Integrated Master Plan and Integrated Master Schedule Preparation and Use Guide

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Integrated Master Plan (IMP) and Integration Master Schedule (IMS) Preparation and Use Guide

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IMP/IMS Preparation and Use Guide Change Record

Date	Change	Rationale

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1 INTRODUCTION

The Department of Defense (DoD), other agencies and DoD contractors use Integrated Master Plans (IMPs) and Integrated Master Schedules (IMSs) to plan and manage projects from inception to completion. Together the IMP and IMS integrate the activities and schedule components necessary to complete a project successfully.

The IMP typically describes three levels of activities: Events, Accomplishments, and Criteria. The IMS adds a fourth level of detail: Tasks, with detailed timelines and deadlines. Each level consists of activities to fulfill the next level in the hierarchy. Programs complete Tasks to satisfy Criteria, which roll up to satisfy Accomplishments, which roll up to complete an Event. The IMP and IMS are integrated, so changes to the plan are reflected in the schedule.

1.1 Purpose

This guide will assist Program Managers (PMs), project officers, and contractors in preparing and implementing IMPs and IMSs for DoD programs. This guide updates earlier DoD IMP/IMS guidance and emphasizes the Government preparing an IMP and an initial execution (IE) IMS (a provisional IMS) early to influence the offerors' proposals, and Government/contractor collaboration on developing a well-established plan for the contract. This guide intends to:

- Provide a consistent philosophy and approach to the IMP and IMS and their development.
- Foster improved IMP and IMS products that reflect a systematic approach.
- Allow tailoring to each project's specific needs and permit offerors to build their IMPs and IMSs consistent with their own management and scheduling structure and formats.
- Improve the learning curve on the use of IMP and IMS for Government Program Management Offices (PMOs) and industry.
- Facilitate the development of well-defined and complete plans and schedules for use in day-to-day project execution, which can mitigate risk and increase the probability of project success.

The principles outlined in this guide apply to incremental and Family-of-Systems (FoS), or System-of-Systems (SoS) programs. This guide:

- Defines key terminology.
- Discusses the concept and purpose of the IMP and IMS.
- Provides guidance on developing and implementing IMP and IMS products.
- Discusses the importance of tailoring requirements in Request for Proposals (RFPs).

- Describes how to evaluate an offeror's IMP and IMS.
- Defines key terminology and provides further supporting references.

Whereas DoD policy is mandatory, this guide is not mandatory but provides recommended methods and best practices from experienced practitioners, program leaders, and defense engineers. The guide references mandatory policy and related guidance to provide context.

The Office of the Under Secretary of Defense (OUSD) for Research and Engineering (R&E) prepared this guide in collaboration with OUSD for Acquisition and Sustainment (A&S) and subject matter experts from across DoD. OUSD(R&E) will develop and coordinate updates as required to incorporate policy changes and user feedback.

1.2 Value of the IMP and IMS

The IMP and IMS provide a framework for managing the project and tracking progress against goals and timelines. They help ensure team members are working toward the same objectives and that issues or delays are identified and addressed in a timely manner. IMPs and IMSs can help organizations manage risk, increase efficiency, and improve communication and collaboration among project stakeholders.

The IMP and IMS are applicable to competitive and sole source procurements with industry as well as Government in-house efforts. They provide ongoing insight into project status by Government and contractor personnel. They help the project develop and support "what-if" exercises and to identify and assess candidate problem work-arounds. Using the IMP and IMS can focus and strengthen the Government-contractor team.

A well-prepared IMP and IMS provide value-added management applications. In preparing for source selection and its activities, the IMP and initial IMS:

- Provide offerors with flexibility in performing detailed project execution planning, organization, and scheduling within any existing RFP constraints.
- Serve as the basis for the offeror's detailed IMS showing how the contractor intends to meet the RFP requirements by accurately representing the offeror's proposed project approach, which should be executable within the cost, schedule, and risk constraints.
- Provide the Government proposal evaluation team with the information needed to assess each offeror's approach against the RFP's requirements including proposal risk, performance confidence, and price and cost evaluation factors.

After contract award, the Government and contractor's plans and schedule:

- Serve as the basis for ensuring mutual understanding of Government expectations and agreement on the project content, project plan, schedule, and risk.
- Provide the detailed integrated execution plan and supporting schedule, identifying what needs to be done and when it should be done.

During the project execution, the IMP and IMS provide a framework for insight into project performance for the PMO and the contractor's management team. When properly integrated with earned value management (EVM) through a sound technical management approach as documented in the project's Systems Engineering Plan (SEP), the IMP and IMS enable the PMO to:

- Identify and assess actual progress versus the planned progress.
- Monitor the project critical path, the series of Tasks that need to be completed on time to ensure the project remains on schedule.
- Assess project maturity.
- Assess the status of risk management activities based on the inclusion of the project risk mitigation activities in the IMP and IMS.
- Assess the progress on selected Key Performance Parameters (KPPs) and Technical Performance Measures (TPMs).
- Provide an objective, quantitative basis for the contractor's performance assessment rating and award fee.
- Provide better insight into potential follow-on efforts that were not part of the original contract award. For example, the contractor should be able to define the activities, new interfaces, and other information more clearly for a potential project increment or contract option.
- Help develop and support "what-if" exercises, identify and assess candidate problem work-arounds, and help develop the work-arounds to problem areas.

2 POLICY AND GUIDANCE

2.1 Engineering of Defense Systems

DoD Instruction (DoDI) 5000.88, Engineering of Defense Systems, directs Major Defense Acquisition Programs (MDAPs), Acquisition Category (ACAT) II, and ACAT III programs to develop a SEP, which includes a description of the IMP and IMS. The description should include definitions, updated schedules, audits, baseline control, and the integration between project-level and contractor detailed schedules. The project-level IMP is typically an attachment to the SEP, and the IMS should be made available in its native format to support independent technical risk assessments.

PMOs that serve as the system integrator should develop and maintain a system-level IMP and execution IMS (Technology Maturation and Risk Reduction (TMRR) and/or Production and Deployment (PD) phase). This guidance applies to most DoD programs following one of the formal Adaptive Acquisition Framework (AAF) pathways.

DoDI 5000.88 allows the approval authority for MDAPs or the DoD Component for ACAT II and III programs to waive the requirement for the IMP and IMS, which may be appropriate for programs that are well developed or less complex.

2.2 DoD Adaptive Acquisition Framework

The DoD AAF established in DoDI 5000.02 allows PMs to develop acquisition strategies and employ processes that match the characteristics of the capability being acquired. IMPs and IMSs are applicable to each AAF but should be tailored to the size and breadth of a project. When properly used, the tools enable programs to identify and mitigate risks.

At a minimum, all AAF pathways should incorporate IMPs and IE IMSs to provide to potential offerors during the pre-award phase of a project. Note that IMPs and IMSs for software acquisitions and the software portion of defense business systems vary greatly from those of traditional acquisition paths. Traditional paths rely on fixed requirements, whereas software acquisition depends on more fluid requirement evolution through the life of the project.

The DoD AAF consists of six pathways: MCA, Middle Tier of Acquisition (MTA), Urgent Capability Acquisition (UCA), Software Acquisition, Defense Business Systems (DBS), and Defense Acquisition of Services (DAoS). Appendix A illustrates the AAF. The Defense Acquisition University (DAU) AAF Document Identification (AAFDID) web page provides additional information for each pathway: https://www.dau.edu/aafdid/Pages/about.aspx. Appendix B provides the complete AAF pathways.

The following paragraphs summarize each pathway in relation to the IMP and IMS.

2.2.1 Major Capability Acquisition (MCA)

The goal of the MCA pathway is to acquire and modernize unique programs that provide enduring capabilities. The programs follow a structured, but not rigid, approach to analyze, design, develop, integrate, test, evaluate, produce, and support a system. Acquisition and product support processes, reviews, and documentation should be tailored based on project size, complexity, risk, urgency, and other factors. DoDI 5000.85, "Major Capability Acquisition"; the OUSD(R&E) "Test and Evaluation (T&E) Enterprise Guidebook, Chapter 4: Major Capability Acquisition"; and the DAU AAFDID web page provide more information. Figure 2-1 illustrates the MCA pathway. IMPs and IMSs should be developed or updated at or before each milestone (MS).

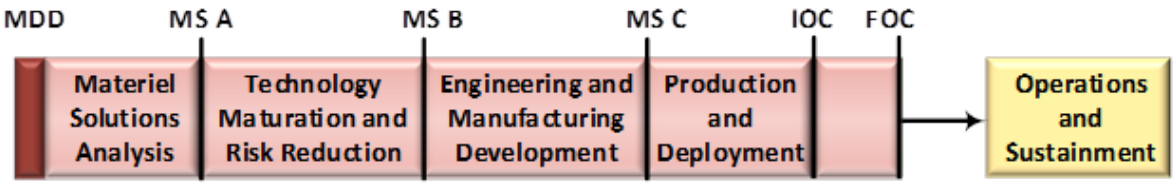


Figure 2-1. MCA Pathway

2.2.2 Middle Tier of Acquisition (MTA)

The MTA pathway includes two subcategories: Rapid Prototyping and Rapid Fielding. The goal is to rapidly develop prototypes within an acquisition project to demonstrate new capabilities or to rapidly field production quantities of systems with proven technologies that require minimal development, integration, and investment. Rapid Fielding programs are expected to begin production within 6 months and proceed to system fielding within 5 years of the MTA project start date. DoDI 5000.80, "Operation of the Middle Tier of Acquisition," and OUSD(R&E) "T&E Enterprise Guidebook, Chapter 3: Middle Tier of Acquisition" provide more information.

Figure 2-2 illustrates the MTA pathway. MTA project activities may be condensed. The IMP and IMS are critical to enable the project fielding within the prescribed time. Both products should be developed at project inception and updated as required.

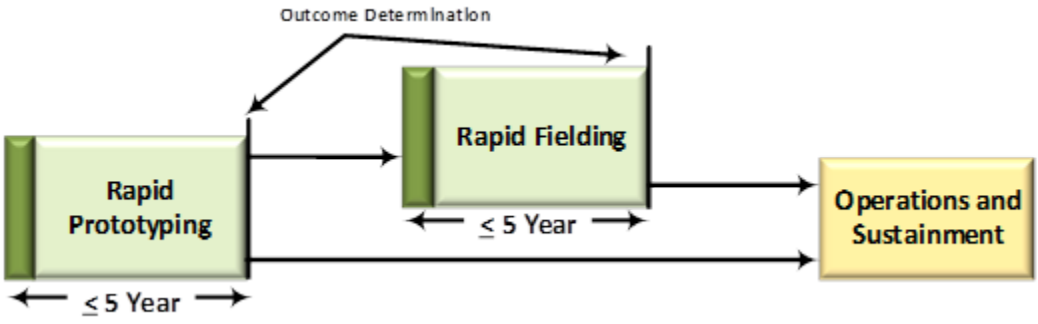


Figure 2-2. MTA Pathway

2.2.3 Urgent Capability Acquisition (UCA)

UCA pathway programs provide capabilities to fulfill urgent operational needs and other quick action capabilities. Systems being developed and fielded under this framework must not exceed $525 million in research, development, and T&E, or $3.065 billion for procurements in Fiscal Year 2020 constant dollars for a single solution. The solutions need to be developed, tested, and fielded in under 2 years. DoDI 5000.81, "Urgent Capability Acquisition," and OUSD(R&E) "T&E Enterprise Guidebook, Chapter 2: Urgent Capability Acquisition" provide more information.

Figure 2-3 illustrates the UCA pathway. Although IMPs and IMSs are not necessarily required for UCA programs, there are many benefits for having them. UCA programs are to be fielded in less than 2 years. During this period, many sequenced time-constrained activities need to be accomplished. In the case of a UCA, the IMP could be as simple as a spreadsheet laying out the Events, Accomplishments, and Criteria. The IMS assists the PM with managing tight schedules.

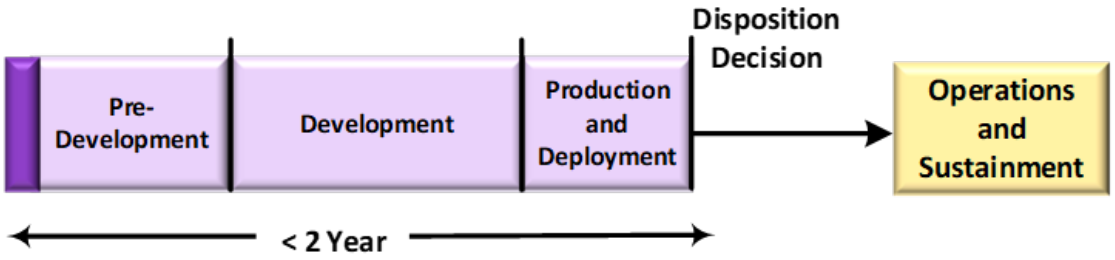


Figure 2-3. UCA Pathway

2.2.4 Software Acquisition

The Software Acquisition pathway is for the timely acquisition of custom software capabilities developed for the DoD. Software programs that meet the definition of a covered DBS should use the DBS pathway in accordance with DoDI 5000.75, "Business Systems Requirements and Acquisition," but may elect to incorporate this pathway for custom developed software. This pathway integrates modern software development practice such as Agile software development, Development, Security, and Operations (DevSecOps), and Lean principles. Small cross-functional teams that include operational users, developmental and operational testers, software developers, and cybersecurity experts work to deliver software rapidly and iteratively to meet the highest priority user needs.

These mission-focused, Government-industry teams use automated tools for iterative development, builds, integration, testing, production, certification, and deployment of capability to the operational environment. These tools are not limited to just the Software Acquisition pathway. DoDI 5000.87, "Operation of the Software Acquisition Pathway," and OUSD(R&E) "T&E Enterprise Guidebook, Chapter 2: Software Acquisition" provide more information.

Figure 2-4 illustrates the Software Acquisition pathway. Use of the IMP and IMS within the Software Acquisition pathway differs from the use in other pathways. Although an IMS typically would not include Level of Effort (LOE) activities, the program should schedule minimum viable product (MVP) and post minimum viable capability release (MVCR) sprints in the IMS.

Programs should work closely with their software development team to ensure the IMP structure matches the structure of Agile elements. For example, features or capabilities from an Agile perspective often correlate to the Criteria level of a project's IMP.

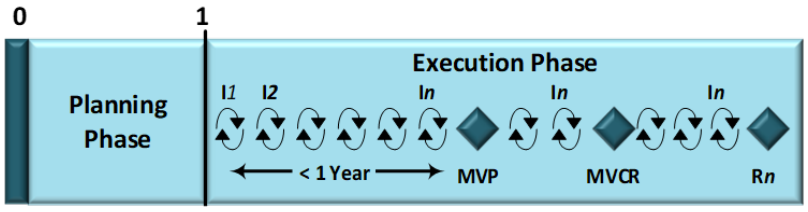


Figure 2-4. Software Acquisition Pathway

2.2.5 Defense Business Systems (DBS)

The purpose of the DBS Business Capability Acquisition Cycle (BCAC) is to rapidly deploy business capabilities that address identified mission and capability needs within approved cost, schedule, and performance parameters. The PM develops documentation to apply commercial best practices and lessons learned to prioritize, rapidly develop, and deploy usable, affordable subsets of capability, such as a release. A release is a manageable subset of functionality, such as MVP, that provides utility in support of the business capability. The utility provided by a release does not have to fulfill the entire business capability. Additional utility may be added through iterative releases based on user feedback to minimize risk and increase adoption. DBS PMs can use IMPs and IMSs to define processes and schedules.

Figure 2-5 illustrates the DBS pathway. DoDI 5000.75 and the OUSD(R&E) "T&E Enterprise Guidebook, Chapter 6: Defense Business Acquisition" provide more information. DBS programs should develop IMPs and IMSs at project inception to assist PMs to navigate successfully through the DBS phases.

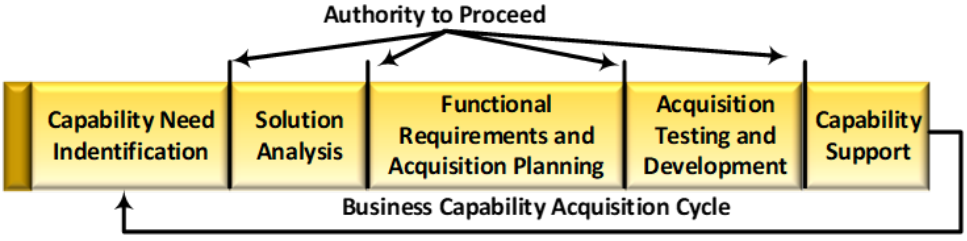


Figure 2-5. DBS Pathway

2.2.6 Defense Acquisition of Services (DAoS)

In the DAoS pathway, organizations acquire services from the private sector such as knowledge-based, construction, electronics and communications, equipment, facilities, product support, logistics, medical, research and development, and transportation services. The pathway assists organizations to identify the required services, research the potential contractors, contract for the services, and manage performance. DoDI 5000.74, "Defense Acquisition of Services," provides more information. Figure 2-6 illustrates the seven steps of the DAoS pathway grouped into three phases: Plan, Develop, and Execute. Although the DAoS pathway does not require the IMP and IMS, the IMS could benefit the PM in planning and managing the schedule.

Figure 2-6. DAoS Pathway

2.3 IMP/IMS Guidance

This guide amplifies the event-based technical approach directed by DoDI 5000.88 and complements guidance provided in the following documents (see also References):

- Agile and Earned Value Management (EVM): A Program Manager's Desk Guide
- Defense Acquisition University (DAU) Guidebook, "A Guide to Program Management Knowledge, Skills, and Practices"
- DAU Guidebook, "A Guide to DoD Program Management Business Processes"
- Defense Contract Management Agency (DCMA) EA PAM 200.1, Earned Value Management System Program Analysis Pamphlet
- DI-MGMT-81861C, Integrated Program Management Data and Analysis Report (IPMDAR)
- DoD Digital Engineering Strategy (DES)
- DoD Earned Value Management Implementation Guide (EVMIG)
- DoD Earned Value Management System Interpretation Guide (EVMSIG)
- DoD Engineering of Defense Systems Guidebook
- DoD Guide for Integrating Systems Engineering into DoD Acquisition Contracts
- DoD Guide to Integrated and Process Development

- DoD IPMDAR Implementation and Tailoring Guide
- DoD Over Target Baseline and Over Target Schedule Guide
- DoD Risk, Issue, and Opportunity Management Guide for Defense Acquisition Programs
- DoD SEP Outline
- Government Accountability Office (GAO) Schedule Assessment Guide: Best Practices for Project Schedules
- Military Standard (MIL-STD)-881F, Work Breakdown Schedule (WBS) for Defense Materiel Items
- Systems Engineering Guidebook

Each Service, program executive office, or PMO may have unique procedures in their approach to developing IMPs, execution IMSs and other supporting documentation, depending on size and scope of each project. Government project teams should refer to their organization's policies during the early stages of project planning for guidance and assistance in preparing these products. The IMP and IMS should be tailored and scaled according to the size, content, maturity, and risk of the project.

2.4 Digital Engineering Guidance

DoD is incorporating digital engineering methods throughout its acquisition processes. The DoD DES is a framework designed to leverage digital technologies to enhance the DoD's engineering capabilities and support the acquisition and sustainment of defense systems. Three key objectives of the DES are to:

- Incorporate digital engineering (DE) principles and practices into the entire defense acquisition life cycle.
- Establish a common DE language, practices, and standards across DoD.
- Provide guidance and support for the development and deployment of the necessary DE tools and infrastructure.

To achieve these objectives, the strategy emphasizes modeling and simulation, data interoperability, and open architecture. The DES calls for the establishment of a DE ecosystem that includes a community of practitioners, a set of technical standards, and a network of digital infrastructure and tools. DE moves the primary means of communicating system information from documents to digital models and their underlying data. Digital models become ubiquitous and central to how engineering activities are performed. Project schedules are digital models and should be integrated with other digital models of the project to support the project's DE effort.

3 RELATIONSHIP OF IMP AND IMS TO WBS

The product that greatly influences the development of the IMP/IMS is the WBS. This section will provide an overview of the WBS and its relationship with the IMP and IMS. MIL-STD-881F provides detailed information on types of WBSs and how they are developed.

3.1 Relationship to Work Breakdown Structure

The WBS is a hierarchical decomposition of a project into smaller, more manageable components, which are grouped into various levels and phases. It is a visual representation of the project scope, showing all the work that is required to be completed to achieve project objectives. Figure 3-1 provides an example of a WBS. MIL-STD-881F includes detailed information on the types of WBSs and how they are developed.

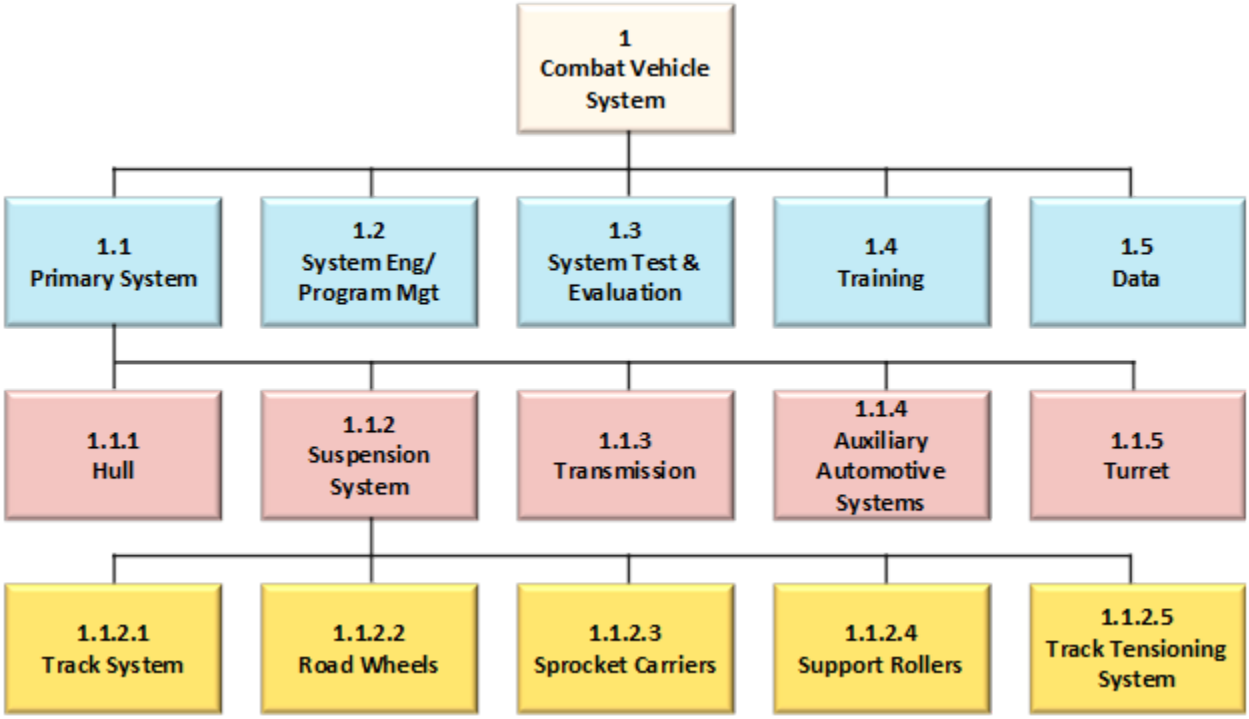


Figure 3-1. WBS Example

A WBS typically consists of the following levels:

- Project. The highest level of the WBS, which represents the overall project.
- Common Elements. Normally the 2nd level of the WBS, referring to elements that are applicable to all major systems and subsystems.
- Phases. Elements that are the major phases and sub-phases of the project.

- Deliverables. The tangible products or services that will be delivered to the customer or stakeholders. These can be broken down into smaller, more manageable deliverables.
- Work Packages. A group of related tasks or activities that are managed as a single unit. They consume resources and are completed to satisfy specific Criteria. Work packages describe the expected way work is to be conducted. They are a subdivision of a control account, assignable to a single program organizational element. Through work packages a program plans the work, measures technical progress, and determines earned value.
- Planning Package. A logical aggregation of future work within a control account that cannot yet be planned in detail at the work package level. As the requirements and project schedule become clearer, planning packages are decomposed into work packages.
- Control Account. A management control point that represents a cluster of related work packages. It is a specific subset of the project's overall WBS that represents a significant portion of the project's work scope and budget. Every task and activity, work package, and planning package should be directly traceable to a control account. It is at the control account where EVM is used to measure progress of a project against its planned cost and schedule.

The WBS is the foundation of the IMP and IMS. The IMP Events, Accomplishments, and Criteria are derived from the WBS common elements, phases, and deliverables. The IMS Tasks and activities link to the WBS at the work package and planning package level.

3.2 Relationship to Organizational Breakdown Structure

The Organizational Breakdown Structure (OBS) allows assignment of roles and responsibilities and also intersects with the WBS. Work and planning packages are assigned to individuals, teams, or Integrated Product Teams (IPTs) and are managed at the control accounts. Figure 3-2 illustrates the relationship among the OBS, WBS, IMP, and IMS.

