Systems Engineering Plan
Preparation Guide

"Technical Planning for Mission Success"

Version 2.01
April 2008

Department of Defense

Office of the Deputy Under Secretary of Defense for
Acquisition and Technology

Systems and Software Engineering
Enterprise Development

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REVISIONS

Revision Number	Date	Description
2.01	April 2008	Eliminated guidance asking that individuals be identified by name in Sections 3 and 4 of the sample SEPs (Chief Systems Engineer, Functional Leads, and individual with Technology Maturation Responsibility) as well as identification of any special security requirements for the CSE. Updated links for Service SE policy documents and the SE WIPT briefing.

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PREFACE

This second version of the Department of Defense (DoD) Systems Engineering Plan (SEP) Preparation Guide clarifies the DoD guidance for systems engineering (SE) planning, or technical planning, for acquisition programs. The guide is separated into three sections tailored to respective milestones and acquisition phases: Milestone A and Technology Development (TD); Milestone B and System Development and Demonstration (SDD); and Milestone C and Production and Deployment (PD) / Operations and Support (O&S). The guide presents a sample SEP format for each milestone and suggests details to include and sources to consult for specific SEP paragraphs. This new version more clearly outlines the strategy for developing a program's technical approach and offers a simplified framework for the program to organize, compile, and document technical planning.

This guide is appropriate for all acquisition category (ACAT) programs and is applicable to each component of a system: hardware, software, support, operational, training, and sustainment. It is derived from published government and industry guidance, standards, and best practice. The guidance is flexible to allow reasonable judgment on the part of the program to ensure the SEP is complete.

The office of primary responsibility for this guide is the Office of the Deputy Under Secretary of Defense for Acquisition and Technology, Systems and Software Engineering, Enterprise Development (ODUSD(A&T)SSE/ED). This office will continue to develop and coordinate updates to the guide as required, based on any future policy changes and customer feedback. To provide feedback, send e-mail to ATL-ED@osd.mil.

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INTRODUCTION

Purpose of the Systems Engineering Plan

The purpose of the Systems Engineering Plan (SEP) is to help programs develop their systems engineering (SE) approach, providing a firm and well-documented technical foundation for the program. The SEP is a living document in which periodic updates capture the program's current status and evolving SE implementation and its relationship with the overall program management effort.

The Office of the Secretary of Defense (OSD) suggests programs organize the SEP according to five critical focus areas:

- Program Requirements: The SEP should define how the program will manage all requirements (statutory, regulatory, derived, certification).
- Technical Staffing and Organization Planning: The SEP should show how the program will structure and organize the program team to satisfy requirements.
- Technical Baseline Management: The SEP should establish a technical baseline approach.
- Technical Review Planning: The SEP should show how the program will manage the technical effort, including the technical baselines, through event-based technical reviews.
- Integration with Overall Management of the Program: The SEP should link SE to other management efforts, including the Acquisition Strategy, test planning, sustainment planning, configuration management, risk management, and life-cycle management.

Although the detailed content of each SEP is tailorable according to the particulars of a program and each update may vary depending on the program's acquisition phase, using a common framework encourages sound technical planning throughout the program's life cycle. The emphasis should be on the rigor of the technical planning as captured in the SEP, not on the SEP itself.

The SEP also serves as a common reference to achieve shared stakeholder insight regarding a program's planned technical approach. It provides a documented understanding of how the program will accommodate cost, schedule, performance, and sustainment trades; the expected products of the SE effort; and how these products will contribute to program decision making. Modeling and simulation (M&S) is a key enabler throughout the acquisition life cycle; therefore, the strategy for using M&S to support the program should be documented in the SEP rather than in a separate stand-alone document.

Office of the Secretary of Defense Policy and Directives

This guide assists programs to implement the following OSD policy directives:

- February 20, 2004, USD(AT&L) Memorandum, "Policy for Systems Engineering in DoD"
- March 30, 2004, Director, Defense Systems Memorandum, "Implementing Systems Engineering Plans in DoD-Interim Guidance"
- October 22, 2004, USD(AT&L) Memorandum, "Policy Addendum for Systems Engineering."

The SE policies established in these documents direct that a SEP shall be approved by the Milestone Decision Authority (MDA) in conjunction with each milestone review and integrated with the Acquisition Strategy. The SEP shall detail the timing, conduct, and success criteria for technical reviews.

Policy also states that technical reviews shall be event driven and conducted when the system under development meets the review entrance criteria as documented in the SEP. These reviews shall include participation by subject matter experts who are independent of the program unless specifically waived by the SEP approval authority and documented in the SEP. Policy directs that each Program Executive Office (PEO) have a lead or chief systems engineer on staff who shall review the PEO's assigned program's SEP and oversee the SEP's implementation.

A program should work through the Systems Engineering Working-level Integrated Product Team (SE WIPT) to draft and mature the technical and management approach reflected in the SEP. SE WIPT members consist of the program office lead engineer, the IPT leads, the contractor lead systems engineer (when appropriate), the PEO systems engineer, the OUSD(AT&L)SSE program support team lead, and the lead system engineers from the system of systems (SoS).

Service Policy

The Services also publish SE / SEP policy that programs should consult:

- April 27, 2006, Assistant Secretary of the Navy (Research, Development and Acquisition) ASN(RD&A) Memorandum, "Revised Policy for DoN Systems Engineering Plan (SEP) Review and Approval"
- June 13, 2005, Assistant Secretary of the Army for Acquisition, Logistics, and Technology ASA(ALT) Memorandum, "Army Systems Engineering Policy"
- October 7, 2005, Secretary of the Air Force-Acquisition SAF/AQ Memorandum, "Air Force Systems Engineering Policy", Attachment 1, and Attachment 2

Suggested SEP Formats

Each program team should tailor the SEP contents and coverage to the needs and complexity of the specific program. As a general guideline, use plain language to document the technical plan; answer the "who, what, why, when, and how" questions associated with technical planning.

The suggested SEP formats provided in this guide include the preferred title pages and coordination/approval pages for ACAT ID, ACAT IAM, and Special Interest Programs. For programs in all other acquisition categories, components may supplement SEP guidance and adapt the title and coordination pages in accordance with direction from the Component Acquisition Executive (CAE) or designated SEP approval authority. The guide includes links to related policy and guidance documents to provide further information on details to include in specific paragraphs.

Clarification of Terms

For the purposes of this guide, the term "system" refers to the total of all components, including hardware, software, and human components as well as the operational, sustainment, and training elements.

The term "system of systems" (SoS) is defined as "a set or arrangement of systems that results when independent and useful systems are integrated into a larger system that delivers unique capabilities" (DAG 4.2.6).

The term "systems engineering" (SE) includes all specialty domains that are part of the SE process, including software engineering, functional engineering (e.g., reliability, safety, and producibility), and other engineering specialties.

The term "life cycle" refers to the continuum of all program phases: Concept Refinement, Technology Development, System Development and Demonstration, Production and Deployment, and Operations and Support (sustainment).

The term "key performance parameter" (KPP) refers to all KPPs and key system attributes (KSAs) applied to the system acquisition, including performance, interoperability, sustainment, safety, or other KPPs/KSAs.

SEP Submittal and Approval Instructions

Programs should develop an initial SEP as early as possible during the Concept Refinement phase. The technical approach documented in the SEP should then contribute to the formulation and update of the Acquisition Strategy and be included as part of each RFP. After contract award (i.e., development, production, or sustainment), the government program team and the contractor(s) should work jointly to update the SEP throughout the program's life cycle;

the level of fidelity and emphasis should evolve as the program progresses. For ACAT ID, ACAT IAM, and Special Interest Programs, the programs should submit all SEPs, draft or final, to the Office of the Deputy Under Secretary of Defense for Acquisition and Technology, Systems and Software Engineering, Assessments and Support (ODUSD(A&T)SSE/AS). For all other programs, the CAE will designate the SEP approval authority and prescribe submittal instructions.

Both the draft and the final SEP shall be submitted in electronic format. When the SEP references other program documents, the program should make those documents available to the SEP review team electronically or as specified by the CAE.

Draft SEP Submittal

- The program should prepare the draft SEP (initial or update) with the assistance of an SE WIPT. Program managers for ACAT ID, IAM, and Special Interest Programs should submit the draft SEP to ODUSD(A&T)SSE/AS for informal review and comment no later than 120 days before the applicable milestone decision. Best practice is to submit the draft SEP no later than 120 days before the anticipated approval date of the Acquisition Strategy.
- Upon adjudication of comments (normally within 45 days), the program should submit the final SEP for formal approval.

Final SEP Submittal

- The appropriate CAE should submit the final SEP to ODUSD(A&T)SSE/AS (or designated representative) for MDA approval no later than 30 days before the milestone decision. Best practice is to submit the SEP no later than 30 days before the anticipated approval date of the Acquisition Strategy.
- Upon adjudication of SEP comments, SSE/AS will forward the SEP to the appropriate Overarching Integrated Product Team (OIPT) leader for endorsement to the MDA.

SEP Update Procedures

- Formal SEP updates signed by the MDA are required for acquisition milestone decisions, program restructures, and/or program deviations. Updates will be submitted to ODUSD(A&T)SSE/AS following the above submittal instructions.
- Informal SEP updates should be approved by the lead/chief systems engineer and program manager before each technical review.

For Joint or multiservice programs, the program will coordinate the SEP with the respective service or agency chief systems engineer before submittal to ODUSD(A&T)SSE/AS Pentagon Room 2B278.

SAMPLE FORMAT FOR

MILESTONE A

AND

TECHNOLOGY DEVELOPMENT

SYSTEMS ENGINEERING PLAN

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PROGRAM NAME – ACAT LEVEL

SYSTEMS ENGINEERING PLAN
VERSION ___

SUPPORTING MILESTONE A
AND
TECHNOLOGY DEVELOPMENT

[MONTH DAY, YEAR]

****

OFFICE OF THE SECRETARY OF DEFENSE (OSD) APPROVAL

_____ _____

Name
Under Secretary of Defense for
Acquisition, Technology and Logistics

Date

[or designated SEP approval authority]

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PROGRAM NAME - ACAT LEVEL

SYSTEMS ENGINEERING PLAN
VERSION ___

SUPPORTING MILESTONE A
AND
TECHNOLOGY DEVELOPMENT

MONTH DAY, YEAR

****

SUBMITTED BY

_____	_____	_____	_____
Name Lead / Chief Systems Engineer	Date	Name Program Manager	Date

CONCURRENCE

_____	_____	_____	_____
Name Chief Systems Engineer (Program Executive Office, System Center or Command)	Date	Name Program Executive Officer or Equivalent	Date

COMPONENT APPROVAL

_____	_____
Name Title, Office Component Acquisition Executive	Date

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CONTENTS

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1. INTRODUCTION

Discuss the purpose of the SEP, who will use it, and how it will be used to define the blueprint for the conduct, management, and control of the technical aspects of the program from concept to disposal. Discuss the commitment to update the document in the Technology Development (TD) phase and throughout the program's life cycle to make it a living document, and discuss the plans to link the contractor's Systems Engineering Management Plan (SEMP) to the SEP.

1.1. Program Description and Applicable Documents

Provide a top-level mission description that summarizes the user's requirements as documented in the Initial Capabilities Document (ICD) and/or draft Capability Development Document (CDD). Convey the overall key elements of the program, including any system of systems (SoS) relationships by using appropriate DoD Architecture Framework views (e.g., Operational View-1) and supporting narrative. Include a system description and a notional diagram of the system.

Discuss the relationship between the SEP and the documents developed during the Technology Development (TD) phase. For example, include the funding profile; draft Acquisition Strategy; System Threat Assessment (STA); and Preferred System Concept (PSC); draft Technology Readiness Assessment (TRA); draft Programmatic Environmental, Safety and Occupational Health (ESOH) Evaluation (PESHE); draft Information Support Plan (ISP); Initial Capabilities Document (ICD) and draft Capability Development Document (CDD); draft Program Protection Plan (PPP); Risk Management Plan (RMP); Technology Development Strategy (TDS); draft Integrated Master Plan (IMP) and Integrated Master Schedule (IMS); the Test and Evaluation Strategy (TES). Cross-reference any overarching or subordinate SoS program-related SEPs. List the points of contact for all the documents.

1.2. Current Program Status

Summarize the overall Acquisition Strategy and how it is event driven. Discuss how the technical requirements and technical risks will be addressed given program funding and schedule constraints. Highlight the major activities that the program conducted to date such as outcomes of technical reviews, test phases, independent reviews, risk reduction activities, trade studies, etc.

Discuss how the Acquisition Strategy mitigates technical risks associated with technology maturation or obsolescence as well as the maturity of technologies to be used. Discuss if any technical refreshes are planned in the System Development and Demonstration (SDD) phase. Highlight the top-level risks associated with technology and the risk closure plans (see SEP 4.3, 6.3).

Provide a program schedule which shows major milestones; SE technical reviews; and notional dates for major events (developmental, operational, and live fire test phases; deliveries; certifications; contract awards; training; site activation, etc.).

