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DEPARTMENT OF DEFENSE
HANDBOOK

KEY SUPPLIER PROCESSES FOR AVIATION AND SPACE SECTOR ACQUISITION AND SUSTAINMENT PROGRAMS

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FOREWORD

1. This handbook is approved for use by all Departments and Agencies of the Department of Defense.

2. This handbook was prepared for the aviation and space business sectors and designed to be used by suppliers to support defense systems acquisitions. Some aspects of the management processes and performance attributes defined herein may be peculiar to this sector as they represent implementation of a number of joint government-industry initiatives.

3. This document provides fundamental management processes and performance attributes for program execution. Additional guidance is provided in the Joint Aeronautical Commanders' Group (JACG), Engineering and Manufacturing Practices for Defect Prevention: A Guide for Aerospace Acquisition Management Teams.

4. This volume is a component of a multi-volume set developed to implement acquisition reform within the aviation and space business sectors of the Department of Defense. The complete set of aviation and space Performance Based Business Environment (PBBE) documents consists of the following:

Integrated Performance Based Business Environment Guide	A capstone document designed to integrate the following volumes within an acquisition strategy framework.
Risk Management Pamphlet	Establishes a risk management framework for acquisition programs and serves to change the cultural thought from "risk avoidance" to "risk management".
Performance-Based Product Definition Guide	Provides guidance for the use of performance-based specifications and supports flexible acquisition and sustainment strategies.
Joint Service Specification Guides (JSSGs)	A preparation guide for JSSG with aviation-unique, sample performance-based specifications.
Key Supplier Process Handbook	Describes top-level key management processes critical to the effective management of an aviation acquisition program.
Contractor Performance Assessment Reports (CPARS)	Provides a generic framework to collect and use contractor performance data in the source selection process.
Performance Risk Assessment Group (PRAG) Guide	Provides guidance on how to obtain and assess past performance data during the source selection process.
Flexible Sustainment Guide	Provides guidance on how to maintain combat capability and reduce life cycle costs by introducing flexibility into integrated logistics support.

5. Comments, suggestions, or questions on this document should be addressed to AFLCMC/EZSS, 2145 Monahan Way, Bldg. 28, Wright-Patterson AFB, OH 45433-7017 or emailed to Engineering.Standards@us.af.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil/.

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TABLE

1. SCOPE

1.1 Scope.

The objective of this handbook is to identify and describe key management processes for program execution. It is oriented to the aviation and space business sectors suppliers who support acquisitions and sustainment. The processes and their associated performance attributes are applicable to all program phases, though their relative importance to program objectives will change throughout the product life cycle. The content of this document may be used to:

a. Develop performance-based acquisition strategies through the identification of process performance attributes most critical to the successful execution of the program;
b. construct solicitations that encourage supplier-defined processes in place of processes defined and controlled by military standards; and
c. provide a common basis to communicate desired process characteristics and performance attributes. This will facilitate efficient communication between government and industry. It may be used by suppliers to define and improve common, facility-wide processes and develop a set of top-down process metrics to assess process effectiveness and monitor process improvements.

1.2 Discussion.

The six processes described in this handbook were selected to represent top-level, generic functional processes common in the aeronautical business sector. Suppliers may differ in their definitions of the boundaries and interfaces of these processes. There may be differences in the specific application of these generic processes from one program to the next within a given supplier's organization. These generic definitions have been developed to allow industry to tailor and partition management processes in a manner that best fits individual functional organization and products. In addition to the top-level processes identified in this handbook, there may be lower-level supporting and enabling processes essential to program performance. The key to successful programs will be to demonstrate the ability to implement an integrated set of industry processes and lower-level supporting and enabling processes to meet the programmatic requirements of the government. The processes, and their characteristics and performance attributes described in this handbook, include the following:

a. Program/data management process (see 4.1).
b. Engineering process (see 4.2).
c. Quality process (see 4.3).
d. Manufacturing process (see 4.4).
e. Procurement/subcontract management process (see 4.5).
f. Logistics process (see 4.6).

1.3 Critical process assessment tools (CPATs).

The CPATs are tools used to identify functions critical to the success of an acquisition program. They can be used to assess the contractors' approach and progress toward planning and implementing a process to carry out the critical function. Refer to Appendix A of this handbook for more information.

2. APPLICABLE DOCUMENTS

2.1 General.

The documents listed below are not necessarily all of the documents referenced herein, but are those needed to understand the information provided by this handbook.

2.2 Government documents.

N/A

2.3 Non-Government publications.

The following document forms a part of this document to the extent specified herein.

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

AS9100	Quality Systems - Aerospace - Model for Quality Assurance in Design, Development, Production, Installation and Servicing

(Copies of this document are available online at http://www.nist.gov.)

SAE INTERNATIONAL

SAE AS6500	Manufacturing Management Program

(Copies of this document are available online at http://www.sae.org/.)

3. DEFINITIONS

3.1 Definitions.

The following definitions apply to terms as used within this document.

3.1.1 Element.

An element is a lower-level indenture of a process that has all the characteristics of a process as described below. Elements may function independently or in conjunction with other elements.

3.1.2 Integrated master plan (IMP).

An IMP is a top-level plan to conduct a program. It integrates all lower-level plans and is an event-driven tool that can minimize the exposure to risk by ensuring all functional elements of the program are aligned before subsequent activities are initiated. The IMP identifies major contractual milestones and may include non-contractual key events that represent both the completion of incremental program objectives and the commitment of future program resources. For each of these milestones and key events, specific entrance and exit criteria are identified which define accomplishments that must be achieved in terms of: (1) achievement of a desired result that indicates design maturity of the products and processes; (2) completion of a discrete step of the planned development; and (3) completion of detailed planning for the next phase of activities.

3.1.3 Key product characteristics.

Key product characteristics are the features of a material, part, or process whose variation has significant influence on product cost, safety, fit, performance, service life, or manufacturability. This concept asserts that among all the characteristics that define a part, material, etc., only a small subset is so critical to functionality or manufacturability that they must be closely controlled during fabrication, assembly, and test.

3.1.4 Operational/user requirements.
These are end-user generated requirements, normally defined in terms of a system capability or characteristic, required to accomplish mission needs. User requirements are initially stated in an Initial Capabilities Document (ICD) and evolve to system-specific performance requirements in the Capabilities Development Document (CDD).

3.1.5 Performance attribute.
A performance attribute is a critical characteristic associated with a process or element which describes the expectations for that process or element in terms of capabilities.

3.1.6 Process.
A process is a set of procedures and methodologies which, when applied, provides a consistent set of outputs for a given set of inputs.

