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DEPARTMENT OF DEFENSE HANDBOOK

PRODUCT SUPPORT ANALYSIS

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FOREWORD

1. This handbook is approved for use by all Departments and Agencies of the Department of Defense (DoD).
2. This handbook provides guidance for the framework and descriptions governing performance of Product Support Analysis (PSA) during the life cycle of systems and equipment. To provide more affordable product support for materiel systems the DoD is focusing on total ownership cost throughout the life cycle. Achieving affordable support takes effective product support management across the product's life cycle.
3. This handbook offers guidance on conventional PSA as an integral part of the systems engineering process. The information contained herein is applicable, in part or in whole, to all types of materiel and automated information systems and all acquisition strategies. However, this handbook does not present a “cookbook” approach to product support—such an approach could not accommodate the vast, widely varying, array of potential materiel acquisitions. It does offer examples and points to consider to help you shape your overall thought processes.
4. The examples provided are just that—examples only. They are not meant to be a definitive solution. They are meant as a launch platform to give you insights into an innovative solution to your particular problem. It follows, then, that explicitly following an example in this handbook is likely to create more problems than it solves.
5. It is understood that the term new not only applies to brand-new products, but may also refer to a change or a major modification to a product.
6. All specific references to activities, sub-activities, GEIA-STD-0007 Copyright © 2012, TA-HB-0007-1 Copyright © 2012, TA-STD-0017 Copyright © 2012, and TechAmerica-STD-0016 Copyright © 2012 are used with permission from TechAmerica (http://www.techamerica.org/standards).
7. Comments, suggestions, or questions on the document should be addressed to Commander, U.S. Army Materiel Command, Logistics Support Activity (LOGSA), ATTN: Policy and Standards (AMXLS-AL), 5307 Sparkman Circle, Redstone Arsenal, AL 35898 or emailed to usarmy.redstone.logsa.list.multiview@mail.mil. Since contact information can change, you may want to verify the currency of this address information using ASSIST Online database at https://assist.dla.mil.

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1 SCOPE

1.1 Scope. This handbook addresses the overall PSA process and its associated activities, the selection and tailoring of those activities to meet DoD program supportability objectives, and sample contract language for acquiring PSA deliverables. The handbook offers guidance on TA-STD-0017, PSA activities as an integral part of the overall systems engineering process. The information contained herein is applicable, in part or in whole, to all types of materiel and automated information systems and all acquisition strategies. The focus of this handbook is to provide guidance to the members of the defense acquisition workforce who are responsible for the supportability of materiel systems or automated information systems. This handbook is for guidance only and cannot be cited as a requirement.

2 APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 4, 5, or 6 of this handbook. This section does not include documents cited in other sections of this handbook or recommended for additional information or as examples.

2.2 Government documents. The following government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-881	-	Work Breakdown Structures for Defense Materiel Items
MIL-STD-3018	-	Parts Management
MIL-STD-3034	-	Reliability Centered Maintenance (RCM) Process

DEPARTMENT OF DEFENSE HANDBOOKS

MIL-HDBK-245	-	Handbook for Preparation of Statement of Work (SOW)
MIL-HDBK-470	-	Designing and Developing Maintainable Products and Systems

(Copies of these documents are available online at https://assist.dla.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other government documents, drawings, and publication form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE REGULATIONS

DoD 4140.1-R	-	DoD Supply Chain Materiel Management Regulation

(Copies of DoD Regulations are available at http://www.dtic.mil/whs/directives/ or from the Defense Technical Information Center, 8725 John J. Kingman Road, Suite 0944, Fort Belvoir, VA 22060-6218.)

DEPARTMENT OF DEFENSE INSTRUCTIONS

DoDI 4151.19	-	Serialized Item Management for Materiel Maintenance
DoDI 4151.20	-	Depot Maintenance Core Capabilities Determination Process

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DoDI 4151.22	-	Condition Based Maintenance Plus (CBM+) for Materiel Maintenance
DoDI 4160.28	-	DoD Demilitarization (DEMIL) Program
DoDI 5000.02	-	Operation of the Defense Acquisition System

(Copies of DoD Instructions are available at http://www.dtic.mil/whs/directives/ or from the Defense Technical Information Center, 8725 John J. Kingman Road, Suite 0944, Fort Belvoir, VA 22060-6218.)

DEPARTMENT OF DEFENSE MANUALS

DoD 4120.24-M	-	Defense Standardization Program (DSP) Policies and Procedures
DoD 4140.26-M	-	Defense Integrated Materiel Management for Consumable Items: Operating Procedures for Item Management Coding
DoD 4151.22-M	-	Reliability Centered Maintenance (RCM)
DoD 4160.21-M	-	Defense Materiel Disposition Manual
DoDM 4160.28-M	-	Defense Demilitarization Manual
Joint Publication: AMC-R 700-9, NAVSUPINST 4790.7, AFLCR 400-21, MCO P4410.22C	-	Wholesale Inventory Management and Logistics Support of Multi-Service Nonconsumable Items
DFARS Part 204	-	Defense Federal Acquisition Regulation Supplement (DFARS) for Administrative Matters
DFARS Part 207	-	DFARS for Acquisition Planning
DFARS Part 227	-	DFARS for Patents, Data, and Copyrights
DFARS Part 246	-	DFARS for General Contracting
DoD RAM-C Manual	-	Department of Defense Reliability, Availability, Maintainability, and Cost Rationale Report Manual

(Applications for copies of DoD Manuals and Joint Publications are available online at http://www.dtic.mil. Copies of DFARS documents are available online at http://www.acq.osd.mil/dpap/dars/dfarspgi/current/index.html.)