1.3. Approach for SEP Updates

Describe the approach for updating the SEP throughout the life of the program. Describe the primary sources and event triggers for SEP updates and include a change log tracing changes to the original document. Include a brief explanation of what drove the change (e.g., new direction or requirements, funding issues, technical issues, or normal program maturation, etc.). List any previous SEP submittals by date.

2. PROGRAM REQUIREMENTS

Provide a brief description of the program requirements in support of the overall mission needs and operational concept as a basis for Milestone A and the TD phase. Include details as recommended in paragraphs 2.1–2.5.

2.1. Capabilities, Requirements, and Concept(s) of Operation

Describe the user's desired concept(s) of operation (CONOPS), capabilities, requirements, and support approach (see DAG 1.3, 4.2.4.1, 4.1.3, 4.3.2).

Consider the following:

- The capability gap in terms of the missions, tasks, and functions.
- The linkage between the desired capabilities and the CONOPS (include a diagram of the CONOPS). Reference the appropriate Joint Capabilities Integration and Development System (JCIDS) documents (e.g., ICD or Draft CDD) (see CJCSM 3170.01F; DAG 4.1.3).
- How the desired capabilities and emerging Key Performance Parameters (KPPs) (e.g., materiel availability, force protection and net-ready) translate into technical specifications.
- How the desired capabilities and emerging KPPs are linked to the PSC.
- The responsibilities of all program stakeholders involved in the requirements process and how the stakeholders will analyze requirements, conduct trades, resolve conflicts and reach agreement.

2.2. Other Requirements Linked to the Preferred System Concept

Describe other requirements linked to the PSC, including the following: potential

statutory/regulatory, specified/derived, and certification requirements, and other design considerations and constraints (see DAG 3.2.1, 4.1.3, 4.3.2.1, 4.2.4.1, 4.3.1, 4.3.2 et seq., 4.4.11).

Consider the following:

- The program stakeholders, by organization and position, needed to endorse the PSC.
- The statutory and regulatory requirements applicable to SE, including DoDI 5000.2, linked to the PSC (see DoD 5000.2 E3. Enclosure 3, E4. Enclosure 4).
- How the program will update and address information dependencies, system interfaces, and interoperability needs from SoS and external system dependencies (see SoS).
- The approach to satisfy requirements (e.g., trade-offs between hardware and software) and the link to the selection of critical technologies.
- How the program will address other requirements (specified, derived, and certification) that relate to the PSC.
- How the program will develop, define, model, trade, manage, and test requirements (see DAG 4.5.7.2).
- How the program will identify, address, and manage the full range of applicable design considerations (see DAG 4.4). How the program will incorporate these design considerations to satisfy all requirements.
- How the architecture products (views, diagrams, descriptions, models, etc.) are related to requirements definition as well as the functional and physical architectures.
- The program's plan to evaluate product support capabilities and refine supportability objectives/constraints to develop the life-cycle sustainment strategy.
- How the program will address ESOH considerations in the TD phase, in support of the entire system life cycle.

2.3. Critical Technologies

Describe the PSC's critical technologies, including the enabling technologies required to meet program objectives and requirements, such as advanced algorithms, models, manufacturing, new designs, operational software, and support systems, etc. Describe the relative risk of the critical technologies, the technology maturation required, and the limitations, safety, and hazards associated with these technologies (see DAG 4.2.3.1, 4.2.4.1, 4.3.2 et seq.; TRA).

Consider the following:

- The enabling technologies the program has chosen to incorporate in the PSC, the Critical

Technology Elements (CTEs), and the currently assessed Technology Readiness Levels (TRLs) for each. Include the TRLs/ MRLs planned at the conclusion of the phase and the activities necessary to achieve them.

- The technical plan, including the key decision points, consistent with the TDS, TES, and TRA, for managing, maturing, assessing, and integrating all critical technologies.
- The risk mitigation or off-ramp for each critical technology, should a technology not mature or is unsuitable (e.g., have limitations, hazards, etc.).
- The metrics and tools (modeling and simulation (M&S)) used to track and assess the critical technologies (see DAG 4.5.7.2).

2.4. Technology Maturation Cost / Schedule Constraints

Describe the cost and schedule constraints on the program and how these relate to the level of technology maturation required (see DAG 3.2.1, 4.2.4.1, 4.3.2).

Consider the following:

- Technology maturation schedule constraints, underlying key assumptions, schedule risks, and mitigation approach needed to mature the selected technologies.
- Technology maturation cost constraints, underlying key assumptions, cost risks, and mitigation approach needed to mature the selected technologies.
- How constraints and technology maturations link to the program's technical and sustainment approach.

2.5. Technology Development and Evolving Acquisition Strategy

Describe how the program will balance requirements and CTE maturity trades to best meet program objectives for the TD phase and the program's evolving acquisition strategy. Describe how success or failure of the technology development will be reflected in the planning for future phases and how it affects desired operational effectiveness and operational suitability (e.g., SDD) (see DAG 4.2.4.1, 4.3.2, 4.4, 4.4.9, 5.1.3.5, 5.2, 5.2.2, 5.4.1.2).

Consider the following:

- How the program will make design trades to support requirements to balance program life-cycle cost, schedule, performance, sustainment, safety, and risk (see DAG 4.5.6).
- Who is responsible for making trade-off decisions and at what level in the organization the decision maker resides.
- The intended use of criteria for decision making and trade-off of alternative design solutions including descriptions of technical objectives, criteria, and weighting factors.

- How the evolving acquisition strategy, sustainment plan, and technical planning for future phases will include off-ramps to adapt to technology maturation delays or failure of CTE maturation.

3. TECHNICAL STAFFING AND ORGANIZATIONAL PLANNING

Describe how the program will organize and staff SE activities to meet the requirements for Milestone A and the TD phase as outlined in section 2 above. Include details as recommended in paragraphs 3.1–3.5.

3.1. Lead/Chief Systems Engineer and Functional Leads

Identify the lead/chief systems engineer's role and responsibility. Identify the roles and responsibilities of the functional leads (experts outside of the program manager's (PM) chain of command responsible for technical processes, products, and product support). Address all elements of the technology development across all elements of the PSC (operations, support, and training) (see DAG 4.1.6).

Consider the following:

- The role and authority of the lead/chief systems engineer relative to the recommendation for Milestone A entry and exit criteria and SE processes and products (technical reviews and technical baselines for each enabling technology).
- The critical skills and experience level required to fill the lead/chief systems engineer position.
- The role and authority of the lead/chief systems engineer to manage external interfaces and information support requirements for SoS (see DAG 4.2.6; SoS).
- The types of functional leads required to address the integrated set of technical requirements (KPPs, statutory, regulatory, specified, certification, and design considerations).
- The program's planned approach to incorporate appropriate technical authority within Integrated Product Teams (IPTs).
- The interaction of the lead/chief systems engineer and the functional leads to address the total set of requirements and technical maturity.
- How the lead/chief systems engineer and the functional leads will interact with the PM with respect to recommendations to balance cost, schedule, performance, sustainment, and risk in support of program decisions.

3.2. IPT Organization/Structure

Describe how the program will organize and structure IPTs to mature enabling technologies and achieve planned program outcomes and their associated CTEs. Include an organizational chart and a table of responsibilities (see DAG 4.1.5; IPPD Handbook).

Consider the following:

- The program's approach for establishing a product-aligned IPT structure.
- How the IPT structure will align with the program's products, planned outcomes, and preliminary Work Breakdown Structure (WBS) to mature critical technologies.
- The role and responsibility of each IPT relative to product development, management responsibilities (cost, schedule, performance) and application of technical and management processes.

3.3. IPT Staffing / Functional Skills

Describe key technical staffing requirements for the entire program, including IPTs. Identify the required number of key technical positions, critical skills, and experience levels necessary to mature the CTEs.

Consider the following:

- How the IPTs will be staffed by appropriate functional support and other stakeholders (e.g., user, technical, sustainment, cost, budget, security, and test) responsible for maturing the enabling technologies and their associated CTEs. Identify their roles and responsibilities with regard to the requirements and design considerations (see SEP 2.1–2.5).
- The number and category of critical skills, and experience required to fill key technical positions (e.g., software, design, sustainment, and test engineers).
- The resources available to the IPTs, the staffing plan, and the current status of filling the key technical positions for each IPT.
- The impact of unfilled positions (e.g., because of lack of funding, lack of experienced people) and how the program will address vacancies.
- A diagram showing planned staffing levels by key program events (e.g., milestones and technical reviews). Include a sand chart to show the number of required full-time equivalent positions (organic, matrix support and contractor).

3.4. IPT Coordination

Describe how the program will integrate and coordinate SE activities within and across

IPTs (see DAG 10.3, 10.3.2).

Consider the following:

- Specific responsibilities of the lead/chief systems engineer, the IPT lead engineers, the SE functional leads, and the Program Executive Office Systems, Systems Center, or Command Chief Engineer and how these program participants will communicate and coordinate.
- How the program will manage, integrate, and control the IPT structure and the SE activities and products (estimates, assessments, risks, requirements, and technical baselines) across the IPTs to support the maturing and integration of technologies.
- How the IPTs will involve all stakeholders (e.g., users, developers, testers, functional leads, SMEs) in trade-off and design consideration analysis.
- The integration of SoS technical planning with peer and higher organizations and authorities to coordinate design considerations and trades.
- How the program will present trade-off decisions to adjudicate disagreements among IPTs.

3.5. Integration with Contractors and External Organizations

Describe how the program will facilitate interaction among the SE Working-level Integrated Product Team(s) (WIPT), other government organizations, and contractor(s) (if applicable) on technical tasks, activities, and responsibilities (e.g., requirements, technical baseline, technical reviews). Describe how the SE WIPT will document the technical and management approach.

Consider the following:

- How the SE WIPT will contribute to and document the technical and management approach.
- The exit criteria for the TD phase and monitoring its accomplishment for all increments of capability.
- The entry and exit criteria for each technical review.
- The execution of the program in accordance with an approved SEP.
- The lessons learned and best practices throughout DoD, relevant to the program's technical approach and status.
- How the program's organization and structure will facilitate clear communication of technical guidance among government offices and all contractors (prime and subcontractors) engaged in SE activities, (e.g., requirements, technical baseline, technical reviews).

4. TECHNOLOGY MATURATION AND PLANNING

Describe the approach for managing the overall technical products and specifications for Milestone A and during the TD phase, including any applicable Advanced Technology Demonstrations (ATDs), Advanced Concept Technology Demonstrations (ACTDs), or Joint Capability Technology Demonstrations (JCTDs) consistent with the program's TDS. Include details as recommended in paragraphs 4.1–4.5.

4.1. Technology Maturation Responsibility

Describe who (by position) will be responsible for managing the CTEs, in support of the PSC as they mature, during the TD phase.

Consider the following:

- The role and responsibility of the lead/chief systems engineer for maturing the technologies and requirements allocated to product and functional IPTs.
- The key participants and their respective roles to mature each CTE and to develop the respective technology baseline.

4.2. Requirements Traceability and Verification and Validation

Describe how the technical baseline approach accounts for requirements traceability and requirements verification and validation (V&V) across the PSC's technical requirements.

Consider the following:

- How the program will track all requirements linked to the PSC (KPPs, statutory/regulatory, specified/derived, and certification requirements, along with verification and design considerations, etc.) from the source to (and throughout) the system technical baseline and specification tree.
- The approach to ensure there are no orphan or childless requirements.
- Who will conduct requirements traceability and V&V and what tools they will use (e.g., M&S) (see DAG 4.5.7.2).
- The plan to trace and map all requirements from initial identification to the V&V efforts.
- How the program will use technical measures to determine program progress, risk, and status, including the program's software development metrics; technical performance measures (TPMs); Critical Technical Parameters (CTPs); measures of effectiveness (MOEs); measures of suitability (MOSs); measures of performance (MOPs); and Sustainment KPP/KSAs (e.g., materiel availability, materiel reliability, ownership cost, and mean down time).

4.3. Technology Maturation and Risk

Describe how the program will assess the results of each technology demonstration to assess technology maturation and consequential program risk.

Consider the following:

- How the program will demonstrate and assess enabling technology elements (e.g., TRA) consistent with the Technology Development Strategy (TDS) and the TES (see DAG 4.5.7.2).
- How the program will address residual technology maturation risk during the SDD phase.
- How the program will integrate risk management within the entire scope of SE efforts (government and contractor) to ensure successful maturation of the CTEs.
- How the program will establish and maintain updated estimates for software size and complexity to form the basis of cost and schedule estimates.
- How the program will involve stakeholders in the assessment of technical maturity.
- The program's plan to establish maturity criteria and the approach for application of these criteria across the WBS down to the configuration item (CI) level.

4.4. Mapping the Technical Baseline to the Preferred System Concept

Describe how results of the technology development effort will map to the user's needed capabilities (ICD to draft CDD), to the Analysis of Alternatives (AoA) results, and to the PSC.