3.1.7 Process implementation.
Process implementation is the application of supplier processes for a given program. The overall implementation and associated dependencies will be described in an Integrated Master Plan (IMP).

3.1.8 Technical performance measurement (TPM).
Technical performance measurement (TPM) is the continuing verification of the degree of anticipated and actual achievement for technical parameters. Confirms progress and identifies deficiencies that might jeopardize fulfillment of a system requirement. Assessed values falling outside established tolerances indicate a need for evaluation and corrective action.

3.1.9 Verification requirements.
Verification requirements are generated by the acquisition community to define the method(s) and criteria by which the achievement of technical requirements will be substantiated during incremental development. Verification requirements apply to both product and process capabilities.

3.2 Acronyms.

CDD	Capabilities Development Document
COTS	Commercial-Off-The-Shelf
CPATs	Critical Process Assessment Tools
CPI	Continuous Process Improvement
ICD	Initial Capabilities Document
IMP	Integrated Master Plan
IPT	Integrated Product Team
NDI	Non-Developmental Item
PP/CSC	Program Planning/Cost and Schedule Control
SPC	Statistical Process Control
TPM	Technical Performance Measurement
VR	Variability Reduction

4. KEY PROCESSES AND CHARACTERISTICS

4.1 Program/data management process.

4.1.1 Discussion/rationale.

The program management process is intended to represent the top-level supplier process for the overall conduct and control of the program. There are seven elements within the process. The three key elements of this process are (1) integration and coordination of all other processes applied to the program, (2) allocation of resources and assignment of responsibilities within the program, and (3) primary communications interface with all involved in the program. This interface includes the parent corporation and the responsibilities for implementing corporate processes for the program. The following elements also contribute to the program management process: (4) risk management, (5) program planning/cost and schedule control, (6) contract compliance, and (7) data management.

4.1.1.1 Integration and coordination.

This element provides for the orchestration of program activities into a unified whole that satisfies the program requirements.

4.1.1.2 Resources and responsibilities.

This element deals with the staffing and resourcing of the teams to execute program activities. It also defines staff responsibilities.

4.1.1.3 Communications.

This element addresses the flow of information within and among the teams or organizations that implement program activities. It also deals with information communicated to the customer to ensure customer satisfaction is the focus of program activities.

4.1.1.4 Risk management.

Risk management is an element that puts in place a structured decision-making process specifically oriented to the identification, balance, and management of cost, schedule, and technical risks bounded by the technical considerations and external constraints. This element consists of five sub-elements: (1) risk identification, risk analysis in terms of probability of occurrence and consequence of failure, (2) risk handling in terms of identification and (3) assessment of alternative risk management options, (4) decision-making and implementation, and (5) tracking or feedback to assess the effectiveness of the risk management effort implemented.

4.1.1.5 Program planning/cost and schedule control (PP/CSC).

The program planning/cost and schedule control (PP/CSC) element for program management interfaces directly with other key processes. It is the mechanism for planning, forecasting, tracking, assessing, and reporting activities, resource expenditures, and requirements. It establishes both a schedule and cost performance baseline for the program. The PP/CSC should also establish a "self-governance" program to verify that internal reviews/audits of processes and performance measures are in place and being used. It provides a method to assess progress in terms of the technical performance, contract schedule, and budget. It interfaces with the engineering process to evaluate technical progress in terms of technical performance measures and their influence on overall program cost and schedule and collects actual expenditures against the program work breakdown structure. It interfaces with the program management process to provide information and data with respect to overall program performance. It is initially used for proposal preparation and is updated based on actual events. An integral part of this process is the cost and schedule estimating methodologies required to forecast remaining effort accurately.

4.1.1.6 Contract compliance.
Contract compliance is the means to record, report, disseminate, and track all active contract requirements and contract changes. These include those for customers and suppliers as well as associates and partners.

4.1.1.7 Data management.
Data management is an element of all six described processes. Data is a collection of recorded information (regardless of the form or method of recording) generated and used to manage the development, acquisition, sustainment, or operation of defense systems and equipment. It is necessary for program definition, control, monitoring, evaluation, and support. Data includes both administrative and technical information, and information created by or retained by suppliers. Reports (financial, progress, logistics, test, etc.), analyses, studies, plans, schedules, records, and other information constitute administrative data. Technical data is required to define and document an engineering design or component configuration. Technical data includes, but is not limited to, specifications, technical data packages (product definition data, associated lists, process descriptions), and technical manuals (operation and maintenance instructions, parts breakdown, and other instructions for installation, operation, maintenance, training, and support). The data management element applies policies, systems, and procedures to identify and control data requirements; acquires data in a timely and economical manner; and ensures the adequacy and accuracy of the data relative to the data requirements.

4.1.2 Performance attributes.

4.1.2.1 Integration and coordination.
Integration and coordination performance attributes include the following:

a. The capability to supply the leadership and management required to meet program objectives through timely and effective decisions and direction based on a structured decision-making process which provides traceability of program decisions including the supporting data and rationale, and
b. the capability to provide timely cost and schedule status across the facility/program.

4.1.2.2 Resources and responsibilities.
Resources and responsibilities performance attributes include the ability to staff, train, organize, and equip the teams necessary to implement the proposed effort and meet overall program objectives.

4.1.2.3 Communications.
Communications performance attributes include the establishment and maintenance of efficient and effective internal and external communications with all customers and suppliers, with an emphasis on customer satisfaction.

4.1.2.4 Risk management.
Risk management exhibits the following performance attributes:

a. The ability to identify program risks and define incremental accomplishment criteria to measure progress in the reduction of that risk,
b. the ability to define mitigating strategies and alternatives with defined decision points for implementation, and
c. the capability to develop cost and schedule estimates which recognize and include the uncertainty of each task due to technical, cost, and schedule risks.

4.1.2.5 Program planning/cost and schedule control.
Program planning/cost and schedule control element exhibits the performance attributes listed below:

a. The ability to accumulate all technical performance, cost, and schedule data relative to responsible and accountable Integrated Product Teams (IPTs) and assess earned value of work in progress;
b. the ability to predict near-term schedules and resource requirements accurately;
c. the ability to forecast time and cost to completion of program/project;
d. the capability to provide timely cost and schedule data relative to cost work breakdown and IPT structure; and
e. the ability to support audits of actual costs tied to the cost work breakdown structure.

4.1.2.6 Contract compliance.
The contract compliance element exhibits the following performance attributes:

a. The ability to maintain and disseminate contract documentation current for all active efforts; and
b. the capability to maintain and distribute schedules for all contract deliverables and events and to provide timely notice of near-term contract requirements to promote compliance.