DEPARTMENT OF DEFENSE GUIDEBOOKS

Conditioned Based Maintenance Plus DoD Guidebook
Defense Acquisition Guidebook
DoD Guide for Integrating Systems Engineering into DoD Acquisition Contracts
DoD Product Support BCA Guidebook
Guidebook for Performance-Based Services Acquisition (PBSA) in the Department of Defense
Logistics Assessment Guidebook
Product Support Manager Guidebook

(Copies of the Defense Acquisition Guide Book are available online at https://dag.dau.mil/Pages/Default.aspx. The Conditioned Based Maintenance Plus Guide Book, the Corrosion Prevention and Control Planning Guidebook and the DoD Guide for Integrating Systems Engineering into DoD Acquisition Contracts are available online at www.acq.osd.mil. The DoD Product Support BCA Guidebook, Logistics Assessment Guidebook, and Product Support Manager Guidebook are available online at https://acc.dau.mil. The Guidebook for Performance-Based Services Acquisition (PBSA) in the Department of Defense www.acquisition.gov/)

DEFENSE ACQUISITION UNIVERSITY PUBLICATIONS

Integrated Product Support (IPS) Element Guidebook

(Copies of the Integrated Product Support (IPS) Element Guidebook available online at https://acc.dau.mil.)

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DEFENSE STANDARDIZATION PROGRAM OFFICE

SD-15	-	Performance Specification Guide
SD-19	-	Parts Management Guide
SD-22	-	Diminishing Manufacturing Sources and Material Shortages

(Copies of these document is available online at https://assist.dla.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

DOD FORMS MANAGEMENT PROGRAM OFFICE

DD Form 250	-	Material Inspection and Receiving Report
DD Form 1423	-	Contract Data Requirements List

(Copies of DoD Management forms are available online at http://www.dtic.mil.)

FEDERAL PUBLICATION

FAR Part 1	-	Federal Acquisition Regulations System
FAR Part 12	-	Acquisition of Commercial Items
FAR Part 15	-	Contracting by Negotiation
FAR Part 46	-	Quality Assurance
FAR Part 52	-	Solicitation Provisions and Contract Clauses

(The electronic version of the FAR is available online at http://farsite.hill.af.mil and www.acquisition.gov.)

OFFICE OF MANAGEMENT AND BUDGET CIRCULARS

OMB Circular A-94	-	Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs

(The OMB Circular A-94 is available online at http://www.whitehouse.gov/omb/circulars_a094)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of documents are those cited in the solicitation or contract.

TECHAMERICA

GEIA-STD-0007	-	Logistics Product Data
TA-HB-0007-1	-	Handbook and Guide for Logistics Product Data Reports
TA-STD-0017	-	Product Support Analysis
TechAmerica-STD-0016	-	Standard for Preparing a DMSMS Management Plan

(Copies of this Standard may be purchased from TechAmerica©, 2500 Wilson Boulevard, Arlington, VA 22201-309; Email standards@techamerica.org; online http://www.techamerica.org/standards. Government users may have access to a download service for technical manuals and other documents and should check with their agency.)

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AMERICAN INTITUTE OF AERONAUTICS AND ASTRONAUTICS

ANSI/AIAA S-102.2.4	-	Performance-Based Product Failure Mode, Effects and Criticality Analysis (FMECA) Requirements
ANSI/AIAA S-102.2.18	-	Performance-Based Fault Tree Analysis Requirements

(Copies of these Standards may be purchased from American Institute of Aeronautics and Astronautics Publications Customer Service, P.O. Box 960, Herdon, VA 20172-0906; Phone 1-800-682-2422 or 703-661-1595; Email aiaamail@presswarehouse.com; online at http://arc.aiaa.org/page/howtoorder)

INTERNATIONAL ELECTROTECHNICAL COMMISSION

IEC 61025	-	Fault tree analysis (FTA)

(Copies of the IEC 61025 may be purchased IEC Regional Centre for North America (IEC-ReCNA, 446 Main Street, 16th Floor Worchester, MA 01608; Phone (508) 755-5663; Email info@iec.ch; online at http://www.iec.ch)

SOCIETY OF AUTOMOTIVE ENGINEERS

JA1011	-	Standard for Reliability Centered Maintenance
JA1012	-	A Guide to the Reliability Centered Maintenance Standard

(Copies of the SAE (JA) documents may be purchased from the Society of Automotive Engineers, SAE Customer Service, 400 Commonwealth Drive, Warrendale, PA 15096-0001; Phone 1-877-606-7323; Email CustomerService@sae.org; http://www.sae.org)

3 DEFINITIONS

3.1 Logistics product data (LPD). That portion of Product Support Analysis (PSA) documentation consisting of detailed data pertaining to the identification of Product Support resource requirements of a product. See GEIA-STD-0007 for LPD data element definitions.