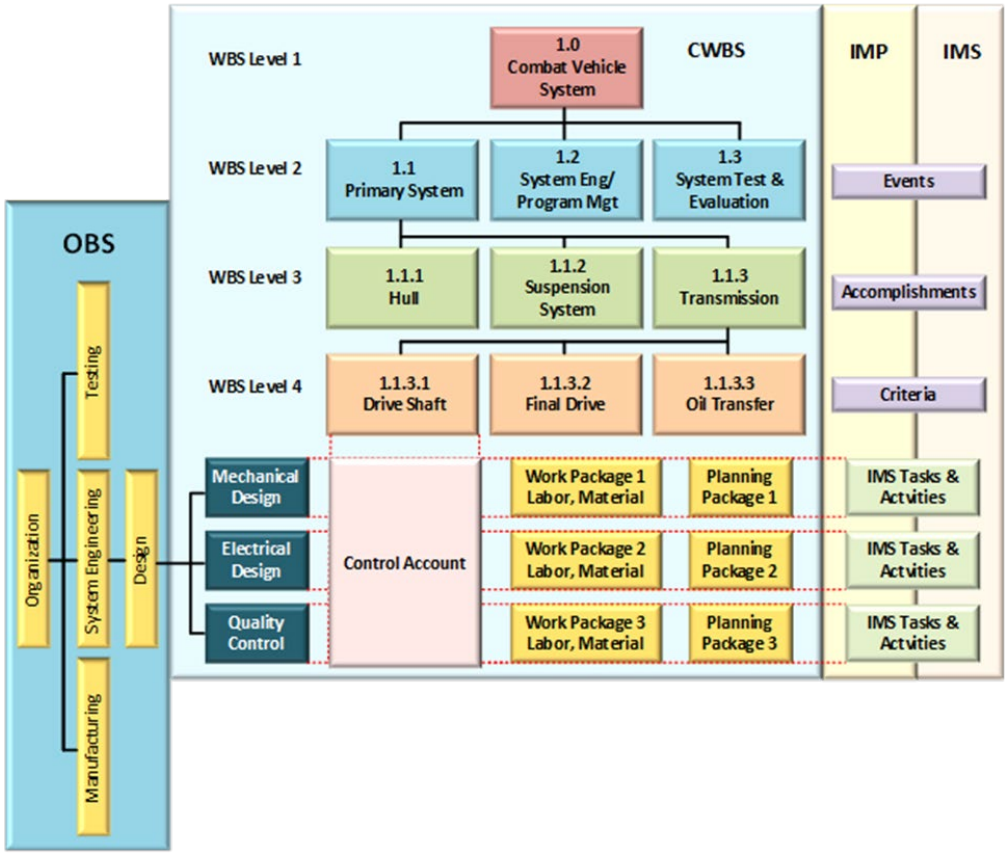


Figure 3-2. Relationship Among OBS, WBS, IMP, and IMS

4 INTEGRATED MASTER PLAN

4.1 IMP Overview

The IMP is an event-based plan consisting of a hierarchy of project events, with each event supported by specific accomplishments, which are to be satisfied by specific criteria. The approved contractor IMP generally becomes part of the contract and thus is legally binding on both the Government and contractor. Although fairly detailed, the IMP is a summary-level document compared with the IMS.

The three major levels of an IMP hierarchy are Events, Accomplishments, and Criteria. DAU defines these levels as follows:

- Event: A project assessment point that occurs at the culmination of significant project activities (Accomplishments and Criteria). An example could be "system testing." In this case, all system testing activity needs to be completed to satisfy this Event.
- Accomplishment: The desired result(s) before or at the completion of an Event that indicates a level of the project's progress. Therefore, Accomplishments are subsets of an Event. An example could be subsets of the Event "system testing," which may include developmental testing (DT), operational testing (OT), and live-fire test and evaluation (LFT&E). These specific Accomplishments need to be completed for Event "system testing" to be considered achieved. In the case of testing, "desired results" refer to the completion of an Accomplishment, not necessarily positive outcomes of that Accomplishment.
- Criteria: The definitive evidence that a specific Accomplishment is accomplished. Criteria are subsets of Accomplishments. For example, hull testing, fire control testing, and survivability testing are subsets of DT and therefore are the Criteria under the Accomplishment "DT."

Developing the IMP and IMS involves some collaboration between the PMO and contractor to arrive at the best plan. The PMO should develop an IMP and IE-IMS (see also Section 1) during the solicitation phase to provide with the RFP. The IMP should be detailed enough to portray the PM's vision of how the project should proceed so the offeror can provide a corresponding proposal in response to the RFP requirements. Potential offerors can provide additional insight as part of their proposed IMP and IMS.

Before developing their respective versions of the IMP and IMS, the Government and offeror's team should understand the system acquisition requirements as outlined in the RFP. The Government should use the proposed IMP to evaluate the offeror's understanding of, and approach to fulfilling, the requirements. The successful offeror's IMP, incorporating any changes

negotiated with the Government, should be included in the contract. The IMP should be kept as one integrated plan that encompasses all IPTs, WBS elements, and functional disciplines.

The post-award project team (Government and contractor) should select the system-level Events, which serve as progress checkpoints and indicate the project's readiness to move to the next group of work efforts. The team then should reevaluate the Accomplishments and Criteria identified in the IMP to support each Event to ensure the elements captured at the post-award time are still correct for execution. IPTs from each functional discipline should perform this check, discussing the Criteria and Accomplishments with the system-level IPT to ensure the IMP includes the correct details. This way if the IMP requires a change, the appropriate personnel will be involved to approve and make the needed contractual changes.

The IMP should include significant subcontractor activities, which in turn should be supported by the subcontractor's IMP and Subcontractor IMS (SC-IMS).

4.2 Developing and Formatting the IMP

This section provides a recommended approach to developing and formatting the IMP. Typical steps in developing an IMP include the following:

- Determine the IMP structure and organization.
- Identify Events, Accomplishments, and Criteria.
- Prepare the "Introduction" and "Narrative" sections.
- Complete the numbering system.
- Iterate Events, Accomplishments, and Criteria with the IPTs during IMS development.

The same principles apply to the IMP, whether developed by the Government or contractor.

4.2.1 Action Verbs

Standardizing verb forms in the IMP and corresponding IMS can help clarify the communication in these documents. A best practice is to phrase the Events, Accomplishments, and Criteria using verbs in the form of past participles such as "[Item] Completed" and "[Item] Conducted" to indicate the final desired state of that item. Similarly, a best practice is to phrase the IMS Tasks starting with an imperative verb, such as "Perform..." or "Develop..." to indicate what the program should do. Appendix A provides a list of commonly used action verbs.

Figure 4-1 illustrates the use of action verbs to describe Events, Accomplishments, Criteria, and Tasks. The Event "A: Preliminary Design Review (PDR) Completed" and the supporting Accomplishment A01 and Criterion A01a are assessment points. The four IMS Tasks (A01a01-A01a04) identify work that is required to be performed to enable the Events, Accomplishments, and Criteria to be designated completed. To satisfy the Event, the program must complete the

Tasks in the work package, which roll up to satisfy the Criterion. Criteria satisfy an Accomplishment, and Accomplishments roll up to complete the Event.

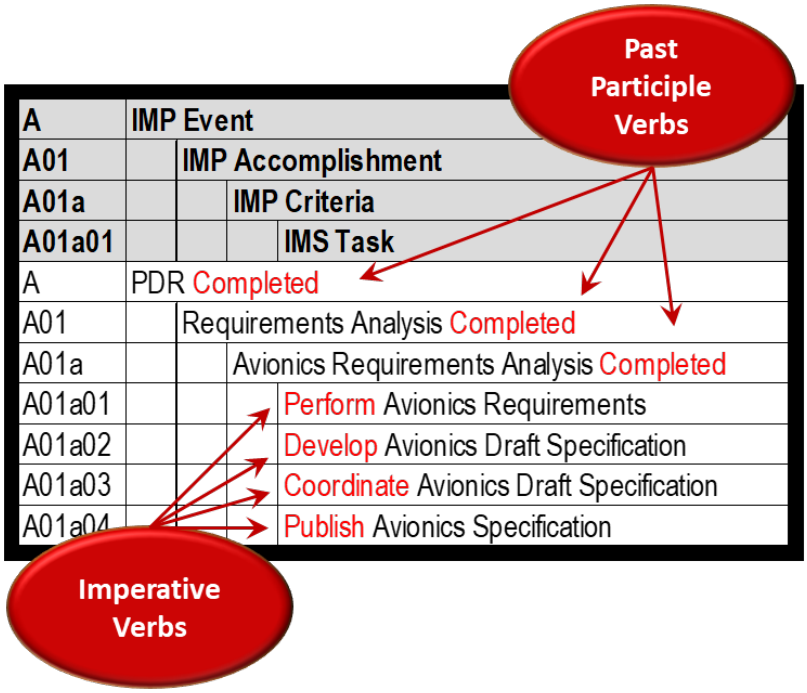


Figure 4-1. Action Verbs

4.2.2 Section 1. Introduction

The introduction should include the following:

4.2.2.1 Description. The IMP should provide a brief description of the project, system, and subsystems.

4.2.2.2 Assumptions. This is a very important paragraph. It documents "assumed" responsibilities among the Government, contractor, subcontractors, and vendors. These assumptions and ground rules need to be understood and agreed upon by both Government and contractor before the parties approve the joint Government and contractor IMP. Items may include:

- Assumptions
    - All stakeholders are committed to the project's success.
    - The project's scope, requirements, and deliverables have been clearly defined.
    - All necessary resources, including people, equipment, and funding, are available or will be made available on time.
    - Risks and uncertainties have been identified and addressed in the plan.

    - The project team has the necessary skills, experience, and knowledge to execute the plan.

- Ground Rules
    - Communication channels are established and adhered to.
    - All project activities are documented and tracked.
    - Milestones and deliverables are defined and monitored.
    - Changes to the plan are managed through a formal change control process.
    - Quality standards and metrics are established and monitored throughout the project.
    - The project is regularly reviewed to assess progress and adjust as necessary.

In some cases, the procuring activity may want the IMP Event table to include expected completion dates, which would be the dates from the execution IMS. If used, these dates may be for information or they may be considered contractual dates that must be met and could be tied to other contractual items, such as the award fee. The procuring activity should clearly state whether the dates are intended to be contractual or simply for information. Although there may be circumstances in which the procuring activity chooses to impose certain dates in the IMP (e.g., Initial Operational Capability), as a best practice most IMP dates should be for information only, to avoid creating a potential need for contract modifications in the future.

4.2.2.3 Event and Action Dictionary. The Event and Action Dictionary (EAD) is a structured list of events and actions that are critical to the success of the project. It provides a common language and understanding of the key milestones and activities that must be accomplished to achieve the project's objectives.

The EAD typically includes a detailed description of each Event or action, its dependencies, timing, and performance metrics. Each event or action is linked to specific tasks, resources, and deliverables required to complete it successfully. The EAD also provides a framework for tracking and reporting progress against the plan, identifying potential risks and issues, and making necessary adjustments to the project schedule and resources.

Some examples of events and actions that may be included in an IMP EAD include:

- Design reviews. A series of formal reviews to ensure that the design of the system meets requirements and is feasible within the project's constraints.
- T&E. T&E events conducted to verify that the system functions as intended and meets the specified performance Criteria.

- Milestones. Significant events in the project schedule, such as completion of major deliverables or the achievement of a key performance milestone.
- Procurement and production events. Activities related to the acquisition and production of hardware, software, and other resources required for the project.
- Risk management events. Activities related to identifying, assessing, and mitigating risks that could affect the project's success.

Overall, the IMP EAD serves as a roadmap for the project team, providing a clear and concise view of the critical events and actions that must be accomplished to achieve the project's objectives.

4.2.2.4 Program Organization. For a sole-source contractor-executed program or competitive contracted programs, the offeror will describe their organizational structure to their IPT level. The successful offeror's IMP program organization description will provide insight to the Government PMO to allow proper alignment of the Government personnel for project oversight and formal communications between the Government and contractor.

4.2.2.5 Reference Documents. This IMP paragraph should include all Government and contractor reference documents that are critical to the project. Government reference documents may include:

- SEP
- Risk Management Plan (RMP)
- Technical Requirements Document (TRD)
- Test and Evaluation Master Plan (TEMP) and Test Strategy
- Configuration Management Plan (CMP)
- Government IMP and execution IMS
- Government WBS
- MIL-STDs
- Software Development Plan (SDP)
- Configuration Management/Data Management Plan (CM/DMP)

Contractor reference documents may include:

- Business Process Plans
- Project Management
- Test Plans and Procedures

- Contract Manuals

4.2.3 Section 2. Numbering, Event Details, and IMP Table

4.2.3.1 Numbering System. The IMP Section 2 begins with a description of the numbering system, which usually consists of hierarchical alphanumeric numbers for both the IMP and IMS. This numbering system is a structured way of identifying and categorizing different Events, Accomplishments, Criteria, Tasks, activities, work packages, and planning packages. This numbering system is typically designed to be consistent and standardized across an entire project, so everyone in the project can understand and use the IMP and IMS.

Some programs may have multiple IMPs and IMSs for multiple contractors and subcontractors and for contractor proprietary reasons. For these cases, the overarching IMP should provide the numbering system of each sub-IMP and how they link to the overarching IMP. Each IMP on a program should use a unique numbering sequence.

Organizations can develop their own numbering systems based on organizational needs and the project management software they are using. The project management software should be able to automatically generate the alphanumeric code. Figure 4-2 provides examples of different IMP numbering methods.

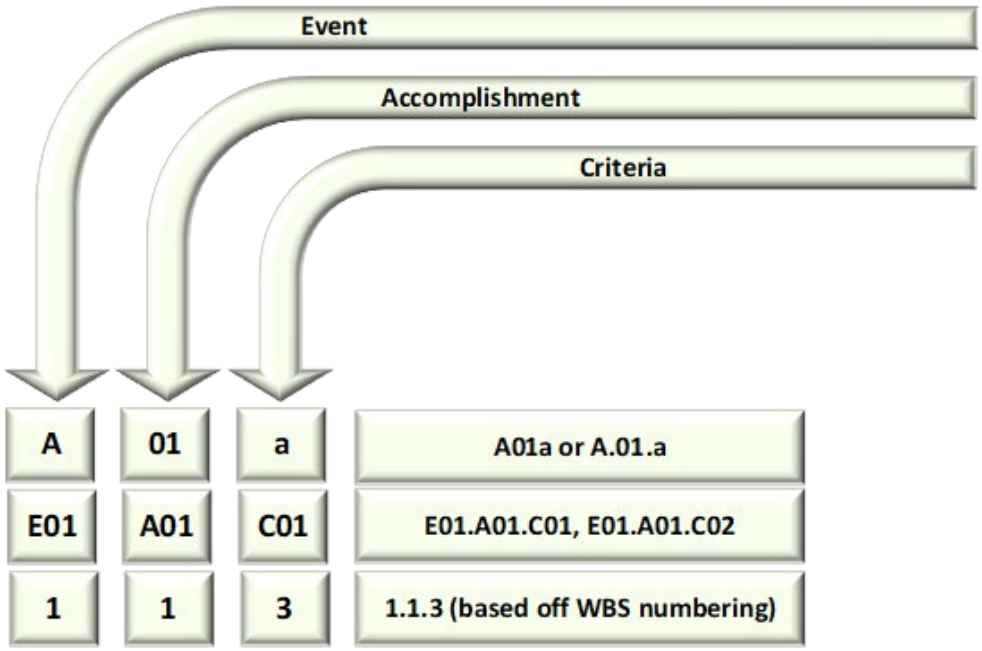


Figure 4-2. Examples of IMP Numbering

4.2.3.2 Project Event Description. The project obtains Event definitions from several sources, primarily initial project planning documents. For example, high-level project roadmaps, implementation plans, or even requirements documents may contain Events that can be

organized into a hierarchy using an IMP. A project Event description typically includes the following information:

- Event Title. A brief descriptive title for the Event or milestone.
- Event Description. A detailed description of the Event, including what is expected to be accomplished and why it is important to the project.
- Event Type. The type of Event, which could be a major milestone, a deliverable, or a decision point. DoD programs often use the abbreviation "MS" to mean "milestone." For the purposes of this guide, the abbreviation MS refers to a major MS, such as MS A, B, or C. A project may choose to use "MS" for other project-defined Events and should clarify the definition in its IMP dictionary.
- Event Date. The planned date for this Event to occur. This could be a specific date or a range of dates, i.e., if the Government program schedule indicates a milestone to be completed in a specific quarter and fiscal year, this projected date is used.
- Event Dependencies. Any Event or milestone that needs to be completed before this Event can occur, i.e., the delivery of x, y, and z need to occur before MS X.
- Event Resources. The resources required to complete the Event, including personnel, funding, facilities, and equipment.
- Event Success Criteria. The specific Criteria that must be met to consider the Event a success.

Not all programs need to go into this level of detail. If developing a new combat helmet, this outline would be overkill, but if developing a new generation combat vehicle or aircraft requiring a manufacturing capability and new technology, then this level of detail would be required.

4.2.3.3 IMP Table. The program develops the IMP table using specific elements of the project's WBS. A basic IMP table should include Events, Accomplishments, Criteria, and cross-reference to the appropriate WBS element(s). Table 4-1 illustrates an IMP table in which the level "F" represents an Event, level "F.01" represents an Accomplishment, and level "F.01.a" represents a Criterion.

Table 4-1. IMP Table Example

Activity #	Event Accomplishment Criteria	WBS #
F	**Event F - System Testing**	**1.5**
F.01	**Developmental Testing (DT) Completed**	**1.5, 1.5.1**
F.01.a	Phase I Water Testing Conducted	**1.5, 1.5.1,** 1.5.1.1
F.01.b	Hull Testing Conducted	**1.5, 1.5.1,** 1.5.1.2

Activity #	Event Accomplishment Criteria	WBS #
F.01.c	Gunnery Testing Conducted	**1.5, 1.5.1,** 1.5.1.3
F.01.d	Interoperability Testing Conducted	**1.5, 1.5.1,** 1.5.1.4
F.01.e	DT Failure Definition/Scoring Criteria Conducted	**1.5, 1.5.1,** 1.5.1.5
F.02	**Live-Fire Test and Evaluation (LFT&E) Completed**	**1.5, 1.5.2**
F.02.a	Full-up LFT&E Waiver Approved	**1.5, 1.5.2,** 1.5.2.1
F.02.b	Hull LFT&E Conducted	**1.5, 1.5.2,** 1.5.2.2
F.02.c	Troop Compartment Panels LFT&E Conducted	**1.5, 1.5.2,** 1.5.2.3
F.03	**Operational Testing (OT) Completed**	**1.5, 1.5.3,**
F.03.a	Operational Assessment (OA) I (Mock-up) Conducted	**1.5, 1.5.3,** 1.5.3.1
F.03.b	OA II (Mission Profile) Conducted	**1.5, 1.5.3,** 1.5.3.2
F.03.c	OT FD/SC Scoring Conducted	1.5.3.3

The distinction between Events and Accomplishments, or between Accomplishments and Criteria, may vary. Often the choice depends on the complexity, size, or length of the project. It is not unusual to see the same activity designated as an Event in one IMP and an Accomplishment in another. Similarly, an Accomplishment in one project may be a Criterion in another or may be a Task in the IMS. If each IMP activity supports the one above it, progressing from specific to general, then the IMP meets the intent.

- Event (F). An Event (e.g., Event F - System Testing) is a project assessment point that occurs at the culmination of significant project activities. An Event includes Accomplishments and Criteria. For an Event to be considered completed, all Accomplishments under the Event must be completed. Summary lines should not use verbs.
- Accomplishment (F.01). An Accomplishment (e.g., DT Completed, LFT&E Completed, and OT Completed) is the desired result(s) before or at completion of an Event, indicating a level of the project's progress. Although no typical number of Accomplishments are expected to be included, normally there will be two or more Accomplishments per Event. The important point is that each selected Accomplishment when completed should substantially contribute to the success of the related Event.

  In Table 4-1, "Event F - System Testing" is composed of three Accomplishments that need to be completed to consider the Event completed. The action verb "completed" needs to be defined in the EAD. In this case, "completed" means "the item or action has been prepared or accomplished and is available for use and/or review." The definition should be broad enough to cover all uses of the word in the IMP.

- Criteria (F.01a). Criteria (e.g., Operational Assessment (OA) I (Mock-up) Conducted; OA II (Mission Profile Conducted; and OT failure definition/scoring Criteria (FD/SC) Scoring Conducted) provide evidence that a specific Accomplishment has been completed. Criteria can be either quantitative or qualitative yet must be measurable. Entry Criteria reflect what should be done to initiate a review, demonstration, or test. Exit Criteria reflect what should be done to ascertain the Event has been successfully completed. There is no typical or required number of Criteria for each Accomplishment in the IMP. Generally, there should be at least two Criteria to support an Accomplishment, but there may be occasions when one is appropriate. The important point is that completion of the Criterion should provide evidence of completion of the associated Accomplishment. In Table 4-1, "conducted" and "approved" are action verbs used for the Criteria. The IMP could define "conducted" as "review or meeting is held physically, and minutes and actions plans are generated, or test or demonstration is performed."

  F.01.a Phase I Water Testing Conducted

  F.01.b Hull Testing Conducted

  F.02.a Full-up LFT&E Waiver Approved

4.2.4 Section 3. IMP Narrative

Section 3 of the IMP provides narratives, if desired, to include: Task Narratives, Process Narratives, and others as necessary (e.g., risk discussion). These will be contractually binding, so the program should be careful when choosing narratives. An option may be to rely on the SEP submittal to discuss specific process approaches. In both the Government and contractor IMPs, the narrative should address only the key elements of developing or implementing a process or procedure (i.e., what it is and how it should be tailored or implemented on the specific project). The IMP narrative does not need to provide supporting information or rationale. The contractor should provide supporting information in the technical volume of the proposal. The IMP process and Task narratives should reference a Statement of Work (SOW) paragraph number and WBS, if applicable.

4.2.4.1 Process Narratives. Process narratives may provide the Government with an understanding of the proposed critical processes and procedures before contract award. These narratives should consist of concise summaries describing key management and functional processes and procedures, how they relate to the integrated product development process, and an overview of efforts required to implement them. For example, if a SEP is not required the

Government might want an explanation of the offeror's technical approach, risk management, or software development activities. Each process narrative should include the following:

- Reference to any governing documentation, such as the contractor's standard process, or any governing DoD or Service guidance.
- An overview of the process, including process flow diagrams (see Figure 4-3).
- If the process is an existing one, a description of how the process should be tailored and implemented to the specific project.
- The description of any metrics that should be used to measure the process.

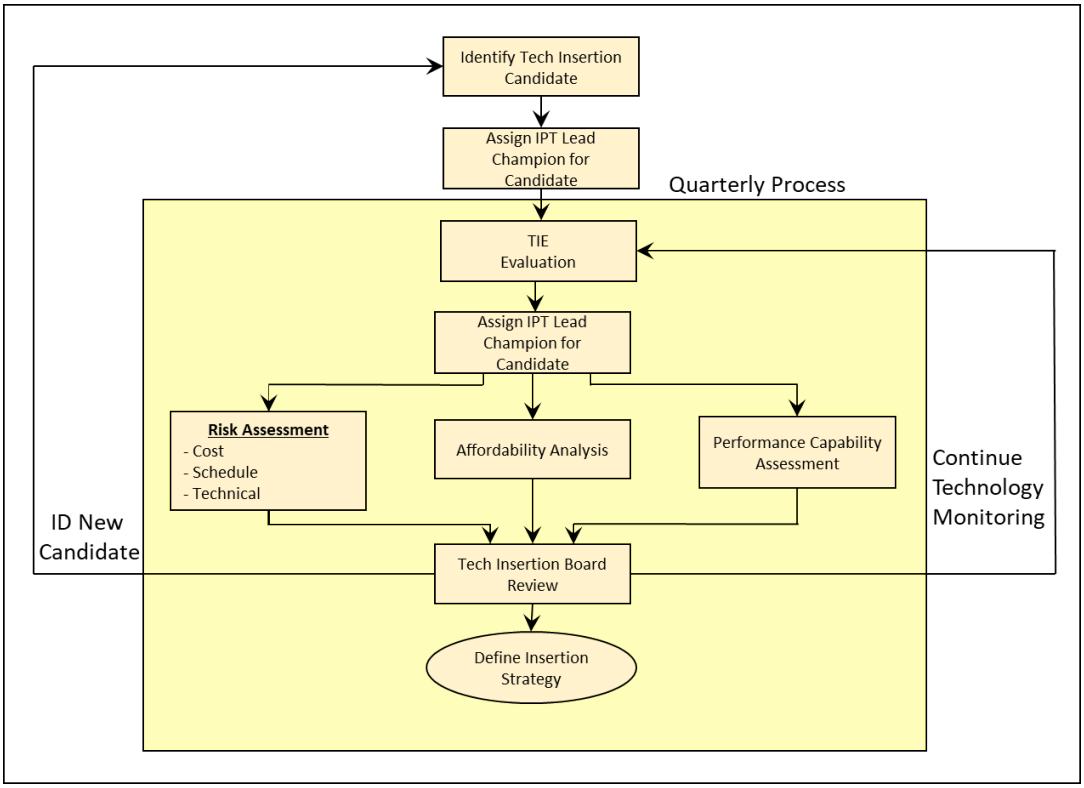


Figure 4-3. Example Process Flow Diagram for a Technology Insertion Process

4.2.4.2 Task Narratives. Task narratives may be used to describe the approach to executing those Tasks for which there may be no specific IMP Accomplishments. For example, the Government might want to define contractually how level-of-effort Tasks, such as configuration management or program control supporting the overall program, should be accomplished.

Practitioners debate whether process narratives should be included in the IMP. Some organizations use them; others discourage their use.

Reasons to include process narratives:

- Provide additional insight into critical processes to be used in executing the project.
- Provide contractual commitment to the use of processes in contractor-executed programs.
- Assist in the development of execution IMS Tasks.

Reasons not to include process narratives:

- Can significantly increase the size of the IMP.
- May necessitate a contract change if processes change.
- Decreases the contractor's flexibility to make internal process changes.
- Inhibits continual process improvements.

In general, the narrative should address only key elements of developing or implementing a process or procedure (i.e., what the process or procedure should be or how it should be tailored or implemented on the specific project). The Government and contractor's narrative need not provide detailed information or rationale. The contractor should provide amplifying information in the technical volume of the proposal. As with Task narratives, process narratives should reference a SOW paragraph number and WBS number, if applicable.

