

Documents for Launch Management Guide

Mission Specific Documents:

1) Mission Need Statement (MNS)

The Mission Need Statement document is a broad statement of need. The need occurs in response to a present situation or threat. For instance, there may be a need for more satellites because the current satellite systems are overtaxed. This document would describe that need, but would not declare a specific system or direct solution to meet that need. It will give potential solutions and alternatives. This is the first document created in a program's life. The government will produce this document as a way to become self aware of its needs. A sample Mission Need Statement is given in Appendix B.

2) Payload Questionnaire / Spacecraft Questionnaire

The Payload Questionnaire document declares physical properties of a particular payload (a satellite if that is what the payload happens to be). These physical properties include everything from mass, target orbit parameters, moments of inertia, and so forth. This is a government created document to be completed by the contractor. The contractor will furnish it with numerical values. A completed Payload Questionnaire begins the future IRD discussions, provides initial assessment of launch services, special data required by the launch contractor, and mission unique requirements.

3) System CONOPS

A system-level Concept Operations (CONOPS) is focused on the system being acquired. The system-level CONOPS is to be a high level written description of a space system that identifies the system's purpose, operational assumptions, the desired effects, how the system will be used, and who is envisioned to operate and use it. It should include a description of the operational nodes and a high level description of the connections between the nodes and the elements of the space system. The sufficiency test for a system-level CONOPS is whether sufficient written detail has been provided in order to generate the required Operational View architecture products for the ICD.

Source: NSS 03-01 page 11.

4) Analysis of Alternatives (AoA)

The Analysis of Alternatives is a brief provided by various contractors, with government and industry input. The purpose of this document is to bring to light any potential alternatives to a particular program. The AoA will provide at least four alternatives at a minimum. The Analysis of Alternatives will address alternatives that fall short of current program requirements, but may have lower risk and/or cost. The document defines the impact an alternative would have on a program if that alternative were selected. The document also states transition issues and any miscellaneous implications the alternative will have.

5) Operational Requirements Document (ORD)

The Operational Requirements Document is a major document and is updated throughout a program's life. It is used by all levels of the Department of Defense to address the needs required for a particular program. The updates occur before every major

milestone. The ORD summarizes the Mission Need Statement, describes the overall mission area of affect (what users or region the system will provide services for), describes existing shortcomings of current systems, describes the capabilities required of the newly proposed system, discusses program support (maintenance planning, computer resources, human systems integration, etc), and states program affordability. Critical sections of the ORD include, Operational Concept, Support Concept, Acquisition Strategy, Threat Environments and Threat Assessments, Shortcomings, Coverage, Capacity, and Protection. A sample ORD is supplied in Appendix B.

6) System Performance Requirements Document (SPRD)

The System Performance Requirements Document specifies the exact demands of the payload functions to be produced. The document tells how the payload is to perform, what the requirements are, what the constraints are, and a general discussion of the description of the payload. The document provides introductory material to the overview and scope of the payload and program.

7) Memorandum of Agreement (MOA)

A Memorandum of Agreement is a document created when two or more authorities must work together toward the completion of a program (an example would be the Navy and the Air Force or two competing contractors). The MOA defines responsibilities and authorities of the two or more interested parties. In essence, this document establishes that the two or more parties must work together in a civil way (Note the title: “memory” of agreement). The document states what information must be freely shared between the parties and which party has the authority in various situations.

8) Request For Proposal (RFP)

The Request for Proposal is a collection of critical documents. The RFP is the government’s method of asking for bids for its desired system. It is divided into thirteen sections. Essentially the government uses this document to tell industry what it needs and asks for proposals in response to the RFP from various companies that can complete the work successfully. Contractor bids are answers to the RFP. After bids are received, a process called Source Selection begins. In this process, the government decides who the winning contractor will be. The sections of the RFP are listed below:

- Section A: Solicitation/ Contract form
- Section B: Supplies or Services and prices/costs
- Section C: Statement of Work/ Statement of Objectives
- Section D: Packaging and Marketing
- Section E: Inspection and Acceptance
- Section F: Deliveries or performance
- Section G: Contract Administration Data
- Section H: Special Contract Requirements
- Section I: Contract Clauses
- Section J: Contract Data Requirements List
- Section K: Representations, certifications, and other statements of offerors
- Section L: Instructions, conditions, and notices

Section M: Evaluation factors for award

All sections are important, but sections B, C, J, L, and M are extremely important when trying to communicate the government's needs to the industry. A brief description of the critical sections follows:

Section B - Contains a brief description of supplies and services required, including quantities and national stock numbers, if applicable. A Contract Line Item Number identifies each item in this section.

Section C – Contains the Statement of Work (SOW) or Statement of Objectives (SOO). The SOO is used when the government is not entirely confident on the answers to address a current dilemma or if the government deems the risk of the program too great and wants to the contractor to assume some of the risk. If this is the situation then a SOO is produced and sent to a contractor. The contractor's response is a SOW. Many programs start with a SOO, but all produce a SOW eventually. The government is responsible for creating the SOO. The government or the contractor is responsible for the SOW creation, depending on the situation.

The SOW is a very critical document. It outlines the tasks the contractor is to perform, identifies commercial and governmental standards, informs the contractor what is required (But not how to meet that requirement; It is important not to tell a contractor how to complete its tasks so that if the final product does not conform to specifications, the contractor is responsible for re-working it and not the government), and defines the scope of the work to be performed. "The SOW, after it becomes part of the contract, is the standard for measuring the contractor's performance." The SOW must be clear and concise. If any ambiguities exist, the courts always rule against the writer. Source: SYS 201 Review Resources, Section 13.0.1. A sample SOO and SOW is available in Appendix B.

Section J – Contains the Contract Data Requirements Lists. These lists tell the contractor what data to deliver, when to deliver it, how to deliver it, and instructions on how to prepare the data. The list also specifies what major meetings are to be held and who is to be invited.

Section L – Contains instructions, notices, and conditions, to offerors. This section contains instructions, notices, and conditions not required elsewhere in the RFP. Section L may contain: required format of a proposal, past performance information, required cost, page limitations, when and where to submit proposals.

Section M – Contains guidelines for evaluating contractor proposals. It states what the evaluation conditions are and gives the order of their importance. The section is used to tell the contractor what areas to focus on when creating their proposal for work to be completed. If one of the mandatory requirements is not met in a contractor's proposal, the government can deem it unacceptable and eliminate the contractor from competing. Some evaluation conditions may be: price, past performance, technical and management capability, personnel qualifications, and prior experience.

9) Early Integration Studies

Early Integration Studies are performed by the contractor to ensure that the rocket and payload can be launched safely and successfully. If there is one or more contractors producing the rocket and the payload separately, then the following studies are used to

show all the interested parties what the spacecraft components can receive before destruction in the form of stresses, temperatures, and loads.

Coupled Loads Model – A three-dimensional loads analysis. These are the loads that the spacecraft will experience during take-off and ascent into orbit. The loads are the external forces put on the spacecraft via gravity, acceleration, wind gusts, and varying pressure. The analysis is a simulation.

Thermal Loads Model – A thermal analysis imposed on the spacecraft before flight and during flight. The thermal analysis shows the temperature and heat flow as it affects the spacecraft. Analysis is used to show that the spacecraft meets all thermal constraints.

Trajectory Mission Planning – Plans the path the rocket and payload will take to acquire the desired orbit.

Contamination Requirements – States the acceptable level of contaminants in the spacecraft. A contamination analysis is performed to ensure that all potential contamination is within the boundaries of required levels.

Mission Unique Hardware – Hardware that is not part of the standard interface, as defined by the Standard Interface Specification, but can be obtained for a particular mission.

Compatibility Payload Hardware – Shows that the hardware to be used for the spacecraft is compatible with the hardware to be used for the launch vehicle. In shorter terms, it must be shown that the spacecraft can fit on the top of the launch vehicle.