Consider the following:

- The program's approach to technical baseline documentation (system, subsystem, functional, and design specifications and standards) and alignment between the WBS and the PSC (see DAG 4.3.2.2)
- The methods that show traceability of KPPs between the JCIDS documents (ICD or draft CDD) if available, and the system performance specification.
- How the program will integrate the individual technologies to accomplish the PSC.

4.5. Updating and Documenting the Preferred System Concept

Describe how the program will define and manage the technical baseline, consistent with the PSC and the TDS.

Consider the following:

- The technical documents that require development and those that currently exist to achieve TD objectives to characterize the technical baseline (see DAG 2.2, 4.2.3.6,

4.2.3.7, 4.2.3.8).

- The approach to manage the technical baseline, accomplish the TRA, and demonstrate the readiness levels to achieve Milestone B (TRL 6) (see DAG 10.5.2; TRA).
- How the program will use technical reviews (e.g., Alternative Systems Review and System Requirements Review) to (1) manage technical baselines and (2) establish system documentation and to assess technical maturity and program risk.
- The configuration management (CM) process the program will use to manage the baselines.
- The need for access to or delivery of technical data, computer software, and other information for obtaining government and contractor data rights that support program analysis (M&S), program development and production objectives, and proposed sustainment strategy.

5. TECHNICAL REVIEW PLANNING

Describe the program's plan to establish and conduct event-driven technical reviews (e.g., Alternative System Review, System Requirements Review, etc.) to manage and control the development of individual enabling technologies and their associated CTEs, specifically for Milestone A and during the TD phase (see DAG 4.5.8). Include details as recommended in paragraphs 5.1–5.5.

5.1. Event-Driven Technical Reviews

Describe the event-driven technical reviews to be conducted during the TD phase at a system, subsystem, and enabling technology element level, as appropriate. Identify program-specific entry and exit criteria, defined and documented, for each technical review (see DAG 4.2.3.3, 4.3, 4.3.1.4, 4.3.2.4, 4.3.3.4, 4.3.3.9, 4.4.11.2, 4.5.2, 4.5.8). (A best practice is to conduct a Systems Requirements Review during the TD phase and provide the traceability between the CDD and the specification to bidders in the Request for Proposal.)

Consider the following:

- The program's approach to executing event-driven technical reviews and ensuring they are not schedule driven.
- The planning and schedule for all TD phase technical reviews:
  - The number of technical reviews planned and to what WBS level.
  - The technical entrance/exit criteria for each review.
  - The approval authority (lead/chief systems engineer and/or functional lead) for

entry/exit criteria for specific reviews.

- The timing of the technical reviews, tied to the achievement of entry/exit criteria and the maturing of the technical baseline.
- How the execution of the reviews will support other key programmatic efforts/decisions.

5.2. Technical Review Management

Describe who will be responsible for overall management of each technical review to be conducted during this phase.

Consider the following:

- The program's approach for oversight and conduct of all technical reviews.
- The key OPRs and stakeholders involved in the technical reviews.
- How the program will determine readiness for technical reviews and who will be responsible for making the decision to authorize the review.
- How the program will involve Service-specific technical authority (see DAG 4.1.6).
- The roles and responsibilities of those involved in conducting technical reviews, and the procedures they will use to conduct reviews and to close outstanding issues from the reviews.
- The approach to ensure that applicable technical documentation (e.g., hardware, software, or process specifications) subject to each review is available as read-ahead material to the appropriate participants (stakeholders and functional leads).
- The approach for integrating outcomes from technical reviews into the technical plan.

5.3. Chairing of Technical Reviews

Describe how the program will select appropriate chair(s) for the technical reviews. (Best practice is to use independent technical authorities.) Describe the role of the lead/chief systems engineer.

Consider the following:

- The approach for determining and selecting of technical review chairs.
- The roles of the PM, lead/chief systems engineer, and the technical review chair and how they will collaborate on technical reviews, especially the determination of readiness for the review or audit, and on reporting of results.
- How the program will ensure that technical reviews are conducted according to established DoD policies and engineering best practice.

- The planned role of the PM in preparing for, executing, and resolving issues from technical reviews.

5.4. Stakeholder Participation in Technical Reviews

Describe the stakeholder participation in the technical reviews to maintain insight to maturation of technology; the PSC; the statutory, regulatory, certification, and verification and validation (V&V) requirements; and the design considerations derived from the PSC.

Consider the following:

- How appropriate stakeholders and representative offices from design consideration areas will be involved at key decision points (e.g., airworthiness certifiers at technical reviews).
- The program's plan to involve stakeholders (e.g., users, testers, safety, certifiers, design and sustainment engineers) in reviews, by organization.
- How the program office, contractor (when applicable) and relevant industry representatives will participate in reviews.
- The planned membership composition including the method for nominating and approving the chairperson and membership for a technical review board, if required.
- How the program office will reconcile resource constraints with technical staffing needs for the reviews.
- The program's approach to involve the test and sustainment communities in the SE process to assess risk and to participate in technical reviews to mature the technical baseline (see DoD 5000.2 E5. Enclosure 5).

5.5. Peer Participation at Technical Reviews

Describe how the program will identify peer review participants for each technical review (see DoD policy).

Consider the following:

- The program's approach to addressing peer review in accordance with DoD policy and how peers will participate in technical reviews.
- The program's method to identify the subject matter areas in which peer insight is most relevant, and how the program will access suitable SMEs.
- The planned participation of senior leadership or SMEs in functional areas at major reviews or at other key decision points.

6. INTEGRATION WITH OVERALL PROGRAM MANAGEMENT

Describe the relationship between SE and key program management processes and

strategies. Describe how program staff working in SE and other areas will communicate and provide information to support reporting and milestone requirements during the TD phase (see DoDI 5000.2 E3. Enclosure 3). Include details as recommended in paragraphs 6.1–6.5.

6.1. Linkage with Other Program Plans

Describe how the technical approach will integrate technology development, requirements maturation, and overall program management planning and control efforts, such as integrated master planning and scheduling (see DAG 4.3.2, 4.3.2.5).

Consider the following:

- The program's approach to linking and integrating SE with other management efforts.
- The planned process for incorporating the TD results into the SDD planning documentation (e.g., CDD, AS, PESHE, Test and Evaluation Master Plan, Software Development Plan, etc.).
- How preliminary producibility analysis, in collaboration with manufacturing engineering, will influence design trades.
- How any required Government Furnished Property (e.g., test ranges, integration laboratories, and special equipment) needed in support of technology demonstration will be included in the technical approach and integrated into the IMP/IMS (see IMP/IMS; DAG 11.3).
- The incorporation of technical baselines and activities across the WBS.
- The use of SE analysis in resource estimation (see DoDI 5000.2 E6. Enclosure 6).
- The use of SE (analysis (e.g. M&S), technical data and decisions) to support other program activities and contribute to key program documents requiring MDA approval (see DoDI 5000.2 E3. Enclosure 3).
- The process for integrating program protection with SE.

6.2. Use of Critical Paths and Technical Reviews

Describe how the program manager, or equivalent, will use the critical path and technical reviews to manage the technical effort.

Consider the following:

- How the SE processes and products are incorporated into the program plan and contribute to the critical path during the TD phase.
- How the PM will incorporate findings from technical reviews into program decision making.

- The method for continuous and accurate identification and management of the critical path tasks, and how the SEP and IMS will be updated to maintain alignment.

6.3. Risk Management Integration

Describe how the SE approach will integrate with the program's risk management (e.g., how the program technical reviews will provide a technical risk input to the risk assessment process) (see DAG 4.2.3.5, 11.4; RM CoP; RMG).

Consider the following:

- How the program will integrate the RMP (including related SoS RMP) with the technical approach and address life-cycle sustainment (see RMG Ch 8; DAG 11.4).
- The linkage between the technical reviews and the program's risk assessment process (e.g., risks of successful completion of the next technical review) (see RMG).
- How the program will address the system ESOH objectives (where applicable) objectives and risks as outlined in MIL-STD-882D.
- How the program will use metrics in the risk assessment process.
- How the program will address risks and issues.
- How residual risk of demonstrated technologies is to be folded into follow-on planning.
- How software and SE risks are linked in the program planning.
- A summary of key technical risks including interdependencies and interfaces.

6.4. Test and Evaluation

Describe how the technical approach supporting test and evaluation (T&E) will integrate the TES and V&V efforts.

Consider the following:

- How V&V plans will be integrated with the SE approach.
- Methods the program will use for verification (inspection, analysis (M&S), demonstration, and test) to ensure T&E assess technology and requirements.
- The use of M&S and prognostics in support of T&E objectives.

6.5. Life-Cycle Sustainment Integration

Describe how the technical approach will integrate the life-cycle sustainment strategy (see SUP 1.3).

Consider the following:

- The selected manufacturing, assembly, and test processes to be evaluated during TD hardware/software build and test, to identify and validate producibility benefits for the future build of SDD hardware and software.
- How the life-cycle sustainment strategy will address each CTE to ensure that the preferred system solution will achieve the mandatory sustainment KPP/KSAs (i.e., materiel availability, materiel reliability, ownership cost, and mean down time) (see SUP 1.3, 3.4; DAG 2.3.12, 4.1.3, 5.2.2; DoDD 5000.1).
- The use of M&S and prognostics in support of life-cycle sustainment objectives.
- The integration of the life-cycle sustainment strategy and related sustainment plans within the overall technical planning.

6.6. Contracting Considerations

Describe contracting considerations for SE (see DAG 4.0, 4.3; Integrating Systems Engineering into DoD Acquisition Contracts).

Consider the following:

- The linkage between the MDA-approved SEP and the contractor's technical plan to establish a fully integrated technical approach.
- Technical guidelines the program will incorporate into the contract to serve as incentives for the contractor to produce the most efficient and cost-effective design.
- Award fees and other performance incentives to ensure contractors, including prime contractors and subcontractors, incorporate event-driven reviews and apply technical baseline management across the program, including among prime contractors and all subcontractors.
- How the program will integrate SE and individual enabling technologies and their associated CTEs in the SDD RFP.
- How the program will assess contractor capability to conduct life-cycle systems and software engineering activities for security practices, including monitoring for foreign ownership control and influence and protecting Critical Program Information (CPI).

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SAMPLE FORMAT FOR MILESTONE B

AND

SYSTEM DEVELOPMENT & DEMONSTRATION

SYSTEMS ENGINEERING PLAN

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PROGRAM NAME – ACAT LEVEL

SYSTEMS ENGINEERING PLAN
VERSION ___

SUPPORTING MILESTONE B
AND
SYSTEM DEVELOPMENT & DEMONSTRATION

[MONTH DAY, YEAR]

****

OFFICE OF THE SECRETARY OF DEFENSE (OSD) APPROVAL

_____ _____

Name Date
Under Secretary of Defense for
Acquisition, Technology and Logistics

[or designated SEP approval authority]

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PROGRAM NAME – ACAT LEVEL

SYSTEMS ENGINEERING PLAN
VERSION ___

SUPPORTING MILESTONE B
AND
SYSTEM DEVELOPMENT & DEMONSTRATION

MONTH DAY, YEAR

****

SUBMITTED BY

_____	_____	_____	_____
Name Lead / Chief Systems Engineer	Date	Name Program Manager	Date

CONCURRENCE

_____	_____	_____	_____
Name Chief Systems Engineer (Program Executive Office, System Center or Command)	Date	Name Program Executive Officer or Equivalent	Date

COMPONENT APPROVAL

_____	_____
Name Title, Office Component Acquisition Executive	Date

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CONTENTS

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1. INTRODUCTION

Discuss the purpose of the SEP, who will use it, and how the SEP will be used to define the blueprint for the conduct, management, and control of the technical aspects of the program from development to disposal. Discuss the commitment to update the document in the System Development and Demonstration (SDD) phase and throughout the program's life cycle to make it a living document and the plans to link the contractor's Systems Engineering Management Plan (SEMP) to the SEP.

1.1. Program Descriptions and Applicable Documents

Provide a top-level mission description that summarizes the user's requirements as documented in the Capability Development Document (CDD). Convey the overall key elements of the program, including any system of systems (SoS) relationships by using appropriate DoD Architecture Framework views (e.g., Operational View-1) and supporting narrative. Include a system description, and a notional diagram of the system.

Discuss the relationship between the SEP and the documents developed during the System Development and Demonstration (SDD) phase. For example, include the funding profile; Acquisition Strategy; System Threat Assessment (STA); and Preferred System Concept (PSC); Technology Readiness Assessment (TRA); Programmatic Environmental, Safety and Occupational Health (ESOH) Evaluation (PESHE); Information Support Plan (ISP); Capability Development Document (CDD); Program Protection Plan (PPP); Risk Management Plan (RMP); Technology Development Strategy (TDS); Integrated Master Plan (IMP) and Integrated Master Schedule (IMS); the Test and Evaluation Master Plan (TEMP). Cross-reference overarching or subordinate SoS program-related SEPs. List the points of contact for all the documents.