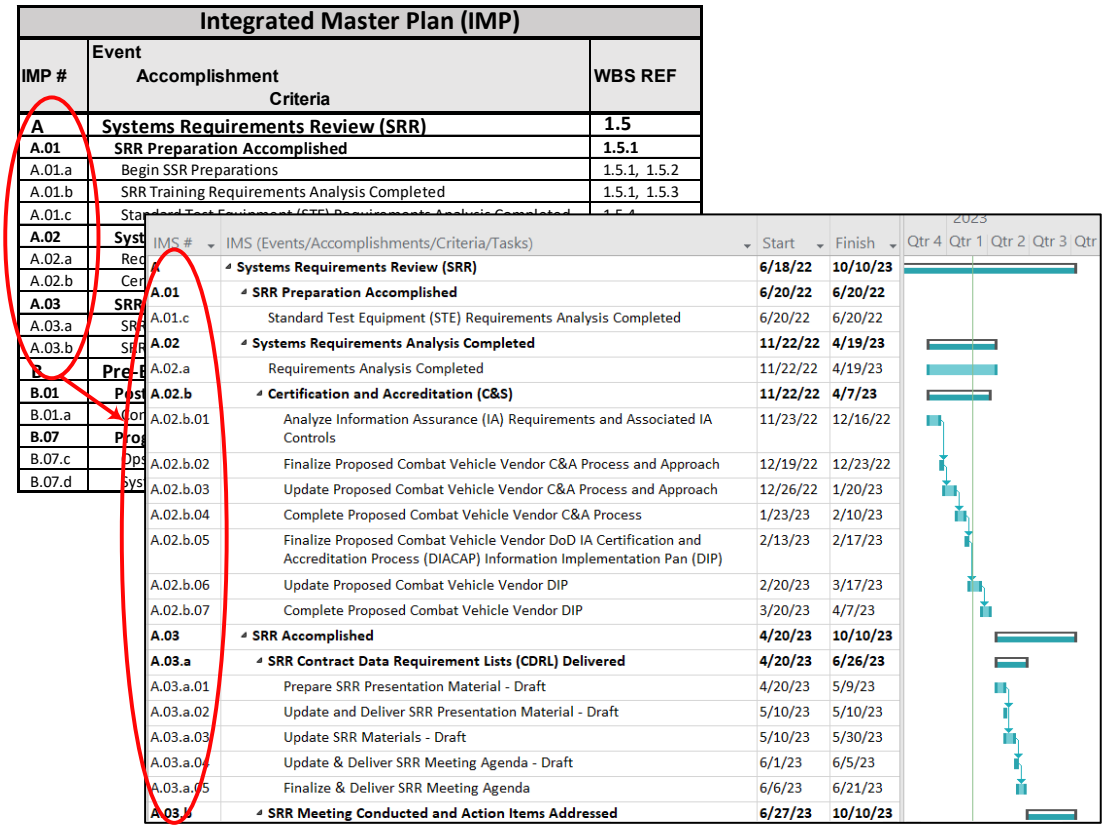
4.2.5 Section 4. Glossary

The IMP should include a glossary of terms and acronyms to ensure stakeholders have a common understanding of the terminology used in the IMP. This is especially true in complex programs involving multiple teams and stakeholders with various backgrounds and expertise.

4.3 Relationship Between IMP and IMS

Figure 4-4 shows the relationship between the IMP and IMS. The IMP tracks the completion of Events through their supporting Accomplishments and Criteria. The IMP should demonstrate the maturation of the product as it progresses through a disciplined systems engineering process.

The IMS reflects the Events, Accomplishments, and Criteria from the IMP and includes further detail in the form of Tasks with estimated dates. The IMS should display IMP traceability (e.g., through a customizable field) using a coding structure that allows for identifying IMP Events, IMP Accomplishments, IMP Criteria, and IMS Tasks supporting the Criteria.



Integrated Master Plan (IMP)

IMP #	Event Accomplishment Criteria	WBS REF
A	**Systems Requirements Review (SRR)**	**1.5**
A.01	**SRR Preparation Accomplished**	**1.5.1**
A.01.a	Begin SSR Preparations	1.5.1, 1.5.2
A.01.b	SRR Training Requirements Analysis Completed	1.5.1, 1.5.3
A.01.c	Standard Test Equipment (STE) Requirements Analysis Completed	1.5.4
A.02	**Syst**	
A.02.a	Rec	
A.02.b	Cer	
A.03	**SRR**	
A.03.a	SR	
A.03.b	SR	
B	**Pre-E**	
B.01	**Post**	
B.01.a	Con	
B.07	**Prog**	
B.07.c	Ops	
B.07.d	Sys	

IMS #	IMS (Events/Accomplishments/Criteria/Tasks)	Start	Finish
	Systems Requirements Review (SRR)	**6/18/22**	**10/10/23**
A.01	**SRR Preparation Accomplished**	**6/20/22**	**6/20/22**
A.01.c	Standard Test Equipment (STE) Requirements Analysis Completed	6/20/22	6/20/22
A.02	**Systems Requirements Analysis Completed**	**11/22/22**	**4/19/23**
A.02.a	Requirements Analysis Completed	11/22/22	4/19/23
A.02.b	**Certification and Accreditation (C&S)**	**11/22/22**	**4/7/23**
A.02.b.01	Analyze Information Assurance (IA) Requirements and Associated IA Controls	11/23/22	12/16/22
A.02.b.02	Finalize Proposed Combat Vehicle Vendor C&A Process and Approach	12/19/22	12/23/22
A.02.b.03	Update Proposed Combat Vehicle Vendor C&A Process and Approach	12/26/22	1/20/23
A.02.b.04	Complete Proposed Combat Vehicle Vendor C&A Process	1/23/23	2/10/23
A.02.b.05	Finalize Proposed Combat Vehicle Vendor DoD IA Certification and Accreditation Process (DIACAP) Information Implementation Pan (DIP)	2/13/23	2/17/23
A.02.b.06	Update Proposed Combat Vehicle Vendor DIP	2/20/23	3/17/23
A.02.b.07	Complete Proposed Combat Vehicle Vendor DIP	3/20/23	4/7/23
A.03	**SRR Accomplished**	**4/20/23**	**10/10/23**
A.03.a	**SRR Contract Data Requirement Lists (CDRL) Delivered**	**4/20/23**	**6/26/23**
A.03.a.01	Prepare SRR Presentation Material - Draft	4/20/23	5/9/23
A.03.a.02	Update and Deliver SRR Presentation Material - Draft	5/10/23	5/10/23
A.03.a.03	Update SRR Materials - Draft	5/10/23	5/30/23
A.03.a.04	Update & Deliver SRR Meeting Agenda - Draft	6/1/23	6/5/23
A.03.a.05	Finalize & Deliver SRR Meeting Agenda	6/6/23	6/21/23
A.03.b	**SRR Meeting Conducted and Action Items Addressed**	**6/27/23**	**10/10/23**

Figure 4-4. Relationship between IMP and IMS

5 INTEGRATED MASTER SCHEDULE

5.1 IMS Overview

The IMS lists the IMP Events, Accomplishments, and Criteria, and also includes detailed Tasks to depict the steps required to satisfy Criteria. The IMS provides a comprehensive overview of Tasks required to complete a project. It includes the start and end dates for each Task, as well as dependencies, durations, and resource requirements. It is an integrated, logically driven, networked-based schedule that is vertically and horizontally traceable.

The GAO Schedule Assessment Guide (GAO-16-89G 2015) lists the following as Best Practice 1: "The schedule should reflect all activities as defined in Program WBS, which defines in detail the work necessary to accomplish a program's objectives, including activities both the owner and contractors are to perform."

The IMS should include all elements associated with the development, production or modification, and delivery of the total product and project high-level plan. The IMS should include durations for each discrete work package and planning package (or lower-level Task or activity), along with predecessor and successor relationships, and any constraints that control the start or finish of each work package and planning package (or lower level Task or activity).

The result is a fully networked bottom-up schedule that supports critical path analysis. Although durations are assigned at the work package and planning package (or lower-level Task or activity) level, these durations will roll up to show the overall duration of any Criterion, Accomplishment, or Event.

A project should use the IMS to verify attainability of contract objectives, to evaluate progress toward meeting objectives, and to integrate the project schedule activities with all related components. The IMS should be defined to the level of detail necessary for day-to-day execution of the project.

The program should develop the IMS using the GAO's 10 Best Practices (GAO-16-89G 2015) and should include clear justification for deviations to the GAO guidelines. The IMS should:

- Maintain consistency with the IMP. The first three levels of the IMS (Events, Accomplishments, and Criteria) should be directly traceable to the IMP. IMP line numbers and labels should be inserted verbatim into the IMS as milestones.
- Illustrate the interrelationships (successor/predecessor logic ties) among Events, Accomplishments, Criteria, and Tasks.
- Indicate early start and late completion dates and duration for each Event, Accomplishment, Criterion, and Task.

- Provide for critical path analysis.
- Provide the ability to filter schedules multiple ways (e.g., by Event, IPT, WBS, earned value management system (EVMS), SOW, or Contract WBS (CWBS)).
- Reflect schedule updates on a regular basis to indicate completed actions, schedule slips, and rescheduling actions.
- Provide the capability for the Government, contractor, or support contractor to perform "what-if" schedule exercises without modifying the master project schedule.
- Maintain consistency with planning package and work package definitions and the EVMS.
- Be traceable to the WBS items supported by each work and planning package.

5.1.1 Types of Schedules

Unless referring to a specific type of IMS, this guide will use IMS. Organizations may use various terms to identify other types of project schedules and who is maintaining them. These are execution schedules, and the development process is similar.

Government Pre-Award Schedule: The Government pre-award schedule[1] is a Government-produced schedule used to plan, coordinate, and track the progress of the Government and industry activities necessary to achieve contract award. Pre-award schedules are normally associated with activities completed during the Materiel Solution Analysis (MSA) and TMRR phases, and during any phase requiring a competitive bid. A Government pre-award schedule can be produced using project management software, spreadsheets, or any other method deemed suitable by an organization.

Government Program Schedule: The Government Program Schedule (also known as a roadmap) is a high-level figure that defines project phases, major milestones, and timelines from project start to completion. This schedule is usually used in programmatic documents and in quarterly project briefings. These schedules are updated as the project matures and timelines shift.

Program Integration Schedules: Integration schedules are complex program schedules that may be aggregated from different acquisition pathways.

Initial Execution IMS (IE-IMS): The IE-IMS is a pre-RFP IMS prepared by the Government. The IE-IMS focuses on how the Government envisions project execution. The IE-IMS is

[1] The term Government pre-award schedule is used to replace Government pre-award IMS, since some organizations do not use an IMS for this schedule. Although the term has changed, it is still a best practice to use program management software for both internal and external schedules.

normally an attachment to the RFP to allow offerors to view and comment on the Government's proposed schedule.

Execution IMS (E-IMS): The E-IMS is a comprehensive IMS used to manage the project. The E-IMS is updated on a regular basis. It should contain all the contract IMP Events, Accomplishments, and Criteria from the contract award to completion of the contract.

Proposed IMS (P-IMS). The P-IMS is the offerors' proposed E-IMS provided as part of their bid to an RFP. The basis for this IMS is the RFP's IE-IMS.

Integrated Government Schedule (IGS). IGS is a term used by some Government organizations to identify a Government-built integrated schedule that captures a specific Government unit's activities (i.e., in-house effort). Whether the IGS reflects/captures additional detail or not outside of the specific unit (e.g., other Government unit's work related to the project, or non-Government effort related to the project) is up to the Government Lead that requested the IGS. As such, the range of detail found in each IGS can vary from being a simple subset of Government activities related to a project to being a very detailed integrated schedule, including those that could be called an E-IMS, to support a project or program.

Contractor IMS (C-IMS). The C-IMS is an E-IMS maintained by the prime contractor. This IMS is the Government- and contractor-approved IMS in which all project Tasks and activities are closely monitored and updated. The Government also may maintain a version of this IMS to track project progress.

Subcontractor IMS (SC-IMS). The SC-IMS is a subset of the C-IMS and provides detailed scheduling of Tasks and activities for each subcontractor. The SC-IMS should contain no Tasks or activities that are not part of the C-IMS.

Figure 5-1 illustrates types of schedules.

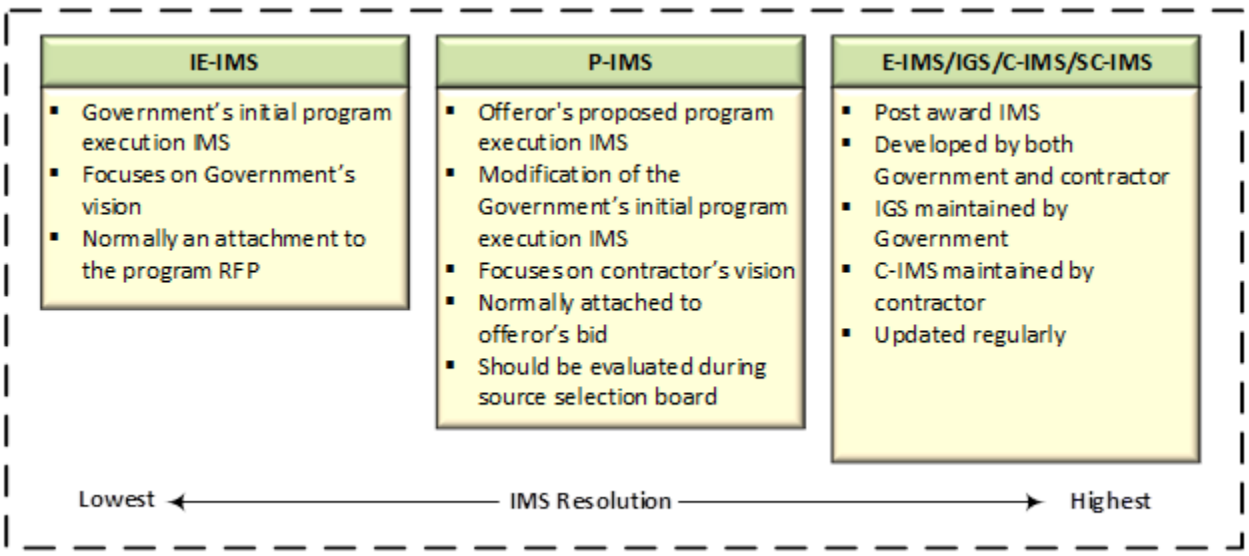


Figure 5-1. Types of IMSs

5.2 IMS Requirements

The overall scope of the IMS will vary depending on the complexity of the project, type of project, and its technical, organizational, and external risks. Schedules need to be comprehensible to the end users and need to conform to organizational standard operating procedures for schedule development. The IMS should be created using a commercial-off-the-shelf (COTS) scheduling software application capable of representing activity precedence relationships in a network structure. When a contractor is required to deliver an IMS, unless otherwise provided in the Contract Data Requirements List (CDRL), they should deliver the IMS to the PMO digitally in the native digital format (an electronic file produced in the contractor's project management tool).

5.2.1 IMS Content

The schedule should contain the contract milestones, Accomplishments, and discrete Tasks and activities (including planning packages where applicable) from contract award to the completion of the contract. The IMS should be an integrated, logical network-based schedule that correlates to the CWBS. The schedule should use a numbering system that provides traceability to the IMP (if applicable) and Contract SOW (CSOW). It should contain contractual milestones and descriptions. It should display periodic analysis of progress to date.

Milestones are points in time that have no duration but denote the achievement or realization of key Events and Accomplishments such as project Events or contract start dates. Milestones do not consume resources since they have no duration.

- Horizontal Integration is the logical relationship and time-phasing between tasks and milestones from program start to finish.

- Vertical Integration demonstrates the consistency of data between the various levels of schedules and consistency of data between various WBS elements and IMP/IMS elements within the schedule.

5.2.2 IMS Traceability

The IMS should trace directly to the WBS and IMP. The WBS provides the work elements common to all programs. The IMP uses those elements to identify project Events, Accomplishments, and Criteria. The WBS bottom-level work packages define the work required to achieve the Criteria (Figure 5-2). The IMP identifies the Criteria. The IMS adds which Tasks are intended to satisfy the Criteria, when the Tasks will be completed, and the order in which they should be completed. The IMS indicates when the Tasks will be completed and the order in which they need to be completed.

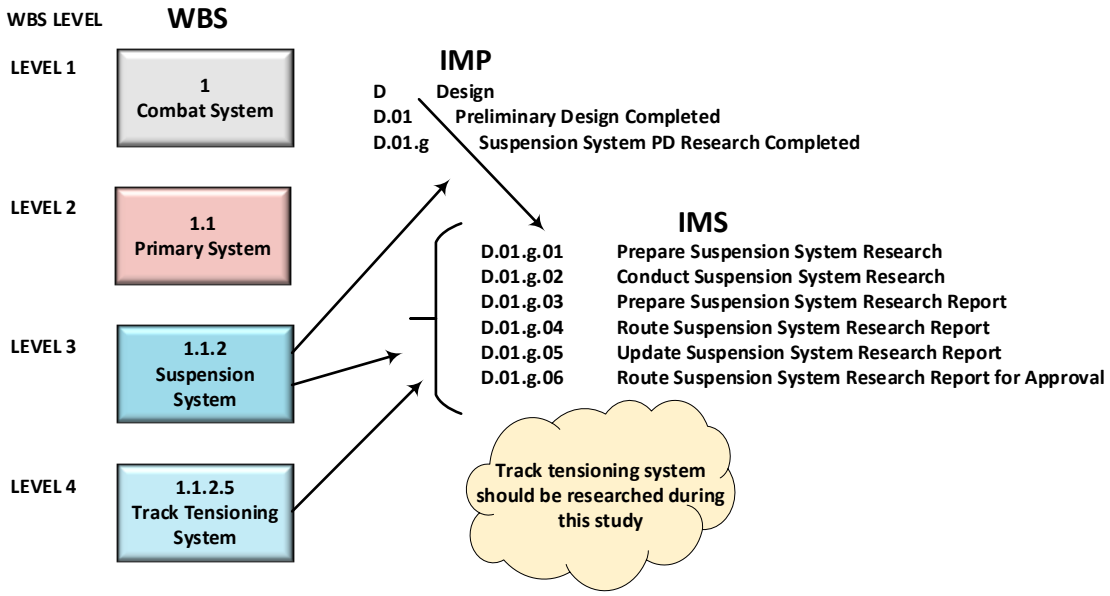


Figure 5-2. WBS, IMP, and IMS Relationship

As a result, the IMS should include all Tasks and activities associated with development, production or modification, and delivery of the total contract. The IMS software tool includes Task duration, along with predecessor and successor relationships, and any constraints that control the start or finish of each Task. Although durations are assigned only at the Task level, these durations should roll up to show the overall duration of any Event, Accomplishment, or Criterion.

As the IMS associates specific dates with all the Events, Accomplishments, and Criteria of the IMP along with the supporting Tasks and their relationships, it serves as the detailed schedule for day-to-day execution of the project and, thereby, an effective tool for management of the project and insight into the progress of the effort. The project can use the IMS to identify problem areas and to help define priorities for management attention and action. Because actual progress can be

compared with the planned progress, the IMS is key to providing performance measurement and evaluating remaining work scope and duration.

5.3 Developing the IMS

5.3.1 Review IMP

The first step in developing an IMS is to review the IMP Events, Accomplishments, and Criteria as well as the IMP Government and contractor business processes. The IMS will build on the IMP structure with Tasks and detailed work packages.

The work packages are a group of related tasks or activities that are managed as a single unit. Unlike planning packages, work packages have an assigned earned value technique, i.e., an assignment describing how budgeted cost of work scheduled (BCWS) also known as earned value, will be taken.

The descriptive labels used in the IMS, for Events, Accomplishments, and Criteria, should be identical to those used in the IMP. Each Event, Accomplishment, and Criterion should be labeled with a brief descriptive title and should be numbered or coded to correlate to the IMP. Through this structure, the IMS Tasks are directly traceable to the IMP.

The IMS lists the dates by which each of the IMP Criteria, Accomplishments, and Events are planned to occur as well as the estimated duration of detailed Tasks required to meet them. Therefore, only after developing the IMS can the project team determine the expected dates for completion of the IMP Events.

The IMS itself typically is not contractually binding because dates are subject to change as the project proceeds and the actual progress may not match with planned estimates. In addition, the detailed Tasks may change for a variety of reasons without affecting the validity or completion of the Criteria. The IMS is a living document that is continually adapting to change as the project progresses. Stakeholders and schedule teams meet on a regular basis to update and status the schedule. Establish resource availability Dates provided in an IMS are not due dates, but realistic expectations for Task completion. To ensure the IMS is event driven, not schedule driven, the project should insist on completing all entry Criteria for an Event before conducting an Event.

The order may vary by circumstances, but the typical steps in developing an IMS, using the IMP, are the following (Figure 5-3):

1. Determine Project Objectives. Project objectives are derived directly from the SOW or CSOW. The SOW provides a clear definition of the project's scope, including the goals and deliverables. Other key benefits include defining project scope, requirements, and timelines.

2. Create or Adopt a WBS. The WBS provides a hierarchical breakdown of project activities into smaller, more manageable components.

3. Develop the IMP. The IMP provides a high-level overview of the entire project, including objectives, goals, and major milestones. Though the basis of an IMP is the WBS, it is normally developed in parallel with the WBS.

4. Define an Organizational Breakdown Structure (OBS). An OBS is a hierarchical model or diagram that represents an organization's structure, identify relationships between different departments, teams, and individuals. It provides a visual representation of the organization's structure and the reporting relationships within it. The OBS is typically used to assign roles to specific individuals, teams, or sections with specific project Tasks or activities within specific control accounts. Define detail work (mainly identify Tasks, which can be a decomposition of control accounts to work and planning packages to Tasks).

5. Develop the IMS.
   - Define Tasks (duration and logic).
   - Establish Resource Availability
   - Identify Milestones. This process links the IMS to the IMP and WBS.

6. Construct the IMS network (logic ties).
   - Validate the IMS.
   - Adjust network.
   - Set IMS baseline.

7. Identify the Critical Path

8. Plan for Monitoring Status and Reporting

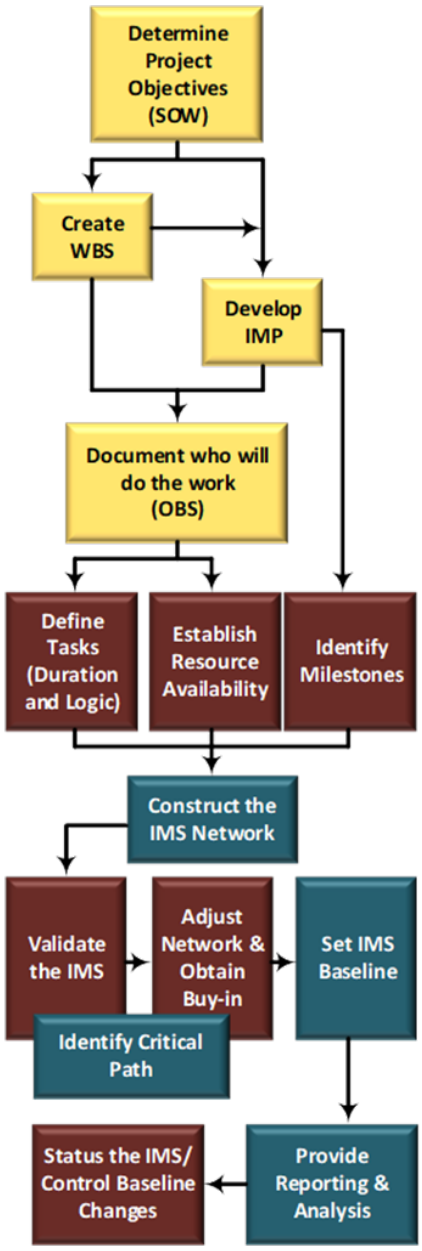


Figure 5-3. IMS Development Process

- Status the IMS/Control Baseline Changes. Status the IMS refers to the current progress of the project relative to the planned schedule. This can be expressed in several ways, such as:
  - On Track. The project is progressing according to the planned schedule, with Tasks being completed on time and within budget.
  - Behind Schedule. The project is not progressing as planned, and Tasks are being completed later than anticipated. This may be due to factors such as delays, resource constraints, or unexpected issues.
  - Ahead of Schedule. The project is progressing faster than anticipated, and Tasks are being completed earlier than planned. This may be due to factors such as efficiencies in the project plan or unexpected opportunities.
  - At Risk. The project is at risk of falling behind schedule or exceeding the budget.
- Provide Reporting and Analysis. The reporting and analysis conducted typically focus on tracking progress of the project and identifying potential delays or issues that could impact the project's timeline or budget.

5.3.2 Develop IMS Document

Typically, in addition to the IMS, each offeror creates and submits an IMS document that explains their schedule approach, defines how to use the electronic file, and identifies the defined fields. This document is used to facilitate evaluation and allows the offeror to provide additional information on the IMS. The following is one suggested format for the IMS document. This structure can be tailored as necessary to meet individual project needs.

Section 1. Provides an introduction including:

- Short overview of the IMS.
- Assumptions and ground rules for the IMS (e.g., calendar used, holiday constraints, etc.).
- Description of unique features of the IMS, such as:
  - Numbering system description
  - Additional data fields included (identify associated text or other field).
  - Description of how the IMS and any changes to it should be managed.

Section 2. Supporting schedule rationale for items such as long Task durations, Task constraints other than "as soon as possible (ASAP)," or very long lead or lag times. Leads should be avoided, but if used they need to be explained.

Section 3. Key elements of the approach taken by the offeror in Gantt or tabular format, and a discussion of the project critical path. The critical path should be easily distinguishable in report

formats. This section also would be appropriate for a discussion of any schedule risk assessment (SRA) to be performed by the offeror.

Section 4. Glossary of terms and acronyms used in the IMS, as required in the RFP, or as determined by the offeror.

Section 5. Summary schedule (Gantt format – normally one page, but can be longer for complex programs, and tabular format).

5.3.3 Define Project Management Tool Settings and Attributes

A project management tool (i.e., schedule software tool) can be powerful, depending on what information is being tracked and the data entered into it is accurate.

Before entering the Events, Accomplishments, Criteria, and Tasks into the schedule software tool, the users should first become familiar with the software their organization uses. If the organization does not have a standard software scheduling template, the schedulers will have to establish one. This includes setting up an automatic numbering system; determining what fields are required (dates, durations, cost, etc.); creating custom calendars with holidays and other unique dates associated with the project management team, i.e., recurring IPT meetings; establishing status date for current update cycle; and confirming Tasks are set to "auto schedule."

Automated Numbering. Automated numbering prevents duplicate numbering and provides a logical flow from specific milestones to the working and planning packages required to reach that milestone. An IMS numbering system is illustrated in Figure 5-4. Organizations can develop their own numbering system, based on their organizational needs and project management tools.

