the Project demonstrates the readiness of the system to undergo system-level testing by the development team using actual or realistically simulated interfaces, environments, and data sets in a controlled environment.

The TRR milestone review verifies that the system has completed its unit development, system integration and interface development such that all system-level requirements and interfaces are ready to be verified in an appropriate test environment. At successful conclusion of the TRR, the system can undergo system-level testing. The TRR should be used to train the users in system operations according to planned operational procedures, and have the test activities be run in accordance with the documentation.

[REQ-029] At the TRR milestone review, the Project will cover the review topics and meet the exit criteria in Table 8.

Table 8: Project Test Readiness Review Milestone Criteria

Topic	Information to Present	Exit Criteria
System Test Plans	All system test plans and their trace to verification of requirements	All system requirements trace to appropriate acceptance tests, and the test plans and procedures are approved.
Unit and Subsystem Tests	All unit-level and subsystem-level test results	All unit-level and subsystem-level test and integration activities have been completed successfully.
Testing interfaces, environments, configuration, and data sets	Source and design of all interfaces, configurations, environments, and data for system testing	Environments, configuration, interfaces, and data are ready for testing appropriate.
Interface Tests	Plans and designs for all internal and external interface tests, mapped to appropriate ICDs	Interface tests will verify interface function as designed and will handle boundary conditions.

5.7. System Buyoff

This milestone review is required when a system is formally delivered to an End User. This review and the buyoff process verifies the system against formal requirements and it establishes whether requirements have been met to allow delivery and acceptance of the system into its final operational location.

According to the complexity and the lifecycle model of the Project, the System Buyoff process may involve any of the following specific reviews as part of the overall System Buyoff milestone:

- The Pre-Ship Review (PSR) verifies that the system has completed all internal testing according to approved plans and procedures, declaring it fit for purpose and ready to be shipped to an End User site, thus confirming all system requirements have been validated and verified.
- The On-Site Acceptance Test (OSAT) confirms that a shipped system has arrived at the external customer's site, has been installed by the development team, and has undergone functional and interface testing in its final environment.

[REQ-030] The System Buyoff milestone review will contain the information and meet the exit criteria defined in Table 9.

Table 9: System Buyoff Milestone Review Criteria

Topic	Information to Present	Exit Criteria
Verification and Validation	Results of all system-level verification tests and activities; End User validates the system meets needs	Confirm all system requirements have been verified, and system functionality has been validated.
Data Management	DMP validation results	Data management tests have been performed and show that the data produced by the system will be effectively managed, catalogued and archived.
End User Training	Status and content of all training and operations documentation; involvement of End Users in the review of all operational and training documentation	Confirm operations manuals and training document are adequate for all End Users
Interface Verification	Results of all internal and external interface tests	System interface testing validates that the system is compatible with all

Topic	Information to Present	Exit Criteria
		interfaces and is supportable by End User system.

5.8. Operations Readiness Review

The Operations Readiness Review (ORR) milestone review occurs at the end of the development, test and deployment phase and establishes the readiness of both the system and the End User for system operations. The ORR examines the actual system characteristics and procedures used in the system or end product's operation. It ensures that all system and support hardware, software, personnel, procedures, and user documentation accurately reflect the deployed state of the system.

The ORR milestone review verifies that the system has undergone a period of checkout at its final installed location, under realistic scenarios. End Users will be fully trained in its operations, maintenance and troubleshooting using testing scenarios that mimic operational use, including boundary conditions and non-nominal situations. This review and the operations readiness process verifies the system as fit-for-use. It establishes whether the system can function in its operational location and end state with all tools, processes, user manuals, and trained personnel able to meet the system's operational goals.

[REQ-031] The Project will hold an ORR milestone review in accordance with the criteria and activities in Table 10 to confirm that the system was implemented according to its requirements and design, and is fit for operational use by the End User.