1.2. Current Program Status

Summarize the overall Acquisition Strategy and how it is event driven. Discuss how the technical requirements and technical risks will be addressed given the program funding and schedule constraints. Highlight the major activities that the program conducted to date such as outcomes of technical reviews, test phases, independent reviews, risk reduction activities, trade studies, etc.

Discuss how the Acquisition Strategy mitigates technical risks associated with technology maturation or obsolescence as well as the maturity of technologies to be used. Discuss any technical refreshes planned in the Production and Deployment (PD) and Operations and Support (O&S) phases. Highlight the top-level risks associated with technology and the risk closure plans (see SEP 4.5 and 6.3)

Provide a detailed program schedule showing major milestones; SE technical reviews;

and all key events (e.g., developmental, operational, and live fire test phases; deliveries; certifications; contract awards; training; site activation, etc.).

1.3. Approach for SEP Updates

Describe the approach for updating the SEP. Describe the primary sources and event triggers for updates. Include a log tracing changes to the original document. Include a brief explanation of what drove each change (e.g., new direction or requirements, funding issues, technical issues, or normal program maturation). List previous SEP submittals by date.

2. PROGRAM REQUIREMENTS

Provide a brief description of the program requirements in support of the overall mission needs and operational concept as a basis for Milestone B and the SDD phase. Include details as recommended in paragraphs 2.1–2.5.

2.1. Capabilities and Key Performance Parameters

Describe the desired capabilities of the program, the traceability of capabilities to user needs (Key Performance Parameters (KPPs), etc.) and to lower-level requirements, and the concept of operations (CONOPS).

Consider the following:

- In a diagram: the linkage between requirements (including lower-level requirements) and the CONOPS. Reference the appropriate Joint Capabilities and Integration Development System (JCIDS) documents (e.g., ICD, CDD, or CPD) (see CJCSM 3170.01F; DAG 4.1.3).
- How the program will develop, define, model, manage, test, trade, and track capabilities, KPPs (e.g., materiel availability, force protection, and net-ready capability), and other requirements (see DAG 4.5.7.3).
- The responsibilities of all program stakeholders involved in the requirements process and how the stakeholders will analyze requirements, conduct trades, resolve conflicts and reach agreement.

2.2. Statutory and Regulatory Requirements

Describe the impact of applicable statutory and regulatory requirements on the system's design. If unknown, describe the approach for understanding the potential impact of these requirements on the design.

Consider the following:

- The statutory and regulatory requirements, including DoDI 5000.2, that are applicable to SE efforts; include the due date, status, and program stakeholders by organization and position (in table format) (see DoDI 5000.2 E3. Enclosure 3, E4. Enclosure 4).
- The plan for capturing and managing these requirements.
- How the program will identify, analyze, decompose, and allocate the SE-related statutory and regulatory requirements.
- How the program will address ESOH considerations in the SDD phase and throughout the system life cycle.

2.3. Specified and Derived Requirements

Describe the user's requirements as illustrated by the program's specification of requirements and derived lower-level requirements. Include a specification tree to illustrate the decomposition of requirements from specified to derived.

Consider the following:

- The technical plan for managing and integrating all specified requirements (e.g., performance, materiel availability) according to the applicable system or performance specification.
- The responsible authority for derivation, decomposition, and allocation of requirements.
- The tools (e.g., modeling and simulation (M&S)) the program will use and who will be responsible for ensuring requirements traceability.
- How the program will ensure that the requirements are managed across contractual boundaries down to the subcontractor level.
- How the program requirements (specified and derived) will be managed, tested, traded, and tracked.

2.4. Certification Requirements

Describe the program's plan to incorporate the applicable program certification requirements into the system design. List the certification requirements levied on the program at each level of development (e.g., subsystem, system, integration, interoperability, joint, and coalition), including the applicable source for the certification requirement (i.e., statute, regulation, or instruction). Describe the approach for understanding the potential impact of certification requirements on the system design, if known (see DoDI 5000.2 E3. Enclosure 3).

Consider the following:

- In a table: the list of certifications (e.g., airworthiness, SUBSAFE, Clinger-Cohen Act, interoperability, spectrum management) that are applicable to the program. Include the due date, status, and program stakeholders by organization and position.
- Applicable safety boards and the process for approval/concurrence.
- How the program will ensure all certification requirements are integrated with the overall set of requirements.
- How the certification processes will integrate with the program's design, development, and test approach.
- How the program will manage all requirements (statutory and regulatory, specified and derived, and certification) and integrate them with the KPPs.

2.5. Design Considerations

Describe the applicable important program design considerations and the linkage between system operational effectiveness and operational suitability to satisfy the KPPs (see DAG 4.4). Characterize any special design considerations that must be integrated into the engineering design effort. Describe the basis for these and other key design considerations and how the lead/chief systems engineer will be involved. Address the requirements and planned technical approach for optimizing system operational effectiveness (SOE) through the balancing of system performance, system availability, interoperability, and total system life-cycle costs (see DAG 3.2.1, 4.1.3, 5.1.3.5, 5.2.2, 5.4.2.1, 7.3, SUP).

Consider the following:

- How the program will identify, address, and manage the full range of applicable design considerations (see DAG 4.4).
- How the architecture products (views, diagrams, descriptions, models, etc.) are related to requirements definition as well as the functional and physical architectures.
- How the program will link engineering activities and the functional and design architecture development activities.
- How the program will update and address system interfaces and interoperability needs from SoS and external system dependencies (see SoS).
- How the program will incorporate these design considerations to satisfy the KPPs and system requirements (both specified and derived).
- The allocation between hardware and software to meet planned program outcomes and to ensure the ability to accommodate requirements changes.

- The functional organization/technical authority responsible for integrating the applicable design considerations into the overall program.
- How the program will establish, allocate, and manage technical performance measures (e.g., materiel availability, system assurance, ESOH, weight, shape, memory capacity, and throughput).
- How the program will negotiate design trades to support threshold and objective requirements to balance program life-cycle cost, schedule, performance, and sustainment while also addressing security and risk issues.
- The stakeholders responsible for making trade-off decisions, and at what level in the organization the decision maker resides.
- The criteria for decision making and trade-off of alternative design solutions including descriptions of technical objectives, criteria, and weighting factors.
- How the technical approach will incorporate proven management techniques and capitalize on existing programs to help realize SOE objectives (e.g., Continuous Process Improvement (see CPI), Value Engineering (see DAG 4.5.4), Reduction of Total Ownership Costs (see R-TOC) etc.).

3. TECHNICAL STAFFING AND ORGANIZATIONAL PLANNING

Describe how the program will organize and staff SE activities to meet the requirements for Milestone B and the SDD phase as outlined in section 2 above. Include details as recommended in paragraphs 3.1–3.5.

3.1. Lead/Chief Systems Engineer and Functional Leads

Identify the lead/chief systems engineer's role and responsibility. Identify the roles and responsibilities of the functional leads (functional leads outside of the program manager's (PM) chain of command responsible for technical processes, products, and product support).

Consider the following:

- The role and authority of the lead/chief systems engineer relative to SE processes and products (technical reviews, technical baselines, etc.).
- The functional leads required to address the integrated set of technical requirements (KPPs, statutory, regulatory, specified, certification, and design considerations).
- The organization supporting the program in the role of technical authority.
- The program's approach to integrating technical authority on appropriate Integrated Product Teams (IPTs).

- The interaction of the lead/chief systems engineer and the functional leads to address the integrated set of requirements.
- How the lead/chief systems engineer and functional leads will present to the PM their recommendations to balance cost, schedule, performance, sustainment, and risk in support of program decisions.

3.2. IPT Organization/Structure

Describe how the program will organize and structure IPTs, to include contractors and key suppliers (when applicable), with consideration of SE to meet planned program outcomes. Include IPT charters for reference (see DAG 4.1.6).

Consider the following:

- How the program will establish a product-aligned IPT structure. Include an organizational chart and table of responsibilities with functional representation.
- How the IPT structure will align with the program's products, planned outcomes, and Work Breakdown Structure (WBS).
- How the IPTs will involve functional representatives and other stakeholders (e.g., user, contractor, technical, sustainment, financial, security, test). (Identify their roles and responsibilities with regard to the requirements and design considerations addressed in section 2.)

3.3. IPT Staffing / Functional Skills

Describe key technical staffing requirements for the program, including IPTs. Identify the required number of key technical positions, critical skills, and experience levels necessary to meet the technical objectives.

Consider the following:

- The number and category of critical skills and experience required to fill each technical position to meet program objectives (e.g., software, design, sustainment, test engineers).
- The resources available to the program, the staffing plan, and current status of filling the key technical positions for each IPT.
- The impact of unfilled positions (e.g., because of lack of funding, lack of experienced people) and how the program will address vacancies.
- In a diagram: the planned staffing levels by key program events (e.g., milestones and technical reviews). Include a chart (e.g., a sand chart) to show the number of required full-time equivalent positions (organic, matrix support, and contractor).

3.4. IPT Coordination

Describe how the program will integrate SE activities within and among IPTs to address the full spectrum of the program.

Consider the following:

- Specific responsibilities of the lead/chief systems engineer, the IPT lead engineers, the SE functional leads, and the Program Executive Office, Systems Center, or Systems Command Chief Engineer(s) and how these program participants will communicate and coordinate.
- How the program will manage, integrate, and control SE products across the IPTs.
- How the program will address trade-off analysis to adjudicate disagreements within and across IPTs.
- How the program will manage, integrate, and control the IPT structure and the SE activities and products (e.g., requirements; technical performance measures (TPMs); risks; technical baselines; and technical budgets such as weight, power, cost, memory, and throughput) across IPTs to support overall systems design and integration (hardware and software).
- How the IPTs will involve all stakeholders (e.g., users, developers, DT/OT testers, functional representatives, software specialists, and SMEs) in trade-off and design consideration analysis to address the full spectrum of technical and sustainment program requirements.

3.5. Integration with Contractor(s) and External Organizations

Describe how the program will facilitate interaction between SE WIPTs, other government organizations, and contractor(s) (if applicable) on technical tasks, activities, and responsibilities (e.g., requirements, technical baseline, technical reviews). Describe how the SE WIPT will document the technical and management approach. Describe how the program will coordinate technical requirements and specifications with functional leads external to the program office (e.g., SoS efforts).

Consider the following:

- How the SE WIPT will contribute to and document the technical and management approach.
- The exit criteria for the SDD phase and monitoring its accomplishment for all increments of capability.
- The entry/exit criteria for each technical review and audit.

- The execution of the program in accordance with an approved SEP.
- The lessons learned and best practices throughout DoD, relevant to the program's technical approach and status.
- How the program will organize and structure technical guidance across government and contractor SE tasks, activities, and responsibilities. Describe how the program will coordinate requirements management, technical baseline management and control, and technical review execution from the prime contractor through all subcontractors.
- The applicability of SoS technical planning in the interaction with higher and peer organizations and authorities, external to the program office. Describe how the program will integrate requirements and coordinate SoS-related design considerations and trades (see DAG 4.2.6; SoS).

4. TECHNICAL BASELINE MANAGEMENT

Describe the approach for managing the overall technical products and specifications for Milestone B and during the SDD phase. Include details as recommended in paragraphs 4.1–4.5.

4.1. Technical Baseline Management Responsibility

Describe who will be responsible for managing the technical baseline (functional, allocated, and product).

Consider the following:

- The role and responsibility of the lead/chief systems engineer for managing requirements allocated to product IPTs.
- The key participants and the plan for technical baseline management (i.e., who manages the configuration) of the system across IPTs and across the program office, contractor, and subcontractors.
- The role and responsibility for the specification and test planning documents to support development (see DAG 4.2.3.6, 4.2.3.7, 4.2.3.8).

4.2. Defining, Approving, and Maintaining the Technical Baseline

Describe the approach to define, maintain, and approve the technical baseline (functional, allocated, and product).

Consider the following:

- How the program will use the technical baseline as a technical management tool.

- How the program will define, approve, and maintain the technical baseline. Include a list of the artifacts. How the program will use technical reviews to establish the baseline.
- How the program will estimate and monitor software size and complexity to maintain accurate and current cost and schedule estimates.
- The roles and responsibilities between the government and the contractor for defining, approving, and maintaining the technical baseline.
- The configuration management (CM) process the program will use to manage and control changes, waivers, and deviations to the technical baseline. Include a diagram. Describe the lead/chief systems engineer's role in control of the CM process.
- The program's approach to assess the baselines relative to the WBS and TPMs.
- How the program will review system documentation as well as technical performance and software measures to continually assess progress and performance against the baseline.
- The program strategy for access to, or delivery of, technical data and computer software and other information, and the strategy for obtaining sufficient government and contractor data rights that support program analysis (M&S), program development and production objectives, and proposed sustainment strategy.

4.3. Requirements Traceability and Verification and Validation

Describe the allocation and verification of all program requirements to the lowest-level configuration items, the product specification, and the requirements traceability and verification and validation (V&V) process across the entire WBS.