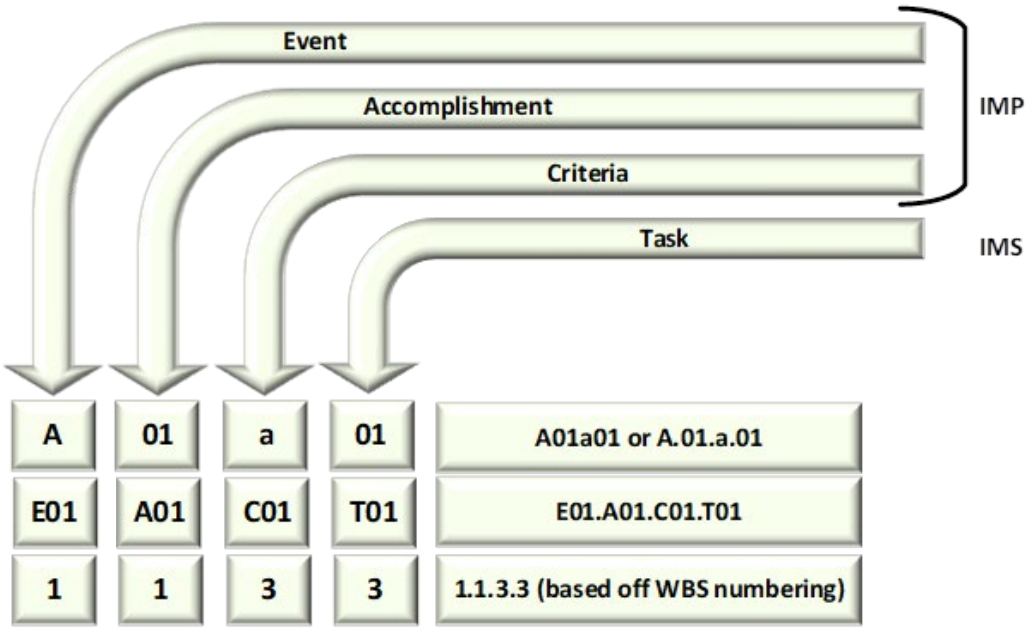


Figure 5-4. IMS Numbering System

Each Task is further refined by attributes. These attributes provide more detail to each Task. Some common attributes include the following:

- Start. Planned Task and project start date.
- Duration. The total amount of time to complete a Task.
- Finish. Planned Task and project finish date.
- Actual Start. Actual Task and project start date.
- Actual Finish. Actual Task and project finish date.
- Resource. People, equipment, and material required to accomplish Task.
- Predecessor. Task that must be completed before another Task.
- Successor. Task that must be completed after another Task.
- Critical. Task that is identified as being on the critical path. Tasks on the critical path need to be completed on time to ensure the project remains on schedule. Critical path can change based on updates to the IMS.
- Other Attributes. May include percentage of work complete; cost; actual start; actual finish; assignments; budget related attributes; cost; cost variance; etc.
- Project Start Date. The team should initiate the IMS by entering the project start date. This entry should enable the project management software tool to automate the remaining start and finish dates as the team enters Tasks, Task start dates, duration, and predecessor and successor relationships.
- Initial Column Settings. The IMS is developed in several stages. The first stage includes entering the IMP information and the IMS Tasks related to the IMP Criteria. The columns initially required to start the IMS include WBS, Task Name, Duration, Start, Finish, Predecessors, and Successors, Task Name, Duration, Start, Finish, Predecessors, and Successors (Figure 5-5).

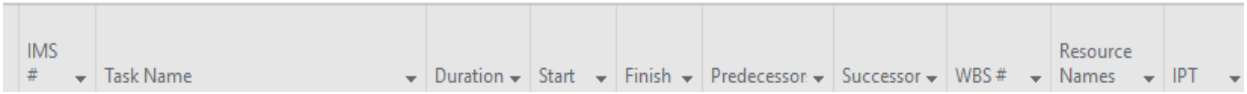


Figure 5-5. Initial Column Settings

5.3.4 Develop Tasks

Each IPT should develop its portion of the IMS by determining what Tasks are necessary to support the IMP. For each Task, the IPT should provide a Task name (including an active verb in imperative form); a duration, and relationship with other Tasks (predecessor(s) and successor(s)). This should allow the identification of the critical path for the project. Minimum and maximum durations may be required for an SRA. The IPT should also confirm the related WBS element for

each Task with the IMP and IMS point of contact, using the WBS Dictionary, which lists and defines the WBS elements.

The building of the IMP and IMS is an iterative process. If an IPT, while building the IMS, should identify required Tasks that do not logically fall under existing identified IMP Criteria, the IPT should suggest the additional Criteria or Accomplishments under which those Tasks would fall. The desired result should always be a clear track from Events to Accomplishments to Criteria to Tasks. If a Task has no logical WBS home, the WBS should be adjusted. This structure allows the Government and contractor to evaluate the progress and maturity of the project and ensures the project is event driven.

In defining Tasks for the IMS, the project may need to add further levels of indenture or subtasks to capture the detail desired by the IPTs and to further define work packages. This is particularly true for higher-level Tasks in the IMS describing work performed by major subcontractors. When a prime contractor is required to deliver an IMS, that contractor IMS may contain a Task that is further broken down into subtasks within the subcontractor's internal IMS. Depending on criticality, the breakdown to subtasks may be included in the prime contractor's IMS. The use of subtasks is not unusual and is compatible with the IMP and IMS structure and philosophy. The numbering system should simply be further defined or extended (e.g., D01a02a or D01a02.1).

5.3.5 Estimate Task Duration

Once the program has identified IMS Tasks, it will estimate duration for those Tasks and determine the activities to associate with the task. This step will require various types of information, including but not limited to the following:

- Historical Data: Historical data on the amount of time to complete certain Tasks and activities.
- Availability of Resources: Availability of required resources, which can significantly impact the duration of Tasks and activities.
- Task Dependencies. Tasks and activities that are dependent on one another and the sequence they are performed can impact the duration.
- Working Hours versus Non-Working Hours. Rules regarding what constitutes working hours, such as a decision of 8 or 10 hour working days; 5 or 7 day work week, etc. These rules can affect the schedule.
- Quality of Resources. Experienced personnel versus inexperience personnel; state-of-the-art facilities and equipment versus sub-par facilities and dated equipment. Quality of resources can play an important role in the time it takes to complete an activity.

- Risk Factors. Potential Events or conditions that can influence the duration of Tasks. Identifying and assessing potential risk factors can assist in developing contingency plans and estimating Task and activity durations more accurately.

Task duration estimation techniques are used to predict the amount of time needed to complete specific scheduling Tasks and activities. The various estimation techniques include:

5.3.5.1 Analogous Estimation. This technique, also known as a top-down estimation, involves comparing current project with similar past projects. Analysts compare similar Tasks between past and current projects, including differences such as manufacturing techniques; materials; changes in process; equipment, facilities, regulations, and quantities. Analogous estimation is primarily used when there is limited information available about the project.

5.3.5.2 Three-Point Estimation. This technique, also known as Program Evaluation and Review Technique (PERT), provides three estimates for each Task:

- Optimistic Estimate. This is the best case scenario estimate, assuming everything goes as planned.
- Pessimistic Estimate. This is the worst case scenario estimate, assuming everything goes wrong. Problems are introduced such as supplier delays, manpower shortages, and other problem sets that potentially cause schedule problems.
- Most Likely Estimate. This is the most realistic estimate based on normal circumstances and potential challenges. This technique falls between the optimistic and pessimistic techniques.

Once these estimations are determined, a weighted average is calculated to arrive at a final estimation. The three-point schedule estimation technique considers the uncertainty and variability of each Task or activity.

5.3.5.3 Parametric Estimation. This technique uses statistical data to estimate the duration of Tasks based on historical data on similar projects. Parametric schedule typically requires a large amount of data and statistical analysis to develop accurate models. These models may be based on factors such as project size, complexity, and team productivity. They may also consider external factors such as market trends, technological advancements, and regulatory requirements. The parametric estimation technique can be a powerful tool; however, it is important to ensure historical data used is relevant and accurate.

5.3.5.4 Single-Point Estimation. A single-point estimate is a subject matter expert’s opinion of what the Task duration is likely to be. The benefits include that it is simple, it is easy to

communicate, and it lends toward quick decision making. The downside is that it can be inaccurate, leave no margin for error, and provide limited insight.

Refer to organizational policies and procedures for how to estimate schedule durations.

5.3.6 Review Task Duration Issues

Long Duration Tasks. According to the DCMA, any Task or activity longer than 44 days is considered a long-duration Task. If the IMS has long-duration Tasks (activities not equal in length to the status interval), the team should review these Tasks to determine if further breakdown is appropriate. If not, the Government or contractor may provide the rationale in the IMS document (Figure 5-6).

During project execution, these activities may need to be further defined and broken into individual elements of shorter duration. Disadvantages of long-duration Tasks include the possibility of distorting the critical path and making it difficult to measure progress. In the example, conducting the generic combat vehicle OA could be broken down even further to include subtasks (e.g., conducting each phase of testing and transportation of test equipment to or from each phase of testing).

	IMS #	Task Name	Duration	Start	Finish	Rationale
1	A02b07	Procure repair parts for OA repair block	**200 days**	8/30/21	6/3/22	Typical procurement time to requisition unique repair items not currently in supply system.
2	F01a06	Conduct generic combat vehicle OA	**150 days**	7/11/22	2/3/23	OA has 4 consecutive phases (gunnery, amphib, desert and cold weather).
3	F01b07	Perform post test data reduction, analysis and reporting	**120 days**	2/6/23	7/21/23	Typical length of time to reduce, analyze and report data.
4						

Figure 5-6. Example of Long-Duration Tasks

Lead Time. (Avoid). A lead, also referred to as negative lag, has an accelerated time between start or finish of a predecessor Task. These dependencies should be avoided due to complexity, increased risk, and lack of precision. Figure 5-7 provides an example of lead time. In this example, analyzing data and producing the OA I test report Tasks are scheduled to start before their predecessor Tasks. This scheduling potentially can be accomplished because data from earlier test events can be analyzed, and sections of the test reports can be written where test events have been completed. Refer to organizational policies concerning lead times.

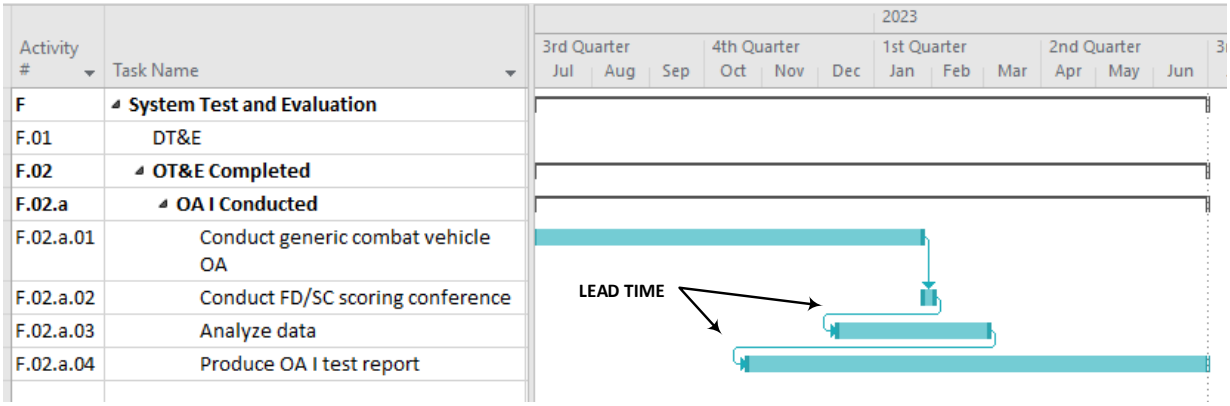


Figure 5-7. Example of Lead Time

Lag Time. Lag time is a delay between the start or finish of a predecessor Task, causing a gap between the two Tasks. Figure 5-8 provides an example of lag time. In this example, test vehicles are shipped to the Arctic Test Center via opportune airlift. Once the vehicles arrive at the Arctic Test Center, the prerequisite for the subsequent testing states that the vehicles must acclimate at least 45 days to outside temperature prior to commencing the cold weather testing. Therefore, a 45-day lag is placed into the logic flow between the vehicle arrival and the subsequent testing.

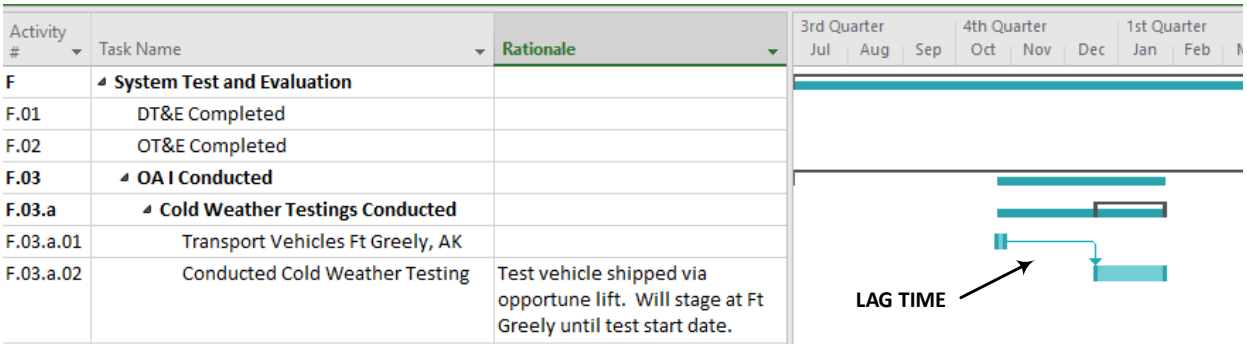


Figure 5-8. Example of Lag Time

5.3.7 Minimize Time Constraints

When developing an IMS, the overall goal is to be free of time constraints on Tasks. Time constraints are user-imposed restrictions, applied via the scheduling tool, on the start date (start constraint) or finish date (finish constraint) of a Task or milestone. Time constraints can affect the Total Float (TF) calculation on tasking, as these constraints can limit the movement of tasking that would normally occur via logic ties. TF is the number of days a project can be delayed before delaying the project completion date. Applying a Time constraint could cause activities that, based on logic ties, are non-critical (i.e., have TF available) to become critical.

Constraints are often categorized as either hard or soft, depending on how the constraint restricts the ability of the activity to accelerate or slip according to the established network. Hard

constraints prevent activities from starting or finishing later than planned. Mandatory start and finish constraints are the most rigid because they do not allow the activity to either take advantage of time savings by predecessor activities or slip in response to delayed predecessors or longer-than-scheduled durations.

By setting the early and late dates of an activity equal to each other, a mandatory start or finish constraint immediately eliminates all float associated with the activity and renders them static in time; successors might start on the next day, even though unconstrained logic would not permit it. Hard constraints are highly discouraged as they can cause scheduling problems which can result in an overall negative impact on a project. Hard constraints include:

- Start No Later Than (SNLT). Schedules an activity to start on or before a certain date. That is, it prevents the activity from starting any later than a certain date. SNLT constraints are also called start on or before constraints.
- Finish No Later Than (FNLT). Schedules an activity to finish on or before a certain date. That is, it prevents an activity from finishing after a certain date. FNLT constraints are also called finish on or before constraints.
- Must Start On (MSO). Schedules an activity to start on a certain date. That is, it prevents the activity from starting any earlier or later than a certain date, thereby overwriting network logic. MSO constraints are also called mandatory start constraints.
- Must Finish On (MFO). Schedules an activity to finish on a certain date. That is, it prevents the activity from finishing any earlier or later than a certain date, thereby overwriting network logic. MFO constraints are also called mandatory finish constraints.

Soft constraints restrict the ability of the activity to start or finish early, depending on the network logic, but allow the activity to start or finish later than planned. These constraints allow delays to permeate the schedule, and given available float, possibly affect the project's end date. Soft constraints include:

- Start No Earlier Than (SNET). Schedules an activity to start no earlier than a certain date. SNET constraints are often used to delay activities in response to available resources, such as labor or funding. The problem with SNET is it prevents the constrained activity from dynamically taking advantage of possible time savings being produced by predecessor activities.
- Finish No Earlier Than (FNET). Schedules an activity to finish no earlier than a certain date.
- ASAP. Schedules a Task or activity as early as possible, without delay. It is often used when no specific deadline for a Task exists, but the Task is still considered to be a high priority.

- As Late As Possible (ALAP). Schedules a Task or activity to be delayed as long as possible without affecting the project timeline, in order to maximize available time for other Tasks.

The IMS should provide a rationale for constraints other than those needed to enhance the understanding of all IMS users. Figure 5-9 provides examples.

TASK ID*	TASK NAME	CONSTRAINT	RATIONALE
L02a01	Order XXX Group A & B production materials (Lot Y)	Start no earlier than	Represents the beginning of the fiscal year, the earliest the Government can award the production option
No. 324	Receive GFE support	Start no earlier than	Projected earliest delivery date by Government

Figure 5-9. Example of IMS Constraints

5.3.8 Identify Relationships

To build a truly integrated schedule that accurately reflects project status, all interrelationships and links among Tasks should be identified. Without accurate relationships, the planned execution phasing could be wrong, the critical path could be wrong, and any statistical schedule risk assessment should be suspect. The IPT members responsible for the Tasks should determine these relationships and iterate them with other IPTs. The relationships are normally assigned to the Tasks as predecessor relationships, and the automated scheduling tool should normally link and generate the listing of successor Tasks. Types of relationships include the following:

Finish-to-Start (FS). FS is the standard “one Task must finish before another starts” link. For example, since a test cannot begin until test procedures are written, the prerequisite for the “Conduct tests” Task is “Write test procedures” with an FS relationship. This is the cleanest relationship for critical path analysis.

Start-to-Start (SS). SS is used when one Task cannot start until another starts (often involving some lag time). For example, a test is scheduled to go on for 4 weeks, but the Task of gathering test results can begin 1 week after the start of the tests. Therefore, the predecessor for the “gathering results” Task is “Conduct tests” with an “SS+5d” relationship.

Finish-to-Finish (FF) (Avoid). An FF dependency means the finish of one task is dependent on the finish of another task, i.e., the second task cannot be completed until the first task has been completed. These dependencies can be useful in certain situations, but they should generally be avoided due to lack of flexibility, increased risk and reduced efficiency. They are appropriate when only the Task completion (but not the Task start) is driven by another Task. For example, the design of an air vehicle could start anytime, but cannot be completed until 1 month after wind

tunnel results are available. In this case the “Conduct wind tunnel tests” Task would become a predecessor for the “Design the air vehicle” Task with a “FF+22d” relationship.

Start-to-Finish (SF) (Avoid). An SF Task contains a dependency between the start of one Task and the completion of another. In an SF relationship, the predecessor Task must start before the successor Task can finish. SF links are considered contradictory because the logic entails that the predecessor must start for the successor to finish and can cause scheduling difficulties; therefore, they should never be used.

All discrete Tasks should have a predecessor and a successor, the exceptions would be the start milestone and end milestone.

Printing a network PERT diagram of reasonable size can be difficult; however, some projects can provide a view that illustrates network relationships. Figure 5-10 gives an example of such a view, which shows the predecessors and successors for any selected Task. The view is a “combination” view, with the top half a Gantt view and the bottom a Task PERT view.

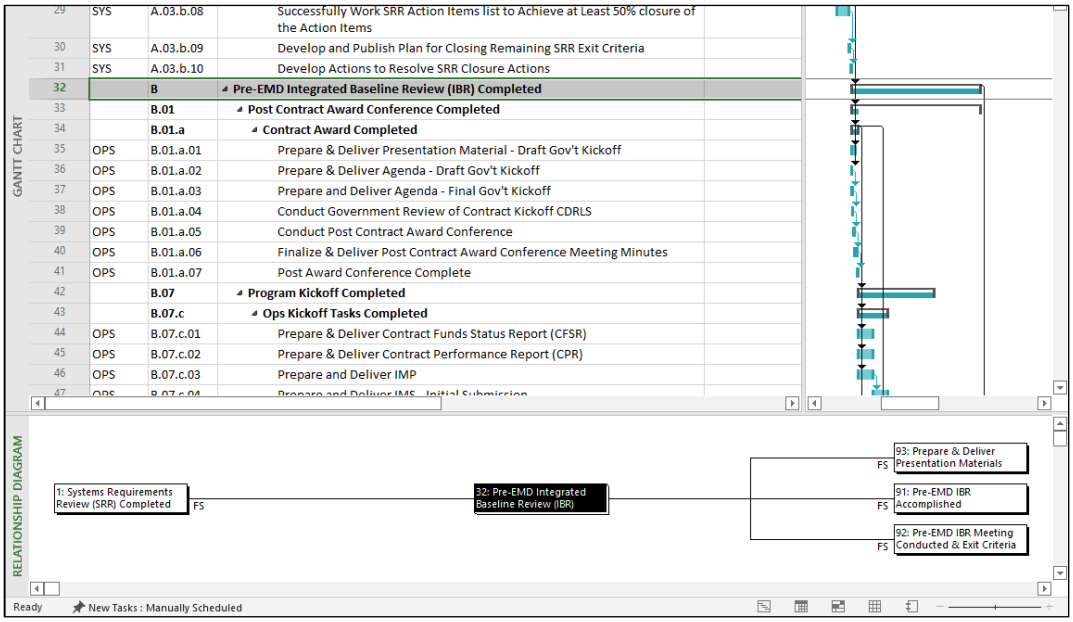


Figure 5-10. IMS “Combination” View with Network Relationship

The IMS should allow sorting or grouping of the IMS by IPT, WBS, and other fields. Sorting filters can be used to customize the output to the user’s needs. Figure 5-11 is an example of sorting the IMS by IPT. In this case, a report can be produced to provide a status of each IPT.

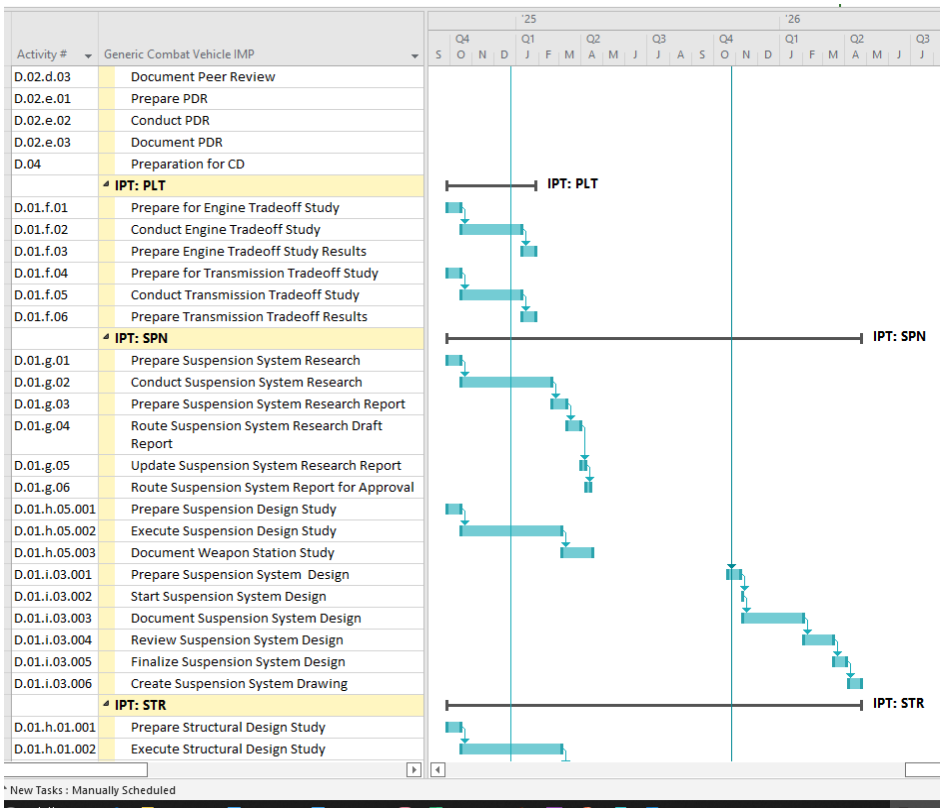


Figure 5-11. IMS Sorted by IPT

5.3.9 Identify IMS Critical Path

The critical path is the sequence of discrete Tasks in the network with the longest duration through the project. Typically, Tasks on the critical path have the least amount of total slack. In an IMS there can only be **one** critical path at any given time. Ideally, Tasks along the critical path have zero days of total slack. Schedule software can display the critical path, but there are many factors that can skew this data such as constraints, calendars, lags/leads, or deadlines, even when use of such elements is justified. After the initial schedule build, the scheduler should validate the critical path displayed by the software by checking the following elements:

- Verify that the critical path is a continuous sequence of discrete Tasks from the present to the end Task or milestone for the project.
- Identify any gaps on the path caused by lags.
- Identify any gaps on the path caused by constraints.
- Identify any gaps on the path caused by a customized calendar.
- Verify there are no start-to-start successor Tasks only (no dangling Tasks).
- Verify there are no LOE, or non-discrete Tasks marked as critical by the scheduling software.

Verify with the project team that the critical path makes common sense and technical sense. Remember, the critical path will not necessarily include every Task that is crucial to technically completing the project. The critical path will represent the longest sequence of Tasks from time-now to the end of the project.

5.3.10 Save IMS Baseline

Saving the IMS baseline is the last step prior to beginning schedule execution and maintenance. A baseline is a “snapshot” of how a project plans to execute the work required to meet objectives. Having a baseline provides the opportunity to analyze project efficiency and help mitigate risks in a proactive manner. Before setting the baseline, the scheduler should ensure that project stakeholders have reviewed and approved the Tasks, durations, and network logic in the IMS. This review should include the critical path and driving paths to major milestones and forecast dates for project deliverables. Once the IMS is approved, the scheduler sets the baseline for the entire IMS using scheduling software.

6 IMPLEMENTING IMP AND IMS

This section describes how the IMP and IMS are implemented in different situations. Events, Accomplishments, and Criteria may vary depending on the project characteristics, but the overriding objective is to use these management tools and tailor them to best serve the specific project. The same principles apply whether the project is an internal Government activity, a contracted effort, or an integrated multi-contract activity. Events, Accomplishments, and Criteria are specifically tied to the project where it is necessary to measure or demonstrate progress before proceeding with follow-on activities. This section is presented chronologically, representing the sequence of a typical solicitation process.

This section addresses three types of schedules: Government project schedule (usually in the form of a figure), Government pre-award schedule (not necessarily an IMS), and an E-IMS.

6.1 Early Project Planning

The Government team develops and implements the Government project schedule as early in the project as possible. The Government project schedule should provide the framework for developing and implementing Government pre-award schedule for a contracted effort. In the case of a Government-executed project, the Government team should proceed directly into the preparation of an IMP and IE-IMS.

For competitive acquisitions, as a best practice the procuring activity should prepare and implement a Government pre-award schedule to plan, manage, and track the activities required for the contract. Based on the Government project schedule, the procuring activity should then determine any project-unique requirements for the IE-IMS to include in the RFP.

The offerors should then provide their P-IMS in their proposals in accordance with the instructions in Section L of the RFP, reflecting each one’s unique approach to fulfillment of the project and technical requirements. The Government source selection team should evaluate these products in accordance with the evaluation criteria detailed in Section M of the RFP.