Table 10: Project Operations Readiness Review Milestone Criteria

Topic	Information to Present	Exit Criteria
System Integration and Deployment	On-site acceptance test results	System is integrated into its final operational location. All interfaces and functional requirements have been verified, and tests in the final operational location have been completed.
Risk Management	All remaining risks, action items and issues	All remaining risks, action items and issues have been retired, mitigated or granted waivers.
Contract Management	Status of contracts/purchase orders; plans for contract transfer and/or closeout as applicable	All contracts are complete, or have a clear plan to completion. Contract performance reports are completed by Acquisition and Grants Office (AGO).

Topic	Information to Present	Exit Criteria
Warranty and Support Agreements	All hardware/software warranties and support contracts for sustainment	All hardware, software and systems requiring warranties and/or support/sustainment arrangements have these agreements in place.
Training, Operations, and Maintenance	The composition of the user team; status of End User training; status and content of all operations documentation; status and content of all maintenance documentation	User team has been identified, trained and has all documentation and processes necessary to receive, operate and maintain the system.
System Disposal Plan	Disposal plans	A comprehensive system disposal plan addresses the safe and secure decommissioning of the system.

5.9. Decommissioning Review

The Decommissioning Review (DR) milestone review will occur just prior to decommissioning and disposal of the system, after the system has reached end-of-life and requires replacement or retiring. The DR confirms the decision to terminate or decommission the system and assesses the readiness of the system for the safe decommissioning and disposal of system assets.

[REQ-032] The DR milestone review will cover the review topics and meet the exit criteria in Table 11.

Table 11: Project Decommissioning Review Milestone Criteria

Topic	Information to Present	Exit Criteria
Decommissioning Procedures	All decommissioning procedures	Decommissioning procedures are comprehensive, actionable, and verified
System Support Contracts And Warranties	All applicable termination clauses in warranty and maintenance support contracts	Confirm all maintenance and support contracts have been completed, and warranty support agreements are set to end.
Project Management	Final Project deliverables; plans for budget close-out	Confirm that all Project deliverables are completed and archived.

Topic	Information to Present	Exit Criteria
		Confirm that plans are in place to close-out the budget.
System Documentation and Data Archival	Status of system data; data archive plan	Confirm that a viable long-term archive for all system data, documents and product exists, and is documented in an appropriate plan.
Personnel Re-assignment	Personnel re-assignment plans	Confirm all remaining personnel supporting the system are covered by a transition plan to new Projects and/or roles.
Property Disposal	Plans for property disposal and any Construction Work In Progress (CWIP)-related documentation for transferring ownership of the system and disposal of government-owned assets and data	Clear and executable plans exist for safely disposing and/or decommissioning of the system, including its assets, data, hardware and software.

6. Document Maturity by Milestone Review

Table 12 lists document maturity by development stage of a Project. They are to be used in conjunction with each technical review criteria. Unless tailored by the Project as part of its PMP, the maturity provided in Table 12 will be used. The list of documents is not exhaustive; some documents may not be applicable to all Projects, and some Projects may need additional documents.

The list of milestones in the Table 12 does not represent the only Project milestones, as Projects can add additional milestones, or use equivalent stakeholder milestones.

Terminology definitions are as follows.

- “Preliminary” is the documentation of information as it stabilizes but before it goes under configuration control. It is the initial development leading to a baseline. Some products will remain in a preliminary state for multiple reviews. The initial preliminary version is likely to be updated at subsequent reviews but remains preliminary until baselined.
- “Baseline” indicates putting the product under configuration control so that changes can be tracked, approved, and communicated to the team and any relevant stakeholders. The expectation on products labeled “baseline” is that they will be at least final drafts going into the designated review and baselined coming out of the review.
- “Update” is applied to products that are expected to evolve as the formulation and implementation processes evolve. Only expected updates are indicated. However, any document may be updated as needed. Updates to baselined documents require the same formal approval process as the original baseline.