Consider the following:

- How the program will track requirements (KPPs, statutory/regulatory, specified/derived, and certification requirements, along with verification, architecture and design considerations, etc.) from the source to (and throughout) the system technical baseline (e.g., specifications, ICDs).
- The approach to ensure that there are no orphan or childless requirements.
- The tools the program will use for requirements traceability and V&V (to include modeling and simulation (M&S)), and who will be responsible for these activities and tools (see DAG 4.5.7.3)
- How the program will use requirements management and CM to support establishing baselines and to control changes.
- The planning to trace and map requirements from initial identification to V&V efforts.

4.4. Specification Tree and WBS Link

Describe and illustrate the alignment among the specification tree; the functional, allocated, and product baseline; and the WBS. Provide a copy of the program WBS to at least Level 3.

Consider the following:

- The program WBS and how it relates to the end item configuration.
- The planned configuration items (CIs), including hardware and software CIs.
- The program's approach to documenting the technical baseline (system, functional, subsystem, and design specifications and standards) and alignment between the WBS and planned technical baseline documents.
- The program's planned use of WBS and specifications as a technical management tool across the SE tasks.
- The methods the program will use to show traceability of top-level requirements (KPPs, certification, statutory, regulatory, etc.) and key safety items (e.g., critical safety) to the JCIDS requirements documents (ICD, CDD, or CPD) down to CI build-to specifications and V&V plans.

4.5. Technical Maturity

Describe how the program will use the technical baseline and the TRA to assess technical maturity and associated program risk.

Consider the following:

- In a table: enabling technologies the program has chosen; Critical Technology Elements (CTEs); and currently assessed Technology Readiness Levels (TRLs), Manufacturing Readiness Levels (MRLs), Engineering and Manufacturing Readiness Levels (EMRLs) and desired readiness levels at completion of the SDD phase.
- The program's plan to measure technical maturity (as opposed to only TPM tracking) and to continue to mature technologies in accordance with the statutory equivalent TRL requirements for all critical technology elements (CTEs) in support of Milestone B entry/exit criteria (TRLs/MRLs).
- How the program will use SE products (functional, allocated, and product baselines) to establish technical maturity to assess program maturity and risk.
- The program's plan to establish technology maturation plans (TMPs). Include the approach for applying these TMPs across the program WBS; down to the hardware and software CI level; and across the WBS at the subsystem, component, and device levels.

- How the evolving acquisition strategy, sustainment plan, and technical planning for future phases will include off-ramps to adapt to technology maturation delays or failure of CTE maturation.

5. TECHNICAL REVIEW PLANNING

Describe the approach to establish and conduct event-driven technical reviews and audits throughout the program life cycle and specifically for Milestone B and during the SDD phase (see DAG 4.5.8). Include details as recommended in paragraphs 5.1–5.5.

5.1. Event-Driven Technical Reviews

Describe the event-driven technical reviews to be conducted at a system, subsystem, and configuration item level. Identify program-specific entry and exit criteria, defined and documented, for each technical review. Describe how the event-driven technical reviews will be conducted. Describe how the program will use technical reviews to establish the technical baselines (see DAG 4.2.3.3, 4.3, 4.3.2.4, 4.3.3.4, 4.3.3.9, 4.4.11.2, 4.5.3, 4.5.8).

Consider the following:

- The program's approach to executing event-driven technical reviews and audits to ensure they are not schedule driven.
- The planning for system-level technical reviews (provide a schedule of all SDD technical reviews):
  - The number of technical reviews planned and to what WBS level.
  - The technical authority (lead/chief systems engineer and/or functional lead) for entry/exit criteria for each review.
  - The technical entrance/exit criteria for each review.
  - The readiness for conducting each review.
- The timing of the technical reviews, tied to the achievement of entry criteria and technical baseline maturity.

5.2. Technical Review Management

Describe who is responsible for overall management of the technical reviews.

Consider the following:

- The program's approach for oversight and conduct of all technical reviews.
- The key office of primary responsibility(s) and stakeholders involved.

- How the program will determine readiness for technical reviews and audits, and who will be responsible for making the decision to authorize and close them out.
- How the program will involve functional leads (see DAG 4.1.6).
- The identification, roles, and responsibilities of those involved in conducting technical reviews, the authority that approves the initiation and closure of technical reviews, and the identification and disposition/closure process for outstanding actions or equivalent items from the reviews.
- The approach to ensuring that the applicable technical products (i.e., hardware, software, or process specifications) subject to each review and audit are available as read-ahead material to the appropriate participants (stakeholders and functional leads).
- The approach for integrating the outcomes of the technical reviews into the program's technical plan.

5.3. Chairing of Technical Reviews

Describe how the program will select appropriate chair(s) for the technical reviews. (Best practice is to use independent technical authorities.) Describe the role of the lead/chief systems engineer.

Consider the following:

- The approach for selecting and assigning technical review and audit chairs.
- The roles of the PM, lead/chief systems engineer, and the technical review chair and how they will collaborate on technical reviews, especially the determination of readiness for the review or audit, and on reporting of results.
- How the program will ensure that reviews are conducted to according to established DoD policy and engineering preferred practice.

5.4. Stakeholder Participation in Technical Reviews

Describe who the stakeholders are and how they will be involved in each technical review to cover all technical requirements, including KPPs; statutory, regulatory, certification, and V&V requirements; and all design considerations (see DAG 4.1.2).

Consider the following:

- How the program will involve appropriate stakeholders (i.e., users, testers, ESOH, certifiers, design and sustainment engineers) and representative offices from design areas at key decision points (e.g., airworthiness certifiers at technical reviews).
- The program's plan to involve stakeholders (e.g., users, testers, safety, certifiers, design

and sustainment engineers) by organization in reviews and audits.

- How the program office, contractor and subcontractors (when applicable), and relevant industry representatives will participate in reviews and audits.
- The membership composition, including the method for nominating and approving the chairperson and membership of a technical review board, if required.
- How the program office will reconcile resource constraints with technical staffing needs for the reviews and audits.
- The program's approach to involve the test and sustainment communities in the SE process to assess risk and to participate in technical reviews to mature the technical baseline (see DoD 5000.2 E5. Enclosure 5).

5.5. Peer Participation at Technical Reviews

Describe how the program will facilitate peer review participation for each of the technical reviews (see DoD policy).

Consider the following:

- The program's approach to addressing peer review in accordance with DoD policy and how peers will participate in technical reviews.
- The program's method to identify the subject matter areas in which peer insight is most relevant, and how the program will access these SMEs.
- The planned participation of senior leadership or SMEs in functional areas at major reviews or at other key decision points.

6. INTEGRATION WITH OVERALL PROGRAM MANAGEMENT

Describe the relationship between SE and key program management processes and strategies. Describe how program staff working in SE and other areas will exchange feedback and provide information to support reporting and milestone requirements for Milestone B and during the SDD phase (see DoDI 5000.2, E3. Enclosure 3). Include details as recommended in paragraphs 6.1–6.5.

6.1. Linkage to Other Program Management Plans

Describe how the program will integrate the technical approach with other related program management planning and control efforts (i.e., the AS, WBS, RMP, PESHE, IMP and IMS, PPP, and Earned Value Management (EVM), etc.). Characterize the approach to determine progress-to-date assessments to support cost reporting and event-driven scheduling (see DAG 11.3).

Consider the following:

- The program's approach to using other management reviews and activities (Program Management Reviews (PMRs), Technical Interchange Meetings (TIMs), Independent Reviews, etc.) to manage the overall technical program.
- How the program will ensure that the technical planning and the IMP/IMS include any required Government Provided Property (e.g., test ranges, integration laboratories, and special equipment) to support System Development and Demonstration. Include link to the program's IMP/IMS.
- The use of IMS and the WBS as the basis for the Integrated Baseline Review (IBR), cost accounts, and EVM implementation (see DAG 11.3.1.3).
- The use of SE analysis in resource estimation (see DoDI 5000.2 E6. Enclosure 6).
- The program's approach for using metrics to monitor prime and subcontractor performance for indicators of impacts to cost, schedule, and performance. (i.e., software development metrics; technical performance measures (TPMs); Critical Technical Parameters (CTPs); measures of effectiveness (MOEs); measures of suitability (MOSs); measures of performance (MOPs); and Sustainment KPP/KSAs (i.e., Materiel Availability, Materiel Reliability, Ownership Cost, and Mean Down Time)). In a table: the metrics, provider, and reporting frequency.
- The use of SE (analysis, technical data, and decisions) to support other program activities and key program documents requiring MDA approval (see DoDI 5000.2 E3. Enclosure 3).
- The process for integrating program protection with SE efforts.

6.2. Program Manager's Approach to Using Technical Reviews

Describe how the program manager will use technical review results to formally advance the program through its planned evolution (e.g., establishing a baseline at CDR).

Consider the following:

- How the PM will use the technical review results as a technical input to program decision making.
- The role of the PM in preparing, executing, and resolving issues from technical reviews.
- The method for the continual and accurate identification and management of the critical path tasks.

6.3. Risk Management Integration

Describe the program's risk management approach along with any SoS risk consideration. Describe how risk management is integrated with SE planning efforts (e.g., describe how the program and SoS technical reviews provide a technical risk input to the risk management process). Describe the linkages between the technical risk assessment, risk mitigation efforts, and the overall risk management process (see DAG 4.2.3.5, 11.4; RMG).

Consider the following:

- How the RMP (including any related SoS RMP) is integrated with the technical approach and addresses life-cycle sustainment considerations (see RMG Ch. 8; DAG 11.4).
- The linkage between the technical reviews and the program's risk assessment process (i.e., risks of successful completion of the next technical review) (see RMG; DAG 4.5.8).
- The risk management tool the program office will use and the tool's compatibility with the prime contractor's and subcontractor's tools.
- How often risks will be reviewed, by whom, and how risks will be communicated.
- How the program will use metrics in the risk assessment process.
- The manager of the risk program and how IPTs will apply risk management.
- How the program will address risks and issues.
- How the program will address the system ESOH objectives and risks as outlined in MIL-STD-882D.
- How risks and SE will be included in the IMP/IMS and linked in the program life-cycle planning.
- How software and SE risks will be linked in the program planning.
- How to minimize risks during the transition from development to production (see DoD 4245.7-M).
- A summary of key SE technical risks, including interfaces and interdependencies with ratings and mitigation plans.

6.4. Test and Evaluation

Describe the integration of test and evaluation (T&E) planning within the SE approach.

Consider the following:

- How the measures of effectiveness and suitability, KPPs, and critical technical measures are stated as quantifiable parameters.
- How verification and validation (V&V) plans will be integrated in the SE approach,

particularly how test objectives in the TEMP will be traceable to performance requirements in the system specifications.

- The methods the program will use for verification (inspection, analysis (M&S), demonstration, and test) to ensure requirements will be addressed in T&E at the system and subsystem level (see DAG 4.5.7.3).
- The use of M&S and prognostics in support of T&E life-cycle sustainment objectives.
- The integration of the TEMP within the overall technical planning.

6.5. Sustainment Integration

Describe the dependency and interplay between system performance, producibility, materiel availability, materiel reliability, ownership cost and mean down time throughout the system life cycle (see SUP 1.3).

Consider the following:

- The implementation of SE in support of a Total Systems Approach to achieve the mandatory sustainment KPP/KSAs (i.e., materiel availability, materiel reliability, ownership cost, and mean down time), and the life-cycle sustainment enablers (e.g., corrosion, RCM, SIM) (see SUP 1.3, 3.4; DAG 2.3.12, 4.1.3, 5.2.2; DoDD 5000.1).
- The use of M&S and prognostics in support of T&E life-cycle sustainment objectives.
- The integration of the Life-Cycle Sustainment Plan within the overall technical planning.
- How the design addresses sustainment, obsolescence, technology refreshment, and disposal.

6.6. Contracting Considerations

Describe SE considerations for the SDD phase to incorporate strong SE (see DAG 4.3; Integrating Systems Engineering into DoD Acquisition Contracts).

Consider the following:

- The linkage between the MDA-approved SEP and the contractor's technical plan System Engineering Management Plan (SEMP) to establish a fully integrated technical approach.
- How SE is factored into the RFP and contract, including subcontractors, as an integral part of the development effort.
- The technical basis for performance-based payments and award fees.
- How the contractors' software plans and related processes (e.g., Software Development Plan (SDP)) will be assessed and integrated with SE plans and processes.

- How the program will incorporate SE and technical guidelines into SDD contract planning to serve as incentives for the contractor performance to produce the most effective and effective program outcomes (e.g., in the areas of materiel availability and materiel reliability, ownership costs, and mean down time).
- How the contract will encourage event-driven reviews and technical baseline management across the program, including between contractors and subcontractors.
- How contractors' capabilities to conduct life-cycle systems and software engineering activities will be assessed for security-related practices, foreign ownership control and influence, and protection of Critical Program Information (CPI).