4.1.2.7 Data management.
The data management element exhibits the following performance attributes:

a. The ability to provide management, technical, and customer personnel the quality information required to accomplish their tasks in an efficient and cost-effective manner; and
b. the ability to refine data requirements continually.

4.2 Engineering process.

4.2.1 Discussion/rationale.
The engineering process is the governing technical management process that manages and controls the product development. It addresses all aspects of total system performance and provides the primary technical interface with the other key processes. It defines the technical processes and interfaces and provides the technical baseline for the Integrated Master Plan (IMP) for development and production. Its primary function is to ensure the product meets the customer's cost, schedule, and performance needs. The cost, schedule, and performance considerations include the total product life cycle.

This definition enables industry to tailor and partition the overall engineering process in the manner which best fits their individual organizational elements and products. The key to a successful engineering process is the integration of these disciplines into an efficient and effective process for the overall technical management of programs and development of systems and equipment which meet user requirements. When hardware and software design, and test and evaluation are addressed as separate disciplines, it will be necessary to demonstrate the defined roles of these disciplines. By its nature, it assumes the functional aspects of the engineering process and becomes integrated over the entire development cycle. These individual disciplines are melded herein and will be discussed in terms of six elements: (1) systems integration, (2) requirements analysis, (3) functional analysis/allocation, (4) design synthesis (e.g., preliminary design and detail design), (5) systems verification, and (6) systems analysis and technical control.

4.2.1.1 Systems integration.
Systems integration provides the overall leadership and management of the engineering process. It is the coordination, communication, and integration of decisions across and among various teams. It includes managing the interfaces internal and external to the system, including hardware to hardware, hardware to software, and software to software. The integration task leverages the individual activities to facilitate and enhance the individual products of the system. This element also provides for the application and tracks the progress of the numerous specialty technical disciplines commonly identified as the "-ilities". It also provides the interface with the manufacturing and logistics support processes to integrate production and support requirements into the product definition.

4.2.1.2 Requirements analysis.
Requirements analysis determines system technical requirements by studying and understanding the user requirements as stated in the Initial Capabilities Document (ICD) and the Capabilities Development Document (CDD), which address the entire life cycle of the system. The CDD describes the missions or tasks the system must accomplish, the environment(s) in which the system will be used, any constraints placed on the system, measures of effectiveness for test and evaluation, system life-cycle factors, and interoperability with other systems and operational requirements. Requirements analysis provides verifiable, performance-based requirements in the system utilization environments and the top-level functional requirements the system must perform. This set of requirements is commonly referred to as "the functional baseline". Requirements analysis flows down to the lowest level of the system. As the system evolves in greater detail, requirements analysis is iterated to address user needs.

4.2.1.3 Functional analysis and allocation.
Functional analysis and allocation defines and integrates a functional architecture to support synthesis of solutions for people, products, and processes and management of risk. Functional analysis/allocation is conducted iteratively to define successively lower-level functions required to satisfy higher-level functional requirements and to define alternative sets of functional requirements. Functional analysis divides big functions into smaller, simpler functions to which a solution can be designed. The lowest level of functional architecture yields a well-defined set of actions that must be performed by the components of the system to meet the top-level requirements, with a set of verifiable component requirements usable as criteria for design. This set of requirements is commonly referred to as "the allocated baseline". This activity also includes initial or conceptual design of products to validate the ability of the selected technologies to achieve desired results.

4.2.1.4 Design synthesis, or preliminary and detail design.
Synthesis, or preliminary and detail design, translates the functional and performance requirements, including interfaces, into a description of the complete system that satisfies the requirements. It defines this solution in terms of a physical architecture of people, products, and processes. For the system products, solutions are iteratively defined through the preliminary and detailed design of the products and selection of production processes. This activity develops the design in accordance with the architecture selected. Results are defined and documented in the form of product definition data that allow hardware and/or software fabrication (coding). This product definition data is part of the overall package commonly referred to as "the product baseline".

4.2.1.5 Design analysis for manufacturing.
Organizations should integrate manufacturing into the product design and development process and should engage manufacturing expertise in this process. In support of this, the organization should conduct analyses of producibility, design, key characteristics, and failure modes. For detail information regarding these topics, refer to SAE AS6500.

4.2.1.6 Systems verification.
Systems verification is the incremental, iterative determination of progress in satisfaction of technical requirements and program objectives. It provides a rigorous, quantitative basis for validation and verification of specification requirements. The ultimate objective is to confirm and document that the design solution meets the specification requirements for all identified operational conditions. System verification addresses all elements of the final solution, including interfaces, as well as the integrated system solution. It is a combination of inspections, analyses and assessments, demonstrations, and tests that authenticates the cost and performance of the system. It also includes the validation of analytical methodologies used as part of the verification processes.

Test management is an integral part of this element. It plans testing and defines, acquires, and manages required resources. These resources include facilities, equipment, test articles, and test personnel. Test management also includes the methodologies required to predict test requirements accurately in terms of schedule. Prediction is based on broad test objectives, maturity of test articles, normal availability of facilities and equipment, and reliability of test methods. It further includes managing the conduct of tests in accordance with the detailed test instructions generated by the engineering process, and recording, analyzing, and reporting test results.

4.2.1.7 Systems analysis and technical control.
Systems analysis and technical control is used to balance the requirements and constraints in the program. It includes, but is not limited to, trade studies among requirements, design alternatives and related manufacturing, test and support processes, program schedule and life cycle cost, configuration management, interface management, deficiency reporting, risk management, and performance-based progress measurement, including the milestone exit criteria, technical performance measurement, and technical reviews/audits.

Configuration management has four key elements: (1) technical baseline definition and maintenance, (2) control, (3) status accounting, and (4) audits. Technical baseline definition and maintenance documents the requirements and functional/physical characteristics of a system and includes such baseline definitions as hierarchy, nomenclature, and numbering. Control ensures changes to these requirements, the product configuration and its characteristics, and related documentation are evaluated and authorized by the use of a systematic process. Status accounting records and reports critical elements of information required to manage the configuration of the system. The audit function confirms the end-item meets verification requirements and the as-delivered product matches the technical documentation.

Interface management controls the design compatibility of internal and external engineering interfaces and consists of performance/physical requirements/design constraints. Deficiency reporting is the systematic means to record, track, control, and provide feedback on technical and administrative actions for reported deficiencies or proposed enhancements to the system.