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Table 12: Project Document Development Stage vs. Review Milestone

Milestone across; document below	**Mission Concept Review**	**Project Kick-off**	**System Requirements Review**	**Preliminary Design Review**	**Critical Design Review**	**Test Readiness Review**	**System Buyoff**	**Operations Readiness Review**	**Decommissioning Review**
Level 1 Requirements	Prelim	Baseline	Update As Needed						
Level 2 and Level 3 Requirements			Baseline	Update As Needed					
Integrated Master Schedule	Prelim	Baseline	Update	Update	Update	Update	Update	Update	Update
Project Budget	Prelim	Baseline	Update	Update	Update	Update	Update	Update	Update
Contracts, SoWs, TTAs		Prelim	Baseline						
International/Interagency Agreements		Prelim	Baseline						
Project Management Plan	Prelim	Baseline	Update As Needed						
System Engineering Plan		Prelim	Baseline						
Configuration and Documentation Management Plan		Prelim	Baseline						
Risk Management Plan		Prelim	Baseline						
Data Management Plan			Prelim	Baseline					
Internal and External Interface Control Documents			Baseline	Update If Needed	Update If Needed				
System Validation and Verification Test Plan				Prelim	Update	Baseline			
System Validation and Verification Procedures				Prelim	Update	Baseline			

Milestone across; document below	**Mission Concept Review**	**Project Kick-off**	**System Requirements Review**	**Preliminary Design Review**	**Critical Design Review**	**Test Readiness Review**	**System Buyoff**	**Operations Readiness Review**	**Decommissioning Review**
Factory Acceptance Test Plan and Procedures				Prelim	Update	Baseline			
On-Site Acceptance Test Plan and Procedures					Prelim	Baseline	Update If Needed		
H/W – S/W Warranty Agreements						Prelim.	Update	Baseline	
Concept of Operation	Prelim	Update	Baseline						
System Deployment Plan					Prelim	Baseline			
User Manuals, Operations Documentation					Prelim	Update	Update	Baseline	
User/Operator Training Plan					Prelim	Update	Update	Baseline	
System Maintenance Plan and Procedures						Prelim	Update	Baseline	
System Disposal Plan				Prelim	Update	Update	Update	Update	Baseline
Project Closeout Report									Baseline

7. Mapping Iterative Development Projects to Milestones

This PR document does not preclude the use of the iterative system development model; the milestone reviews required by this document can be adapted to either lifecycle model. For this PR, iterative development is considered to use "developmental" or beta releases of a system with limited functionality, followed by successive releases featuring enhanced designs and functionality based on testing of the previous release.

Iterative development lifecycles, such as the Agile Approach, often employ the "Scrum Framework" of repeated, intense build-and-release cycles where system releases are made early and often to incorporate lessons learned, feedback and even new requirements solicited during the previous build and testing phase. Iterative development lifecycles allow a system development to be responsive, flexible and deployable much earlier than a traditional "waterfall" model featuring complex system specification, design, development, testing and finally deployment in a strict linear order.

The PM of an iterative system development is expected to adapt the milestones described in this document to fit within the successive functionality release model of the iterative lifecycle, while maintaining a level of documentation and testing formality that allows the requirements of this PR to be met, where applicable. Table 13 provides guidance for iterative development lifecycle Projects to achieve Project milestones within an iterative development environment.

Table 13: Iterative System Development Lifecycle vs. Waterfall Review Milestone

Traditional "Waterfall" Development Milestone	**Iterative Lifecycle Model Equivalent "Milestone" or Development Stage**
Project Kick-Off	Iterative system top-level concepts, along with high-level use cases. development and release process roadmap.
Preliminary Design Review	Iterative system storyboard and roadmap; early design concepts and top-level functional requirements. This review milestone can be broken into a series of lower-level, focused reviews as the system design and concept prototyping iterates.
Critical Design Review	First major scrum period supporting a preliminary system release for beta testing by developers under controlled conditions and simulated interfaces.
Test Readiness Review	Second major scrum period supporting an upgraded system release for enhanced testing by End Users under nominal operating conditions. Multiple TRRs can be held to support major iterative releases.
System Buy-off	The system has reached the point where the current release can be provided to the End User, even with further post-delivery releases planned.
Operations Readiness Review	Preparation for first deployment of the iterative system into the End User environment, reporting on testing with

Traditional "Waterfall" Development Milestone	Iterative Lifecycle Model Equivalent "Milestone" or Development Stage
	involvement of Operators and real interfaces to external systems, using test data to create nominal and boundary input conditions. Note that successive ORRs can follow as system is enhanced with iterative releases to incorporate new functionality.
Decommissioning Review	End of anticipated system release cycles supporting original design concepts; decisions on enhancing/adapting functionality or retiring system.