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SAMPLE FORMAT FOR MILESTONE C

AND

PRODUCTION & DEPLOYMENT /

OPERATIONS & SUPPORT

SYSTEMS ENGINEERING PLAN

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PROGRAM NAME – ACAT LEVEL

SYSTEMS ENGINEERING PLAN
VERSION ___

SUPPORTING MILESTONE C
AND
PRODUCTION & DEPLOYMENT /
OPERATIONS & SUPPORT

[MONTH DAY, YEAR]

****

OFFICE OF THE SECRETARY OF DEFENSE (OSD) APPROVAL

_____ _____

Name
Under Secretary of Defense for
Acquisition, Technology and Logistics

Date

[or designated SEP approval authority]

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PROGRAM NAME – ACAT LEVEL

SYSTEMS ENGINEERING PLAN
VERSION ___

SUPPORTING MILESTONE C
AND
PRODUCTION & DEPLOYMENT
OPERATIONS & SUPPORT

MONTH DAY, YEAR

****

SUBMITTED BY

_____	_____	_____	_____
Name Lead / Chief Systems Engineer	Date	Name Program Manager	Date

CONCURRENCE

_____	_____	_____	_____
Name Chief Systems Engineer (Program Executive Office, System Center or Command)	Date	Name Program Executive Officer or Equivalent	Date

COMPONENT APPROVAL

_____	_____
Name Title, Office Component Acquisition Executive	Date

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CONTENTS

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1. INTRODUCTION

Discuss the purpose of the SEP, who will use it, and how it will be used to define the blueprint for the conduct, management, and control of the technical aspects of the program from production to disposal. Discuss the commitment to update the document throughout the Production and Development (PD) / Operations and Support (O&S) phases to make it a living document and the plan to link the contractor's Systems Engineering Management Plan (SEMP) to the SEP.

1.1. Program Description and Applicable Documents

Provide a top-level mission description that summarizes the user's requirements as documented in the Capability Production Document (CPD). Convey the overall key elements of the program, including any system of systems (SoS) relationships, by using appropriate DoD Architecture Framework views (e.g., Operational View-1) and supporting narrative. Include a system description and a notional diagram of the system.

Discuss the relationship between the SEP and the documents developed or updated during the PD and O&S phases. For example, include the funding profile; Acquisition Strategy; System Threat Assessment (STA); Programmatic Environmental, Safety and Occupational Health (ESOH) Evaluation (PESHE); Information Support Plan (ISP); Capability Development Document (CDD); Program Protection Plan (PPP); Risk Management Plan (RMP); Integrated Master Plan (IMP) and Integrated Master Schedule (IMS); the Test and Evaluation Master Plan (TEMP). Cross-reference overarching or subordinate SoS program-related SEPs. List the points of contact for all the documents.

1.2. Current Program Status

Summarize the overall Acquisition Strategy and how it is event driven. Describe how the program is prepared to transition into PD and O&S. Describe the accomplishment of the required SDD exit criteria and list any remaining critical actions. Highlight the outcomes of major activities the program has conducted to date, such as technical reviews, test phases, independent reviews, risk reduction activities, and trade studies.

Provide a detailed program schedule that shows major milestones, SE technical reviews, and key program events (e.g., developmental, operational, and live fire test phases; deliveries; certifications; contract awards; training; site activation).

1.3. Approach for SEP Updates

Describe the approach for updating the SEP. Describe the primary sources and event triggers for SEP updates and include a log tracing changes to the original document. Include a brief explanation of what drove the change (e.g., new direction or requirements, funding

issues, technical issues, or normal program maturation, etc.). List any previous SEP submittals by date.

2. PROGRAM REQUIREMENTS

Provide a brief description of the overall mission needs and operational and sustainment concept as a basis for Milestone C and during the PD and O&S phases of the program. Include details as recommended in paragraphs 2.1–2.5).

2.1. Technical Oversight Approach

Describe the technical oversight approach to be applied during the PD and O&S phases (i.e., systems supported using Continuous Process Improvement (CPI) principles and how well the technical approach, data collection, and analysis methodology supports the optimization of planned life-cycle support and materiel availability requirements).

Consider the following:

- The method to ensure technical oversight in PD and O&S.
- How the program will monitor all relevant PD and O&S data.
- How the program will develop, define, model, manage, test, trade, and track capabilities, Key Performance Parameters (KPPs) (i.e., materiel availability, force protection and net-ready capability), and other PD and O&S related requirements.
- How the program will satisfy the statutory, regulatory, and certification requirements that are applicable to SE efforts; include the due date, status, and program stakeholders by organization and position (in table format) (see DoDI 5000.2 E3. Enclosure 3, E4. Enclosure 4).
- The responsibilities of all program stakeholders involved in technical oversight of production, production tooling and processes, deployment, operations, and support across the supply chain.
- How the program will address system design considerations (e.g., ESOH) throughout the system life cycle.

2.2. Comparison of Data to Planning Assumptions

Describe how the technical approach reflects how the program will track and analyze PD and O&S data and compare it against planning assumptions made during design and development.

Consider the following:

- The PD and O&S data (e.g., achievement versus producibility goals, production learning

curve, materiel availability, materiel reliability, ownership cost, and mean down time) to be tracked and assessed in support of the SE activities.

- The plan for analyzing (modeling and simulation (M&S)) and employing data to manage the achievement of planned outcomes.
- How the technical approach will capitalize upon the results/analysis of PD and O&S data.
- The program stakeholders, by organization and position, for the PD and O&S data requirements collection and analysis.

2.3. Use of Data to Continuously Monitor the System

Describe how the program will collect, triage, model, analyze, and assess production and O&S data to continuously monitor system hazards and risks; integrity of key safety items (e.g., critical safety items); key manufacturing characteristics; materiel availability; materiel reliability; ownership cost; mean down time; and maintenance of applicable system certifications (i.e., airworthiness, SUBSAFE, etc).

Consider the following:

- The technical plan for managing, integrating, and controlling PD and O&S data (e.g., conduct of trend analysis of planned versus actual data, unit recurring cost, etc.) in order to assess and increase productivity and reduce life-cycle cost.
- The responsible authority for derivation, decomposition, and allocation of PD and O&S data requirements.
- The tools (e.g., M&S) used and the organizations responsible for ensuring PD and O&S data requirements traceability, integrity, and management (see DAG 4.5.7.4, 4.5.7.5).
- How the program will ensure that PD and O&S data are collected and managed across government organizational and contractual boundaries (subsystem contractors) and sustainment functions (supply, maintenance, distribution, and in-service engineering).
- How the program will manage, test, trade, and track program requirements (specified and derived lower-level requirements).

2.4. Production and Design Driven Operations & Support Costs

Describe the program's approach to tracking and controlling PD-driven and design-driven O&S costs (e.g., production costs, reliability performance-to-plan, corrosion-related costs, maintenance and repair costs) and total ownership costs (TOC) (see DoDI 5000.2 E3. Enclosure 3).

Consider the following:

- How the program will identify, track, and analyze PD-driven and design-driven O&S costs, integrate the costs into the overall program cost, establish schedule and performance baselines, and ensure that funding and sustainment are included in the affordability assessment.
- The responsible stakeholder(s) for collaborating on the PD and system-driven O&S costs.
- How the O&S costs (i.e., driven by materiel availability, materiel reliability, ownership cost, and mean down time) relate to the budgeted and resourced O&S investment.
- How the program will identify, assess, and minimize TOC drivers.
- How the program will provide system-specific data required to complete National Environmental Policy/EO 12114 analysis (when applicable) and documents to support operational test and evaluation and basing.
- How the technical approach will incorporate proven management techniques and capitalize on existing programs to help realize System Operational Effectiveness (SOE) objectives (e.g., Continuous Process Improvement (see CPI), Value Engineering (see DAG 4.5.4), Reduction of Total Ownership Costs (see R-TOC), etc.).

2.5. Configuration Changes

Describe how the program will determine, manage, and control configuration changes during the PD and O&S phases (i.e., as-designed, as-built, as-maintained configurations) (see DAG 4.1.3, 5.1.3.5, 5.2.2, 5.2.3, 5.4.2.1, 7.3; SUP).

Consider the following:

- How the program will update and address system interfaces and interoperability changes from SoS and external system dependencies (see DAG 7.3).
- How the program will translate Technical Order changes against the in-service system into production and follow-on system increments under consideration or development.
- How the program will consider and implement operational and sustainment-related changes (results from O&S), deferred capabilities, and new requirements.
- How the program will consider and implement lessons learned from Low-Rate Initial Production (LRIP) to improve efficiency, quality, and capacity and to improve production and sustainment.
- How the program will evaluate O&S data to determine potential configuration changes that would improve materiel availability and reduce TOC.
- How the program will address important design considerations in proposed configuration changes (e.g., producibility and sustainment) (see DAG 4.4).

- How the architecture products (views, diagrams, descriptions, models, etc.) are related to requirements definition as well as the functional and physical architecture.
- How the program will link engineering activities with functional and design architecture development activities.
- The functional organization / designated technical authority responsible for overseeing trusted sources and approving configuration changes for key safety items (e.g., critical safety items) and other system components.
- How the program will establish, allocate, and manage technical performance measures to support configuration changes (e.g., materiel availability, systems assurance, ESOH, shape, weight, memory capacity, and throughput).

3. TECHNICAL STAFFING AND ORGANIZATIONAL PLANNING

Describe how the program will organize and staff SE activities to meet the requirements for Milestone C and during the PD and O&S phases. Include details as recommended in paragraphs 3.1–3.5.

3.1. Lead/Chief Systems Engineer and Functional Leads

Identify the lead/chief systems engineer's role and responsibility. Identify the roles and responsibilities of the functional leads (functional leads outside of the program manager's (PM) chain of command responsible for technical processes, products, and product support). Address the full spectrum of technical surveillance needs and how they will be implemented on the program (see DAG 4.1.6).

Consider the following:

- The role and authority of the lead/chief systems engineer relative to the adequacy and recommendation for Milestone C entry/exit criteria, and SE processes and products (e.g., Operational Test Readiness Review (OTRR), Technology Readiness Assessment, Production Readiness Review (PRR) and In-Service Review (ISR), Physical Configuration Audit (PCA) and Functional Configuration Audit (FCA), and technical baselines).
- The functional leads required to address the integrated set of technical requirements (KPPs, statutory, regulatory, specified, certification, and design considerations).
- The organization supporting the program in the role of technical authority (including in-service engineering authority).
- The program's approach to integrating technical authority or their representative on appropriate Integrated Product Teams (IPTs).

- The interaction of the lead/chief systems engineer and the functional leads to address the technical surveillance needs.
- How the lead/chief systems engineer and the functional leads will present to the PM their recommendations to balance cost, schedule, performance, sustainment, and risk in support of program decisions.

3.2. IPT Organization/Structure

Describe how the program will organize IPTs with consideration of SE to meet planned program outcomes. Provide IPT charters for reference (see DAG 4.1.6).

Consider the following:

- How the program will establish a product-aligned IPT structure (include an organizational chart and a table of responsibilities showing functional representation).
- How the IPT structure for the engineering support team aligns with the program's products, planned outcomes, and Work Breakdown Structure (WBS).
- How the engineering support team's IPT will accommodate functional representatives and other stakeholders (user, contractor, technical, sustainment, cost, budget, production, security, and test) and identify their roles and responsibilities with regard to the requirements and design considerations addressed in section 2.

3.3. IPT Staffing / Functional Skills

Describe the key technical staffing requirements for the program, including each IPT; identify the required number of key technical positions, critical skills, and experience levels necessary to meet the technical objectives.

Consider the following:

- The number and category of SMEs: critical skills and experience required to fill each IPT to meet the program's PD and O&S objectives (e.g., industrial, software, design, sustainment, and test engineers, and supply chain technicians).
- The resources available to the program, the staffing plan, and current status of filling the key technical positions for each IPT (including production and sustainment).
- The impact of unfilled positions (e.g., because of lack of funding, lack of experienced people) and how the program will address vacancies.
- Provide a diagram that shows the planned staffing levels by key program events (e.g., milestones and technical reviews). Include a sand chart to show the number of full-time equivalent positions (organic, matrix support, and contractor).

3.4. IPT Coordination

Describe how the program will integrate and coordinate SE activities within and across IPTs.

Consider the following:

- Specific responsibilities of the lead/chief systems engineer, the IPT lead engineers, the SE functional leads, and the Program Executive Office, Systems Center, or Systems Command Chief Engineer(s) and how these program participants will communicate and coordinate.
- How the program will manage, integrate, and control SE products and processes across the IPTs.
- How the program team will present trade-off decisions to adjudicate disagreements within and across IPTs.
- How the program will manage, integrate, and control the IPT structure and the SE activities and products (estimates, assessments, risks, requirements, and technical baselines) to support production and sustainment.
- How the IPTs will involve all stakeholders (e.g., users, logisticians, production leads, developers, DT/OT testers, functional leads, and SMEs) in trade-off consideration analysis.