For incremental developments, the first increment is especially important because it establishes the foundation for the delivered capability in subsequent increments. This foundation or basic framework for the project includes physical growth capacity to achieve an affordable expansion. The IMS should include embedded Criteria and Tasks to define the growth and to defend the growth robustness so the capability can evolve affordably for all future increments. While each increment is essentially self-contained with its own IMS, there should be schedule connections to indicate dependencies between the increments. Thus, each increment cannot be considered completely by itself. The IMS should:

- Minimize cross-increment connections to minimize the potential for ripple effects from schedule slips in the predecessor increments; when these connections are necessary, the team should embed interface Criteria in the IMP and IMS to help manage the relationships.
- Include cross-increment relationships when conducting critical path analyses on the IMS. Including these relationships can bring special problems because the automatically generated critical path is tied to the end of the last increment. Use of artificial activities or constraints may be required to assess the critical path for an individual increment.
- Establish milestones and Tasks in the IMP and IMS for starting subsequent increments, including impacts on critical resources and adequate maturation of predecessor increment development.
- With SoS or FoS, critical external interfaces can result from the requirements process and the emphasis to look outside individual Services for materiel solutions to the requirements. This introduction of external interfaces can lead to an increased number of stakeholders in a project, especially given the usually increased requirements for SoS and FoS. The IMS should:
    - Serve as a tool to help manage expectations of stakeholders.
    - Embed technical and programmatic interface points in the IMS for exchange of data and delivery of products among the stakeholders in a project, including milestones or Tasks to define the interfaces between the various individual project IMPs and IMSs.

6.2 Government Project Planning

The Government project schedule is often prepared and maintained as a single product in Gantt-type format, showing critical activities and interfaces across the entire project, as well as critical dates that may be dictated by higher authority. The Government project schedule should capture the plan for executing the acquisition strategy, including incremental approaches.

Figure 6-1 shows one example of a high-level, generic Government project schedule and high-level examples of two supporting contract schedules. In the example, Contract A represents the schedule for the weapon system prime contract. Contract B might be a contract through another procuring activity within another DoD procuring organization to a subsystem contractor, whose equipment should be integrated into the weapon system. The Government project schedule shows how the key Events (or activities) of the execution contracts (A and B) interface with and support each other and interface with and support the completion of the Events of the Government project schedule. The key activities shown for Contract B to support that integration would also be reflected in the Contract A schedule.

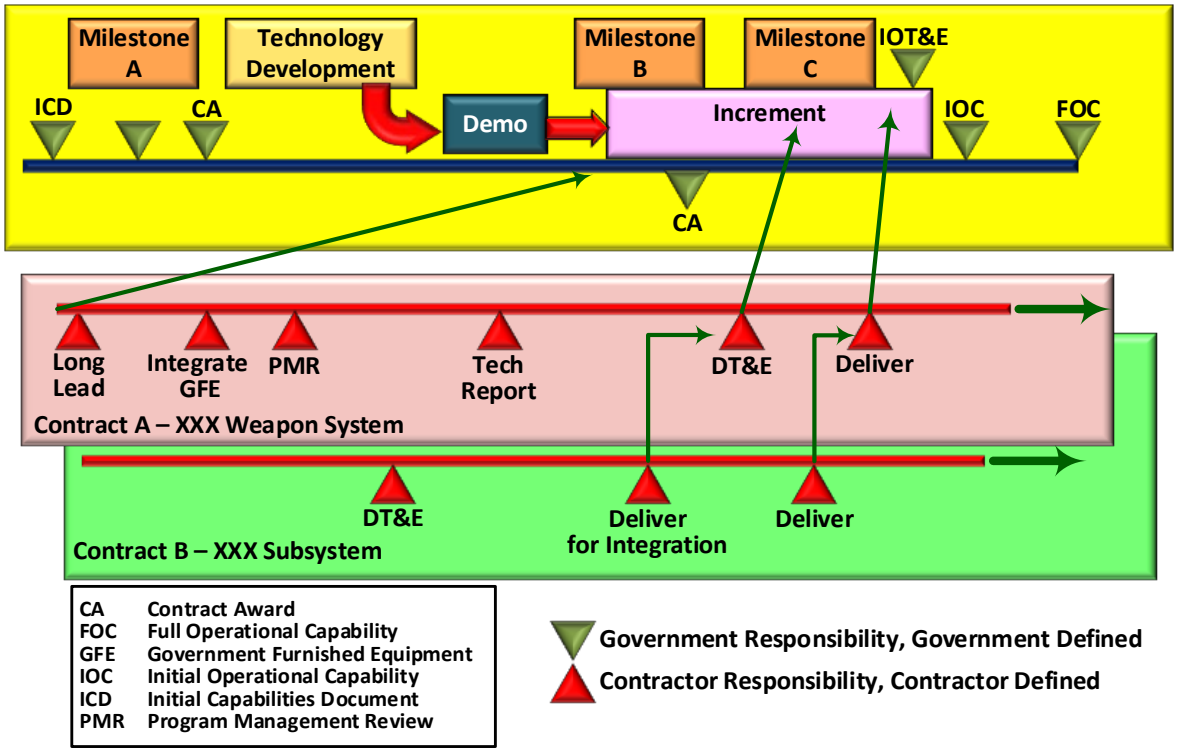


Figure 6-1. Example Government MCA Project Roadmap

6.3 Government Pre-Award Schedule

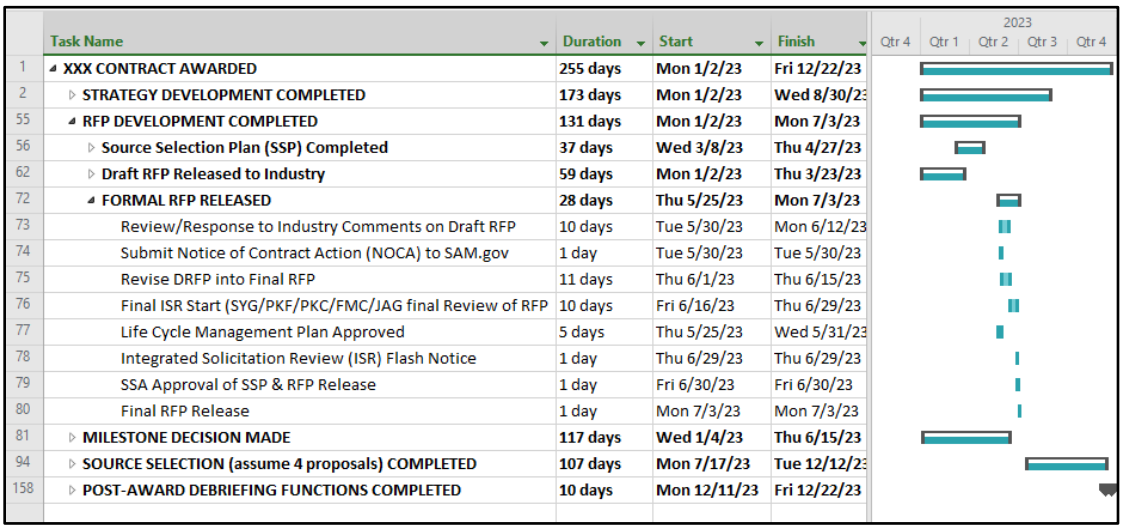
A PMO can use the Government pre-award schedule to plan, coordinate, and track the progress of those Government and industry activities necessary to achieve contract award. Depending on the acquisition strategy and the complexity of the source determination and contracting, each PMO should decide whether to prepare a Government pre-award schedule. The Government pre-award schedule should capture:

- What needs to be done and when all functional disciplines should be on contract.
- Who must make it happen (e.g., PMO, user, acquiring location, other service, other agency).
- How it fits together to support the contract award and eventual execution of the project.

The Government pre-award schedule can help the project track the progress of all supporting contracting efforts, regardless of their source, associated with the project. This ability to maintain oversight is important because managing in a multi-agency, multi-project, multi-contract environment is becoming the norm rather than the exception.

The Government pre-award schedule can help in cases requiring integration of externally developed, managed, or controlled products into the system or subsystem being managed.

Figure 6-2 provides an example of a Government pre-award schedule in IMS format. This example uses a pre-award structure, with activities that could be classified as Events (e.g., Contract Awarded); Accomplishments (e.g., Strategy Development Completed, RFP Development Completed); Criteria (e.g., Source Selection Plan (SSP) Completed, Formal RFP Released); and Tasks (e.g., Revise the Draft RFP (DRFP), Prepare Executive Summary letter). The Government pre-award schedule does not necessarily have to contain all defined levels of an IMS. In some cases, it may be appropriate to assign durations at what may be the Criteria level or even the Accomplishment level. The key is to tailor it to a specific application.



	Task Name	Duration	Start	Finish
1	**XXX CONTRACT AWARDED**	**255 days**	**Mon 1/2/23**	**Fri 12/22/23**
2	**STRATEGY DEVELOPMENT COMPLETED**	**173 days**	**Mon 1/2/23**	**Wed 8/30/2**
55	**RFP DEVELOPMENT COMPLETED**	**131 days**	**Mon 1/2/23**	**Mon 7/3/23**
56	**Source Selection Plan (SSP) Completed**	**37 days**	**Wed 3/8/23**	**Thu 4/27/23**
62	**Draft RFP Released to Industry**	**59 days**	**Mon 1/2/23**	**Thu 3/23/23**
72	**FORMAL RFP RELEASED**	**28 days**	**Thu 5/25/23**	**Mon 7/3/23**
73	Review/Response to Industry Comments on Draft RFP	10 days	Tue 5/30/23	Mon 6/12/23
74	Submit Notice of Contract Action (NOCA) to SAM.gov	1 day	Tue 5/30/23	Tue 5/30/23
75	Revise DRFP into Final RFP	11 days	Thu 6/1/23	Thu 6/15/23
76	Final ISR Start (SYG/PKF/PKC/FMC/JAG final Review of RFP	10 days	Fri 6/16/23	Thu 6/29/23
77	Life Cycle Management Plan Approved	5 days	Thu 5/25/23	Wed 5/31/23
78	Integrated Solicitation Review (ISR) Flash Notice	1 day	Thu 6/29/23	Thu 6/29/23
79	SSA Approval of SSP & RFP Release	1 day	Fri 6/30/23	Fri 6/30/23
80	Final RFP Release	1 day	Mon 7/3/23	Mon 7/3/23
81	**MILESTONE DECISION MADE**	**117 days**	**Wed 1/4/23**	**Thu 6/15/23**
94	**SOURCE SELECTION (assume 4 proposals) COMPLETED**	**107 days**	**Mon 7/17/23**	**Tue 12/12/2**
158	**POST-AWARD DEBRIEFING FUNCTIONS COMPLETED**	**10 days**	**Mon 12/11/23**	**Fri 12/22/23**

Figure 6-2. Generic Pre-Award IMS

6.4 Contract Awarded

When the contract is awarded, the IMP submitted by the winning contractor becomes the basis for the contract IMP (Government/contractor negotiated). The P-IMS submitted by the contractor should be baselined and become the basis for updates normally submitted either as a CDRL, according to the instructions contained in the tailored IMS data item description (DID), or through the Data Accession List (DAL). The P-IMS becomes the C-IMS. This regular deliverable should be provided for day-to-day execution, including the contractor's award or incentive fee performance. Changes to either the IMP or C-IMS during project execution are discussed below.

Open communication and trust are critical during project execution, whether between the Government and the contractor or among internal Government teams and among Government organizations. The IMP and C-IMS information provides the baseline for the communication and execution of the project.

Most project events directly affect all IPTs, so the project needs to establish a communication link that ensures all interfaces are recognized and addressed. If problems are identified and

addressed regularly in team meetings through C-IMS status reporting, the team can form mitigation plans to minimize disruptions and their cost and schedule impacts. In many programs, electronic data interchange is available between the Government and contractor team. In these cases, the C-IMS could be made available to the Government team on an ongoing basis.

6.5 Contractor IMS

After the Government awards the contract, the C-IMS should become the schedule baseline for the project by which performance is measured, and management should execute the project using this plan. Sometimes realities of project execution lead to a variation between planned progress and actual progress. The project may need work-arounds to return to the project baseline. When this adjustment occurs, the C-IMS should reflect the changes; however, the PM should archive the original IMS for reference. The changes, or work-arounds, should follow the documented C-IMS change process as defined by the contractor.

The project team should determine how the C-IMS is updated and who is responsible for making the updates. The change control process should be clearly stated, to cover the following:

- The documented coordination and approval of C-IMS changes.
- The identification of the IPT responsible for performing the changes and maintaining configuration control.
- How the C-IMS changes are monitored and controlled.
- How the C-IMS revisions are published and distributed to project personnel.

Updates to the schedule may be documented as they occur. As projected slips to the schedule become apparent, the team should assess the impact to the critical path for that activity and develop work-around plans. If the project team is reviewing status regularly in team meetings and through C-IMS status reporting, they can formulate mitigation plans as an ongoing activity.

The project team may use work-around plans at several different levels. At the project team level, the expected activities can be tracked and monitored at working group meetings (e.g., the integrated test team or the integrated logistic support working group).

The C-IMS documentation showing what needs to be accomplished to complete each of the activities is an invaluable tool to assess the status and project potential problems. To be effective, as soon as the team determines that the project cannot complete scheduled Tasks as required, they should notify project management. By reporting promptly, the project can begin to assess the overall project impacts and formulate plans to ensure project integrity.

6.6 Examples of IMP and IMS Implementation

To illustrate how the IMP is employed, the example in Figure 6-3 uses a single Event, along with one of several supporting Accomplishments and one of several supporting Criteria for that Accomplishment. The respective Event, Accomplishment, and Criterion are:

a. OA completed.

(1) OA Test Readiness Review (TRR) completed.

(a) Safety Certifications provided.

When the system safety certification is provided to the test team (lower right), that Criterion is satisfied. When this Criterion is satisfied along with all the other entry Criteria that would support a TRR, the review can be held. When the review is held and satisfies its exit Criteria, the TRR Accomplishment supporting the OA is complete. When all the other Accomplishments that would normally support an OA are completed, then the OA Event is complete.

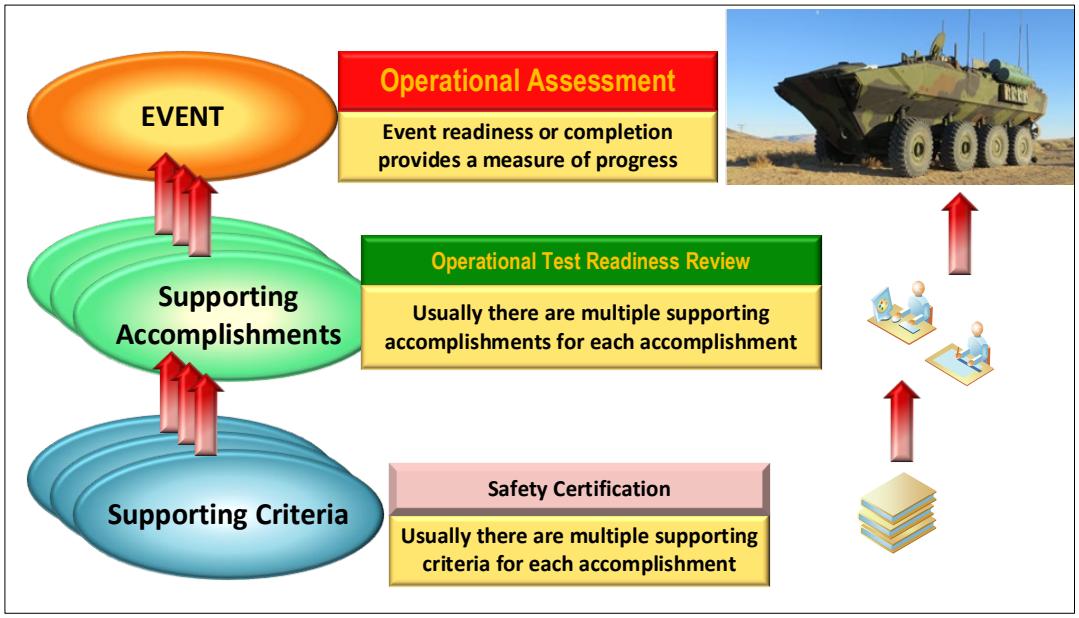


Figure 6-3. IMP Summary of Effort Supporting an Event

To illustrate how the IMS is implemented, the example above is expanded by adding four specific Tasks that support satisfaction of that Criterion.

a. OA completed.

1. OA Test Readiness Review completed.

(a) System Safety Certification Approved.

i. Perform system safety testing and analysis.

ii. Prepare system safety report.

iii. Prepare system safety certification.

iv. Route system safety certification for approval.

When the four specific Tasks are successfully completed, the system safety certification is approved, the OA TRR is convened, and approval for the OA has been granted (Figure 6-4). The actual IMP and its IMS would have multiple Accomplishments supporting the OA with multiple Criteria and each Criterion supported by multiple Tasks, such as scheduling range time, coordinating operating forces to support the OA, etc.

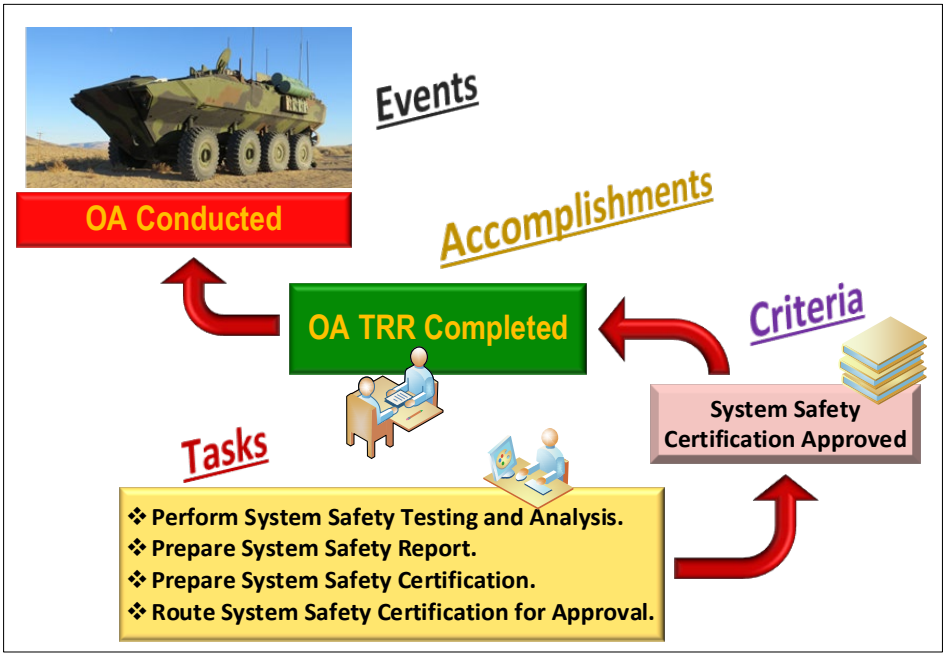


Figure 6-4. IMS Implementation

The project should use the IMP and the associated baseline IMS as the starting point to assess and mitigate the impacts caused by project perturbations. In the case of directed budget cuts, critical path analysis can be used as a starting point to identify items for potential cut that would cause the least project impact. More important, after the efforts to be cut are identified, the affected project teams can be tasked to assess the impacts to determine if they are feasible. This process can provide meaningful impact analysis. After the team's analysis, they should be better able to execute the changes because they helped analyze and define them to make them more executable. Conversely, if the impacts are unacceptable, the IMS information should help support the analysis and allow the project team to identify other options.

A complete IMS with well-defined relationships can be responsive to "what-if" exercises at varying levels. Most "what-if" exercises represent significant potential changes to the project funding, content, and approach. A sufficiently descriptive IMS can be an invaluable tool for examining alternatives to provide meaningful answers to the questions conveyed in "what-if" exercises, and Schedule Risk Assessment (SRA) tools can support the exercises.

When changes must be made to the project, the project team should update the IMP and C-IMS to reflect the revised planning and schedule and should communicate the information to all project participants. The project team should ensure the financial planning and EVMS baselines, if applicable, are adjusted to reflect the new, approved baseline. Factors such as project maturity, risk status, and funding changes could require IMP changes and contract modifications.

Each project team should determine the level and format for reporting project progress and problems to internal and external management. The project teams can internally track activities to any level they consider necessary, but they should roll up those Tasks to reflect the pertinent information desired at each management level. Internal project reviews may be conducted to provide senior management with the current execution status in terms of cost, schedule, and performance. The information required would be expected to be significantly less than that required by the project teams to perform comprehensive workload integration, but it would be tailored to allow the project team to resolve issues.

As a best practice, the contractor should submit an electronic schedule update and a monthly report containing a summary identifying progress to date, variances to the planned schedule, causes for the variance, potential impacts, and recommended corrective action to avoid schedule delays. Actual start and completion dates should be reported. The status report should also identify potential problems and provide a continuing assessment of the network critical path.

The IMP and IMS are also extremely useful sources of information that can be provided to outside organizations whose ongoing support is necessary for the project. These organizations may include Service Headquarters, Congress, DoD, GAO, and the other DoD Services on joint programs. The IMP and IMS can serve as useful tools for assessing the impact of funding cuts and other project iterations. When combined with other traditional sources of project status information such as IPMDAR, deliveries, and financial tracking, the IMP and IMS can provide a more robust assessment and can help the PM better understand available options when making programmatic decisions.

When the IMS is used as the baseline management tool for the day-to-day execution of the contract, it can be the source for other information required to satisfy project requirements. Many contracts require the PMO to assess performance, and much of the information needed is readily obtainable from the IMP and IMS. The PMO can use this information to justify and substantiate the Contractor Performance Assessment Report (CPAR).

Likewise, if the contract has an award or incentive fee provision, the project team can use the IMP and IMS to support the PMO’s evaluation. The project may tie successful completion of IMP and IMS Events and associated Accomplishments to award or incentive fee criteria. In some cases, the project may correlate periods of performance with the completion of the Events. The IMP and IMS provide a common baseline the PMO can use to focus essential work efforts.

7 SCHEDULE RISK ANALYSIS AND SCHEDULE HEALTH

7.1 Schedule Risk Analysis

This section provides an overview of schedule risk analysis, other Government and industry practices for assessing schedule health, and schedule risk management. After preparing the IMS, it is appropriate to analyze the schedule and its associated risk. This analysis should include a discussion of the critical path but should not focus only on the critical path. Activities just off the critical path should be identified, analyzed, and tracked as these activities can become the next critical path. A continual or frequent critical path analysis allows the team to understand the technical status.

A program conducts schedule risk analysis during the source selection process and periodically throughout the life of the project to assess the risk of offerors' IMSs, especially when adjustments are made to the schedule. The three types of schedule risk analyses discussed in the section include the narrative analysis, technical analysis, and statistical SRA.

7.1.1 Schedule Risk Narrative Analysis

A schedule risk narrative analysis is a technique used to identify and assess schedule risks by analyzing the narrative descriptions of the risk provided by project team members or stakeholders. This analysis involves reviewing the written descriptions of schedule risks in project documentation such as risk registers, risk management plans, or project reports.

The goal of a schedule risk narrative analysis is to gain a better understanding of the specific risks that could impact the project schedule, as well as the underlying causes and potential consequences of those risks. By analyzing the language used to describe the risks, PMs can gain insight into the attitudes and perceptions of project team members toward schedule risks and can identify gaps in risk awareness or risk management strategies.

The schedule risk narrative analysis can also help PMs prioritize their risk management efforts by identifying the most significant and likely risks, as well as the potential impact of those risks on the project schedule. By integrating the findings of a schedule risk narrative with other risk assessment techniques such as expert judgment or Monte Carlo simulation, PMs can develop a more comprehensive understanding of schedule risks and develop effective risk management strategies.

7.1.2 Technical Risk Analysis

The goal of a technical analysis is to gain a better understanding of the technical risks that could affect the project schedule and identify potential solutions to mitigate those risks. Technical risk analysis can help PMs identify potential issues with project plans, such as unrealistic or overly

aggressive timelines, incomplete or inaccurate specifications, or dependencies on unproven or unfamiliar technologies. A technical risk assessment can help PMs ensure their project plans are technically feasible and robust, and that any technical risks are identified and addressed in a timely manner.

Technical risk assessments are typically conducted through a structural process that involves several key steps:

- Review Project Planning. The project team should review the IMP and identify potential technical risks that could affect the project schedule. This involves reviewing project timelines, dependencies, resource allocation, and technical specifications.
- Identify Technical Risk. Functional experts can identify potential risk based on their knowledge and experience. These risks may include issues related to design, development, testing, deployment, or maintenance.
- Compare Technical Plan with Schedule. The team should compare technical plan processes with schedule timeline to ensure the technical process is consistent with the schedule timeline for activities. If a process narrative states it will take a certain amount of time to complete a certain process, the schedule should also reflect the same amount of time to complete that process (Tasks or activities).
- Assess Likelihood and Impact. Identified risks are assessed for likelihood and impact on project schedule. This involves analyzing the probability of the risk occurring and estimating the impact of the risk on the project timeline.
- Develop Risk Mitigation Strategies. PMs can develop mitigation strategies based on the technical risk assessment to address the most critical risks. These strategies may include adjusting the project plan, modifying technical specifications, allocating additional resources, or conducting additional testing or quality assurance.
- Monitor and Manage Risks. Once risk mitigation strategies have been implemented, PMs must monitor and manage the risks throughout the project life cycle. This involves tracking the status of each risk, assessing the effectiveness of the mitigation strategies, and adjusting the risk management plan as needed.