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Appendix A: Glossary

Analysis of Alternatives: A formal analysis method that compares alternative approaches by estimating their ability to satisfy requirements through an effectiveness analysis and by estimating their life-cycle costs through a cost analysis. The results of these two analyses are used together to produce a cost-effectiveness comparison that allows decision makers to assess the relative value or potential programmatic returns of the alternatives. An analysis of alternatives broadly examines multiple elements of Project alternatives (including technical performance, risk, life cycle costs, and programmatic aspects).

Baseline: An agreed-to set of requirements, designs, budgets, schedules, or documents that will have changes controlled through a formal approval and monitoring process.

Decision Memorandum: The document that summarizes the decisions made at program decision milestones or as necessary in between program decision milestones.

Decommissioning: The process of ending an operating mission and the attendant Project as a result of a planned end of the mission or Project termination.

End-User: Any entity or individual for whom a system or artifact is produced (e.g. customer)

Exit Criteria: Specific accomplishments that must be satisfactorily demonstrated to meet the objectives of a life-cycle and technical review so that a technical effort can progress further in the life cycle. Exit criteria are documented in the corresponding technical review plan.

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

Iterative Development: A system development lifecycle model featuring incremental development and deployment of system functionality, as opposed to a waterfall lifecycle model with sequential phases of progressive development culminating in a final system delivery. Iterative development, such as the Agile Approach, often employ the “Scrum Framework” of repeated, intense build-and-release cycles where system releases are made early and often to incorporate lessons learned, feedback and even new requirements solicited during the previous build and testing phase. Iterative development lifecycles allow a system development to be responsive, flexible and deployable much earlier than a traditional “waterfall” model

Milestone Review: The event at which the MDA determines the readiness of a program/Project to progress to the next phase of the life cycle (or to the next milestone).

Milestone Decision Authority: The individual authorized by the government to approve and fund Projects for implementation.

NESDIS Office(s): A term used in the widest sense to include NESDIS Headquarters elements, NESDIS Operations and Acquisitions offices, the Center for Satellite Applications and Research (STAR), and the National Centers for Environmental Information (NCEI).

Process: A set of activities used to convert inputs into desired outputs to generate expected outcomes and satisfy a purpose.

Product: Products include documents, facilities, firmware, hardware, software, tools, materials, processes, services, and systems.

Program: A strategic investment that has defined goals, objectives, architecture, funding levels, and a management structure that supports one or more Projects.

Program Decision Milestone: The event at which the MDA determines the readiness of a Project to progress to the next phase of the life cycle.

Project: A specific investment that has defined goals, objectives, requirements, lifecycle cost, a beginning, and an end. A Project yields products or services that directly address NESDIS' strategic needs. In this document, the term 'Project' applies in the widest sense to include Projects, programs, portfolios, and major initiatives.

Requirement: A statement that identifies a system, product, or process characteristic or constraint. A requirement statement must be clear, correct, feasible to obtain, unambiguous in meaning, and able to be validated at the level of the system structure at which it is stated.

Stakeholder: A group or individual for whose need or mission a requirement or Project is created. Also known as the "customer".

Standing Review Board: The board responsible for conducting milestone reviews of a program/Project and providing objective, expert judgments to the convening authorities.

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

Tailoring: The process used to seek relief from in the implementation of PR requirements consistent with program or Project objectives, allowable risk, and constraints.

Validation (of Requirements): The continuous process of ensuring that requirements are well-formed (clear and unambiguous), complete (agrees with customer and stakeholder needs and expectations), consistent (conflict free), and individually verifiable and traceable to a higher-level requirement or goal.