Additional analyses include fluid, software, electrical, and safety analyses, and mechanical and electrical design analyses. Each analysis is equally important.

10) Interface Requirements Document (IRD)

The payload contractor creates the Interface Requirements Document. It defines technical requirements imposed by the payload on the rocket. The payload data includes: mission requirements, spacecraft characteristics, mechanical and electrical interfaces, and test operations. The IRD is a major document that is due before the preliminary design review.

11) Interface Control Document/Mission Specification / Mission Specifications (ICD/MS)

Note: Lockheed Martin declares this document as the ICD and Boeing declares it as the MS. The document and its purpose are exactly the same for each company, only the name changes depending on which corporation is creating it. A sample ICD is provided in Appendix B.

The ICD/MS follows the Interface Requirements Document. The rocket manufacturer prepares this document. The document includes all mission-peculiar requirements. The ICD/MS contains all technical requirements stated in the IRD and any additional requirements found during the integration process. The ICD/MS supercedes the IRD and the SOW in case any conflicts arise between the documents.

“The ICD/MS is a top-level interface requirements document between the spacecraft and launch vehicle. It contains physical, functional, environmental, operational, and performance requirements for the interface and is a contractually binding document. The document establishes how each interface requirement is to be verified to ensure that all interface details have been accomplished in compliance with ICD/MS requirements.” Source: Atlas V Mission Planner’s Guide, page 203.

12) Capability Development Document (CDD)

The CDD is the government’s primary means of defining authoritative, measurable and testable capabilities needed by the warfighters to support the SDD phase of an acquisition program. The CDD provides the operational performance attributes necessary for the acquisition community to design a proposed system and establish a program baseline. It states the performance attributes, including Key Performance Parameters that will guide the development and demonstration of the proposed increment. A sample CDD is provided in Appendix B.

Source: CJCSM 3170.01A 12 March 2004, Enclosure E

13) Capability Production Document (CPD)

The CPD is the government’s primary means of providing authoritative, testable capabilities for the Production and Deployment phase of an acquisition program. The CPD captures the information necessary to support production, testing, and deployment of an affordable and supportable increment within an acquisition strategy. The CPD provides the operational performance attributes necessary for the acquisition community to produce a single increment of a specific system. A sample CPD is provided in Appendix B.

Source: CJCSM 3170.01A 12 March 2004, Enclosure F

General Documents:

1) Evolved Expendable Launch Vehicle Standard Interface Specification (SIS)

“This document defines the Standard Interface between the payload and the Evolved Expendable Launch Vehicle System. The standard interface was developed to standardize equipment, processes and services among systems and vehicles and to standardize payload integration.” Source: EELV SIS, page 1.

A copy of the EELV SIS is given in Appendix B.

2) SATCOM Capstone Requirements Document (CRD)

“The purpose of the Satellite Communication Capstone Requirement Document (SATCOM CRD) is to describe the overarching required capabilities and desired effects for a SATCOM Family of Systems (FoS) in order to evolve and transform the existing and planned US Government SATCOM and data relay architectures of Department of Defense’s (DoD’s) Global Information Grid (GIG); the Intelligence Community’s (IC’s) information infrastructure, specifically the National Reconnaissance Office’s Communications Network (NCN); and the NASA Integrated Services Network (NISN). It captures the enduring vision for the role of SATCOM and data relay systems and services as a fundamental part of the information enterprises of these organizations. It makes the connection between space-based information capabilities and the ways

warfighters, intelligence organizations, and NASA intend to operate from the present to 2020 and beyond.” Source: SATCOM CRD, page 5.

3) Federal Acquisitions Regulations (FAR)

“The Federal Acquisition Regulations System is established for the codification and publication of uniform policies and procedures for acquisition by all executive agencies. The Federal Acquisition Regulations System consists of the Federal Acquisition Regulation (FAR), which is the primary document, and agency acquisition regulations that implement or supplement the FAR.” Source: FAR, page 21.

A copy of the FAR is given in Appendix B.