7.1.3 Statistical SRA

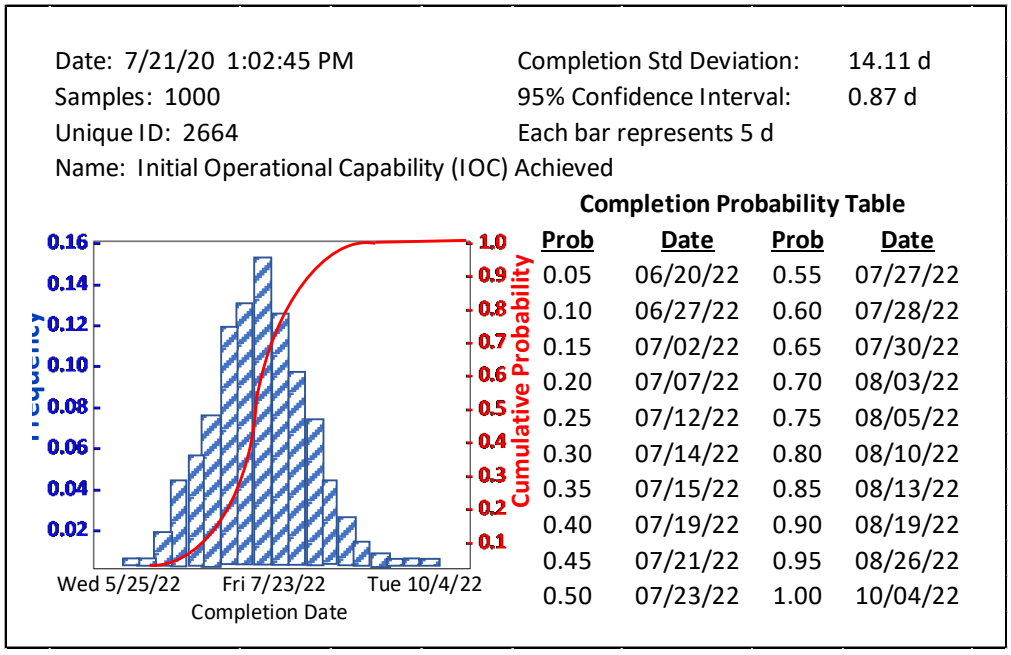
Statistical SRA is a powerful analytical tool for risk management, opportunity management, and decision making. Unlike EVM, the SRA uses statistical techniques to predict a level of confidence in meeting a project's completion date. This assessment focuses on uncertainty, key risks, and how they affect activity durations. Nearly every schedule possesses a degree of uncertainty, thereby making the entire schedule uncertain. The PMO is encouraged to run statistical simulations on the schedule.

The intent of the SRA is to evaluate whether the baseline schedule is executable in view of the identifiable risks. See the IPMDAR Implementation and Tailoring Guide for detailed risk mitigation guidance.

The SRA can be a valuable tool for "what-if" exercises to quantify the impacts of potential project changes. SRAs can be used to evaluate offerors' proposed IMSs during the bidding period, or they can be used throughout the life of the project. The following paragraphs refer to the Government's assessment during the source selection process.

The Government's assessment of what items are moderate or high risk may not match the offerors' assessed risks for the proposed approach. Offerors should be allowed to identify appropriate areas of risk and to discuss why the Government's anticipated risk should not materialize using their approach. During the source selection process, the Government determines the potential schedule impacts of the technical risks associated with the offeror's proposed approach by examining the best, most likely, and worst case duration of the workflow of activities associated with the riskiest aspects of that offeror's approach.

If the procuring activity plans to perform an SRA, the proposed IMS is typically requested in an electronic format that can be entered into a schedule networking software compatible with the Government's software package. The schedule team loads the offeror's proposed schedule data and then may adjust the data to reflect the Government technical team's assessment of the contractor's schedule. The software should use Monte Carlo simulations for each of the activities given the range of duration, for the purpose of determining a cumulative confidence curve, also referred to as a histogram (Figure 7-1).



Completion Probability Table

Prob	Date	Prob	Date
0.05	06/20/22	0.55	07/27/22
0.10	06/27/22	0.60	07/28/22
0.15	07/02/22	0.65	07/30/22
0.20	07/07/22	0.70	08/03/22
0.25	07/12/22	0.75	08/05/22
0.30	07/14/22	0.80	08/10/22
0.35	07/15/22	0.85	08/13/22
0.40	07/19/22	0.90	08/19/22
0.45	07/21/22	0.95	08/26/22
0.50	07/23/22	1.00	10/04/22

Figure 7-1. Sample SRA Results

Some SRA programs should also perform a "critical path analysis/critical analysis," identifying the number of times every Task in the IMS shows up on the critical path during the simulation runs. One benefit of this analysis is that while the team may know what Tasks are on the critical path today, the criticality analysis shows the team what Tasks could be on the path in the future if mitigation is not applied on the risks and uncertainty. As some of these Tasks may have high float today, the critical path analysis can be a great help to the team to avoid tunnel vision (i.e., concentrating only on the histograms and their inputs) in the SRA approach.

An SRA typically results in a low confidence level regarding making the exact dates in the IMS. This low confidence is expected because during the simulation all Tasks can expand to their maximum duration; however, not all can shorten to their minimum duration because other Tasks should move onto the critical path in their place. A high-confidence schedule should take this potential fluctuation into account and should set an acceptable band around the Event completion dates.

Best practice is to compare the project's overall risk-adjusted schedule generated by this method against parametric schedule estimates based on actual historical project performance for analogous programs – especially early in project development, before a detailed contractor WBS is available. Later, this parametric estimate can be used as a sanity check on the bottom-up estimates. Comparison of the overall schedule with historical project schedules can highlight and potentially help overcome both the inherent underestimation bias of bottom-up methods and the effects of externally imposed schedule requirements.

7.2 Schedule Health

Schedule health is essential for day-to-day project management. Schedule health focuses on the mechanics (construction) of the schedule to ensure it is a useful project planning and execution tool. Otherwise, an improperly built schedule (e.g., missing logic ties, improper logic ties, improper use of constraints, etc.) will reduce the effectiveness of the schedule by the team.

The following is a non-inclusive list of schedule metrics that can help provide a team with insight as to the schedule health condition of the IMS. As with many process metrics, deeper analysis may need to be involved on some metrics (e.g., number of constraints) to determine if an improper condition is present or not.

7.2.1 DCMA 14-Point Schedule Metrics

DCMA-EA PAM 200.1, "Earned Value Management System Program Analysis Pamphlet (EVMSPAP)," provides standards to ensure the EVM and IMS analyses are performed consistently and incorporate a 14-point schedule metric to assist PMs to identify problem areas in a contractor's IMS. This analysis includes completed Tasks, LOE Tasks, subprojects or summary

Tasks, and MS. These metrics provide a framework for asking educated questions and performing additional research.

7.2.2 GAO's Standard Quantitative Measuring for Assessing Schedule Health

The GAO Schedule Assessment Guide: Best Practices for Project Schedules (2015) provides an assessment of schedule best practices that encompass both qualitative and quantitative information. The quantitative assessment involves a detailed analysis of the schedule data to determine the overall health of the network.

7.2.3 Generally Accepted Scheduling Practices (GASP)

The GASP are eight overarching tenets for building, maintaining, and using schedules as effective management tools. The National Defense Industrial Association (NDIA) developed GASP and the Planning and Scheduling Excellence Guide (PASEG). An IMS compliant with GASP and PAGET is considered not "merely healthy, but fit."

7.3 Risk Overview

Although the AAF pathways differ, project management remains constant. Within project management, if a single responsibility could be considered the most important, it would be risk management.

Risk management is the continued process of identifying, analyzing, and acting on those Events that may affect the cost, schedule, or performance of a project. Although a project cannot eliminate risk, it can minimize or mitigate risk if staff are actively involved in monitoring the daily activities of their programs or projects. The DoD Risk, Issue, and Opportunity Management Guide for Defense Acquisition Programs defines a risk as:

> *Potential future event or condition that may have a negative effect on achieving project objectives for cost, schedule, and performance. Risks are defined by (1) the probability (greater than 0, less than 1) of an undesired event or condition and (2) the consequences, impact, or severity of the undesired event, were it to occur.*

7.3.1 Cost Risk

Cost risk is a potential increase in project costs that could raise the project's overall cost beyond the original budget. Cost risks can lead to both schedule and performance risks. To counter cost risks, a PM may have to trade project costs with future performance by lowering a system's performance parameters to stay within budget.

7.3.2 Schedule Risk

Schedule risk is the potential for a project, Task, or activity to be completed outside of planned schedule or deadline. It refers to the likelihood that unforeseen events or circumstances will delay or disrupt the planned timeline, causing the project to be completed later than expected.

Schedule risk can arise from a variety of factors, including changes in project requirements, unexpected technical difficulties, delays in receiving necessary resources or materials, and unforeseen external events such as weather conditions, supplier issues, and even pandemics.

Effective risk management practices involve identifying potential schedule risks, assessing their likelihood and impact, and developing contingency plans to mitigate the impact of those risks should they materialize. By taking proactive steps to manage schedule risk, project managers can help ensure that projects are completed on time and within budget.

7.3.3 Performance Risk

Performance risk is a situation in which there is a high potential for the project to fail to meet a system specification. Normally performance risks can be mitigated with performance trade-offs, but if the unachievable performance is a critical technical parameter (CTP) derived from a KPP from the system's operational requirements, then the PM either should add more resources to resolve the risk or receive approval from higher authority to conduct trade-offs. Inability to achieve a CTP and/or KPP can be grounds to end a project.

7.3.4 IMP and IMS in Risk Management

IMP. From a risk standpoint, a well-crafted IMP provides a wealth of information that can identify potential sources of risk. The IMP should identify risk activities and potential risk-mitigating efforts. In addition, the detailed narratives should allow the project team to identify potential areas of risk. For example, if the project team develops the IMS without referring to the Government or contractor business process in the IMP, they may miss certain Government or contractor required Tasks, which could lead to scheduling risks in the future.

IMS. The IMS is an important risk management tool. A properly constructed and well-maintained IMS can reveal schedule and cost risks through the project management software tool being used. A properly constructed IMS reduces a PM's overall risk; therefore, includes a complete set of Tasks, with accurate scheduled start dates, durations, and resources. Maintenance of an IMS is just as important as the initial creation. For example, if an actual Task start date differs from the schedule start date, the IMS manager should enter the actual start into the IMS software tool so the impact of the actual start can be analyzed.

8 PREPARING THE RFP

8.1 Overview

The Government should communicate its IMP and IMS requirements to the offerors so industry can effectively develop an IMP and IMS to reflect both the customer's requirements and its own proposed approach to executing the project. The procuring activity should initially communicate project requirements through industry days and then include them in the draft and final RFP, using this guide as a reference and including any project-unique tailored requirements. See the DoD EVMIG for additional tailoring guidance.

The IMP and IMS evaluation criteria should be developed to support both the planned acquisition strategy and the overall proposal evaluation approach. Pre-award activities, such as industry meetings and draft RFP release, are opportunities to communicate, develop, and refine the IMP and IMS evaluation criteria. Whether the solicitation falls under Federal Acquisition Regulation (FAR) Part 12 or FAR Part 15, drafts of Section M, "Evaluation Criteria," and Section L, "Instructions to Offerors," should be provided to industry as early as possible to permit the maximum amount of communication.

FAR 15.204-5 Part IV, Representation and Instructions, provides guidance on RFP Section L.

The Assistant Secretary of Defense (Acquisition) (ASD(A)), Acquisition Data and Analytics (ADA) Integrated Program Management (IPM) website provides additional guidance on IPMDAR DID and CDRLs.

8.2 Section L. Instructions, Conditions, and Notices to Offeror or Respondents

There should be a direct correlation between Section L and Section M. Consider the following when drafting Section L:

- The IMP should reflect the offeror's technical architecture being proposed.
- The plan should follow the disciplined technical approach as required by the Government SEP and RFP.
- The names for Events, Accomplishments, Criteria, and Tasks should be descriptive, concise, and specific to the project.
- The significant risks identified elsewhere in the proposal should be adequately addressed in the IMS. Consider requesting that the proposed IMS flag these critical risk mitigation efforts in a separate field to permit easy filtering or sorting to highlight them for the evaluators.

- LOE type activities do not have to be included in the IMS; however, the LOE time-phased budget should be included in the RFP basis of estimate (BOE) response.
- The IMS should meet the stated schedule requirements for delivery.
- The IMS should have a logical flow.
- A critical path that appears reasonable for the proposed project should be evident.
- If a statistical SRA should be performed, the offeror should be requested to provide their minimum-maximum Task duration with the supporting rationale for those Tasks identified as moderate or high risk.

If multiple priced production options are included in the RFP, the Government should consider requiring the detailed IMS to include only the first priced option to illustrate the contractor's plan and schedule approach. Based on that IMS, the Government could acknowledge and accept that the offeror is capable of planning and/or scheduling the other options. In the future, when the Government decides to exercise one of the future options, they then request the contractor to submit a detailed IMP and IMS for that option.

8.2.1 Sample Section L

The examples below for Section L (Instructions to Offerors) of the RFP provide the major tenets that should be included in the RFP to provide the Government with the necessary information for an evaluation of the offeror's IMP and IMS. Section L and Section M should be closely linked. Section L provides the supplemental requirements and guidance for tailoring the IMP and IMS for a specific project. The contractor should be encouraged to propose the systems they will use to plan and manage. Two examples of Section L language follow below:

8.2.1.1 Example 1. One strategy is to place integrated RFP requirements across appropriate sections of the RFP. In this example, the IMP and IMS are addressed separately, and it is assumed the RFP calls for a Contracts Volume and a Technical Volume. Since the IMP should be contractually incorporated, a logical place to ask for it is the Contracts Volume of Section L.

The offeror shall provide the following documents in Section J as part of the Model Contract:

- *SOW*
- *System Specification*
- *IMP*
- *CWBS*

Then the RFP can request the IMP in the appropriate section of the Contracts Volume.

The offeror shall provide an IMP as part of their proposal submittal. The offeror's proposed IMP shall be provided as an attachment (in Section J) to the Model Contract. For guidance in development of the IMP, the offerors shall use the current "IMP and IMS Preparation and Use Guide." The offerors shall then tailor that guidance as required for their approach. The following additional requirements apply to the (insert project name) IMP: (Insert additional requirements in accordance with the guidance below).

Since the IMS represents all of the activities necessary to execute the project and illustrates how all of the activities are integrated, the logical place to ask for it in Section L is the Technical Volume, usually as an attachment.

The offeror shall provide an IMS as part of their proposal submittal. For guidance in developing the IMS, the offerors shall use the current "IMP and IMS Preparation and Use Guide." The offerors shall then tailor that guidance as required for their approach. The following additional requirements apply to the (insert project name) IMS: (Insert additional requirements in accordance with the guidance below)

8.2.1.2 Example 2. A second approach is to have the IMP and IMS instructions integrated in Section L as the following example demonstrates:

The offeror shall provide an IMP and IMS. The details of the offeror's integrated processes shall be addressed in the IMP and IMS. The IMP and IMS shall demonstrate the offeror's approach to the integrated product and process development (IPPD) framework wherein the IMP and IMS include all necessary activities performed by all functional disciplines to produce the product required by this RFP. For guidance in development of the IMP and the IMS, the offeror shall use the current "IMP and IMS Preparation and Use Guide." The offeror shall then tailor that guidance as required for its approach.

The IMP shall be event-based, containing the Events, Accomplishments, and Criteria needed to successfully complete the project. The following major project events shall be the minimum provided in the IMP: (e.g., PDR), Critical Design Reviews (CDRs), etc.). Other events may be included as necessary at the discretion of the offeror. The IMP shall demonstrate that the (insert project name) project is structured to provide a balanced technical approach, to minimize and control risk, to accomplish up-front summary planning and commitment, and to provide a basis for subsequent detailed planning. The IMP shall be structured to allow measurement of progress toward (insert project name) project life cycle requirements and to provide management within process verification of requirements to make informed event decisions. The IMP shall contain the following in contractor format:

- *Events – logical points to assess progress.*

- *Accomplishments – Two or more for each Event, defining the desired results before or at completion of each Event.*
- *Criteria – Two or more for each Accomplishment defined as measurable information that provides definitive evidence that a specific Accomplishment is being completed. Completion of all these Criteria constitutes completion of the Accomplishment.*
- *Narratives (if required to further the understanding of the IMP) – Narratives may be categorized as two types: process narratives and Task narratives. Each narrative should be limited to xx pages and include a Statement of Objectives (SOO)-what is the purpose of the process or Task being addressed and how should it be tailored or implemented for this project.*
    - *The offeror shall provide process narratives for the following processes (list):*
    - *The offeror shall provide Task narratives to describe the approach to execute those Tasks for which there may be no specific IMP Accomplishments (e.g., level-of-effort Tasks such as configuration management or project control).*
- *The IMS shall be submitted in accordance with the IPMR, IPMDAR DID, IMS. The offeror shall provide the results of a statistical SRA.*
- *The SRA data shall include a narrative describing the ground rules and assumptions used to perform the simulation and the histograms for each of the activities identified above as minimum IMP Events.*

8.3 Section M. Evaluation Factors for Awards

The focus of Section M, "Evaluation Criteria," is to provide the Government's method of reviewing the offeror's plan for completeness, reasonableness, and realism, while also assessing the offeror's understanding of the effort and the soundness of their approach. In developing criteria, the Government should consider the size and complexity of the effort. Examples of elements to consider include development approach, commercial content, and a proposal approach that includes unique business arrangements such as teaming. Section M should be consistent with Section L, "Instructions, Conditions, and Notices to Offerors or Respondents." Requirements should be consistent with other proposal inputs and should be complete, clear, and usable throughout project execution. Generally, Section M criteria should be developed before Section L. Section M should distinguish the IMP from the IMS and clarify the link between them. Since the IMP and IMS should reflect the offeror's approach, the RFP should include the specific evaluation criteria for the offeror's IMP and IMS.

8.3.1 Section M Scenarios

Following are some scenarios of Section M language regarding the IMP and IMS. The language should be tailored based on specific risks to the project and the importance of the IMP and IMS.

8.3.1.1 Scenario 1. The Government should evaluate whether the offeror's IMP and IMS reflect understanding of the project requirements and provide a sound approach to meeting those requirements. Evaluation is based on the extent to which the IMP details an event-based technical approach to executing the project and identifies the key project Events, Accomplishments, and associated completion Criteria. Events of particular interest to the Government include event-based technical reviews, technical baseline approval, etc. Also of particular interest are the risks identified by the offeror, how they should be mitigated, and their relationship to the IMS.

8.3.1.2 Scenario 2. Evaluation is based on the extent to which the plan provides a SEP, IMP, IMS, CWBS, and Contract SOW that represent consistent and achievable plans to accomplish development activities, clearly tracing back to the SOO and CDRL. The IMP should provide a subcontractor or interdivisional team member management plan that describes a well-integrated contractor team from both an administrative and technical point of view. The IMS should identify critical paths and provide for slack to accommodate unexpected project Events.

8.3.1.3 Scenario 3. The Government should evaluate the offeror's IMP and IMS to determine whether they incorporate and reflect the offeror's understanding of the requirements and to assess the soundness of the approaches described in the offeror's proposal.

8.3.1.4 Scenario 4. The Government should evaluate each offeror's technical approach using the offeror's proposed SEP, system or subsystem specification, IMP (and its correlation to the IMS), and any proposed deviations to the requirements as evidence of the offeror's understanding of the requirements specified in the RFP, of the soundness of the offeror's approach, and of a commitment to meeting those requirements.

8.3.2 Sample Section M Language

8.3.2.1 M-1 Factor and Subfactor Weighing

Evaluation factors are identified in Table 8-1. Non-Price Evaluation Factors/Subfactors. Within the Management Factor, the Project Management Subfactor is more important than the IMP and IMS Subfactors. The IMP and IMS Subfactors are approximately equal in importance. Each of these Subfactors is more important than the Small Business Participation and Commitment Subfactor.

Table 8-1. Non-Price Evaluation Factors/Subfactors

Evaluation Factors
Factor 1 (F-1) Technical
Subfactor TS-1: System Specification
Subfactor TS-2: Technology Maturity/Manufacturing Readiness
Factor 2 (F-2) Management
Subfactor MS-1: Project Management
Subfactor MS-2: Integrated Master Plan (IMP)
Subfactor MS-3: Integrated Master Schedule (IMS)
Subfactor MS-4: Small Business Participation and Commitment
Factor 3 (F-3) Past Performance

8.3.2.2 M-2 Integrated Master Plan (IMP)

The Government will evaluate the effectiveness of the Offeror's proposed approach for accomplishing the SOW requirements for development of the IMP. The Government will evaluate the Offeror's proposed approach and understanding of the entire effort as demonstrated in the proposed IMP.

8.3.2.3 M-3 Integrated Master Schedule (IMS)

The Government will evaluate the effectiveness of the Offeror's proposed approach for accomplishing the SOW requirements for development of the IMS. The Government will evaluate the Offeror's proposed approach and understanding of the entire effort as demonstrated in the proposed IMS and accompanying SRA.

8.4 Other Applicable Sections and Considerations

Offerors should also review Section B (Supplies or Services and Price/Costs); Section F (Deliveries or Performance); and the CDRL (DD Form 1423) because these sections may provide supplemental requirements to be considered in the development of the IMP and IMS. Following are specific areas where supplemental guidance may be needed.

8.4.1 Project Activities

The Government should provide a list of any minimum required activities they want addressed in the IMP and IMS. These may be Events, Accomplishments, or Criteria, and may be derived from the IMS, operational requirements, or internal PMO requirements. For example, the Government project schedule may have Events for operational test and evaluation (OT&E) and initial operational capability (IOC), which would be appropriate Events for the IMP and IMS. Another example would be the user's Capability Development Document (CDD) or SOO, which might define Criteria for a site activation or for IOC. These Criteria could be provided for inclusion in

the IMP and IMS. Finally, the PMO may desire a "TRR," and should include this requirement in the RFP. In this case, the offeror could decide to include the TRR as an Event, or perhaps as an Accomplishment, supporting an Event for a major project test.

8.4.2 Date Constraints

Although the IMP is an event-driven plan, there may be some "hard date" constraints in the Government project schedule that must be carried into the IMS, such as a directed IOC date. These should be provided either in the RFP, the RFP library as part of the IE IMS, or during industry day and pre-solicitation conferences. The proposal should indicate how the project will meet the dates. It is often difficult to analyze the schedules in a time-constrained source selection to successfully evaluate the realism of the proposed schedule. Offerors may suggest high-risk, concurrent acquisition strategies and aggressive duration estimates to attempt to meet the requirement. Therefore, if any high-risk elements exist within the schedule, the offerors should identify all risk mitigation efforts in the IMS.

8.4.3 Size

Though there is no "standard" size for either an IMP or IMS, the Government may impose restrictions on the size of each. Whether the Government imposes a restriction or not, the offeror should strive to build an IMP and IMS of sufficient detail to fully describe the project for the Government's evaluation and to manage their own day-to-day execution of the project after contract award. The offeror should succinctly describe the work required to complete the contract in sufficient detail to fully demonstrate an understanding of the scope and flow of the work. The size of the resulting IMP and IMS is dependent on numerous factors such as the length, content, and complexity of the contracted project, the amount of new development, the technical risk and associated risk mitigation activities, and the scope of required testing. Because the IMP normally becomes a contractual document defining the event-driven project approach, it should not be page or line limited.

- The IMS is an extension of the information contained within the IMP, reflecting not only the Events, Accomplishments, and Criteria identified in the IMP, but also Tasks and subtasks subordinate to the Criteria. An IMS summarized at too high a level may often result in masking critical elements of the plan to execute the project and fail to show the risk management approaches being used. Furthermore, it may result in long-duration Tasks and artificial linkages, which should mask the true critical path.
- Conversely, too much detail can make it more challenging to evaluate the IMS during source selection. The critical efforts and key risk mitigation efforts can get "buried" in the details. The IMS Tasks should correlate with the BOE in the cost volume; those Tasks should ultimately form the basis for EVMS work packages. The IMS need not cover

every possible project Task, but should describe a realistic and supportable schedule, illustrating the plan to meet all project requirements.

- At times the Government evaluation team may need to limit the IMS submittal size to better facilitate timely proposal evaluation. This situation may arise when the procuring activity is resource limited or plans to perform an SRA on a very complex project. If the Government believes an IMS line limit is appropriate, one-on-one discussions between the Government and offerors should be held as early as possible (e.g., industry days, bidder's conference, etc.) to establish an appropriate IMS size limit consistent with programmatic requirements, and available source selection time and resources. In the event an IMS line or page limit is imposed, it should provide adequate lines for inclusion of sufficient detail to fully describe the schedule. It is essential the requirements of the RFP be consistent with any limits imposed on the IMS.

8.4.4 Complexity

If the complexity, size, or other characteristics of the project force a relatively large IMS, the following techniques may aid the evaluators in performing a timely and effective evaluation:

- Focus the schedule and technical analysis efforts in areas of more obvious risk, based on the Government-industry risk workshop's risk matrix and the offeror's risk assessment and risk mitigation plans reflected in their proposal. Consider requesting the proposed IMS flag these critical risk mitigation efforts in a separate field to permit easy filtering or sorting to highlight them for the evaluators.
- Focus the schedule and technical analysis on the Tasks most likely to show up on the project critical path. Most SRA models include a critical path analysis for all Tasks during the simulation. Run an initial assessment, and then focus the evaluator's efforts on those Tasks on the critical path, e.g., more than xx% of the time from simulation runs.
- Require the offeror to provide their minimum-maximum Task duration with the supporting rationale for those Tasks identified in the above two bullets.

8.4.5 Unique Project Aspects

The RFP should address any unique aspects or interrelationships of the project that may affect the IMP and IMS. For example, if the software for an aircraft subsystem such as the missile is being developed and must be delivered in time to support integration of the aircraft operational flight program (OFP), that information should be provided, along with a schedule for the aircraft OFP. Another example would be modification kits that must be delivered to a logistics center to support specific aircraft going through programmed depot maintenance. Again, this type of information should be included in the RFP.

8.4.6 IMP Narrative

If the Government requires IMP narratives, the RFP should specifically state what types of narratives are desired. For process narratives, the RFP should identify any specific processes the Government requires as a minimum set to be addressed. The RFP should also describe any content required in the narratives (e.g., company standard process designation). It is recommended "contractor format" be allowed for the narratives. Avoid redundancy in areas where the RFP calls for submission of a plan with the proposal. If the RFP requests a SEP be submitted with the proposal, the RFP should not also request an IMP narrative on the technical approach, since it will be contained in the SEP.

8.4.7 Page Limitation

If narratives are required for the IMP, it may also be necessary to impose a page limit for the narratives; however, if the Government imposes a page limit on narratives, the Government team should ensure the limits are consistent with the requested information. For example, if a Government RFP levies a 20-page limit for the entire IMP but at the same time requires IMP narratives on 15 topics along with all definitions, dictionaries, Events, Accomplishments, Criteria, and other supporting narrative, the page limit will not allow for the stated requirements.