Waterfall Development: An approach to system development that follows a linear progression through very distinct phases where system implementation and operation only occur towards the end of the lifecycle, after requirements definition and architectural design are complete. This is common in large hardware or software system developments

Appendix B: Acronyms

AA	Assistant Administrator
ACIO-S	Assistant Chief Information Officer for Satellites
AGO	Acquisition and Grants Office
AIT	Assembly, Integration, and Test
AoA	Analysis of Alternatives
AOA	Annual Obligation Authority
APMC	Agency Program Management Council
ATP	Authorization to Proceed
CDR	Critical Design Review
ConOps	Concept of Operations
CWIP	Construction Work In Progress
DAO	Department Administrative Order
DMP	Data Management Plan
DOC	Department of Commerce
DR	Decommissioning Review
DUS/O	Deputy Under Secretary for Operations
EC	Executive Council
H/W	Hardware
ICD	Interface Control Document
KO	Kick Off
MCR	Mission Concept Review
MRB	Milestone Review Board
NAO	NOAA Administrative Order
NASA	National Aeronautics and Space Administration
NCEI	National Centers for Environmental Information
NESDIS	National Environmental Satellite, Data, and Information Service
NOAA	National Oceanic and Atmospheric Administration
ORR	Operations Readiness Review
OSAAP	Office of Systems Architecture and Advanced Planning

OSAT	On-site Acceptance Test
PDR	Preliminary Design Review
PMC	Program Management Council
PM	Project Manager
PMP	Project Management Plan
PoC	Point of Contact
PR	Procedural Requirements
PSR	Pre-Ship Review
RFA	Request for Action
RID	Review Item Discrepancy
ROM	Rough Order of Magnitude
SAR	Systems Architecture and Requirements
S/W	Software
SoW	Statement of Work
SRB	Standing Review Board
SRR	System Requirements Review
SoW	Statement of Work
STAR	Satellite Applications and Research
TOR	Terms of Reference
TRR	Test Readiness Review
TTA	Technical Task Agreement
WBS	Work Breakdown Structure

Appendix C: Requirements Matrix

The following table contains the requirements for the Project milestones derived from this NESDIS PR document, with reference to sections within this document. Self-assessment of compliance will be provided to the OSAAP Director at Project KO, annually thereafter, and on request.

The Project will document in the PMP compliance or non-compliance with all the requirements below.

Section	REQ #	Requirement text from NESDIS-PR-1240.1 section listed
2.1	001	OSAAP ensures compliance with this PR.
2.1	002	The OSAAP Director will establish a Standing Review Board (SRB) for all Projects where the NESDIS AA or higher authority is the MDA that provides an independent, NESDIS-level assessment of technical milestones.
2.2	003	NESDIS Office Directors establish policies, processes, and procedures to execute the requirements of this PR.
2.2	004	If the NESDIS AA designates an Office Director as the MDA, then that Office Director is responsible for establishing the SRB per Section 2.3.
2.4	005	The PM will develop the milestone plan and deliver the program decision milestone reviews and technical milestone reviews in accordance with the requirements of this PR and as documented in the PMP.
2.4	006	The PM will allocate adequate resources to meet the requirements of this PR commensurate with the scope, size, and complexity of the Project.
3	007	Each Program Decision Milestone will be scheduled based upon Project preparedness for that milestone as determined by the relevant decision forum illustrated in Figure 2.
3	008	The PM will seek a Milestone Decision Memorandum from the MDA after each Program Decision Milestone.
3.1	033	At Milestone 0, the Project will provide the following information and documentation: initial requirements, Analysis of Alternatives (AoA), preliminary Concept of Operations (ConOps), and rough order of magnitude (ROM) cost and schedule.
3.2	009	At Milestone 1, the Project will provide the following information and documentation: ROM Budget with sufficient margin; preliminary Integrated Master Schedule (IMS) with milestones shown and sufficient margin; Work Breakdown Structure (WBS), down to at least Level 2; ICE; preliminary Project team structure, including internal and external participants; Project-level Requirements; ConOps; Acquisition