4) Payload Planner’s Guide/Mission Planner’s Guide/User’s Guide

A payload planner’s guide’s purpose is to aid a customer or government in understanding a particular launch vehicle and its subsequent launch process. A planner’s guide should clarify the launch management process for its respective launch vehicle. It details critical documents required, shows timelines of deliverables, gives rocket specifications including flight profiles, and provides information on potential launch facilities. The companies who produce the launch vehicle write a planner’s guide. A planner’s guide is invaluable to a launch manager. The general information inside a guide is referred to often.

Sample Planner’s Guides provided in Appendix C include:

Lockheed Martin Atlas V (USA) Mission Planner’s Guide

Boeing Delta II (USA) Payload Planner’s Guide

Boeing Delta IV (USA) Payload Planner’s Guide

ILS Proton (Russian) Payload Planner’s Guide

H2-A (Japan) User’s Guide (Helps if one can read Japanese)

Sea Launch Zenit-3SL (International) User’s Guide

Arianespace Ariane 5 (French) Planner’s Guide can be downloaded here:

http://www.arianespace.com/site/launcher/launcher_sub_index.html

5) Department of Defense Document (DODD)

5000.1 – Documents the defense acquisition system. “[DODD 5000.1] provides management principles and mandatory policies and procedures for managing all acquisition programs.” Source: DODD 5000.1, page 1.

5000.2 – “[The DODD 5000.2] establishes a simplified and flexible management framework for translating mission needs and technology opportunities, based on approved mission needs and requirements, into stable, affordable, and well-managed acquisition programs that include weapon systems and automated information systems (AISs)... authorizes Milestone Decision Authorities (MDAs) to tailor procedures to achieve cost, schedule, and performance goals.” Source: DODD 5000.2, page 1.

Note: The NSS 03-01 document replaces the DODD 5000.2 for acquisition programs dealing with National Space Security (i.e. satellite launches).

A copy of both the DODD 5000.1, 5000.2 is given in Appendix B.

6) National Security Space Acquisition Policy (NSS 03-01)

The NSS is a guide for how space acquisitions should be made. It states who has authority to make key decisions and sets up the process for space acquisitions, which must be followed. “This document provides acquisition process guidance for the Department of Defense (DoD) entities that are part of the National Security Space (NSS) team.” Source: NSS 03-01, page 1.

Note: NSS 03-01 replaces DODD 5000.2 for programs that deal with space acquisitions. The major differences between the NSS 03-01 and DODD 5000.2 are:

- 1) NSS focuses on the needs for high technology, but small quantity programs. For example, only three satellites may need to be produced in contrast to 500 tanks. The DODD 5000.2 is used for the large quantity items.
- 2) Funding for space acquisition usually occurs early in the program’s life rather, as compared to high production programs. For instance, high dollar amounts are used to create satellites initially, whereas a prototype tank is designed, discussed, then 500 are ordered. Research, development, test, and evaluation funds can be used for the first two satellites.

A copy of the NSS 03-01 is provided in Appendix B.

7) Military Standards

MIL-STD-1540B – Test Requirements For Space Vehicles. “This standard establishes uniform definitions, environmental criteria, test requirements, and test methods for space vehicles and their subsystems and components.” Source: MIL-STD-1540B, page 10.

MIL-STD-1540D – Product Verification Requirements For Launch, Upper Stage, and Space Vehicles. “This document requires that a process be established to develop and manage verification requirements to assure that launch and space equipment can function correctly and withstand stresses it may encounter during its life cycle including end-of-life performance requirements. This document is intended for use in developing the detailed verification requirements for a particular project. The application of these requirements should result in an effective verification process and consequently high confidence in achieving successful space missions.” Source: MIL-STD-1540D, page: 5.

MIL-STD-1472 – Human Engineering. “The purpose of this standard is to present human engineering design criteria, principles, and practices to achieve mission success through integration of the human into the system, subsystem, equipment, and facility, and achieve effectiveness, simplicity, efficiency, reliability, and safety of system operation, training, and maintenance.” Source: MIL-STD-1472, page 9.

A copy of each military standard is provided in Appendix B.