Technical risk management is a structured process specifically oriented to the identification, balance, and management of technical risks and associated cost and schedule impacts. It is primarily intended to be a proactive process that acknowledges the technical risks at the outset of the program and manages these risks to a predetermined plan, but it also includes the early recognition and management of unexpected problems. It supports the overall program risk management process by identifying technical risks, providing analyses in terms of probability of occurrence and consequence of failure, and identifying and assessing alternative approaches. Then, based on the program decisions, implements and tracks the effectiveness of the alternative(s) selected.

Performance-based progress measurement is the identification of key technical performance parameters in a structured format where lower-level performance parameters support performance parameters at higher levels of integration, prediction of their time-phased level of performance based on design maturity, and the tracking and reporting of actual versus projected performance. It provides for early recognition of unexpected problems.

4.2.2 Performance attributes.

4.2.2.1 Systems integration.

Performance attributes of systems integration include the following capabilities:

a. Provide the leadership necessary to integrate all technical disciplines and functional processes (e.g., manufacturing and logistics), and establish and maintain effective communications with, and among, participants throughout the development effort;
b. identify key product characteristics and control allowable design margins for the integrated/installed performance of system components;
c. establish and track internal and external software component margin allocation and budgeting;
d. identify and manage technical risks;
e. identify and manage critical interfaces and prevent sub-optimal solutions by continually looking across all product teams;
f. provide quality interface control documents on a timely basis;
g. determine the appropriate application of specialty functions (-ilities);
h. staff, train, organize, and equip the technical teams necessary to implement the proposed technical effort required to meet overall program objectives; and
i. provide tools, databases and development practices specific to end-items.

4.2.2.2 Requirements analysis.

The performance attributes of requirements analysis include the following capabilities:

a. Define comprehensive and quantitative system performance requirements based on demonstrated/projected end-item performance capabilities;
b. integrate subsystem performance estimates into overall system performance;
c. establish and maintain a decision database that provides a traceable record of the system performance and verification requirements to customer/user needs, requirements, and objectives;
d. define, manage, track, and verify hardware/software growth and spare requirements in the program specifications;
e. provide system-level cost/performance trade studies that assess the use of commercial-off-the-shelf (COTS)/non-developmental items (NDIs) and provide the ability to adjust system-level performance requirements when large cost savings are possible; and
f. establish life-cycle requirements for the system (e.g., manufacturing, support, disposal, training, etc.).

4.2.2.3 Functional analysis and allocation.
The performance attributes of functional analysis and allocation include the following capabilities:

a. Define a complete set of verifiable performance requirements for the products necessary to achieve required system capabilities at a level that allows reasonable development activities relative to risks, resources, and constraints;
b. define comprehensive and quantitative installed and uninstalled performance requirements for how and where the end-item products will be used;
c. include product life requirements in early design trade studies;
d. allocate performance requirements, including interface tolerances, to subsystems and components as the design progresses;
e. establish and maintain a decision database that provides a traceable record of performance and verification requirements from each end-item to system-level requirements;
f. identify potential COTS and NDIs, and establish alternate subsystems/component requirements matrices based on estimated product performance capabilities for the intended use.

4.2.2.4 Design synthesis, or preliminary and detail design.
Design synthesis performance attributes include the following capabilities:

a. Define a physical architecture that satisfies overall system-level requirements;
b. model adequately the performance of both end-items and the integration of these end-items;
c. identify key performance design and safety requirements and key design requirements at each level of system or product indenture and translate them into design solutions;
d. identify key product characteristics and associated key production processes, and define and control allowable design margins and capabilities for key production processes;

e. identify control requirements for product integrity during operation and support phases to maintain the system or product operation within the users' key performance capabilities;

f. perform sensitivity analyses to establish design margins and examine the effects of design requirement shortfalls as well as the tolerance to variations in use, producibility, supportability, and other determining factors;

g. perform appropriate trade studies, prototypes, simulations, analysis, and design methodologies compatible with the identified system incremental development phasing;

h. establish and maintain a decision database that provides a traceable record of the results of analyses, trade studies, etc., which support key technical decisions;

i. integrate the design requirements for manufacturing (e.g., tooling datum requirements) and support processes (e.g., diagnostics, maintenance requirements) with the product design, and to facilitate ease of assembly through the use of geometric dimensioning and tolerancing; and

j. provide quantitative performance assessments of potential COTS and NDIs for the intended use based on demonstrated capabilities, environments, and performance.

4.2.2.5 System verification.
The performance attributes of system verification include the following capabilities:

a. Conduct incremental developmental analyses, simulations, and/or tests to develop required design data and verify design requirements and producibility;

b. perform final qualification/performance verification that represents usage and environments expected over the life of the system or product;

c. identify test objectives and other critical information required to plan for and execute testing;

d. predict test requirements in terms of schedule and resources;

e. acquire and manage test resources, conduct the required testing in a timely and effective fashion, and interface with the manufacturing processes to provide for the timely availability of test articles;

f. report results accurately and establish and maintain a verification database that provides a traceable record of performance verification; and

g. assess adequacy of verification of COTS and NDIs, identify additional verification requirements if needed, and integrate existing verification data into the overall system verification database.

4.2.2.6 Systems analysis and technical control.
Systems analysis and technical control performance attributes include the following capabilities:

a. Verify changes and variances to the system are accurately evaluated, documented, and approved, and that changes are accomplished using a systematic, measurable change process;

b. provide definitive, accurate, and timely information on the current configuration of the system for use within management and technical processes;

c. confirm the end-items meet verification requirements, and provide traceable results the as-delivered product matches its technical documentation;
d. control interfaces among systems, subsystems, and commodities to provide for design compatibility;
e. identify problems, conduct root cause analyses, and define and implement corrective actions for both the products and the production processes that generated the problem to preclude recurrence;
f. early identification of technical risks and advanced planning to manage these risks adequately as part of the initial program development;
g. identify and apply measures of effectiveness and technical performance measures which capture the maturity, performance, and risks in the program and establish associated incremental milestone criteria and accomplishments; and
h. conduct trade studies among requirements, design solutions, program schedule, life-cycle costs, and various program constraints, and to provide technical alternatives and options to technical and program management decision makers.

4.3 Quality process.

4.3.1 Discussion/rationale.

The quality process refers to any of a number of processes that form the Quality Management System and serve to achieve quality. Quality processes should be based on the elements of SAE AS9100 the industry standard for Quality Management Systems – Requirements for Aviation, Space and Defense Systems, or equivalent. The organization is responsible for the quality of all products purchased from suppliers, including customer-designated sources. Quality processes may be company, commercial, or international quality systems as long as they meet the basic requirements of AS9100.