3.2 Product support analysis. The analysis required to create the package of support functions required to field and maintain the readiness and operational capability of major weapon systems, subsystems, and components, including all functions related to weapon system readiness.

3.3 Product support analysis plan (PSAP). A document which identifies and integrates all Product Support Analysis activities, identifies management responsibilities, and outlines the approach toward accomplishing PSA activities to meet program requirements.

3.4 Other definitions of terms. Other definitions and terms in this handbook may be found in the following locations:

3.4.1 Glossary of Defense Acquisition Acronyms and Terms at https://dap.dau.mil/glossary/Pages/Default.aspx

3.4.2 DOD Dictionary of Military and Associated Terms at http://www.dtic.mil/doctrine/dod_dictionary/

4 GENERAL GUIDANCE

4.1 Purpose and scope. This section provides general information on key product support topics including Product Support Analysis, Factors that Impact PSA, Metrics, and Logistics Product Data. It also provides external references for obtaining additional information on the product support management process.

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4.2 PSA. PSA is a wide range of analyses that are conducted within the systems engineering process. The goals of Product Support Analyses are to ensure that supportability is included as a system performance requirement and to ensure the system is concurrently developed or acquired with the optimal support system and infrastructure. PSA includes the integration of various analytical techniques with the objective of designing and developing an effective and efficient Product Support Package. The primary techniques used in PSA are: Failure Mode, Effects and Criticality Analysis (FMECA), Fault Tree Analysis (FTA), Reliability Centered Maintenance (RCM) Analysis, Level of Repair Analysis (LORA), Maintenance Task Analysis (MTA), and core logistics analysis, source of repair analysis, and depot source of repair analysis. Please refer to Section 5 for detailed guidance on Product Support Analysis.

4.3 Metrics. Metrics are central to Product Support Analysis forming the common thread between the analytical processes from setting the Warfighter requirements in the JCIDS process to driving the actions required to achieve affordable readiness during the Operations & Support phase. For more information on the JCIDS process can be found by referring to CJCSI 3170.01H Joint Capabilities Integration and Development System and the JCIDS Manual for the Operation of the Joint Capabilities Integration and Development System (https://acc.dau.mil/communitybrowser.aspx?id=267116). For more information on metrics refer to the DASD(MR) Library at http://www.acq.osd.mil/log/mr/library.html.

4.4 PSA and logistics product data. The data resulting from the PSA process is tailored to a specific format to enhance usability by engineering and product support activities. A subset of this data is called Logistics Product Data (LPD) and is defined by industry standard GEIA-STD-0007. Contract requirements for LPD should be tailored and consistent with the planned support concept. In addition, the contract requirements should represent the minimum essential requirements to cost-effectively maintain the fielded system as well as foster source of support competition throughout the life of the system. The Program Manager (PM) should coordinate government requirements for the data across program functional specialties to minimize redundant contract deliverables and inconsistencies. Ultimately, LPD assists the Product Support Manager (PSM) in building an efficient product support package, considering all elements of Product Support.

4.5 DoD integrated product support implementation roadmap. For more information on product support management and supportability analysis, please refer to the DoD Integrated Product Support Implementation Roadmap (https://dap.dau.mil/dodpsroadmap). This roadmap provides important information on several product support topics including policy, guidance, references, continuous learning modules, and service specific items. It also identifies the activities and outputs for the twelve Integrated Product Support (IPS) elements and provides information on major program key events and products. For broader guidance on the Defense Acquisition System, please refer to the Defense Acquisition Guidebook (DAG) (https://dag.dau.mil/).

5 DETAILED GUIDANCE

5.1 Introduction. This section of the handbook provides rationale and guidance for the selection and tailoring of PSA activities. This section is to be used to tailor PSA requirements in the most cost effective manner to meet DoD program supportability objectives. Supportability objectives can be found in the DAG section 5.3. This section of the handbook it is not to be referenced or implemented in contractual documents. No requirements are contained in this section. The users of this section may include the DoD contracting activity, government in-house activity, and prime contractor or subcontractor, who wishes to impose PSA activities upon a supplier.

5.1.1 How to use this section. This section provides structuring guidance for PSA as well as how to apply the individual activities and sub-activities defined in TA-STD-0017, Product Support Analysis. Where this document refers to a specific activity defined in TA-STD-0017, the activity number will be noted in parentheses; e.g. (Activity 1). Appropriate service specific guidance may be necessary to supplement the guidance provided in this section. When a provisioning activity has comprehensive printed guidance that a contractor must follow and when it is too lengthy to include in a statement of work, the governing document for the guidance should be attached as an exhibit to the contract and referenced in the Statement of Work (SOW). Examples of governing documents are regulations, instructions, orders, and pamphlets.