3.5. Integration with Contractor(s) and External Organizations

Describe how the program will facilitate interaction between SE WIPTs, other government organizations, and contractor(s) (if applicable) on technical tasks, activities, and responsibilities (e.g., requirements, technical baseline, technical reviews) down to and including subcontractors. Describe how the SE WIPT will document the technical and management approach in the SEP. Describe how the program will coordinate technical requirements and specifications with functional leads external to the program office (e.g., SoS efforts) (see SoS).

Consider the following:

- How the SE WIPT will contribute to and document the technical and management approach.
- The entry and exit criteria for the Full Rate Production/Deployment Decision and monitoring its accomplishment for all increments of capability.
- The entry and exit criteria for each technical review and audit.
- The execution of the program in accordance with an approved SEP.

- The lessons learned and best practices throughout DoD, relevant to the program's technical approach and status.
- The overall organization and structure to provide technical guidance across government and contractor SE tasks, activities, and responsibilities. Describe how the program will coordinate requirements management, technical baseline management and control, technical review execution, and sustainment from the prime contractor to the subcontractors.
- As applicable, the SoS technical planning in cooperation with higher and peer organizations and authorities external to the program office (see DAG 4.2.6; SoS).

4. TECHNICAL BASELINE MANAGEMENT

Describe the approach for managing the overall technical products and specifications for Milestone C and during the PD and O&S phases. Include details as recommended in paragraphs 4.1–4.5.

4.1. Technical Baseline Management Responsibility

Describe who is responsible for managing the technical baselines, particularly the product baseline and the configuration management (CM) process.

Consider the following:

- The role and responsibility of the lead/chief systems engineer for managing requirements allocated to product IPTs.
- The key participants and the plan for technical baseline management (i.e., who manages the configuration) of the system across IPTs and across the program office, contractor, and subcontractors.
- The role and responsibility for specification and test planning documents that support production and sustainment (see DAG 4.2.3.6, 4.2.3.7, and 4.2.3.8).

4.2. Technical Baseline Control

Describe how the program will manage and control the system's technical baseline.

Consider the following:

- The process for developing technical/design modifications.
- The program's approach to using the technical baseline as a technical management tool.
- How the program will define, approve, and maintain the technical baseline. Include a list of artifacts.

- The use of the product baseline to manage and control system development in support of production and sustainment objectives.
- How the program will update and monitor as-delivered software size and complexity to form the basis of cost and schedule estimates for follow-on releases.
- The roles and responsibilities between the government and the contractor for defining, approving, and maintaining the technical baseline.
- How the program will use technical reviews to manage the system's technical baseline and to continually assess new or emerging technology to achieve new program objectives.
- The CM process used to manage and control the baselines. Include a diagram of the process. Describe the lead/chief engineer's role in the CM process (see CM).
- The program strategy for access to or delivery of technical data, computer software, and other information, and for obtaining sufficient government and contractor data rights that support program analysis (M&S), program development and production objectives, and proposed sustainment strategy.

4.3. Requirements Traceability and Verification and Validation

Describe how the technical baseline will account for requirements and certification traceability and requirements verification and validation (V&V) for any changes to the baseline, including key safety items (e.g., critical safety items).

Consider the following:

- How the program will track requirements changes to the baseline (KPPs, statutory/ regulatory, specified/derived, and certification requirements, along with verification, architecture, design considerations, production, etc.) to/from the source to (and throughout) the system technical baseline and specification tree.
- The approach to ensure that there are no orphan or childless requirements changes to the baseline.
- The tools used for requirements traceability and V&V (i.e., M&S), and by whom (see DAG 4.5.7.4, 4.5.7.5).
- Requirements management traceability linked to CM and to changes to the technical baseline.
- The planning to trace and map all PD and O&S changes to the baseline from initial identification to the V&V efforts.

4.4. Technical Baseline

Describe how the technical baseline maps across the entire WBS in support of system production and sustainment. Include a copy of the program WBS to at least Level 3.

Consider the following:

- The program's technical baseline documentation (system, functional, subsystem and design specifications, and standards) and alignment between the WBS and the technical baseline documents supporting production and operations.
- The program's production and sustainment WBS approach down to the hardware and software configuration item (CI) level.
- How the program will trace top-level requirements (KPPs, certification, statutory, regulatory, etc.) and key safety items to the JCIDS requirements documents (ICD, CDD, or CPD) down to CI build-to specifications and V&V plans (DT and OT).

4.5. Technical Approach to Assess Risk

Describe how the technical approach continues to address the manufacturing and operational hazards (e.g., production quality, materiel availability, and safety) that could jeopardize achievement of program outcomes.

Consider the following:

- The program's plan to measure the production and O&S risk (e.g., quality, materiel availability, and ESOH).
- How the SE process continuously assesses production risk against the product baseline.
- How stakeholders will be involved continuously in the assessment of risks that could jeopardize achievement of program outcomes (e.g., quality, materiel availability, and ESOH) (see DoD 4245.7-M).

5. TECHNICAL REVIEW AND AUDIT PLANNING

Describe the approach to establish and conduct periodic technical reviews and audits throughout the program life cycle and specifically for Milestone C and during the PD and O&S phases (see DAG 4.5.8). Include details as recommended in paragraphs 5.1–5.5.

5.1. Event-Driven Technical Reviews and Audits

Describe the event-driven technical reviews to be conducted at a system, subsystem, and CI level. Identify program-specific entry and exit criteria, defined and documented, for each technical review. Describe how the program will conduct event-driven technical reviews.

Describe how the program will use technical reviews to establish the technical baselines in support of production and sustainment requirements (see DAG 4.2.3.3, 4.3, 4.3.4.4, 4.3.5.4, 4.4.11.2, 4.5.1, 4.5.3, 4.5.8, and 4.5.7.4).

Consider the following:

- The program's approach to executing event-driven technical reviews (e.g., Production Readiness Review (PRR), Operational Test Readiness Review (OTRR), and In-Service Review (ISR)), and audits (e.g., Physical Configuration Audit (PCA)) and to ensure they are not schedule driven.
- The planning for technical reviews (provide a schedule of all remaining technical reviews):
  - The number of technical reviews planned and to what WBS level.
  - The technical authority (lead/chief systems engineer and/or functional lead) for entry/exit criteria for each review.
  - The technical entrance/exit criteria for each review.
  - The readiness for conducting each review.
- The timing of the technical reviews and audits, tied to the achievement of entry criteria and maturing of the technical baseline.
- How the PCAs will confirm that the engineering drawings, specifications, and technical data (including commercial off-the-shelf documentation) is consistent with the "as-built" configuration.
- How the reviews and audits will support other key programmatic efforts/decisions (i.e., transition to full production).

5.2. Responsibility for Technical Reviews and Audits

Describe who is responsible for the overall management of technical reviews and audits.

Consider the following:

- The program's approach for oversight and conduct of technical reviews and audits (i.e., OTRR, PCA, ISR, etc.).
- The key OPRs and stakeholders involved.
- How the program will determine readiness for technical reviews and audits, and who will be responsible for making the decision to authorize and close them out.
- How the program will involve the technical authority (see DAG 4.1.6).
- The roles and responsibilities of those involved in conducting technical reviews and

audits, and the procedures they will use to conduct and close outstanding issues from the reviews and audits.

- The approach to ensure the applicable technical products (e.g., hardware, software, or process specifications) subject to each review and audit are available as read-ahead material to the appropriate participants (stakeholders and functional leads).
- The approach for integrating the outcomes of the technical reviews and audits into the program's plan.

5.3. Chairing of Technical Reviews and Audits

Describe how the program will find and select appropriate chair(s) for the technical reviews. (Best practice is to use independent technical authorities.) Describe the role of the lead/chief systems engineer.

Consider the following:

- The approach for determination and selection of technical review and audit chairs.
- The roles of the PM, lead/chief systems engineer, and the technical review chair and how they will collaborate on technical reviews, especially the determination of readiness for the review or audit, and on reporting of results.
- How the program will ensure that reviews and audits are conducted according to established DoD policy and engineering preferred practice.

5.4. Stakeholder Participation in Technical Reviews and Audits

Identify the stakeholders and describe how the program will involve stakeholders for each technical review to cover all production and sustainment requirements; KPPs; statutory, regulatory, certification, and V&V requirements; and design considerations (e.g., realized reliability) (see DAG 4.1.2).

Consider the following:

- How appropriate stakeholders (e.g., users, testers, ESOH, certifiers, production leads, and design and sustainment engineers) and representative offices for specific design and sustainment considerations areas are involved at key decision points (e.g., airworthiness certifiers at technical reviews and audits).
- The program's plan to involve stakeholders (e.g., users, testers, safety, certifiers, design and sustainment engineers) by organization in reviews and audits.
- How the program office, prime contractor, subcontractors, and relevant industry representatives will participate in reviews.

- The membership composition, including the method for nominating and approving the chairperson and membership of a technical review or audit board, if required.
- How the program office will reconcile resource constraints with technical staffing needs for the reviews and audits.
- The program's approach to involve the T&E and sustainment communities in the SE process to assess risk and to participate in technical reviews to mature the technical baseline (see DoD 5000.2 E5. Enclosure 5).

5.5. Peer Participation at Technical Reviews and Audits

Describe how the program will identify peer review participants for the technical reviews and audits (see DoD policy).

Consider the following:

- The program's approach to addressing peer review in accordance with DoD Policy and how peers will participate in technical reviews.
- The program's method to identify the subject matter areas in which peer insight is most relevant; how the program will determine the technical authority to access suitable SMEs.
- The participation of senior leadership or experts in functional areas (e.g., SMEs) at major reviews or at other key decision points

6. INTEGRATION WITH OVERALL MANAGEMENT OF THE PROGRAM

Describe the relationship and feedback mechanisms for Milestone C and during the PD and O&S phases. Describe key sustainment program management processes and strategies that support reporting and milestone requirements per DoDI 5000.2 (see E3. Enclosure 3). Include details as recommended in paragraphs 6.1–6.5.

6.1. Program Management Planning and Control

Describe how the SE approach is integrated with overall program management planning and control efforts across production and sustainment (e.g., the AS, WBS, RMP, IMP/IMS PESHE, and Earned Value Management (EVM)).

Consider the following:

- How the program will integrate and coordinate SE activities across production and sustainment phases to support program cost, schedule, and performance.
- The program's approach to linking and integrating SE with other management efforts.

- How the program will include in its technical planning any Government Furnished Property (e.g., test ranges, integration laboratories and special equipment) needed to support production and sustainment, and how the program will link this planning to the IMP/IMS (see DAG 11.3). Provide a copy of the IMP/IMS.
- The use of IMS and WBS as the basis for any production or sustainment contract Integrated Baseline Review (IBR), cost accounts, and EVM implementation (see DAG 11.3.1.3).
- The use of SE analysis (e.g., M&S) in resource estimation and availability (e.g., Special Tooling and Special Test Equipment needed for manufacturing).
- The program's approach for using metrics to monitor prime and subcontractor performance for impacts to cost, schedule, and performance (i.e., software deficiency reports; technical performance measures (TPMs); Critical Technical Parameters (CTPs); measures of effectiveness (MOEs); measures of suitability (MOSs); measures of performance (MOPs); and Sustainment KPP/KSAs (i.e., materiel availability, materiel reliability, ownership cost, and mean down time)). In a table: the metrics, provider, and reporting frequency.
- The use of SE technical planning (analysis, program data, and decisions) to support other program activities and key program documents requiring MDA approval (see DoDI 5000.2 E3. Enclosure 3).
- The technical planning to support program closeout and disposal.
- The process for integrating program protection with SE.

6.2. Program Manager's Role in Technical Reviews

Describe how the program manager will use technical reviews to manage the technical effort and to contain overall production and sustainment costs.

Consider the following:

- How the PM will use the production and sustainment technical reviews in program decision making.
- The role of the PM in preparing for, executing, and resolving issues from the production and sustainment technical reviews.
- The method for the continual and accurate identification and management of the critical path tasks, production rates, and quantities.

6.3. Risk Management Integration

Describe how the SE approach is integrated with the program's risk management effort along with any SoS risk consideration (e.g., how technical reviews provide a risk assessment input to the ongoing manufacturing and hazard risk assessment process) (see DAG 4.2.3.5, 11.4; RMG).

Consider the following:

- How the program will integrate the RMP (including any related SoS RMP) with the technical approach and address life-cycle sustainment considerations (see RMG Ch 8; DAG 11.4).
- The linkage between the production and sustaining SE technical reviews and the program's risk assessment process (e.g., risks of successful completion of the next technical review) (see RMG; DAG 4.5.8).
- Identity of the manager for the risk program and how the IPTs will apply risk management.
- How often risks are reviewed, by whom, and how risks will be rolled up.
- How the program will address risks and issues.
- The risk management tool the program office will use and its compatibility with the prime contractor's tool.
- How the program will use metrics to assess program risks.
- How the program will address the system ESOH objectives and risks, as outlined in MIL-STD-882D.
- How the program will mature enabling technologies and their associated critical technology elements (CTEs) and processes to support design changes during production and sustainment.
- How the program will accept ESOH risks and communicate hazards and mitigations plans to the user and operations and sustainment organizations (see DAG 4.3.5.3.3).
- How to minimize risks during the transition from development to production (see DoD 4245.7-M).
- How the program will include risks and SE in the IMP/IMS and link them in the program life-cycle planning to support manufacturing and sustainment (e.g., changes in proven materials, special processes, subcontractors, and components).
- A summary of key SE technical risks, including interfaces and interdependencies, with ratings and mitigation plans.