Section	REQ #	Requirement text from NESDIS-PR-1240.1 section listed
		Strategy (if required); preliminary PMP; and high-level risks and issues.
3.3	010	At Milestone 2, the Project will provide the following information and documentation: Updated baseline budget with sufficient margin; updated baseline IMS with milestones shown and sufficient margin; WBS with sufficient detail for adequate tracking; ICE; updated baseline PMP; requirements derived below Project level as needed; ConOps; Preliminary System Architecture; Acquisition Plan update; and Project risks and issues update.
3.4	011	At Milestone 3, the Project will provide the following information and documentation: baseline budget with sufficient margin; baseline IMS, with milestones shown and sufficient margin; baseline cost and schedule execution status; PMP execution status and any requested changes; requirement verification results; system performance evaluation; technical and programmatic changes since last decision Milestone; Acquisition Plan execution status; and Project risks and issues.
3.5	012	At Milestone 4, the Project will provide the following information and documentation: baseline budget with sufficient margin; baseline IMS, with milestones shown and sufficient margin; baseline cost and schedule execution status; PMP execution status and any requested changes; Requirement verification results; System performance evaluation; Technical and programmatic changes since last decision Milestone; Acquisition Plan execution status; Project risks and issues; and End-User confirmation that system meets needs and user is ready to operate.
4	013	At a minimum, each Project must have at least one technical milestone review in each phase of the Project.
4	014	PMs are directly responsible for ensuring all required documentation and technical milestone review content are completed before holding a technical milestone review.
4.1	015	Technical milestone reviews will be scheduled based upon Project preparedness for that event and ability to meet the technical milestone review exit criteria, as determined by the Program Manager and the SRB Chair.
4.1	016	Any outstanding Project actions, review comments, and open changes from any previous technical milestones or reviews will be closed out to the SRB's satisfaction or otherwise dispositioned before the upcoming milestone review period begins.
4.1	017	Additions to any specific technical milestone review exit criteria beyond the generic requirements listed in Section 5 will be included in the PMP and approved by OSAAP, and the MDA.

Section	REQ #	Requirement text from NESDIS-PR-1240.1 section listed
4.2	018	All technical milestone review artifacts, presentations, notes, minutes, comments, and documents updated following a technical milestone review, will be placed under configuration control in a location accessible to all review participants.
4.2	019	Action item and lien closure plans will be approved by the SRB.
4.2	020	Technical reviews cannot be passed with liens in place.
4.2	021	The PM will issue a post-milestone review report within 15 working days of the conclusion of each technical milestone review including, at a minimum: ● List of materials (with version numbers) presented at the review (e.g., documentation, test artifacts, reports, risk matrix, and systems under test); ● Names of personnel attending the review; ● List of pre-review actions items closed during the review; ● List of post-review action items not closed out during the review; ● Any changes to the Project baseline resulting from the review; and ● A post-review plan with dates for closeout of action items and discrepancies.
4.2	022	The SRB will produce a technical milestone review closeout report within 10 days of the review that will list, as a minimum: ● Names of SRB members in attendance; ● List of Review Item Discrepancies (RIDs) and action items raised during the review; ● SRB review of the OSAAP assessment of validation; ● SRB evaluation of Exit Criteria; ● SRB decision on whether the technical review is passed; ● Any liens against the technical milestone; and ● Any SRB concerns not captured in an action item or RID.
4.2	023	Following each technical milestone review, the SRB and the Project will brief the MDA on the results of the technical milestone review.
5.1	024	The MCR will cover the review topics and meet the exit criteria in Table 3.
5.2	025	The KO milestone review will cover the review topics and meet the exit criteria in Table 4.
5.3	026	The Project will meet all applicable SRR review activities and exit criteria defined in Table 5.