5.1.2 Structuring guidance. PSA is an iterative and multidisciplinary activity with many interfaces. The PSA process can be divided into two general parts: (a) analysis of product support, and (b) assessment and

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verification of supportability. The iterative nature of this process and the input - output relationship of the interfaces change with the acquisition phases as described below.

5.1.3 Analysis of product support. This portion of the PSA process commences at the system level to affect design and operational concepts; identify gross product support resource requirements of alternative concepts; and to relate design, operational, and supportability characteristics to system readiness objectives and goals. The system level analysis is characterized by application assessments, comparative analysis and cost/readiness driver identification, identification of technological opportunities, and tradeoffs between support, operational, and design concepts and between alternative support concepts such as organic versus contractor support, built-in versus external test capability, and varying numbers of maintenance levels. Once system level tradeoffs are made, the analysis shifts to lower system indenture levels and toward support system optimization within the framework established by the system level analysis. This analysis defines the product support resource requirements of the system through an integrated analysis of all operator and maintenance functions and tasks to determine task frequencies, task times, personnel and skill requirements, supply support requirements, etc., to include all elements of IPS. Optimization is achieved at lower indenture levels through allocation of functions and tasks to specific maintenance levels, repair versus discard analyses RCM analyses, and formulating design recommendations to optimize maintenance times and product support resource requirements. Data from this level of the PSA is used as direct input into the development of data products associated with each IPS element such as provisioning lists, personnel and training requirements, and technical manuals. This assures compatibility between IPS element documents and permits common use of data which apply to more than one Product Support element.

5.1.4 Assessment and verification. This part of the PSA process is conducted throughout the system/equipment's life cycle to demonstrate, within stated confidence levels, the validity of the analysis and products developed from the analysis, and to adjust the analysis results and products as required. This part of the process starts with early planning for verification of support concepts and continues through development, acquisition, deployment, and operations to include assessment and verification of post deployment support.

5.1.5 Interfaces. Some of the major PSA activities where interfaces play a key role are listed below along with the interfacing activities:

a. Comparative Analysis (Activity 6). Interfacing activities-human engineering, reliability, maintainability, environment, safety, occupational health, design engineers and IPS element managers.
b. Functional Requirements (Activity 9). Interfacing activities-design engineering, reliability, maintainability, human engineering, safety and IPS element managers.
c. Evaluation of Alternatives and Tradeoff Analysis (Activity 11). Interfacing activities-design engineering, reliability, maintainability, affordability, safety, human engineering, cost estimating, and IPS element managers.
d. Task Analysis (Activity 12). Interfacing activities, reliability, maintainability, human engineering, and safety.
e. Determination of Product Support Resource Requirements (Activity 12 and 13). Interfacing activities-design engineering, human engineering, and IPS element managers.

5.1.5.1 Coordination of interfaces. Coordination of these interfaces is a major management challenge which requires final resolution at the working level in some cases. The activities in TA-STD-0017 are structured to facilitate assignment of applicable activities to the community most directly involved without loss of overall task integrity. For a specific acquisition program, PSA interfaces will be described in the Product Support Analysis Plan (Activity 2) which should be reviewed to assure that input-output relationships, responsibilities, and timing of activities are properly addressed to prevent over-lap and duplication. The following guidance may be useful in addressing the interface problem.

5.1.5.2 Inputs and outputs for system level product support analysis. Some of the system level PSA involves system analysis/engineering at the hardware-operating-support trade level (Activity 11.3). System level PSA is an input to and subset of these tradeoffs and is in turn a collection, synthesis, and "system" analysis of inputs from various specialized areas. The outputs from the system level PSA impact the interfacing activities in that they constitute boundary conditions or goals for specialized engineering programs and IPS element concepts and plans.

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5.1.5.3 Refinement and extension of the system level product support analysis. As development progresses, the PSA is iterated and extended to lower indenture levels with the input-output concept described in 5.1.5.2 still functioning. Boundary conditions, constraints, and objectives are refined and expanded based on inputs from specialized engineering and IPS element areas. Additionally, the support system is optimized within the boundaries and objectives established. Specific activity tradeoffs within engineering specialties and IPS elements are conducted to provide specific boundaries for follow-on efforts. These would include the Built-in Test (BIT) versus external test tradeoffs (Activity 11.8) and training tradeoffs (Activity 11.6). Figure 1 is provided to clarify the input through output interfaces in a PSA Program.