8.4.8 Submittal Requirements

The IMS should be submitted no less frequently than monthly in accordance with the DID DI-MGMT-81861, IPMR, and IPMDAR DID. If a Contractor Performance Report (CPR) is required, the IMS should be statused and submitted in advance of or concurrently with the CPR. However, the Government team may also want a hardcopy submittal for evaluation purposes. In this case, rather than impose a boilerplate requirement in the RFP, the Government team should consult with the source selection evaluators to confirm what format is needed. The formats most used are:

- Gantt Charts. A graphical display of project activities that depict work activities in an integrated fashion. Activities are represented by bars showing the length of time for each activity. These are often displayed on legal size (11 x 14) or tabloid size (11 x 17) pages.
- Tabular Forms. Tables containing data for each activity. These are best viewed in a landscape format (size page dependent on number of data fields requested).

Requesting many data fields in the tabular format can drive both the IMS size and number of pages. Requiring submittal of both Gantt and tabular hardcopy formats can easily drive page size and page count to an unwieldy level.

Network diagrams are often referred to as PERT charts. These charts show all the Task relationships; however, network charts may be extremely large and may have to be printed on

plotters. Some available “plug-in” tools make it easier to view or print network charts, but the products are still significant in size in hardcopy formats. It may be easier to use views available in the electronic submittal to view the Task relationships.

The RFP should provide instructions as to the type of digital format desired for the IMP and IMS in accordance with the format requirements identified in the IPMR, IPMDAR DID, and IMS, and should address the desired format for post-award submittals of updates to the IMS. If a CDRL item is desired, then the RFP should use the IPMR, IPMDAR DID, and IMS.

The Government team may have to dictate which automated scheduling tool it wants the offeror to use for the IMS submittal to facilitate evaluation; however, after contract award the Government and contractor should use the same tool for day-to-day execution of the project. If the Government cannot manage data directly from the contractor’s schedule management system, the contractor can be directed to periodically generate export files for the Government’s use. If the Government allows the offeror to propose a tool that the Government team is not using, the RFP should ask the contractor to address issues such as post-award training of the Government team and software tool licenses.

8.4.9 Requests for Additional Information

The Government team may want specific additional data to be included in the IMS. The reason for this additional data is frequently to support sorting of the IMS data using the different text fields as the sorting parameter. Table 8-2 shows examples of additional data that might be considered for inclusion. The Government should not direct the use of specific fields for additional data since the offeror may reserve specific fields for integration with other tools; however, the Government should provide the data dictionary defining the use of these fields and their location in the scheduling tool, including filters customized to use these fields.

Table 8-2. Example of Additional Data Request for an IMS

ADDITIONAL DATA	TEXT FIELD
IMP reference code (single numbering system)	Text xx
WBS	Text xx
SOW Reference (if not the same as WBS)	Text xx
IPT	Text xx
Mission Capability Subfactor (RFP Section M)	Text xx
Risk (Medium to High)	Text xx
Contract Line Item	Text xx
Organizational/Function Code	Text xx

The IMP numbering, WBS, SOW, and IPT are probably the most requested data fields and provide the most value for traceability and for sorting of the data. The general nature of most

RFP Section M (Evaluation Criteria) mission capability subfactors minimizes the value-added benefits of trying to trace each IMS Task to a specific subfactor. The practice of identifying both a WBS and an IPT for each IMS Task may make a requirement for an organizational or functional code unnecessary. The offeror may want to trace the Tasks to individual contract line numbers (CLINs) for accounting purposes. In summary, it is up to each procuring activity to decide what additional data is needed for their project. These requirements should "earn their way." Also, the proposed IMS should clearly identify which fields are used for the data.

Other requirements may apply directly to the IMP or IMS. An example for the IMS might be a requirement to provide a rationale for Task durations greater than xx days. The Government should avoid providing conflicting guidance in the RFP Section L (Instruction to Offerors) and in the DID.

8.4.10 Sample SOW Language

Below is sample language for the SOW to assist the offeror's teams in understanding and addressing the requirements discussed in this section.

> *The contractor shall manage the execution of the (insert project name) project using the IMP and the associated IMS as day-to-day execution tools and to periodically assess progress in meeting project requirements. The IMP shall be maintained and shall be updated when it is deemed necessary to reflect changes to the ongoing project, subject to procuring activity approval. The contractor shall report on project progress in accordance with the IMP at each project management review, at selected technical reviews, and at other times at the Government's request.*
>
> *The contractor shall revise the IMS, where necessary, to reflect the IMP. The contractor shall use it as a day-to-day execution tool and to periodically assess progress in meeting project requirements. The contractor shall maintain and update the IMS, when necessary, to reflect Government-approved changes in the IMP, or changes in the contractor's detailed execution activities or schedule. The IMS shall include the activities of the prime contractor and their major subcontractors. All contractor schedule information delivered to the Government or presented at project reviews shall originate from the IMS. The contractor shall perform appropriate analyses of the IMS Tasks and report potential or existing problem areas and recommend corrective actions to eliminate or reduce schedule impact (CDRL xxxx; IPMR, IPMDAR DID, IMS).*

The Government should use the IMP and IMS to evaluate the credibility and realism of the offeror's approach to executing the proposed effort within cost and schedule constraints.

8.4.11 Sample Submittal Instructions

Following are sample submittal instructions:

> *The offeror shall submit an IMS in accordance with the IPMR, IPMDAR DID, IMS. The IMP and IMS shall be submitted in Volume XX: The IMP and IMS are not page or line limited (except for the IMP narratives stated in L.XXX above) and should give sufficient detail to facilitate Government assessment of schedule realism.*
>
> *The IMP shall be placed on the contract as an attachment. After contract award, periodic submission of the IMS should be as a CDRL item as described in the tailored IPMR, IPMDAR DID, and IMS.*

9 EVALUATING THE IMP AND IMS FOR SOURCE SELECTION

Because the proposed IMP and IMS represent the offeror's detailed plan for executing the project, they enable the Government to effectively evaluate the offeror's understanding of the project requirements and the soundness of the proposed approach. The contractor's performance with respect to their proposed IMP and IMS may be used as input data for contractor performance assessments. The IMP and IMS provide an effective method for evaluating the schedule progress of the project at any point, when effectively linked with the overall technical approach and EVMS.

9.1 Multifunctional Plan and Schedule

The IMP and IMS are a multifunctional plan and schedule, respectively, and should therefore be evaluated by a multifunctional team, led by project management with the following involvement and responsibilities:

- Project management focuses on the overall project approach.
- Engineering focuses on the technical approach, including requirements, design, development, integration, producibility, and risk mitigation. Engineering also ensures the required IMS Tasks are identified, with proper durations and linkages, to include requirements analyses, synthesis (design), modeling and simulation, prototyping, working groups; DT including subassembly, assembly component, line replaceable unit subsystem (hardware, software, and hardware-software integration), and system qualification. Finally, engineering ensures interfaces are identified with interface control documents or requirements and associated Tasks, including external interfaces with other systems, Government Tasks, or products, etc.
- Test focuses on the subsystem, system-level testing, developmental test and evaluation (DT&E), and OT&E. Test also ensures test planning and test execution Tasks are identified with proper durations and linkages.
- Logistics focuses on integrated logistics support, including all aspects of system fielding.
- Financial management focuses on translating the most probable schedule into a most probable cost, using the inputs and risk assessments from other functional experts.
- Contract management focuses on ensuring the approach meets contractual requirements and deliverables.

9.2 Pre-IMP Evaluation

Before the source selection team (SST) begins the IMP evaluation, the PMO should take several preparatory steps to familiarize the SST with the RFP requirements and proposal structure.

Accomplishing these steps, in the order recommended, should significantly decrease the overall assessment time. The SST should become familiar with the offeror's overall project approach. If the proposal does not contain an Executive Summary, or if the contents are too vague to provide adequate insight, the SST should review the technical and management sections to ensure understanding of the overall project approach, i.e., major subsystems, software development, top-level integration approach, and testing approach.

Section M spells out the evaluation criteria. The SST should review the requirements, ensuring clear understanding of both the thresholds and objectives. Section L stipulates any specific guidance on how offerors are expected to present information to satisfy the Section M requirements. Also, the SST should be familiar with the offeror's proposal requirements. Reviewers should have a copy of the IMS software application file as a reference when reviewing the proposed IMP.

The SST should compress the IMP to Outline Level 1, which shows the "Events" and the major review points throughout the project. This view represents the top-level project flow, which should appear reasonable and familiar. The SST's next step is to expand the IMP to Outline Level 2 to see the Accomplishments for each Event (on large programs it is easier to expand one Event at a time). In each case, this Level 2 list constitutes the major inputs to the related Event. The Level 2 list should make logical sense. Finally, the SST should expand to Outline Level 3 to see the criteria necessary for completing each Accomplishment (on large programs it is easier to expand one Accomplishment at a time).

9.3 Steps in Evaluating the IMP and IMS

At this point, the SST should be familiar with both the RFP requirements and proposal structure and is ready to begin the IMP and IMS evaluation. The team should consider the following five steps when reviewing each:

- Compliance with Section L instructions
- Consistency with other proposal inputs
- Completeness, quality, and reasonableness of the schedule
- Clarity and usability for project execution
- Compliance with Section M criteria

9.3.1 Evaluating the IMP

The IMP should succinctly explain how the various project parts should be integrated into the whole. With the descriptive section as the foundation, the IMP should outline how the contractors will meet the Government project requirements. The process narratives, if applicable,

should explain how the key processes are going to be tailored and integrated across multiple subcontractors.

The SST should evaluate the submitted proposal for RFP compliance. This evaluation should identify any needed evaluation notices (ENs) early in the process. The SST evaluates whether the Section L content requirements were met. Frequently Section L should specify required descriptive information, including which narratives are required and narrative discussion content. Considerations include:

- Is the WBS field populated, and does it easily map to the cost volume and SOW?
- Does the IMP reflect the Government project approach?
- Is it consistent with the technical approach documented in the SEP?
- Does it use event-based technical reviews with independent peer participation?
- Are appropriate entry criteria established for each technical review?
- Does it illustrate when the technical baselines are approved and who the technical authority is?
- Is the integration and test approach reflected in the Accomplishments and Criteria?
- Is it consistent with the TEMP? Does it have a logical flow?
- Is there a test plan written before the CDR?
- Are the specific test procedures completed before the TRR?
- Does the IMP show the buildup from unit test to subsystem test to system integration?
- Is the software development and integration approach reflected in the Accomplishments and Criteria?
- Is the software development approach consistent with the SDP, if applicable?
- Does the SDP have a logical flow?
- Is the software requirements specification written before design, which precedes unit code and test?
- Are the significant risks identified elsewhere in the proposal adequately addressed?
- If a specific subsystem (perhaps subcontracted out) is viewed as a technical risk, are the design and test maturation reflected as Criteria or Accomplishments to support various Events?

Major project events are opportunities to gauge project status and typically are spaced no more than 4-6 months apart for a complex project. Since there is no guidance on how to define an

Event in the IMP and IMS, traditional major technical reviews can provide a good starting point. Interim status reviews may need to be inserted to avoid creating excessive time between Events. The SST should assess the descriptive section and IMP to determine if the Events reflect logical project maturation over time (e.g., System Requirements Review (SRR) leads to PDR, which leads to CDR, which leads to TRR).

The SST should evaluate the IMP to determine if the Accomplishments adequately support the related Events, i.e., do they represent the complete list of major entry criteria for the Event? There should be enough Accomplishments to represent progress required of each functional discipline. Each Event and the subordinate Accomplishments should be reviewed separately. As a best practice, reviewers should perform an easy cross-check to ensure a multidisciplined approach is being followed: confirm that every functional discipline is significantly involved in at least one Accomplishment for each Event. If not, decide if they should be.

The major entry criteria are the objective evidence of Accomplishments that need to be satisfactorily completed. They document the claimed progress and can be seen, touched, or demonstrated using well-defined terms. Meeting all the Criteria indicates completion of the Accomplishment. The IMS should take these Criteria and further break them into Tasks representing the work necessary to meet the Criteria. The SST then reviews the Criteria necessary for completing each Accomplishment. Do these make sense, as the listing of "objective evidence" needed to provide confidence each Accomplishment was satisfactorily completed? The Criteria should be objective and measurable. The SST reviews each Accomplishment separately. As a best practice, the SST should ensure Events occur at the system level and cross multiple IPTs. Accomplishments also may cross multiple IPTs. Each Criterion needs to directly relate to a particular IPT, which aids future accountability and reporting. Each IPT can then fill out subordinate Task definitions, durations, and linkages (i.e., below the Criterion level).

Subcontracted efforts should be appropriately outlined in the IMP, particularly if those efforts are a major portion of the project or convey high risk. Examples include requirements flow to specific subcontractors, and specific subcontractor design reviews accomplished in advance of system-level design reviews.

Since the IMP defines the bilateral agreement of what constitutes the event-driven plan, it is appropriate that key Government-Furnished Equipment (GFE) and Government-Furnished Information (GFI) items be included (probably at the Criteria level).

The SST should evaluate any process narratives to ensure they contain the appropriate level of detail. The intent here is not for the offeror to restate existing company processes but to explain how these processes should be used (and tailored) to execute the project. The SST should consider how the offeror will use the IMP and IMS to manage the project, including such processes as: risk management trades, system integration, test planning, logistics and support

planning, configuration management, etc. As a best practice, the offeror should always discuss risk management in a process narrative, tailored to include specific subcontractor processes, and each process should be limited to five pages, including:

- Statement of Objectives. Describe the purpose of this process and how it should be tailored for this project.
- References. Cite existing internal company procedures and systems.
- Approach. Describe the primary features and flow of the process and identify key participants within the process. Describe how the Government interfaces with or obtains insight into the process and outputs.

Are the "names" for Events, Accomplishments, and Criteria descriptive, concise, and specific to the project (or are they generic)? A best practice is that activity names (whether summary level or Task level) should be stand-alone as much as possible, without relying on the context within which they appear, i.e., preliminary design, system design study completed, etc. This approach facilitates later use of specialized scheduling software application filters to create unique views without losing the meaning. For example, the IMP and IMS should use "Line Replaceable Unit (LRU) xxx Hardware and/or Software Integration Testing Completed" rather than "Testing Completed." Are there action verbs associated with each "name?" The plan should include a dictionary in the descriptive section to establish a common understanding of what each term really means.

Is there a consistent structure for Accomplishments and Criteria from Event to Event (as appropriate)? Does it ensure the multifunctional considerations are included at each Event? For example, does each Event have Accomplishments (or Criteria under an umbrella Accomplishment) associated with risk management, integration and test, and integrated logistics support (ILS) efforts? These elements can be tailored to eliminate inappropriate categories from a specific Event (e.g., there may not be separate Criteria for ILS planning for the "SRR Accomplished" Event).

9.3.2 Evaluating the IMS

Because the IMS is built from the IMP, it should be evaluated after the IMP is evaluated. The IMS should enable the Government to assess its level of confidence that the project is structured to be executable; it should be the key Government determinant as to the offeror's ability to successfully execute the proposed project.

The SST should familiarize themselves with the IMS and should review Section M, Section L, and the overall IMS structure. This structure should logically follow from the IMP; therefore, the evaluation process should be expanding to Outline Level 4 (and below) to reveal the Tasks associated with each Criterion.

The SST should evaluate whether the Section L submittal content and format instructions are met (content, filters, views, special column entries, etc.). Affirmative answers to the following IMS questions should ensure consistency with other proposal input.

- Is the IMS an extension of the information contained within the IMP, reflecting not only the Events, Accomplishments, and Criteria identified in the IMP, but also Tasks subordinate to the Criteria?
- Is the overarching technical approach reflected in the IMS?
- Are the ILS elements included and consistent with the technical approach?
- Is any required production planning consistent with the rest of the proposal?
- Are the significant risks identified elsewhere in the proposal adequately addressed?
- Does the IMS include the activities identified in the risk mitigation plans for significant risks?
- Does the IMS incorporate risk burndown activities that are event and schedule driven?
- Does the IMS incorporate decision points?

The IMS should be constructed to permit filtering on a specific risk, so that all associated Tasks can be reviewed. Two best practices are associated with this activity. First, effective risk mitigation planning includes identifying specific actions, which reduce the likelihood of or the consequences of occurrence. In aggregate, these actions compose the specific risk mitigation plan and should be included as Tasks within the IMS. Second, cost estimates should reflect the risk mitigation planning included in the proposal. If the cost estimate does not include these activities, either the efforts should not be accomplished, or the project should experience cost growth associated with the unbudgeted activities. The estimates should also reflect actual historical costs for analogous programs (through analogy or parametric means).

Is the WBS field populated, and does it easily map to the cost volume? If no grouping exists for the WBS, a grouping should be created to organize the list of Tasks by WBS to enable the cost reviewers (with assistance from the technical team) to evaluate whether the cost inputs are reasonable for the work scheduled in the IMS. LOE activities and low-risk activities in the WBS roll-up may not be reflected in the IMS.

Is the IMS traceable to the EVMS? There should be a direct correlation, resulting in traceability, between the information reflected in the IMS and that reported in the EVMS. If the IMS and EVMS use separate databases, the SST should ensure the WBS numbering conventions in both databases are traceable between applications to ensure consistency. If the IMS and EVMS use a common database, the SST should ensure the accuracy of both.

The IMS should be structured so the flow is determined by the starting date of the network, activity duration, and the connecting activity logic. The SST should perform checks for overall IMS compliance with recommended norms. The following list of recommended checks is not "go/no-go," but may indicate incomplete schedule logic. These are good for a first cut, but the proposal IMS may deviate from these for good reason, so the SST should evaluate based on the individual scheduling merits:

- Critical Path. Absence of a valid critical path or one that does not seem reasonable could indicate one of several mechanical errors, such as circular logic, excessive durations, simplistic linkages, missing linkages, etc. A critical Task could also be a result of a constraint, such as "SNET," for an activity late in the project's life.
- All lowest-level Tasks have both predecessors and successors (except the initial and final Task). The SST can filter activities to reveal any that have no predecessors or no successors. Items that fail this test are either not linked properly or are unnecessary efforts. An exception may exist for items such as GFE (no true predecessor) or deliverables to the customer, which are not used by the supplier (no true successor). For these exceptions, the SST should consider use of contract start as a predecessor or contract complete as a successor, to ease the analysis.
- There should be no or minimal constrained dates. The SST can filter for "Constrained Dates" and "Constraint Type" to see if constraints are used and, if so, the extent to which the constraints are appropriate and/or drive any critical path determinations.
- There should be no excessive durations. These long Tasks should generally be broken into more detail to provide adequate insight into the planning and tracking of project during execution.
- All float or slack should be reasonable. Excessive float or slack could indicate either missing successor linkages or planning well in advance of need (which may be an issue for programs with termination liability limits). Float or slack should be allocated in such a way that top-level cross checks agree with the aggregate schedules.
- All lead time or lag should be reasonable. Excessive lead time could indicate missing successor linkages or planning well in advance of need (which may be an issue for programs with termination liability limits). If lags are used, are they reasonable and realistic or are they being used to drive a date as opposed to letting logic drive the schedule? Negative lags are not appropriate. If they exist in the offeror's IMS, they should be accompanied by an explanation of their use. Because lags are required delays before the successor Tasks can start (e.g., concrete cure time), they should not be used only to simplify a more complex schedule relationship. Instead, the IMS logic should define what drives the lag and put that item in the IMS. If lags represent anticipated

delays (and simplify the IMS), such as document review time, these assumptions should be explained in the write-up.

The SST should evaluate the cadence of the Events in the schedule. Are they appropriately spaced? If they are too close in time (less than 3 months), should the Events be merged into a single gathering point, with one an Accomplishment to the other? If they are too far apart (perhaps more than 6 months and certainly over 1 year), how should the overall progress be monitored to have an early warning of project problems? It may be appropriate to add an intermediary Event such as a progress review. If they are payment milestones, what are the implications for contractor cash flow?

Are LOE-type activities included? As a best practice, LOE Tasks, by their definition, cannot influence an event-driven schedule and should not be included in the IMS; however, if the offeror wishes to include LOE Tasks to maintain consistency with the cost system, the Tasks should be included in a way that does not yield an erroneous critical path or drive the dates for project-reporting Tasks.

Outline Level 1 of the schedule and the Gantt chart should show a natural waterfall for both the start points and end points, perhaps with some overlap between Events. The waterfall should still exist when expanded to Outline Level 2 and beyond, again with some amount of overlap. The waterfall demonstrates the Tasks with higher-level activities associated with the corresponding Events. The SST should ensure the proper work time calendar has been used and that it matches the company calendar. If subcontractors have different work schedules (or Government activities), the SST should assess the adequacy of how the offeror considers these differences.

The “big picture” should make sense. For example:

- When is a PDR planned?
- Is it realistic for the technical challenge being approached?
- How do these dates compare with the Government’s pre-RFP estimates?
- Is the Government schedule realistic?
- Does the IMS support any contractually required dates?

The SST should examine individual Tasks in detail, ensuring they present logical relationships (predecessor and successor linkages) and Task durations.

Do the predecessor and successor linkages accurately represent the relationship between Tasks? Are the relationships consistent with sound engineering practice and company processes described in the IMP process narratives, or is risky concurrency being scheduled in order to meet a defined date? Asking two questions about each Task should resolve this issue:

- Which Tasks should be completed before this Task can start?
- Which Tasks depend on the completion of this Task before they can start?

Are the Task duration's relationships realistic? Areas that are often unrealistic include: (1) schedule durations to fully document and review the requirements and flow-down to subsystems; (2) software development, unit test, and integration test; (3) hardware and/or software integration and test; and (4) material lead times for prototype build. Material lead time should be tied to the design process, as appropriate.

The following two best practices refer to duration: (1) Duration rationale is referenced within the IMS (a data field) and directly traceable to the cost volume BOEs. (2) Software coding, integration, and testing durations are traceable to a software model output. Whenever possible, analytical tools, calibrated with actual company experience (reflected in the Past Performance volume), should be used to evaluate Tasks and determine estimated Task durations.

What are the expected ranges of schedule variance for the various activities? Are they realistic, based upon risk and do they discriminate between activities? For example, is software rated as higher duration risk than the time to conduct a meeting? What distribution is used for the various activities? Typical distributions and their proper use include the following:

- Triangular (lower confidence, higher risk) distribution curves can be used as an expedient short-cut for Tasks such as software development, hardware-software integration, system-level integration and testing, and transition to production. While exceptions exist, these categories typically experience unforeseen delays. Where possible, use of long-tailed distributions (Weibull, Rayleigh, Lognormal) is recommended as they produce more realistic risk models.
- Normal distribution curves should be used for parameters where the coefficient of variations is small and worst case is bounded.
- Beta (higher confidence, lower risk) distribution curves are typically used for areas where a company has extensive experience and very high confidence in completing a Task on time.
- Fixed (very high confidence, little risk) distribution curves may be used for Tasks which, in and of themselves, are relatively risk free (such as meeting durations).

Finally, it is important to account for likely correlation among durations of work packages when conducting the risk analysis of the proposed IMS. In practice, very high correlations (0.5 or higher) are often observed in the schedule estimation errors of individual work packages within a project. There are many reasons for this and an extensive literature on how to account for this correlation in the cost risk analysis. As a simple example, an extended spell of rainy weather might influence a construction project. The same random Event causes unexpected delays in

many different work packages. In the same way, funding instability, technical challenges, labor shortages, and other random Events can induce simultaneous delays across many different work packages, and even across multiple programs. Correlation among estimating errors does not change the mean length of the critical path, but it greatly increases the width of the tails of the distribution of possible schedule durations.

The SST should evaluate the degree to which any RFP-imposed IMS total line limitations might have affected the offeror's ability to accurately portray detailed Task level information. If the RFP restricted the total IMS line count, it may be more difficult to discern how the offeror has summarized their more detailed schedule to stay with the line constraints. Figure 9-1 illustrates the impact of imposing line limits on a proposal IMS (lack of detailed tasks and activities).

	Task Name	Duration	Start	Finish	Predecessors
1	**"Widget" LRU Integration**	**196 days**	**6/28/22**	**3/28/23**	
2	**Hardware Build Completed**	**127 days**	**6/28/22**	**12/21/22**	
3	HW Interfaces Defined	60 days	6/28/22	9/19/22	
4	HW Prototype Completed	22 days	9/20/22	10/19/22	3
5	HW Final Version Completed	45 days	10/20/22	12/21/22	4
6	**Software Coding Completed**	**105 days**	**9/22/22**	**2/15/23**	
7	SW Build 1 Completed	45 days	9/20/22	11/21/22	3
8	SW Build 2 Completed	60 days	11/22/22	2/13/23	7
9	**LRU Testing**	**75 days**	**12/14/22**	**3/28/23**	
10	Preliminary Integration Testing Completed	15 days	12/14/22	1/3/23	4,7
11	Final Integration Testing Completed	30 days	2/14/23	3/27/23	5,8,10
12	**W"Widget" LRU Integration Completed**	**196 days**	**6/28/22**	**3/28/23**	
13	Hardware Build Completed	195 days	6/29/22	3/28/23	
14	Software Build Completed	105 days	9/21/22	2/14/23	13SS+60 days
15	LRU Testing Completed	90 days	11/23/22	3/28/23	14SS+45 days

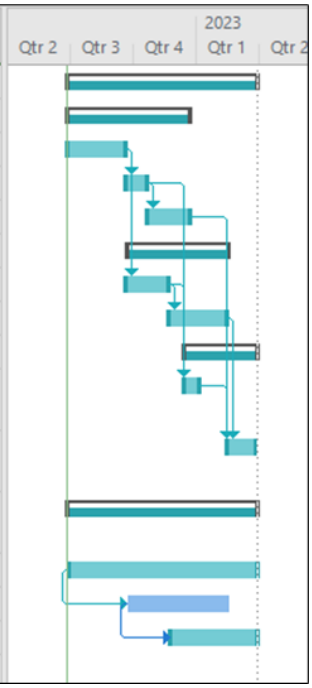


Figure 9-1. Example of a Constrained IMS

The SST should continue the IMS evaluation as follows:

- Filter the IMS for risk mitigation plans and check the plans for completeness and consistency with other project inputs.
- Evaluate for duration and logical relationships to ensure they should accomplish the desired risk mitigation.
- Evaluate to determine if the level of detail is commensurate with project impact. For example, more detail may be desired on how the subsystems are integrated into the system than on the vendor parts procurement process. The key question is: "Where does project management need the additional insight?" Often the risk mitigation activities

associated with risk items rated high or moderate should also be on the critical path, because the likelihood of the risk causing a project impact is what resulted in the risk assessment.