Section	REQ #	Requirement text from NESDIS-PR-1240.1 section listed
5.4	027	The Project will meet all applicable PDR review activities and exit criteria defined in Table 6.
5.5	028	The CDR milestone review will contain the information and meet the exit criteria defined in Table 7.
5.6	029	At the TRR milestone review, the Project will cover the review topics and meet the exit criteria in Table 8.
5.7	030	The System Buyoff milestone review will contain the information and meet the exit criteria defined in Table 9.
5.8	031	The Project will hold an ORR milestone review in accordance with the criteria and activities in Table 10 to confirm that the system was implemented according to its requirements and design, and is fit for operational use by the End User.
5.9	032	The DR milestone review will cover the review topics and meet the exit criteria in Table 11.

Appendix D: References

Reference documents and publications listed below provide suitable guidance to how similar Agencies to NOAA implement Project management processes, including milestone reviews, for Projects of similar scope and complexity, or provide background information to NOAA policies.

- Federal Acquisition Institute, Project Manager's Guidebook.
- NASA Space Flight Program and Project Management Handbook, NASA/SP-2014-3705 (2015).
- NASA Space Flight Program and Project Management Requirements, NASA/PR 7120.5E.
- NASA Project Planning and Control Handbook, NASA/SP-2016-3404.
- NASA/SP-2007-6105, NASA Systems Engineering Handbook.
- Defense Acquisition Handbook, Defense Acquisition University.
- Project Management Book of Knowledge, Project Management Institute (5th Edition).
- Agile Practice Guide, Project Management Institute and Agile Alliance, September 2017.
- Federal Plain Language Guidelines, May 2011 (Rev.1).

Additionally, the DOC Office of Space Commerce, the DOC Office of the General Counsel, and the Office of Management and Budget all provide useful information on topics such as the involvement of the commercial sector with NOAA, the legal aspects of entering into contracts, and the Federal budgeting process.

Appendix E: DOC to NASA Project Milestone Comparison

The Project phases and Key Decision Point Milestones for NASA programs are slightly different from the DOC Project phases and milestones. Figure 4 shows the mapping of milestones and phase names between the two organization's Project life cycles.

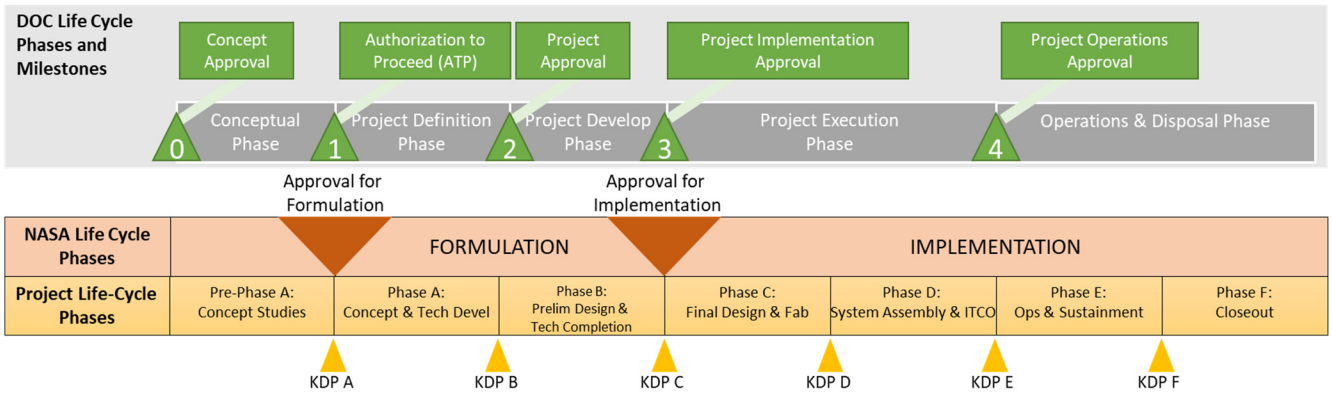

Figure 4: NASA Life Cycle Phases Mapped to DOC Life Cycle Phases

Appendix F: Sample Milestone Decision Memorandum

Joint NOAA and NASA
Program Management Council
GOES-R Series Program KDP II/KDP C Decision Agreement