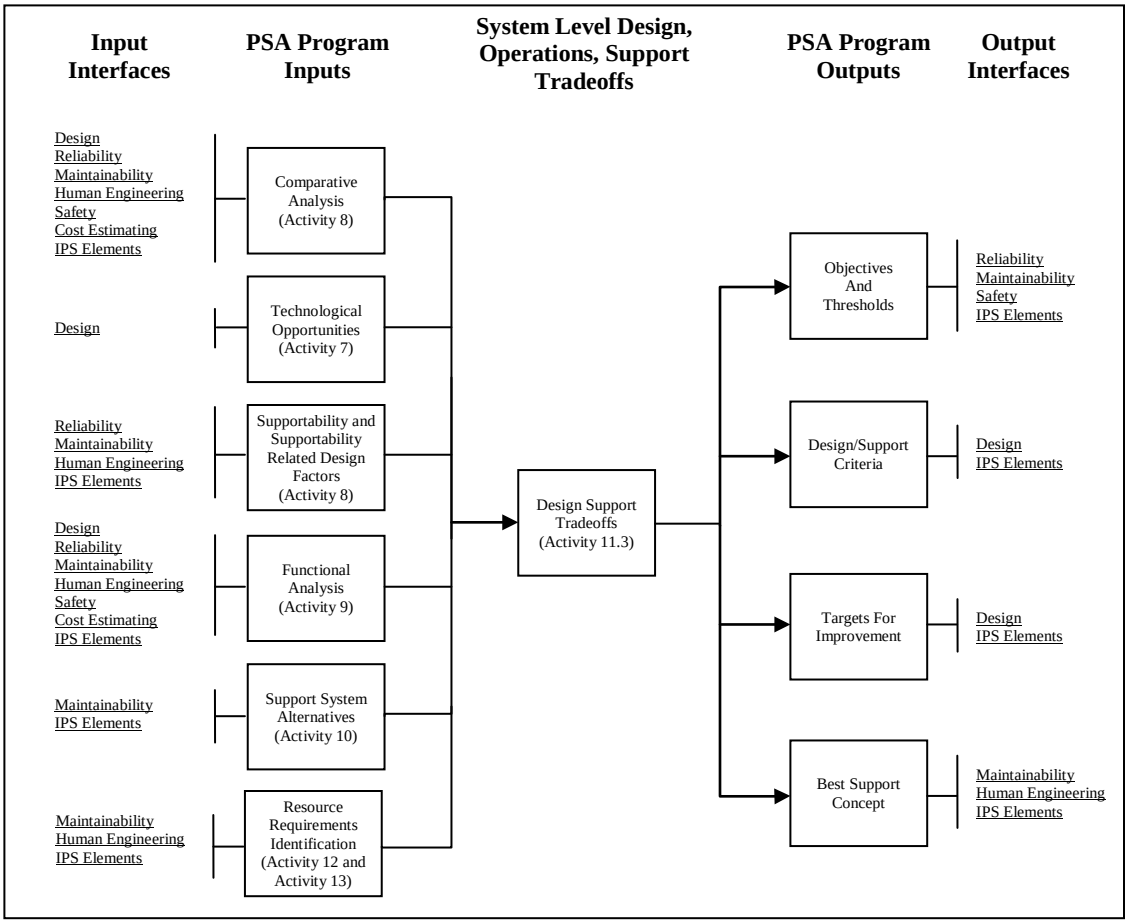

FIGURE 1. System level PSA interfaces

5.1.5.4 Task analysis (Activity 12). PSA is structured to serve an integrating function in providing source data for engineering and functional specialties regarding operator, maintainer and support personnel task requirements. This source data is intended to serve as input to the analytical requirements of these specialties.

5.1.5.5 Resource requirements identification (Activities 12 and 13). This step in the PSA process involves identification of all product support resource requirements. This identification involves many inputs from design and specialized engineering areas and all resource requirements are summarized in the LPD repository. These requirements are then fed to the various IPS element managers for their use in further development of management plans and products for individual IPS elements.

5.1.6 Major criteria. Major system acquisition policies are contained in DoD Instructions 5000.01 and 5000.02. The four prime factors that govern system acquisition programs are cost, schedule, performance, and supportability. The PSA process provides direct input into the supportability and cost factors associated with a system/equipment and, therefore, provide significant input into system/equipment decisions. While specific criteria and emphasis will vary from one acquisition to another, four prime issues have emerged at the system level which

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affect acquisition decisions and which are outputs of the PSA process. These are described in 5.1.6.1 through 5.1.6.4.

5.1.6.1 Cost. Cost constraints are an inescapable economic reality. Obtaining high quality, capable, and affordable systems which meet user needs is the goal of all defense acquisition programs. Evaluating the affordability of a product requires consideration of support investment and Operations and Support (O&S) costs, as well as other acquisition costs. Life cycle cost estimates compare the investment and recurring ownership costs for different system alternatives. The cost analysis methodology used should consider the support resources necessary to achieve specified levels of readiness (operational availability, A_o) for a range of assumptions regarding system reliability and maintainability characteristics, usage rates, and operating scenarios. Because of the uncertainty in estimating resource costs like manpower and energy, sensitivity analyses should be performed. Sensitivity analyses help to identify and weigh the various factors which drive life cycle costs. This knowledge is key to understanding and managing program risk.

5.1.6.2 Affordability. All major elements of life cycle cost should be addressed as part of the system analysis and control activities. The objective is to minimize cost within major constraints such as readiness requirements. Ongoing assessments of life cycle costs during a product's acquisition and continuing through its service life provide important insight to effective life cycle management. These assessments are required not only because costs change over time, but also because what constitutes acceptable affordability is also subject to change. What is affordable under one set of economic conditions may be unaffordable under another. Therefore, it is important to investigate opportunities to reduce the cost of ownership throughout all phases of a system's life cycle.