4.3.2 Performance attributes.

Performance attributes include the following capabilities:

a. Provide a documented quality system that conforms to AS9100 or other equivalent generally-accepted commercial, international, or military standards;
b. identify and document the common, facility-wide processes used to create the products and services of the facility;
c. identify the products and services of the common, facility-wide processes, including intermediate products and services;
d. identify the customer(s) of the products and services (internal and external), and to provide a customer satisfaction orientation which considers what is necessary to fulfill customer needs;
e. identify suppliers required by the common, facility-wide processes and provide clear definitions of supplier requirements;
f. configure the common, facility-wide process to provide for clear interfaces with internal and external customers and suppliers to facilitate the communications required to satisfy requirements and to allow facility processes to be tailored to specific program requirements; and
g. provide continuous improvement through measurement and analysis of the performance of common, facility-wide processes as implemented on each program

within the facility, and the ability to eliminate sources of errors/defects and non-value-added activity.

4.4 Manufacturing process.

4.4.1 Discussion/rationale.

The manufacturing process includes the total set of activities and interfaces necessary to convert the product definition into an affordable end-item product. The objective of the manufacturing process is to provide: (1) a complete definition of the factory environment in which the product is to be produced for consideration by the product/production process design activity; (2) a capable, efficient factory design as a product of the development program; (3) development and production/reproduction articles produced in support of delivery requirements; and (4) adequate insight into how factories are performing during contract execution. Reproduction includes the repair and overhaul of service units. The manufacturing process assesses the product and factory design, production processes, and tooling. It mitigates production transition risk through evaluation of design and manufacturing alternatives relative to program affordability, manufacturing efficiency, and quality objectives. It identifies and resolves production and quality-related problems experienced in the manufacturing facility.

The manufacturing process supports the program/data management process by providing the up-front planning for the factory management systems necessary to manage the factory. Within the factory there must be adequate control to verify a thorough understanding of how the product is being built and what actions may be taken to reduce risk. These factory control systems must consider the control of the material on the production floor, the planning and statusing of work in process, and a systematic approach to continuous improvement and waste elimination.

The manufacturing process also supports the engineering process by providing for the integration of the product and factory design. If production costs are to be controlled, there must be a continual interchange between the product and factory design activities. That is, the capabilities of the planned or existing factory must be a consideration in the product design and vice-versa in terms of unit production cost, the projected delivery schedule, and product quality requirements. To determine the impact of the factory to production cost, consideration must be given to items such as process capacity and capability, environmental concerns, standard work content, factory flow, and assembly methods. Factory modeling may be used to validate the compatibility of the product design and factory in terms of cost, schedule, and quality requirements.

Organizations should establish, document, and maintain a Manufacturing Management System consistent with SAE AS6500 Manufacturing Management Program. SAE AS6500 can provide effective guidance for many of the elements mentioned above.

The overall manufacturing process will be discussed in terms of five elements: (1) material control; (2) shop floor planning, tracking, and control; (3) factory flow optimization; (4) factory design; and (5) factory performance.

4.4.1.1 Material control.

Material control is the identification, ordering, receipt, flow, and tracking of material for the system. This element should provide visibility and control of material as it is used within the factory.

4.4.1.2 Shop floor planning.

The shop floor planning, tracking, and control element addresses the factory systems necessary to plan, status, and accomplish production risk management.

4.4.1.3 Factory flow optimization.
The factory flow optimization element will seek to identify and eliminate continually waste or non-value-added effort.

4.4.1.4 Factory design.
The factory design element addresses the concurrent technical development of the product and factory to verify that these aspects of the product/production processes are considered and the factory infrastructure is in place to support manufacturing activities necessary to accomplish the program. This includes activities such as tool design/fabrication and consideration of facilities necessary to produce the end products. This element should provide for the integration of the product and production processes with the factory design activities.

4.4.1.5 Factory performance.
The factory performance element identifies and seeks to reduce the direct labor content of the product, optimizes the man/machine interface, and establishes control and feedback mechanisms within the factory. This element should provide management visibility of efficiency and productivity. It should also provide data to determine factory problem areas, thus driving corrective action and continuous improvement. Sub-elements include the following:

a. Use of stable, capable manufacturing processes as the basis for product acceptance. Replacement of discrete inspection or test by stable, capable processes eliminates the cost associated with non-value-added verification activities. Defective products must be repaired or reworked and re-inspected, or scrapped, all of which add cost to the final product without adding value. In most cases, a stable, capable process is the preferred condition since it generally leads to the lowest cost method of product acceptance.

b. Control of variation in the measurement system. Measurement processes exhibit variation just as manufacturing processes do. Consequently, it is important to conduct measurement equipment repeatability and reproducibility analyses when performing process capability studies to verify that measurement device variation is not consuming an excessive amount of design tolerance.

c. Root cause, closed-loop corrective action. Advanced manufacturing systems emphasize prevention of a defect's recurrence through the use of multi-functional teams and formal problem solving techniques. This approach is combined with high-level management attention and tracking to evaluate and implement changes in designs, production processes, tooling, work instructions, training, etc., to ensure the problem does not recur.

d. Continuous process improvement (CPI) or variability reduction (VR). The basic objective is to reduce the cost to deliver a quality product. This is achieved by assessing the root causes of variability and instituting cost-effective changes to reduce this variability by eliminating or reducing the impact of root causes. Another aspect of CPI is the evaluation of the design to identify cost-effective ways to make it more robust or more tolerant to variation. In the more general sense, CPI would address the processes associated with the product, including factory infrastructure processes such as inventory control, parts and material handling, and technical, business, and administrative support functions (as they affect production).

4.4.2 Performance attributes.

4.4.2.1 Material control.

A performance attribute of material control is the ability to store, move, and manage the material requirements to optimize on-schedule support to production requirements.

4.4.2.2 Shop floor planning and control.

Shop floor planning and control performance attributes include the following capabilities:

a. Determine product flow and span time within the factory;
b. provide product status information;
c. provide a production scheduling and control system utilized plant-wide; and
d. manage factory operations and resources to deliver required articles on schedule- including tooling, test, and support equipment.

4.4.2.3 Factory flow optimization.

A performance attribute of factory flow optimization is the ability to identify and eliminate non-value-added effort continuously within the product flow. Organizations can analyze the manufacturing processes using Modeling & Simulation (M&S) techniques to identify potential bottlenecks or constraints, confirm the achievability of planned cycle times, evaluate impacts of process variabilities, and estimate required quantities of tooling, personnel, and inventory. The organization should evaluate the proposed design and manufacturing concepts using M&S techniques before the product and process designs are implemented in the actual production environment. M&S techniques should match the level of complexity of the product manufactured. Levels may range from spreadsheet analysis of manufacturing characteristics, to basic methods of modeling and simulation of selective manufacturing processes, up to virtual factory simulations.