6.4. Test and Evaluation

Describe how the technical approach integrates the test and evaluation (T&E) planning during the PD and O&S phases. Describe the technical approach for the integration and test activities (DT&E) and facilities to support system integration and verification for OT&E and production.

Consider the following:

- How V&V plans will be integrated in the SE approach.
- How the overall SE technical planning integrates with the TEMP.
- How the "test, analyze, and fix" activities will be coordinated to resolve deficiencies or further improve the system prognostics in support of T&E.
- How test activities integrate with OT&E to consolidate test requirements where possible.

6.5. Life-Cycle Sustainment Integration

Describe how the technical approach integrates the sustainment planning into the PD and O&S phases. Describe the relationship among system performance, producibility, materiel availability, materiel reliability, ownership cost, and mean down time throughout the system life cycle (see SUP 1.3).

Consider the following:

- How the program will implement SE in a total systems approach to meet the mandatory sustainment KPP/KSAs (i.e., materiel availability, materiel reliability, ownership cost, and mean down time), and the life-cycle sustainment enablers (e.g., corrosion, RCM, SIM) (see SUP 1.3, 3.4; DAG 2.3.12, 4.1.3, 5.2.2; DoDD 5000.1).
- How the overall SE technical planning integrates with the Program Manufacturing Plan and the Product Support Plan.
- How SE technical planning addresses sustainment, obsolescence, technology refreshment.
- Pre/Post Initial Operational Capability (IOC) Supportability Assessment.
- The use of M&S and prognostics in support of production and life-cycle sustainment objectives (DAG 4.5.7.5, 4.5.7.4).

6.6. Contracting Considerations

Describe the SE contracting considerations for production and sustainment (see DAG 4.0, 4.3; Integrating Systems Engineering into DoD Acquisition Contracts).

Consider the following:

- The linkage between the MDA-approved SEP and the contractor's SE plan to establish a fully integrated acquisition and sustainment approach.
- SE as an integral part of future contract actions (Requests for Proposal and Engineering Change Proposals) for prime and subcontractors to support production and sustaining efforts.
- How the program will evaluate contractors' software plans and related processes (e.g., Software Development and Sustainment Plans) and integrate those plans with the SEP and processes.
- The technical basis for performance-based payments and award fees.
- The technical basis to provide incentives for the contractor to provide effective and cost-effective solutions (e.g., design for production efficiency and quality; optimize materiel availability and reliability while minimizing cost and mean down time).
- The technical basis to provide incentives for event-driven reviews and technical baseline management across the program, including prime-to-prime contractors and prime-to-subcontractors.
- How the program will assess contractors' capabilities to conduct life-cycle systems and software engineering activities for security-related practices, foreign ownership control and influence, and protection of Critical Program Information (CPI).

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REFERENCES

Links in the Guide

Directives

DoD 4245.7-M, "Transition from Development to Production," 09/1985,
(http://handle.dtic.mil/100.2/ADA303209)

DoDD 5000.1, The Defense Acquisition System, May 12, 2003
(http://akss.dau.mil/dag/DoD5000.asp?view=document&doc=1)

DoDI 5000.2, Operation of the Defense Acquisition System, May 12, 2003
(http://akss.dau.mil/dag/DoD5000.asp?view=document&doc=2)

CJCSI 3170.01F, Joint Capabilities Integration and Development System, 1 May 2007
(http://www.dtic.mil/cjcs_directives/cdata/unlimit/3170_01.pdf)

Systems Engineering Policy

February 20, 2004, USD(AT&L) Memorandum, "Policy for Systems Engineering in DoD"
(http://www.acq.osd.mil/sse/docs/Policy-for-Systems-Engineering-in-DoD-20Feb04.pdf)

March 30, 2004, OUSD(AT&L) Memorandum, "Implementing Systems Engineering Plans in DoD—Interim Guidance"
(http://www.acq.osd.mil/sse/docs/Implementing_SE-Plans_In_DoD-Interim-Guidance-30Mar2004.pdf)

October 22, 2004, USD(AT&L) Memorandum, "Policy Addendum for Systems Engineering"
(http://www.acq.osd.mil/sse/docs/Policy-Addendum-for-Systems-Engineering-22Oct04.pdf)

June 13, 2005, ASA(ALT) Memorandum, "Army Systems Engineering Policy"
(http://library.saalt.army.mil/archive/Memo/2005/Army%20Systems%20Engineering%20Policy.pdf)

October 7, 2005, SAF/AQ Memorandum, "Air Force Systems Engineering Policy", Attachment 1 and Attachment 2
(https://www.my.af.mil/gcss-af/USAF/AFP40/Attachment/20070206/AF%20SE%20Policy%20Memo.pdf),
(https://www.my.af.mil/gcss-af/USAF/AFP40/Attachment/20070206/AF%20SE%20Policy%20Atch%201.pdf),
(https://www.my.af.mil/gcss-af/USAF/AFP40/Attachment/20070206/AF%20SE%20Policy%20Atch%202.pdf)

April 27, 2006, ASN (RD&A) Memorandum, "Revised Policy for DoN Systems Engineering Plan (SEP) Review and Approval"
(http://www.acq.osd.mil/sse/docs/RevisedPolicyforDoNSEP_Review_Approval_27Apr2006.pdf)

Systems Engineering Related Guides and Handbooks

Continuous Process Improvement Transformation Guidebook
(http://www.dau.mil/pubs/Guidebook/DoD%20Continuous%20Process%20Improvement%20(CPI)%20Guidebook%20-%20FINAL%2012%20May%2006.pdf)

Defense Acquisition Guidebook (DAG)
(http://akss.dau.mil/dag/)

Designing and Assessing Supportability in DoD Weapon Systems: A Guide to Increased Reliability and Reduced Logistics Footprint (SUP)
(http://www.dau.mil/pubs/Guidebook/FINAL%20GUIDE%20with%20Memo%20-%20October%2024.pdf)

DI-MGMT-81466A Contract Performance Report (CPR) DID
(http://www.acq.osd.mil/pm/currentpolicy/cpr_cfsr/CPR%20Final%203-30-05.pdf)

DI-MGMT-81650 Integrated Master Schedule (IMS) DID
(http://www.acq.osd.mil/pm/currentpolicy/cpr_cfsr/IMS%20Final%203-30-05.pdf)

DoD Guide for Achieving Reliability, Availability, and Maintainability (RAM)
(http://www.acq.osd.mil/sse/docs/RAM_Guide_080305.pdf)

DoD Integrated Product and Process Development Handbook, August 1998
(https://acc.dau.mil/GetAttachment.aspx?id=37477&pname=file&lang=en-US&aid=9017)

Earned Value Management Implementation Guide (EVMIG)
(http://guidebook.dcma.mil/79/EVMIG.doc)

Guide for Integrating Systems Engineering into DoD Acquisition Contracts, 11 December 2006
(http://www.acq.osd.mil/sse/docs/Integrating-SE-Acquisition-Contracts_guide_121106.pdf)

Integrated Master Plan and Integrated Master Schedule Preparation and Use Guide (IMP/IMS)
(http://www.acq.osd.mil/sse/docs/IMP_IMS_Guide_v9.pdf)

MIL-HDBK-61A, Military Handbook Configuration Management Guide, August 2006
(http://assist.daps.dla.mil/quicksearch/basic_profile.cfm?ident_number=202239)

MIL-HDBK-881A Work Breakdown Structure Handbook
(http://www.acq.osd.mil/pm/currentpolicy/wbs/MIL_HDBK-881A/MILHDBK881A/WebHelp3/MILHDBK881A.htm)

Reduction of Total Ownership Costs (R-TOC) Best Practices Cost, July 2003
(http://ve.ida.org/rtoc/open/documents/d2843.pdf)

Risk Management Guide for DoD Acquisition (RMG), August 2006
(http://www.acq.osd.mil/sse/docs/2006RMGuide4Aug06finalversion.pdf)

System Safety - ESOH Management Evaluation Criteria for DoD Acquisitions (ESOH)
(https://acc.dau.mil/GetAttachment.aspx?id=133296&pname=file&lang=en-US&aid=26701)

System of Systems Systems Engineering Guide: Considerations of Systems Engineering in a System of Systems Environment (SoS)
(http://www.acq.osd.mil/sse/docs/SoS-SE-Guide.pdf)

Systems Engineering Plan (SEP) SE WIPT Guide to Development (SE WIPT Briefing)
(http://www.acq.osd.mil/sse/docs/SE-WIPT-SEP-Brief.ppt)

Technology Readiness Assessment (TRA) Deskbook, May 2005
(http://www.dod.mil/ddre/doc/tra_deskbook_2005.pdf)

Additional Resources

Guides

A Modular Open System Approach to Acquisition, September 2004
(http://www.acq.osd.mil/osjtf/pdf/pm_guide.pdf)

Systems Engineering Community of Practice Quick Reference Links – Systems Engineering
(https://acc.dau.mil/GetAttachment.aspx?id=111020&pname=file&lang=en-US&aid=24272)

Training and Education

Information on Systems Engineering Continuous Learning Modules
(http://www.acq.osd.mil/sse/ed/edutrain_sp6.html)

Fundamentals of Systems Engineering
(http://www.dau.mil/catalog/Course_Description/Course_Description%2076.pdf)

Intermediate Systems Planning, Research, Development and Engineering, Part I
(http://www.dau.mil/catalog/Course_Description/Course_Description%2076.pdf)

Intermediate Systems Planning, Research, Development and Engineering, Part II
(http://www.dau.mil/catalog/Course_Description/Course_Description%2077.pdf)

Technical Leadership in Systems Engineering
(http://www.dau.mil/catalog/Course_Description/Course_Description%2077.pdf)

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ACRONYMS

ACA	Associated Contractor Agreement
ACAT	Acquisition Category
AS	Acquisition Strategy
AoA	Analysis of Alternatives
AS	Assessments and Support
CAE	Component Acquisition Executive
CDD	Capability Development Document
CM	Configuration Management
CI	Configuration Item
CONOPS	Concept of Operations
CPD	Capability Production Document
CPI	Continuous Process Improvement
CTE	Critical Technology Element
CTP	Critical Technical Parameter
DAG	Defense Acquisition Guidebook
DUSD(A&T)	Deputy Under Secretary of Defense for Acquisition and Technology
ED	Enterprise Development
ESOH	Environmental Safety and Occupational Health
EVM	Earned Value Management
FCA	Functional Configuration Audit
ICD	Initial Capabilities Document
IMP	Integrated Master Plan
IMS	Integrated Master Schedule
IPPD	Integrated Product and Process Development
IPT	Integrated Product Team

ISR	In-Service Review
JCIDS	Joint Capabilities Integration and Development System
JROC	Joint Requirements Oversight Council
KPP	Key Performance Parameter
KSA	Key System Attribute
MDA	Milestone Decision Authority
M&S	Modeling and Simulation
MOE	Measure of Effectiveness
MOP	Measure of Performance
MOS	Measure of Suitability
MOSA	Modular Open System Approach
MRL	Manufacturing Readiness Level
OIPT	Overarching Integrated Product Team
OPR	Office of Primary Responsibility
OSD	Office of the Secretary of Defense
OTRR	Operational Test Readiness Review
OUSD(AT&L)	Office of the Under Secretary of Defense for Acquisition, Technology and Logistics
O&S	Operations and Support
PBL	Performance Based Logistics
PCA	Physical Configuration Audit
PEO	Program Executive Office or Program Executive Officer
PESHE	Programmatic Environmental, Safety and Occupational Health Evaluation
PM	Program Manager
PRR	Production Readiness Review
PSC	Preferred System Concept
PSP	Product Support Plan

PSTL	Program Support Team Lead
RCM	Reliability Centered Maintenance
RMP	Risk Management Plan
SDD	System Development and Demonstration
SE	Systems Engineering
SEMP	Systems Engineering Management Plan
SEP	Systems Engineering Plan
SME	Subject Matter Expert
SOE	System Operational Effectiveness
SoS	System of Systems
SSE	Systems and Software Engineering
STA	System Threat Assessment
TD	Technology Development
TDS	Technology Development Strategy
TEMP	Test and Evaluation Master Plan
TES	Test and Evaluation Strategy
TMP	Technology Maturation Plan
TPM	Technical Performance Measure
TRA	Technology Readiness Assessment
TRL	Technology Readiness Level
T&E	Test and Evaluation
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology and Logistics
V&V	Verification and Validation
WBS	Work Breakdown Structure
WIPT	Working-level Integrated Product Team

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