5.1.6.3 Manpower and personnel constraints. Demographics indicate the current problems with manpower and personnel shortages (in terms of quantity, skills, and skill level) will continue for the next decade or more. The problem is of such magnitude that it should be approached through the design process as well as the more traditional manpower and personnel approaches of services. New system/equipment manpower quantities and skill level demands should be managed like other major design parameters, such as performance and weight, beginning with the earliest conceptions of the new system/equipment.

5.1.6.4 System readiness. Product Support related design parameters (such as Reliability and Maintainability (R&M)), product support resources (such as spares and manpower), and logistic system parameters (such as resupply time) will be related to system readiness objectives and goals. Such objectives may vary from system to system and from peacetime to wartime. Operational availability is frequently a good peacetime measure, while operational availability, sortie rates (surge and sustained), and percent coverage are frequently used wartime measures which are key for peacetime readiness and wartime capability. System readiness measures are equal to performance, schedule, and cost as design pattern, and should be managed accordingly beginning with the earliest conception of new systems/equipment.

5.2 PSA management, surveillance, and control. The following paragraphs detail the management, surveillance, and control activities necessary to carryout PSA.

5.2.1 General considerations. During the PSA effort, general considerations of management, surveillance, and control are required.

5.2.1.1 Program management. Good management of the PSA effort requires (1) planning which identifies all the required actions, (2) scheduling which identifies the timing of each required action and who is responsible for each action, and (3) execution through timely management decisions. Management procedures should be established to assure that the right information is available at the right time so that timely decisions can be made. PSA planning and management should always be performed by the requiring authority.

5.2.1.2 Identifying analysis task requirements. The determination of which PSA activities should be performed for a given acquisition program and life cycle phase is covered in 5.1.

5.2.1.3 Timing. Scheduling an activity accomplishment is critical for the PSA program to achieve its objectives. Scheduling and managing activity accomplishments can be significantly aided by employing critical path networking techniques. The criteria that should be applied for proper scheduling of PSA actions is to assure that (1)

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all required actions are completed and results are available when needed, and (2) only the required actions are done and only the required data is available to prevent wasting resources and time. Factors to consider when scheduling PSA activities include the following:

a. During the early phases of acquisition, PSA activities should be completed and supportability information available when system/equipment alternatives are being considered to achieve design influence. Later in the acquisition process, PSA activities should be completed and supportability information available to assure that the IPS elements are identified, tested, and fielded on a timely basis.

b. When comparing alternatives, do not analyze below the level necessary to evaluate differences. Lower level analyses can be conducted after an alternative is selected.

c. Sometimes it can be too late in an acquisition program to do some PSA activities. For example, when design is fixed, design oriented tradeoffs offer little or no return on investment.

5.2.1.4 Program execution. A successful PSA effort requires that the identified activities be conducted as planned. Assurance of this is achieved through continued monitoring of the effort to identify problems as they occur, and having an established mechanism to make management decisions to eliminate or minimize the problems as they occur. Efficient program execution requires that working arrangements between the PSA program and other system engineering processes be established to identify mutual interests, maximize the benefits of mutually supporting activities, and minimize effort overlap.

5.2.2 PSA strategy (Activity 1). This activity is the earliest planning activity for a PSA program and is the key first step in developing the most cost effective program. Analyzing probable design and operational approaches, supportability characteristics, and available data before finalizing activity requirements assures that the PSA program is focused on the key areas which provide maximum supportability impact on design. The small investment in this activity is essential to assure a good return on future investments. While most germane to developing a strategy for concept exploration activity, this activity is generally applicable prior to preparation of any solicitation document containing PSA activity requirements.

5.2.2.1 Overview. This strategy identifies the contractor's approach and description of how the PSA will be conducted to meet program requirements as part of the system engineering process. The PSA strategy is used to establish and execute an effective PSA program. When submitted as a response to a solicitation document, it is used in the source selection process.

5.2.2.1.1 Purpose. To develop a proposed PSA strategy for use early in the acquisition program; and identify the PSA activities which will provide the best return on investment and document the risks of accomplishing these objectives.

5.2.2.1.2 Required for. The PSA strategy interrelates with the Acquisition Strategy (AS) and is included in the Life Cycle Sustainment Plan (LCSP). It should be available prior to preparation of any solicitation document containing PSA activity requirements, and should be used as a guide in developing such documents. Failure to accomplish this activity may result in a strategy and plan that fails to establish a properly tailored PSA program.

5.2.2.1.3 When required. Initial PSA strategy development begins in the Materiel Solution Analysis (MSA) Phase concurrent with the development of the acquisition strategy. The PSA strategy is generally updated through the Production and Deployment (P&D) Phase. Required updates should be completed prior to initiation of the next program phase, so that the updated PSA strategy is available concurrent with phase initiation.