4.4.2.4 Factory design.

Factory design performance attributes include the following capabilities:

a. Define factory performance requirements;
b. provide manufacturing data, factory capabilities, special tooling/test equipment requirements, and unique production process characteristics which affect or influence the design of the products and factories;
c. optimize product requirements with factory capabilities; define factory cost, schedule, and quality requirements; and
d. develop the production planning necessary to build the product and provide the manufacturing support systems (tooling, test equipment, etc.) on schedule.

4.4.2.5 Factory performance.

The performance attributes of factory performance include the following capabilities:

a. Identify standard labor content;
b. optimize the use of resources;
c. measure first pass yields and implement continuous process improvement or variability reduction;

d. verify manufacturing processes and tooling which control key product characteristics and are stable and able to meet customer product requirements;

e. use stable, capable manufacturing processes as a basis for product acceptance in lieu of inspection and test;

f. assess the contribution of variation associated with measurement and test equipment and ensure it is accounted for when determining process capability;

g. facilitate process maturity through continuous variability reduction for key product characteristics;

h. provide continuous improvement by measuring and analyzing manufacturing process performance, and eliminating sources of errors/defects and non-value-added activity; and

i. facilitate the rapid disposition of defects, rapid and accurate identification of the root causes of defects, and the implementation of effective corrective action.

4.5 Procurement/subcontract management process.

4.5.1 Discussion/rationale.

The subcontract management process establishes the total set of business and technical relationships between the customer and supplier. The process begins with development of requirements and subcontract acquisition strategy, and involves all phases of the acquisition cycle. It involves all of the other key supplier processes and many of their elements and sub-elements. Emphasis is placed on close, interactive relationships between customer and supplier and longer-term business relationships, as opposed to arms-length, short-term relationships. Key to accomplishing these changing relationships is early and continuing involvement of suppliers with the customer in the entire acquisition life cycle and development of fully-integrated teamwork among the customer and their suppliers. This approach builds long-term, cooperative relationships with suppliers and stresses extensive information sharing and joint problem-solving that is based on mutual trust and commitment. In this respect, subcontract management must be expanded to enable key suppliers to participate in the integration process.

The subcontract management process interfaces with the program management process by providing the contractual linkages between the prime and suppliers. It also defines the technical relationships of the key suppliers in support of the prime's IPTs. It describes the roles and responsibilities of parties and establishes the formal and informal communications channels. The technical relationship will also include the integration of the configuration management process in terms of: configuration identification; control, status accounting, and audits; and interface management.

An integral part of the subcontract management process is an effective method to assess supplier performance which provides for efficient proposal evaluation and award of contracts to best value suppliers. For more information on prime, subcontractor, and U.S. Government supplier management processes and procedures, refer to the Supplier Management Process Guide (see Appendix B).

4.5.2 Performance attributes.

Performance attributes include the following capabilities:

a. Differentiate between suppliers based on past performance and other indicators of risk;
b. provide timely subcontract awards based on best value;
c. define mutually-acceptable contracts which completely define technical and business relationships relative to the contract effort;
d. synchronize production schedules;
e. assess make/buy alternatives based on core competencies;
f. provide information-sharing among stakeholders;
g. establish mutually beneficial relationships;
h. integrate supplier processes as an integral part of the overall program performance measures and metrics; and
i. provide for the selection of key suppliers based on their ability to implement appropriate aspects of quality systems.

4.6 Logistics process.

4.6.1 Discussion/rationale.
The overall logistics process will be discussed in terms of two elements: (1) logistics planning and (2) product support. Logistics planning and development processes are multi-functional, technical and management planning disciplines associated with the design, development, test, production, fielding and sustainment of the infrastructure support elements necessary to sustain the system in the field. Product support activities include maintenance or materiel management activities in support of fielded systems.

4.6.1.1 Logistics planning.
Logistics planning involves the integration of the product support sub-elements during the upfront design. Development and integration of these sub-elements is essential to successful fielding, operation, and support of the system. Specifically included, is the planning required to evolve and establish maintenance concepts and requirements for the lifetime of the system. Because of the impacts on systems design and the long-term operations and support cost implications, a cost-effective support concept needs to be established early in the program after careful consideration of all viable alternatives and refined concurrently with the design effort into detailed maintenance plans.

4.6.1.2 Product support.
Product support includes all sustainment activities which support operational systems, including disposal. Sub-elements required for this support include the following:

a. Manpower and personnel: Military and civilian personnel with the skills and grades required to operate and support the system over its lifetime at peacetime and wartime rates. Program managers should strive to minimize the quantity of personnel and the skill levels required to operate and maintain systems;
b. Supply support: The secondary items necessary to field and support the system, including consumables, repair parts, and spares;
c. Support equipment: All equipment required to support the operation and maintenance of the system. This includes associated multi-use end-items, ground-handling and maintenance equipment, tools, metrology and calibration equipment,

test equipment, and automatic test system. The automatic test system includes automatic test equipment hardware and operating system software, test program sets that include the interface test adapter hardware and software programs to test individual weapon electronic items, and the associated software development environments and interfaces;

d. Technical manuals and technical data: These are scientific or technical information recorded in any form or medium (such as manuals or drawings). Computer programs and related software are not technical data; whereas, the documentation of computer programs and related software are technical data. Also excluded are financial data or other information related to contract administration;

e. Training and training devices: These are processes, procedures, techniques, training devices, and equipment used to train civilian and active duty and reserve military personnel to operate and support the system. This includes individual and crew training (both initial and continuation) as well as new equipment training; and initial, formal, and on-the-job training;

f. Computer resources support (CRS): The computer resources may be part of the system, a subsystem, support equipment (automatic test system), training equipment and training devices, or other applications. Computer resources support considers all support elements as they apply to the computer resources employed by the system. Generally, however, CRS focuses on facilities, hardware, system software, software development and support tools, related documentation and data, and identification and establishment of the knowledge and skills required to provide sustainment and future modification of the computer resources;

g. Facilities: Permanent, semi-permanent, or temporary real property assets required to support the system. This includes studies conducted to define facilities or facility improvements, locations, space allocation, utilities, environmental requirements, real-estate requirements, and equipment; and

h. packaging, handling, storage, and transportation: These are the resources, processes, procedures, design considerations, and methods which ensure all system, equipment, and support items are preserved, packaged, handled, and transported properly. This includes environmental considerations, equipment preservation requirements for short- and long-term storage, and transportability.