Summary: The GOES-R Series program is managed in partnership between National Oceanic and Atmospheric Administration (NOAA) and National Aeronautics Space Administration (NASA). A Joint NOAA and NASA Program Management Council (PMC) met on May 16, 2012 and evaluated the GOES-R Series Program's Key Decision Point C of the life cycle as defined in accordance with the NASA Interim Directive (NID 7120-81) for the NASA Procedural Requirement (NPR) 7120.5D: Space Flight Program and Project Management Requirements and the GOES-R Management Control Plan. The Joint NOAA and NASA PMC determined that the GOES-R Series Program is ready to proceed to Phase C. The GOES-R Series Program is defined as a Single-Project Program in accordance with NID 7120-81 for NPR 7120.5D and is baselined to include GOES-R, S, T, and U.

Decision: Based on this review and the program readiness documents, the Joint NOAA and NASA PMC recommends approval for the GOES-R Series Program to continue into Phase C with the schedule and life cycle cost as specified in Table 1 with budget phasing per Table 2. The GOES-S, T and U launch readiness dates are planning dates and official LRDs will be established by NOAA based on the health of the constellation and budget realities. The cost and schedule commitments are aligned with the content described in the GOES-R Series Level 1 Requirements Document signed by the Deputy Under Secretary of Commerce for Oceans and Atmosphere on October 25, 2011.

This decision reaffirms actions taken to date to enable exercise of contract options for GOES-T and U in the FY13 and FY14 timeframes, respectively. These actions included technical and programmatic assessment by the GOES-R Independent Review Team (which supported the program conclusion that exercising the T and U options represented the least-cost and most feasible schedule for maintaining the operational geostationary constellation), the evaluation of costs by independent cost estimators, and the request for funds as a part of the President's FY12 budget.

Additionally, this decision recognizes the fact that schedule risk remains, as reflected in the 48% schedule confidence, which is below the NASA standard external commitment of 70% schedule confidence. However, given the priority placed on minimizing gaps in geostationary coverage, the progress to date in the program, and recommendations from external review boards, the PMC affirms that the highest potential for maintaining constellation availability is to aggressively manage schedule towards the October 2015 planned launch readiness date.

Table 1: KDP II Cost and Schedule Baseline Commitments

	Management Commitment
Cost – Life Cycle Cost Commitment / Cost Confidence Level	$10,860.3M / 73%
Schedule (Launch Readiness Dates):	
GOES-R / Schedule Confidence Level	10/2015 / 48%*
GOES-S / Schedule Confidence Level	2/2017 / 70%
GOES-T / Schedule Confidence Level	4/2019 / 86%
GOES-U / Schedule Confidence Level	10/2024 / 100%

* Less than NASA standard 70% schedule confidence level

Table 2: GOES-R Program Budget Profile

Prior Yrs ($M)	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FYTC	Total
2,792.9	615.6	802.0	950.8	844.7	781.7	706.3	578.7	2,787.6	10,860.3

Program Reporting: As part of the regular reporting on the GOES-R Series Program, NOAA and the GOES-R Series Program will continue to highlight for the Chief Financial Officer and Assistant Secretary for Administration actual or expected deviations from GOES-R's capability (including enhancements) and cost or schedule variances in all program elements – including ground systems, spacecraft, and instruments – exceeding 5% of the dollar amount or schedule currently established for that element.

Concurrence:

GOES-R Program Manager — Date: 5/16/12	NASA Goddard Spaceflight Center Director — Date: 16 MAY 2012
NOAA Assistant Administrator for NESDIS — Date: 5/16/12	NASA Science Mission Directorate Associate Administrator — Date: 5/16/12
NOAA, PMC Chair, Chief of Resources and Operations Management — Date: 5/16/12	NASA Associate Administrator (Acting) — Date: 5/16/12

Approval:

Under Secretary of Commerce for Oceans and Atmosphere & NOAA Administrator — Date: 5/16/12

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