5.2.2.1.4 Responsibility. The government is responsible for performing this activity to provide early management of the PSA program during the MSA Phase. Typically the contractor assumes the development and update of the PSA Strategy prior to Engineering Manufacturing and Development (EMD) Phase and retains it through P&D, while the government retains overall responsibility throughout the programs life.

5.2.2.2 PSA strategy content requirements. The content of the PSA Strategy is dependent upon each program's unique requirement. The following, while not all inclusive, is a list of recommended items that the government may wish to include.

a. Identification of the product, procuring activity, preparing activity, and contract number.

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b. Proposed supportability objectives for the new system.

c. Estimated cost to perform the proposed PSA activities.

d. Identification of proposed organizations to perform the recommended PSA activities.

e. The rationale used in making the above recommendations. This rationale can include the following as appropriate:

(1) Potential design impacts from performing PSA activities.

(2) Cost effectiveness of each activity.

(3) Availability of data required to perform the activity.

(4) Estimates of reliability and maintainability, operating and support costs, product support resource requirements, and readiness characteristics of potential design and operational approaches for the new product.

5.2.3 PSA planning (Activity 2). The PSAP is the basic tool for establishing and executing effective PSA program. The PSAP may be a standalone document and included as part of the program's Systems Engineering Plan (SEP)/Systems Engineering Management Plan (SEMP) or as an annex to the LCSP. Plans submitted in response to solicitation documents assist the requiring authority in evaluating the prospective performing activity's approach to, and understanding of the PSA activity requirements, and the organizational structure for performing PSA activities.

5.2.3.1 Overview. The PSAP documents the PSA program; including the management, authority, activities, responsibility, integration, and results.

5.2.3.1.1 Purpose. To develop a PSAP which will effectively implement the PSA program. It also documents the PSA management structure and authority; what PSA activities are to be accomplished; when each activity will be accomplished; what organizational units will be responsible for accomplishing each activity; how all activities are integrated; and how results of each activity will be used.

5.2.3.1.2 Required for. The PSAP is a basic tool for executing an effective PSA program to meet the system and product support requirements. When it is submitted as part of the response to a solicitation document, it is used in the source selection process. Failure to accomplish this activity may result in the inability to determine if the level of effort proposed is in line with the strategy and cost constraints as well as impacting the development and implementation of the LCSP.

5.2.3.1.3 When required. The PSAP is prepared in the Materiel Solution Analysis (MSA) phase and updated in all subsequent phases.

5.2.3.1.4 Responsibility. During MSA, the government is responsible for initial preparation of the PSAP. The contractor assumes responsibility for updating the PSAP prior to the P&D Phase and retains PSAP responsibility during subsequent phases.

5.2.3.2 PSAP and the statement of work. The PSAP is generally submitted in response to a solicitation document and generally becomes a part of the SOW when approved by the requiring authority. When requiring a PSAP, the requiring authority should allow the performing activity to propose additional activities or activity modifications, with supporting rationale to show overall program benefits, to those activities contained in the solicitation document.

5.2.3.3 PSAP content requirements. The content of the PSAP is dependent upon each program’s unique requirement. The following, while not all inclusive, is a list of recommended items that the government may wish to include.

a. Identification of the new product, procuring activity, preparing activity, and contract number.

b. A description of how the PSA program will be conducted to meet the system and product support requirements contained in the applicable program documentation.

c. An identification of the management structure and authorities applicable to PSA. This includes the interrelationships between line, service, staff, and policy organizations.

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d. An identification of each of the Activities that will be accomplished and how each will be performed.

e. An identification of the major tradeoffs to be performed.

f. A description of how PSA activities and data will interface with other PS and product oriented activities and data.

g. The Work Breakdown Structure (WBS) identification of items for which PSA will be performed and documented. (for more information on WBS refer to MIL-STD-881 Work Breakdown Structures for Materiel Systems).

h. A PSA Candidate List (National Stock Number (NSN), Item Name, Contractor and Government Entity (CAGE) and part number) and applicable selection criteria. The list should include all items recommended for selection or non-selection.

i. The method by which supportability and supportability related design requirements are disseminated to designers, associated personnel, and subcontractors. In the case of subcontractors identify the controls levied under such circumstances.

j. Identification of government data to be furnished the contractor.

k. The PSA requirements on Government furnished equipment/materiel and subcontractors/vendor furnished materiel including end times of support equipment.

l. The procedures (where applicable) to evaluate the status and control of each activity, and identification of the organizational unit with the authority and responsibility for executing each activity.

m. The procedures, methods, and controls for identifying and recording design problems or deficiencies affecting supportability, corrective actions required, and the status of action taken to resolve the problems.

n. Description of the data collection system to be used by the performing activity to document, disseminate and control the PSA and related design data.

o. Description of design review procedures, when no procedures exist, which provide for official review and control of released design information to include PSA program participation.

5.2.3.4 Updating the PSAP (Activity 2.2). The PSAP should be a dynamic document that reflects current program status and planned actions. Accordingly, procedures should be established for updates and approval of updates by the requiring authority when conditions warrant. Program schedule changes, test results, or PSA activity results may dictate a change in the PSAP for it to be used effectively as a management document.

