



NASA Procedural Requirements

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Chapter 6. Systems Engineering Management Plan

6.1 Systems Engineering Management Plan Function

6.1.1 A Systems Engineering Management Plan (SEMP) is used to establish the technical content of the engineering work early in the Formulation phase for each project and updated as needed throughout the project life cycle. The SEMP provides the specifics of the technical effort and describes what technical processes will be used, how the processes will be applied using appropriate activities, how the project will be organized to accomplish the activities, and the resources required for accomplishing the activities. The process activities are driven by the critical events during any phase of a life cycle (including operations) that set the objectives and work product outputs of the processes and how the processes are integrated. (See Appendix D for an annotated outline for the SEMP.) The SEMP provides the communication bridge between the project management team and the technical implementation teams. It also facilitates effective communication within the technical teams. The SEMP provides the framework to realize the appropriate work products that meet the entry and exit criteria of the applicable project life-cycle phases to provide management with necessary information for assessing technical progress.

6.1.2 The primary function of the SEMP is to provide the basis for implementing the technical effort and communicating what will be done and by whom, when, where, cost drivers, and why it is being done. In addition, the SEMP identifies the roles and responsibility interfaces of the technical effort and how those interfaces will be managed.

6.1.3 The SEMP is the vehicle that documents and communicates the technical approach, including the application of the common technical processes; resources to be used; and key technical tasks, activities, and events along with their metrics and success criteria. The SEMP communicates the technical effort that will be performed by the assigned technical team to the team itself, managers, customers, and other stakeholders. Whereas the primary focus is on the applicable phase in which the technical effort will be done, the planning extends to a summary of the technical efforts that are planned for future applicable phases.

6.1.4 The SEMP is a tailorable document that captures a project's current and evolving systems engineering strategy and its relationship with the overall project management effort throughout the life cycle of the system. The SEMP's purpose is to guide all technical aspects of the project.

6.1.5 The SEMP is consistent with higher level SEMPs and the project plan.

6.1.6 The content of a SEMP for an in-house technical effort may differ from an external technical effort. For an external technical effort, the SEMP should include details on developing requirements for source selection, monitoring performance, and transferring and integrating externally produced products to NASA. (See Appendix D for further details.)

6.1.7 The SEMP provides the basis for generating the contractor engineering plan.

6.2 Roles and Responsibilities

6.2.1 Working with the program/project manager, the technical team determines the appropriate level within the system structure at which SEMP's are to be developed, taking into account factors such as number and complexity of interfaces, operating environments, and risk factors.

6.2.2 The technical team establishes the initial SEMP early in the Formulation phase and updates it as necessary to reflect changes in scope or improved technical development.

6.2.3 The technical teams shall define in the project SEMP how the required 17 common technical processes, as implemented by Center documentation, including tailoring, will be recursively applied to the various levels of project product layer system structure during each applicable life-cycle phase [SE-58]. The technical teams will have their approaches approved by the Designated Governing Authority (DGA). (See SE Handbook).

6.2.4 The technical team baselines the SEMP per the Center's procedures and policies at SRR for projects and single-project programs and System Definition Review (SDR) for loosely coupled programs, tightly coupled programs, and uncoupled programs. The content of Appendix D should be used as a guide. At the discretion of the project manager and the DGA, for a small project the material in the SEMP can be placed in the project plan's technical summary and the annotated outline in Appendix D used as a topic guide.

6.2.5 As changes occur, the SEMP will be updated by the technical team, reviewed and reapproved by both the DGA and the program/project manager, and presented at subsequent milestone reviews or their equivalent. The SEMP is updated at major milestone reviews through the SIR.

6.2.6 The technical team shall ensure that any technical plans and discipline plans are consistent with the SEMP and are accomplished as fully integrated parts of the technical effort [SE-59].

6.2.7 The technical team shall establish Technical Performance Measures (TPMs) for the project that track/describe the current state versus plan [SE-60]. These measures are described in the SEMP per Appendix D.

6.2.8 The technical team shall report the TPMs to the program/project manager on an agreed-to reporting interval [SE-61].

6.2.9 A technical leading indicator is a subset of the TPMs that provides insight into the potential future states. The technical team shall ensure that the set of TPMs include the following leading indicators:

- a. Mass margins for projects involving hardware [SE-62].
- b. Power margins for projects that are powered [SE-63].

6.2.10 The technical team shall ensure that the set of Review Trends includes closure of review action documentation (Request for Action, Review Item Discrepancies, and/or Action Items as established by the project) for all software and hardware projects [SE-64].

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