4.6.2 Performance attributes.

4.6.2.1 Logistics planning.

Logistics planning performance attributes include:

a. The ability to conduct support trade-offs which consider the impacts on life-cycle support;

b. the ability to analyze and assess alternative support approaches;

c. the ability to identify, define and/or develop support resources related to one another and consistent with the system design configuration and the users' requirements;

d. the ability to plan for, track, and mitigate the support impact caused by engineering design changes; and

e. the ability to develop and provide engineering and support-related technical data which enables further support resource development or management.

4.6.2.2 Product support.
Product support performance attributes include the following:

a. The ability to provide cost-effective maintenance and materiel management activities for in-service system support consistent with the users' readiness requirements;
b. the ability to track and assess materiel management and maintenance metrics and develop and implement effective courses of action to remediate identified deficiencies; and
c. the ability to apply defect prevention practices in the post-production support and sustainment phase of systems and products, including modifications, upgrades, and product improvements.

5. NOTES

5.1 Intended use.
This handbook is intended to supplement departmental manuals, directives, and military standards, and provide fundamental information which describes the generic key processes for program execution used by suppliers to support defense acquisition for the aviation and space sectors.

5.2 Subject term (key word) listing.

Configuration management
Critical process assessment tools
Data management
Engineering process
Interface management
Logistics process
Manufacturing process
Process attributes
Procurement/Subcontract management process
Program/Data management process
Quality process
Risk management

5.3 Changes from previous issue.
The margins of this handbook are marked with vertical lines to indicate where changes from the previous issues were made. This was done as convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations.

CRITICAL PROCESS ASSESSMENT TOOLS (CPATs)

A.1. SCOPE

A set of templates developed by the Space and Missile Systems Center, titled, “Critical Process Assessment Tools (CPAT),” are useful to assess risks associated with various supplier processes. The information contained herein is intended for guidance only and is applicable to this handbook.

A.2. CPAT AREAS

The CPATs, closely aligned with processes addressed in this handbook, provide guidance on detailed questions and answers in the areas depicted on Figure A-1.

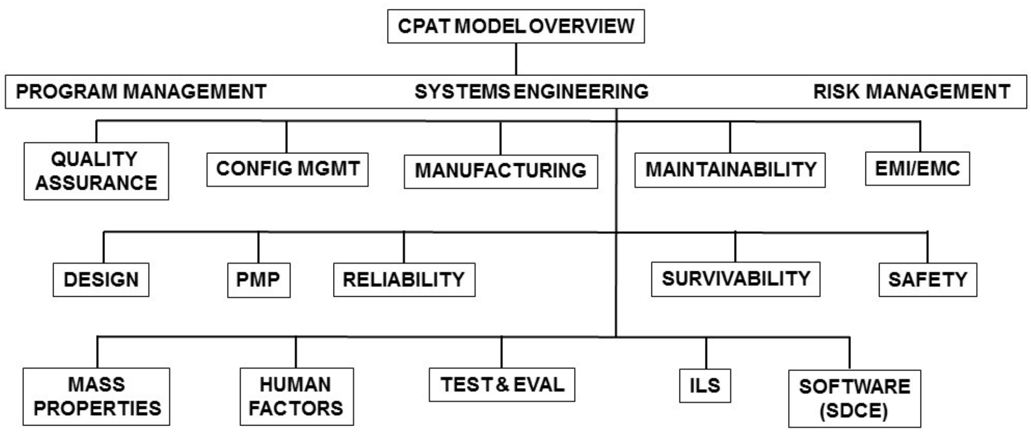

FIGURE A-1. CPAT model.

The CPATs are tools that can be used to identify functions critical to the success of an acquisition program. They can be used to assess the contractors' approach and progress toward planning and implementing a process to carry out the critical function. Each CPAT first provides an overview of the function that corresponds to the critical process and helps determine if the process is critical to a given contract. Each tool then decomposes the critical process into generic performance objectives that project officers and engineers can tailor to a specific contract. The CPATs can support the development of Requests for Proposals (RFPs) to reflect the criticality of those processes that must be performed to ensure the system that is ultimately delivered to the military operators and maintainers meets all mission and supportability requirements. For each objective, the CPATs then define a series of performance-oriented source selection standards and questions that can be tailored to the program to assess the contractor’s approach prior to contract award and progress after award. Table A-I maps between the CPAT process areas and the key supplier processes.

TABLE A-I. Mapping of CPAT to key supplier processes (KSP).

KPSH CPAT	Program/Data Management	Engineering	Quality	Manufacturing	Procurement/Subcontract Management	Logistics
Program Management	×				×	
Systems Engineering		×				
Risk Management	×	×				
Design		×				
Reliability		×				
Quality/Product Assurance			×			
ILS						×
Maintainability						×
Test & Evaluation		×				
Manufacturing				×		
Configuration Management	×	×				
Parts, Materials & Processes (PMP)			×		×	
Safety		×				
Survivability		×				
Mass Properties		×				
Human Factors		×				
EMI/EMC		×				

SUPPLIER MANAGEMENT PROCESS GUIDE

B.1. SCOPE

This appendix provides guidelines to help in the assessment of supplier management processes and procedures. The information contained herein is intended for guidance only.

B.2. SUPPLIER MANAGEMENT BACKGROUND

B.2.1 Supply chain impact.

Recent United States Air Force (USAF) estimates indicate that 70 to 80 percent of any weapon system value stream cost distribution is in the supply chain. In today's global environment, suppliers play an increasingly important role in product development and contribute significantly to the affordability of any weapon system, while requiring the most attention up-front and early.

Nearly 80 percent of the life cycle cost of any system is committed during early design and development phases. Typically, supplier network represents an enormous opportunity of distributed technical knowledge and an excellent source of cost savings.

B.2.2 Subcontract collaboration.

Subcontract management (SM) is inherently a responsibility of the prime contractor. However, experience has shown program offices that develop the infrastructure to collaborate early with the Defense Contract Management Agency (DCMA), the prime contractor, and key suppliers have seen significant benefits in identifying potential risks and subsequently developing proper risk mitigation plans. As a result, they have been able to enhance product and process quality, improve delivery performance, and avoid significant cost impacts.

Since the issues surrounding the supply chain typically impact program quality, cost, and schedule, program management personnel can be key contributors in addressing this type of risk and providing visibility into potential future suppliers' problems/issues.

B.3 SUBCONTRACT MANAGEMENT GUIDELINES

The following guidelines can be helpful to program offices to assess and positively influence the prime contractor's subcontract management processes and procedures.