The SST's critical path analysis should focus on the IMS's ability to manage critical path Tasks. Identification and management of the critical path Tasks are important to project success. Therefore, managing the critical path Tasks provides the opportunity to take timely management actions necessary to preclude a schedule slip. For example, if highlighted early enough, resources can be shifted from a non-critical path Task to a critical path Task, thereby potentially avoiding a project slip. Viewed differently, working critical path Tasks ahead of schedule is the only way to complete the project ahead of schedule.

Critical path analysis is probably the most valuable tool for the SST for analyzing the IMS, but it depends on having valid durations, predecessors, and successors. The SST should filter the schedule for activities on the critical path (lowest float or slack value and the longest network path). If no critical path exists, or if the critical path appears overly simplistic, it is highly likely the IMS has not been properly constructed (e.g., constrained dates, long durations, improper or incomplete predecessor and successor logic, excessive lags, etc.). Assuming a valid critical path, the next level of review can occur. The following critical path analyses should provide the necessary insight into the critical path:

- Does the critical path run from the first activity (probably contract award) to the final activity (probably delivery of something)?
- Are there adequate numbers of activities on the critical path, such that the IMS doesn't appear to be overly simplistic (and therefore probably erroneous)?
- Are the Tasks shown as being on the critical path the ones to be expected for this project? If an expected Task is not on the critical path, review the total slack to determine how far off the critical path it is.
- Are the items highlighted as risk areas on the critical path (normally many of them should be)? If not, is there a logical explanation?
- For items viewed as higher risk or long duration that are not on the critical path, evaluate their logic to understand if they are valid or if there are improper linking, unrealistic durations, etc.?

The SST should filter the schedule for activities on the near critical path(s), (next four lowest float or slack value and the longest network paths). Particularly in complex programs, when the critical path moves around Tasks that are completed, finish early, or slip, and previously non-critical path items suddenly become the project drivers. Awareness and management of these continually updated critical items helps ensure a high likelihood of project success.

Uncertainty is an important ingredient in all project schedules, and it plays a particularly significant part in complex programs. Each activity has its own uncertainty risk. For example, an item that is on or near the critical path may have relatively little schedule risk (such as receipt of COTS hardware) while other items may have substantial schedule risk (such as software development) even if they are not on or near the critical path. By statistically analyzing the schedule, it is possible to look at the impacts of predictable variations in Task completion dates. The variations provide significant additional insight into the "near critical path," identifying those Tasks that are likely to become critical path if durations of other activities change.

Finally, aside from any Section L requirements, there are specialized views, tables, filters, and groups that facilitate such actions as improved risk management, earned value calculations, and Government insight. Having completed the evaluations of the IMP and IMS, the SST can now assign ratings.

The IMP and IMS evaluations are normally a distinct management subfactor. Whether or not it is a separate subfactor, the evaluation should be accomplished in accordance with the specific source selection policies and guidance. The ratings should use the rules (color rating, adjective rating, etc.) as described in the Source Selection Plan.

The SST should assign a rating to the subfactor, depicting how well the offeror's proposal meets the subfactor requirements in accordance with the stated explanation, within the subfactor. The rating represents the assessment of how well the stated solution meets the requirements, regardless of any risk that might be associated with the ability to achieve that solution. The SST should assign a proposal risk rating, representing the risks identified with an offeror's proposed approach as it relates to the applicable subfactor. The proposal risk rating assesses the likelihood of being able to achieve the proposed solution.

Appendix A. Action Verbs

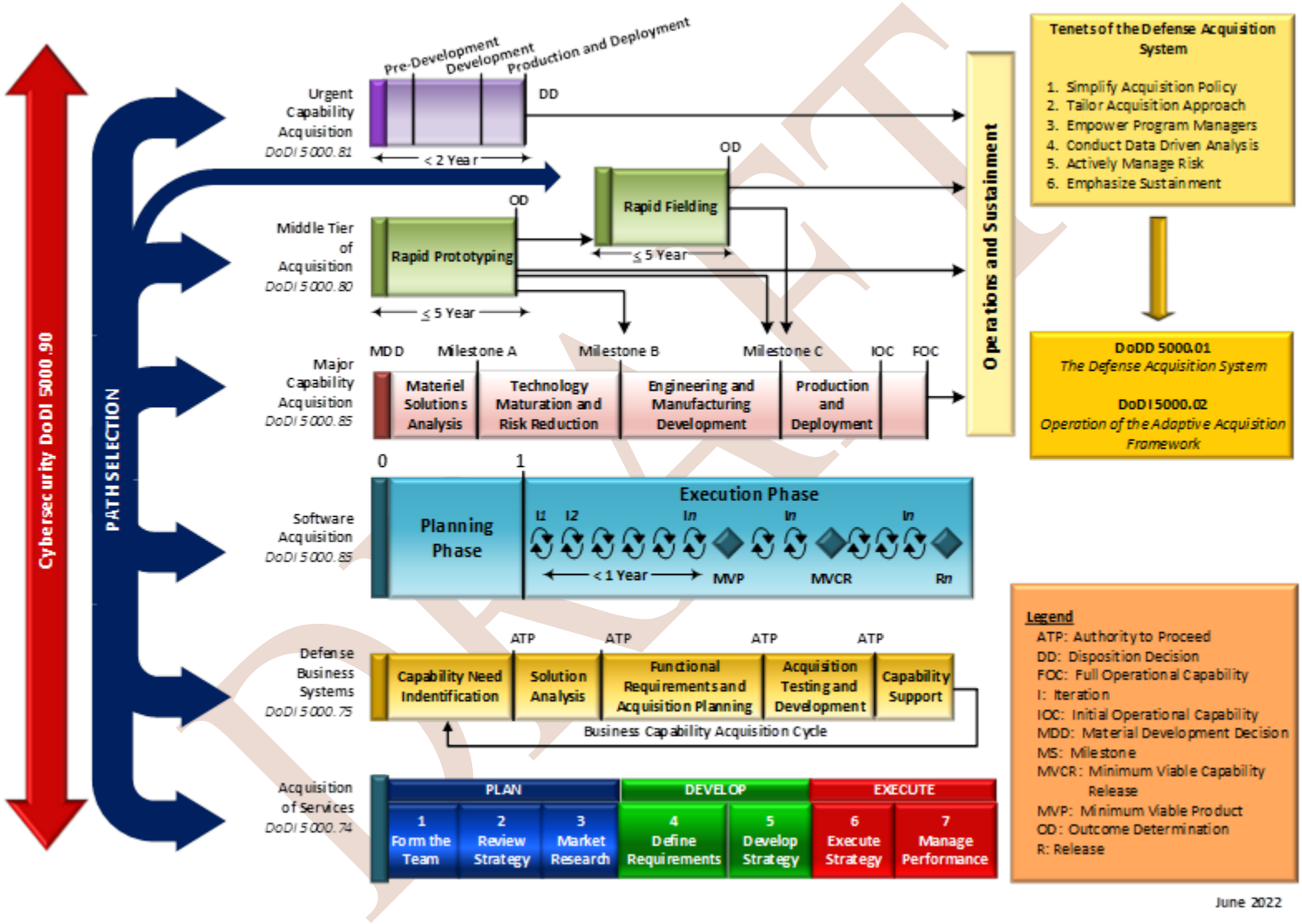
Following are common action verbs used and definitions used in IMPs.

Verb	Definition
Acquired	Procured and/or fabricated and available
Allocated	Apportioned to specific elements
Analysis/Analyzed	The subject parameter(s) has been technically evaluated through equations, charts, simulations, prototype testing, reduced data, etc.
Approved	The subject item, data, or document has been submitted to the Government and the Government has notified the contractor that it is acceptable
Assembled	Sub-elements brought together to create a larger element using authorized work instructions
Assigned	Selection process has been completed and an individual alerted
Available	The subject item is in place, the subject process is operational, or the subject data or document has been added to the Data Accession List
Awarded	Contract or subcontract is authorized to begin
Baselined	Configuration established and documented
Completed	The item or action has been prepared or accomplished and is available for use and/or review
Concurrence	The Government has expressed its agreement with the contractors proposed design, approach, or plan as documented in either formal correspondence or meeting minutes, presentations, etc.
Conducted	Review or meeting is held physically, and minutes and action plans are generated, or test or demonstration is performed
Configured	Subject item has had its essential qualities and limits fixed and described in appropriate documentation
Coordinated	Activity or document has been reviewed and approved by appropriate authority

Verb	Definition
Deficiencies corrected	New designs and/or procedures to correct documented deficiencies to requirements have been identified and incorporated into the baseline documentation. May include hardware fixes or retrofits
Defined	Identified, analyzed, and documented
Delivered	Distributed or transferred to the Government (by DD 250, if applicable)
Demonstrated	Shown to be acceptable by test and/or production or by field application
Developed	Created through analysis and documented
Documented	Placed in a verifiable form (written or recorded or electronically captured)
Drafted	An initial version (usually of a document) has been created, which should require updating to finalize
Ended	Completed; over
Established	The subject item has been set and documented
Finalized	Last set of planned revisions has been made or final approval has been obtained
Generated	Required information has been placed into written form
Identified	Made known and documented
Implemented	Put in place and/or begun
Incorporated	Individual elements or constituent parts have been combined and performance verified
Initiated	Begun
In-Place	At the physical location needed, ready to use or to perform
Met	Agreement reached that requirements have been satisfied
Obtained	Received and documented
Ordered	Purchase orders completed

Verb	Definition
Performed	Defined Task has been completed and results are available
Prepared	Information placed into written form
Provided	Given to in some traceable form (paper, briefing, electronically, etc.)
Published	Distributed to team members, either formally (by CDRL), or by placement on data accession list
Received	Shipped or delivered item is physically in possession of intended receiver
Refined	Next level of detail has been added or updates made
Released	Approved
Reviewed	Presented for examination to determine status and discuss issues
Submitted	Formally submitted to the Government
Trained	Type I training course completed
Updated	Revisions made to documents, metrics, and cost estimates to incorporate contractor and/or Government changes
Validated	Subject item, data, or document has been tested for accuracy by the contractor
Verified	Substantiated by analysis and/or test performed independently of builder or preparer
Written	Created but not yet published or submitted

Appendix B. Adaptive Acquisition Framework



Appendix C. IMP and IMS Development Checklist

	ITEM	GOV'T	CTR	N/A
A	**COLLECT SUPPORTING DOCUMENTATION** **(IT'S THE GOV'T RESPONSIBILITY TO ENSURE CONTRACTORS ARE PROVIDED WITH REQUISITE GOVERNMENT DOCUMENTATION)**			
A-1	Approved Capabilities Development Document (CDD)	☐		☐
A-2	Program Roadmap Schedule	☐	☐	☐
A-3	Government Pre-Award Schedule	☐	☐	☐
A-4	System Requirements Document (SRD)	☐	☐	☐
A-5	System Specifications	☐	☐	☐
A-6	Statement of Objectives (SOO)	☐	☐	☐
A-7	Work Breakdown Structure (WBS) and WBS Dictionary	☐	☐	☐
A-8	Contract Line Number (CLIN)	☐	☐	☐
A-9	Contract Data Requirements List (CDRL)	☐	☐	☐
A-10	System Evaluation Plan (SEP)	☐	☐	☐
A-11	Risk Management Plan (RMP)	☐	☐	☐
A-12	Statement of Work (SOW)/Contract SOW (CSOW)	☐	☐	☐
A-13	Gov't Organization Breakdown Structure (OBS)	☐	☐	☐
A-14	Contractor OBS	☐	☐	☐
A-15	Program's Security Classification Guide (SCG) (The classification of certain aspects of a program can impact the classification of the IMP and IMS)	☐	☐	☐
A-16	Non-Disclosure Agreements (NDAs)	☐	☐	☐
A-17	Relevant Military Standards (MIL-STDs) and Military Handbooks (MIL-HDBK)	☐	☐	☐
A-18	Relevant Guidebooks and Standard Operating Procedures (SOPs)	☐	☐	☐

B	DEVELOP IMP (GOV'T & CTR)				
B-1	**Prepare Section I**	Provide a brief description of the project, system and subsystems.	☐	☐	☐
B-2		List all assumptions. (This is especially important in post award contractor IMP)	☐	☐	☐
B-3		List all ground rules for the program.	☐	☐	☐
B-4		List event and action dictionary. (structured list of events and actions critical to the program)	☐	☐	☐
B-5		Describe program organization.	☐	☐	☐
B-6		List all reference documentation.	☐	☐	☐
B-7	**Prepare Section II**	Define IMP and IMS numbering system. (If the contract involves multiple IMPS, ensure the overarching IMP provides the numbering system to each subordinate IMPs. This could be the case if various contractors' processes involve proprietary information).	☐	☐	☐
B-8		Describe all project events. (title, description, dates, dependencies, resources, success criteria)	☐	☐	☐
B-9		Provide complete IMP table. (Can be a continuous table or multiple tables broken out by major events)	☐	☐	☐
B-10	**Prepare Section III** **(All Tasks and processes either need to be described in the IMP or a reference provided where they are described (SOW, SOP, etc.)**	Provide Task narratives.	☐	☐	☐
B-11		Provide process narratives.	☐	☐	☐
B-12	**Prepare Section IV**	Provide a glossary of terms and acronyms.	☐	☐	☐
C	**DEVELOP INTEGRATED MASTER SCHEDULE**				
	Form all required IPTs. The number of IPTs will depend on the complexity of the program. The purpose of these IPTs are to determine time and resources required to complete their specific Tasks and activities. IPTs can include PM, system engineering, logistics, testing, manufacturing, integration, firepower, communications, etc.		☐	☐	☐

	Define the battle rhythm. This includes all daily, weekly, monthly, quarterly reoccurring event (IPT meetings, reviews, reports, etc.).	☐	☐	☐
	Define Gov't and contractor responsibilities. The overarching IPT consisting of both Gov't and ctr leaders needs to ensure that both Gov't & ctr have a clear understanding of their responsibilities based on the SOW.	☐	☐	☐
	Determine all Tasks and activities required to complete each work package (IPT).	☐	☐	☐
	Establish dependencies and relationships between Tasks and activities (IPT).	☐	☐	☐
	Estimate duration and level of effort for each Task and activity (IPT).	☐	☐	☐
	Develop a schedule network diagram to create a visual representation of the project activities, their dependencies and their critical path (IPT).	☐	☐	☐
	Allocate resources to each Task and activity (IPT).	☐	☐	☐
	Combine all previous steps into a single integrated master schedule (scheduler).	☐	☐	☐
	Check internal logic. Validate the correct sequence of exist for each WBS path (scheduler).	☐	☐	☐
	Check external logic. Validate external relationships between various WBS paths, to ensure they are logical, i.e., design activities need to occur before fabrication activities (scheduler).	☐	☐	☐
	Determine critical path.	☐	☐	☐
	Conduct schedule risk analysis.	☐	☐	☐
	Conduct schedule health.	☐	☐	☐
	Monitor, update and control the schedule.	☐	☐	☐

Glossary

Accomplishment	The desired result(s) before or at completion of an Event that indicates a level of the project's progress.
Agile	A software development methodology that values individuals and interactions over processes and tools; working software over comprehensive documentation; customer collaboration over contract negotiation; and responding to change over following a plan.
Common Element	Those elements are common to all major systems and subsystems (not including software acquisition systems). Common WBS elements are applied to the appropriate levels and elements within the WBS they support.
Control Account	A management control point that represents a cluster of related work packages. It is a specific subset of the project's overall WBS structure that represents a significant portion of the project's work scope and budget. Every task and activity, work package and planning package should be directly traceable to a control account. It is at the control account where EVM is used to measure progress of a project against its planned cost and schedule.
Criteria	The definitive evidence that a specific Accomplishment is accomplished. Criteria are subsets of Accomplishments.
Critical Path	A sequence of discrete work packages and planning packages (or lower level Tasks or activities) in the network that has the longest total duration through an end point that is calculated by the schedule software application. Discrete work packages and planning packages (or lower level Tasks or activities) along the critical path have the least amount of float or slack (scheduling flexibility) and cannot be delayed without delaying the finish time of the end point effort. Essentially "critical path" has the same definition as "project critical path" with the exception that the end point can be a milestone or other point of interest in the schedule.
DevSecOps	All work related to ensuring the ability to continuously integrate and deliver working code. This responsibility encapsulates multiple areas (i.e., configuration management, automation, development, testing, security, integration, deployment and operations). It encourages the concept of "shifting-left" to reduce handoffs and include all functional areas in planning as early as possible. DevSecOps practices contain their own set of terms and concepts that exceed the scope of this document (e.g., continuous integration; continuous delivery; continuous monitoring; automation; telemetry).
Dictionary	A detailed document that provides a comprehensive description of each task, activity and deliverable in a project.

Event	A project assessment point that occurs at the culmination of significant project activities: Accomplishments and Criteria.
Execution IMS	A comprehensive IMS used to manage the project on a daily basis. It is normally provided by the contractor via a CDRL item. It is updated on a regular basis. It should contain all of the contract IMP Events, Accomplishments, and Criteria from contract award to completion of the contract.
Government Project Schedule	A schedule that captures the plan for executing the acquisition strategy, including incremental approaches.
Horizontal Integration	The logical relationships and time-phasing between Tasks and milestones from project start to finish. The logical relationship and time-phasing between Tasks and milestones from project start to finish. Work that is planned in a logical sequence considering the interdependencies among work packages and planning packages (or lower level Tasks or activities), ensuring the overall schedule is rational, and provides methodology to evaluate the impact of current schedule status on subsequent work packages and planning packages (or lower level Tasks or activities) and milestones.
Initial Execution (IE)	An IMS produced by the Government during the MSA phase and later refined during the TMRR phase. The initial execution (IE) IMS focuses on the Government's vision of how the project should be executed. The IE IMS is normally an attachment to the RFP to allow offerors see and comment on the Government's proposed schedule**.**
Integrated Master Plan (IMP)	A detailed document consisting of business process narratives and an event-based plan consisting of a hierarchy of project events, with each being supported by specific Accomplishments, and each Accomplishment associated with specific Criteria to be satisfied for its completion. The IMP is normally part of the contract and thus contractually binding.
Integrated Master Schedule (IMS)	The IMS is an integrated, logically driven, network-based schedule that is vertically and horizontally traceable. The IMS is traceable to the IMP (if applicable), organizational structure, control accounts, WBS, and SOW. The WBS, in the IMS, is consistent with the cost data set.
Level of Effort (LOE)	Effort of a general or supportive nature that does not produce definite end products. It is typically measured through the passing time.
Logical Sequence	A sequence of events, Tasks, activities, etc. that follow a rational order based on reasoning ability.
Near Critical Path	The lowest float or slack paths of discrete work and planning packages (or lower level Tasks or activities) in the network that has the longest total duration nearest to the critical path.

Network	A schedule format in which the activities and milestones are represented along with the interdependencies between work and planning packages (or lower level Tasks or activities). It expresses the logic (i.e., predecessors and successors) of how the project should be accomplished. Network schedules are the basis for critical path analysis, a method for identification and assessment of schedule priorities and impacts. At a minimum, DoD EVMIG directs all discrete work shall be included in the network.
Organizational Breakdown Structure (OBS)	An organization model or diagram that links employees, IPTs, departments with specific work packages.
Period	An interval of time between the start and finish of an activity, Task, event or process.
Periodic Analysis	A written analysis of the project execution status. The level of detail and frequency of reporting should be defined in the CDRL
Planning Package	A logical aggregation of future work within a control account that cannot yet be planned in detail at the work package or Task level.
Pre-Award Schedule	A schedule used to plan, coordinate, and track the progress of the Government and industry activities necessary to achieve contract award.
Project Critical Path	A sequence of discrete work and planning packages (or lower level Tasks or activities) in the network that has the longest total duration through the contract or project that is calculated by the schedule software application. Discrete work and planning packages (or lower level Tasks or activities) along the critical path have the least amount of float or slack (scheduling flexibility and cannot be delayed without delaying the finish time of the entire work effort. *See also* Critical Path
Release	The release represents the core element of the project structure, guiding how frequently the project delivers capabilities to the end users. The length of each release depends upon operational, acquisition, and technical factors that should be discussed with stakeholders across the user and acquisition organizations. As a general guideline, most releases should take less than six months. Shorter release cycles have several benefits, the most important being that the project deploys useful capability to the end-user faster.
Task or Activity	An element of work performed during the course of a project. An activity has an expected duration, expected cost and expected resource requirements. Some systems may define Tasks or activities at a level below the work package while other systems do not differentiate between the two. It is a time-phased, detailed activity (where work is accomplished, and funds are expended) required to support the IMP Criteria, Accomplishment, and events to meet project requirements.

Vertical Integration	The consistency of data between the various levels of schedules and consistency of data between various WBS elements and IMP or IMS elements (if applicable) within the schedules.
Work Breakdown Structure (WBS)	A product-oriented hierarchical decomposition of project deliverables, including hardware, software, services, data and facilities. The hierarchy is an output of system engineering efforts during the pre-acquisition and acquisition of a defense materiel item.
Work Package	A group of related tasks or activities that are managed as a single unit. They consume resources and are completed to satisfy specific Criteria. Work packages describe the expected way work is to be conducted. They are a subdivision of a control account, assignable to a single program organizational element. Through work packages a program plans the work, measures technical progress, and determines earned value.

Acronyms

A&S	Acquisition and Sustainment
AAF	Adaptive Acquisition Framework
AAFID	AAF Document Identification
ACAT	Acquisition Category
ADA	Acquisition Data and Analytics
ALAP	As Late As Possible
AoA	Analysis of Alternatives
ASAP	As Soon As Possible
ASD (A)	Assistant Secretary of Defense (Acquisition)
ATP	Authority to Proceed
BCAC	Business Capability Acquisition Cycle
BCWS	Budget Cost of Work
BOE	Basis of Estimate
C&A	Certification and Accreditation
CA	Contract Award
CDD	Capability Development Document
CDR	Critical Design Reviews
CDRL	Contract Data Requirement List
CFSR	Contract Funds Status Report
C-IMS	Contractor IMS
CLIN	Contract Line Number
CM/DMP	Configuration Management/Data Management Plan
CMP	Configuration Management Plan
COTS	Commercial-off-the-Shelf
CPAR	Contractor Performance Report
CPR	Contract Performance Report
CSOW	Contractor Statement of Work
CTP	Critical Technical Parameter
CWBS	Contract WBS
DAL	Data Accession List

DAoS	Defense Acquisition of Services
DAU	Defense Acquisition University
DBS	Defense Business Systems
DCMA	Defense Contract Management Agency
DD	Disposition Decision
DE	Digital Engineering
DES	Digital Engineering Strategy
DevSecOps	Development, Security, and Operations
DIACAP	DoD IA Certification and Accreditation Process
DID	Data Item Description
DIP	DIACAP Information Plan
DoD	Department of Defense
DoDI	DoD Instruction
DRFP	Draft RFP
DT	Developmental Test
DT&E	Developmental Test and Evaluation
EAD	Event and Action Dictionary
E-IMS	Execution IMS
EMD	Engineering and Manufacturing Development
EN	Evaluation Notices
EVM	Earned Value Management
EVMIG	Earned Value Management Implementation Guide
EVMS	Earned Value Management System
EVMSIG	Earned Value Management System Interpretation Guide
EVMSPAP	Earned Value Management System Program Analysis Pamphlet
FAR	Federal Acquisition Regulation
FD/SC	Failure Definition/Scoring Criteria
FF	Finish-to-Finish
FNET	Finish No Earlier Than
FNLT	Finish No Later Than
FOC	Full Operational Capability
FoS	Family-of-Systems

FS	Finish-to-Start
GAO	Government Accountability Office
GASP	Generally Accepted Scheduling Practices
GFE	Government Furnished Equipment
GFI	Government Furnished Information
HW	Hardware
I	Iteration
IA	Information Assurance
IBR	Integrated Baseline Review
ICD	Initial Capabilities Document
IE-IMS	Initial Execution IMS
IGS	Integrated Government Schedule
ILS	Integrated Logistic Support
IMP	Integrated Master Plan
IMS	Integrated Master Schedule
IOC	Initial Operational Capability
IPM	Integrated Program Management
IPMDAR	Integrated Program Management Data Analysis Report Integrated Program Management Data and Analysis Report
IPPD	Integrated Product and Process Review
IPT	Integrated Product Team
ISR	Integrated Solicitation Review
JAG	Judge Advocate General
KPP	Key Performance Parameter
LFT&E	Live Fire Test and Evaluation
LOE	Level of Effort
LRU	Line Replaceable Unit
MCA	Major Capability Acquisition
MDAP	Major Defense Acquisition Program
MDD	Material Development Decision
MFO	Must Finish On
MIL-HDBK	Military Handbook

MIL-STD	Military Standard
MS	Milestone
MSA	Material Solution Analysis
MSO	Must Start On
MTA	Middle Tier of Acquisition
MVCR	Minimum Viable Capability Release
MVP	Minimum Viable Product
NDA	Non-Disclosure Agreement
NDIA	National Defense Industrial Association
NOCA	Notice of Contract Action
OA	Operational Assessment
OBS	Organizational Breakdown Structure
OD	Outcome Determination
OFP	Operational Flight Program
OT	Operational Test
OT&E	Operational Test and Evaluation
OUSD	Office of the Under Secretary of Defense
PASEG	Planning and Scheduling Excellence Guide
PD	Production and Deployment
PDR	Preliminary Design Review
PERT	Program Evaluation and Review Technique
P-IMS	Proposed IMS
PM	Program Manager
PMO	Program Management Office
PMR	Program Management Review
R	Release
R&E	Research and Engineering
RFP	Request for Proposals
RMP	Risk Management Plan
SC-IMS	Subcontractor IMS
SCG	Security Classification Guide
SDP	Software Development Plan

SEP	System Engineering Plan
SF	Start-to-Finish
SNET	Start No Earlier Than
SNLT	Start No Later Than
SOO	Statement of Objective
SOP	Standard Operating Procedures
SoS	System of Systems
SOW	Statement of Work
SRA	Schedule Risk Assessment
SRD	Systems Requirement Document
SRR	Systems Requirement Review
SS	Start-to-Start
SSP	Source Selection Plan
SST	Source Selection Team
STE	Standard Test Equipment
SW	Software
SWBS	Subcontract WBS
T&E	Test and Evaluation
TEMP	Test and Evaluation Master Plan
TF	Total Float
TMRR	Technology Maturation and Risk Reduction
TPM	Technical Performance Measure
TRD	Technical Requirement Document
TRR	Test Readiness Review
UCA	Urgent Capability Acquisition
WBS	Work Breakdown Schedule

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