B.3.1 Purpose.

a. Understand prime's processes and procedures for managing suppliers,
b. obtain insight into suppliers posing potential risk,
c. keep government leaders informed of any potential adverse impact, and
d. assist in the development of risk mitigation plans.

B.3.2 Roles and responsibilities.

B.3.2.1 Program office.

a. Team up with primes and DCMA supplier management organization to establish an understanding of how supplier risks are identified and managed.
b. Begin consideration of the supply base and supplier risks as early as possible, preferably during the conceptual design phase.
c. Participate in supplier's Program Management Reviews (PMRs).
d. Understand prime's SM processes and identify shortcomings and strengths so that risk can be managed.
e. Routinely participate in joint SM metrics reviews and goal setting - demand that the metrics assess all important SM elements: schedule (shortages), cost, quality and performance.
f. Keep government leaders informed (including the warfighter) of any potential risks.
g. Promote the use of SM best practices.
h. Promote a lean outreach program through the prime for suppliers.
i. Promote an affordability program that includes flow-down of responsibility and funding to suppliers.
j. Develop meaningful CPAR/award fee parameters for the prime SM assessments. This varies from program to program based on the acquisition cycle of each program. Below are some typical objective/subjective parameters to be considered:
   (1) On-time award of purchase orders (PO's),
   (2) supplier delivery to manufacturing need date,
   (3) big bone delivery to manufacturing need date,
   (4) percentage of PO's placed with high-performing suppliers,
   (5) percent of dollars placed with high-performing suppliers,
   (6) percent of PO's found compliant (pre-award audit),
   (7) percent of suppliers with unsatisfactory rating (monthly),
   (8) cost of supplier quality (supplier non-conformance cost/1000 earned standard hours),
   (9) number of supplier quality escapes to final assembly operation,
   (10) average number of days for suppliers to respond to supplier corrective action notices (SCAN),
   (11) total number of delinquent SCANs (monthly),
   (12) management responsiveness (subjective),
   (13) timely notification to the program office regarding supplier concerns (subjective), and
   (14) work transfer risk mitigation plans (subjective).
k. Keep responsibility with the prime contractor for managing its suppliers, but understand the program's supply chain.

B.3.2.2 Contractor.

a. Be sensitive/open to customer needs and expectations.
b. Educate customer on SM processes and procedures.
c. Remember that your product must satisfy the needs of the warfighter, who is putting his/her life on the line.
d. Make certain your suppliers manage their supply chain.
e. Compile a database of SM best practices within the aerospace industry as well as other high performing industries.
f. Strive to reduce the number of the supplier base to include fewer but higher performing suppliers (partners).

B.3.3 Potential conflict areas/pitfalls.

a. Prime's privity of contract, sensitive cost and pricing information.
b. Lack of trust.
c. Suppliers assuming program office representative is providing contractual direction.
d. Ignoring early warning signs relating to systemic processes in favor of daily fire fighting.
e. Inadequate consideration of what's necessary to support the weapon system with spares, tooling, and engineering data for future mods.

B.3.4 Key points to be emphasized.

a. Avoid surprises for leadership, including the user.
b. Understand how requirements are allocated from the System Program Office (SPO) to the prime and subsequently throughout the supply chain (e.g., key characteristics, quality requirements, process and product specification, etc.).
c. Understand and establish top level key metrics areas.
d. Gain insight into subcontractor critical processes regardless of size.
e. Use DCMA for problem identification and solutions to these problems.
f. Establish and maintain personal one-on-one professional relationships with DCMA and prime contractor.
g. Manage critical parts from a warfighter readiness perspective, not just a prime and subcontractor perspective. In addition to Critical Safety Items (CSI), the user often has a list of readiness critical items. It is vital for the program office, prime contractor and suppliers to be in tune with this list.
h. Encourage primes to integrate suppliers early during product development.
i. Cultivate open communication, informal links, and knowledge sharing throughout the supply chain.
j. Use benchmarking with world class companies.
k. Listen to the voice of the supplier.

l. Form multi-disciplined, multi-organizational teams to manage implementation of a new supplier, new capability, or modification of an existing requirement.
m. Are government/prime policies hindering supplier performance? If so, what can be done to improve supplier performance without degrading the deliverable product? Does everything you do and require of your counterpart add value?

B.3.5 Key methods/steps.
Considerations:

a. What is the latest policy, and what guidelines are used by the prime to manage suppliers?
b. How do the above processes flag potential problems and what is the "trip-wire" point?
c. What metrics are in place to assess the overall health of the system? Some of the CPAR and award fee metrics listed above can also be used here.
d. What make/buy policies are in place and are they followed properly?
e. What processes are in place to follow up on make/buy decisions to ensure the supplier and program succeed?
f. What scoring criteria are used to evaluate suppliers?
g. What processes and procedures are in place to assess risk associated with work transfer, and how are risk mitigation plans developed in this area?
h. Is there a supplier certification program in place, and how is the process managed?
i. Are supplier management strategies aligned with enterprise's vision and goals?

B.3.6 Barriers.

a. Prime privity of contract and sensitive cost/pricing information.
b. Lack of trust.
c. Timely communication of supplier problems/risks.
d. Personnel continuity.
e. Lack of proper processes.
f. Resistance to change or new way of doing business.
g. Lack of knowledge about key stakeholders (including the customer) and about delivering value.
h. Suppliers not feeling as a team with the prime and the government.
i. Bureaucracy both for government and prime contractor.

B.3.7 Enablers.

a. Initiate trust building steps to overcome resistance.
b. Work as a team with common SM goals.
c. Use metrics/predictive indicators to obtain early warning of potential problems.

d. Develop database and maintain current SM information in case of personnel turnover.
e. Structure the process to guide the supplier network.
f. Baseline the current SM processes.
g. Conduct self-assessments to gage supplier management process maturity.
h. Benchmark against world class companies.
i. Assess current SM processes and use management vision to define a more streamlined and effective future state.
j. Communicate customer needs/expectations with the prime and suppliers.
k. Use of Supplier Advisory Councils to better communicate with suppliers and listen to their concerns.
l. Hold off-site meetings between SPO, DCMA, and contractor to engage in continuous improvement.
m. Establish cooperative relationship success stories (e.g., proven payback from teaming between the government, prime, and suppliers).

CONCLUDING MATERIAL

Custodians:
Army - AV
Navy - AS
Air Force - 11

Preparing activity:
Air Force - 11

(Project 15GP-2017-005)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at https://assist.dla.mil.