5.2.4 Program and design reviews (Activity 3). This activity is directed toward four types of reviews; (1) review of design information within the performing activity from a supportability standpoint, (2) system/equipment design reviews, (3) formal system/equipment, program reviews, and (4) detailed PSA program reviews. These system/equipment reviews, to include provisioning conferences, should be scheduled in a manner that supports integrated engineering principals and support concepts. The first type (Activity 3.1) provides Logistics Engineers (LE) the authority with which to manage design influence and tradeoffs. For most developers this type of review is a normal operating practice and performance of this activity would not impose any additional cost. This activity is primarily applicable during design and design modification efforts but may be used when performing a non-developmental acquisition program. Contractor procedures for this type of review would be included in the PSAP.

5.2.4.1 Overview. This activity establishes a requirement for the contractor to plan and provide for official review and control of released design information with PSA program participation to assure that the PSA program is proceeding in accordance with the contractual milestones so that the supportability and supportability related design requirements will be achieved.

5.2.4.1.1 Purpose. To provide for timely PSA program participation in the official review and control of design information; the scheduling of detailed PSA program reviews; and product support risk assessments at program reviews. It also ensures that all pertinent aspects of the PSA program are addressed as an integral part of all formal program and design reviews.

5.2.4.1.2 Required for. Design reviews identify and discuss all aspects of the PSA Program, provide product support specialists a mechanism for accomplishing design influence and tradeoffs. PSA program reviews include but are not limited to IPS management team meetings, reliability program reviews, integration reviews, PSA guidance

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conferences, and provisioning reviews. These reviews aid in monitoring the overall progress, quality, and consistency of the PSA effort. Failure to accomplish this activity may needlessly increase the risk of project development.

5.2.4.1.3 When required. Program and design reviews are generally initiated during the MSA phase and scheduled periodically throughout subsequent phases.

5.2.4.1.4 Responsibility. The government is responsible for this activity during MSA. The contractor assumes responsibility during the TD Phase and subsequent phases.

5.2.4.2 System/equipment design reviews and program reviews (Activities 3.2 and 3.3). Reviews such as preliminary design reviews, critical design reviews, and production readiness reviews are an important management and technical tool of the requiring authority. They should be specified in Statements of Work (SOW's) to assure sufficient staffing and funding and are typically held periodically during an acquisition program to evaluate overall program progress, consistency, and technical adequacy. An overall PSA program status should be an integral part of these reviews whether conducted internally, with subcontractors, or with the requiring authority. The results of performing activity's internal and subcontractor reviews should be documented and made available to the requiring authority on request.

5.2.4.3 PSA technical interchange meetings (Activity 3.4). In addition to system/equipment program and design reviews, specific reviews of the PSA program should be periodically conducted (Activity 3.4). These reviews should provide a more detailed coverage of items addressed at program and design reviews and should address progress on all PSA activities specified in the SOW. Representative discussion items include activity results, data, status of assigned actions, design and supportability problems, test schedule and progress, and the status of subcontractors' and suppliers' efforts. PSA reviews should be conducted as part of the system reviews when possible, and should be specified and scheduled in the SOW for Activity 3. An integral part of this review process is the conduction of a detailed guidance conference as soon as possible after contract award to assure a thorough and consistent understanding of the PSA requirements between the requiring authority and performing activity. Additionally, the requiring authority should establish review policies which maximize the resources available for review. Review of draft LPD reports contained in TA-HB-0007-1 vice sampling of PSA data, scheduling reviews on an as required rather than a fixed schedule basis, and concentrating on drivers and high risk areas are some of the considerations that should be addressed in establishing the review policies.

5.2.4.4 Accession list. In addition to formal reviews, useful information can often be gained from performing activity data which is not submitted formally, but which can be made available through an accession list. A data item for this list should be included in the Contract Data Requirements List (CDRL). This list is a compilation of documents and data which the requiring authority can order, or which can be reviewed at the performing activity's facility. Typically, the details of design analyses, test planning, test results, and technical decisions are included. These data constitute a source of information not otherwise available.

5.3 Supportability objectives. It is essential to conduct PSA early, in an acquisition program to identify constraints, thresholds, and targets for improvement, and to provide supportability input into early tradeoffs. It is during the early phases of an acquisition program that the greatest opportunity exists to influence design from a supportability standpoint. These analyses can identify supportability parameters for the new system/equipment which are reasonably attainable, along with the prime drivers of supportability, cost, and readiness. The drivers, once identified, provide a basis for concentrated analysis effort to identify targets and methods of improvement. Mission and support systems definition activities are generally conducted at system and subsystem levels early in the system acquisition process (JCIDS Process, MSA Phase).

5.3.1 General considerations. Identification and analysis of risks play a key role due to the high level of uncertainty early in the life cycle. Performance of these activities requires examination of current operational systems and their characteristics, as well as projected systems and capabilities that will be available in the time frame that the new system/equipment will reach its operational environment. New system/equipment supportability and supportability related design constraints should be established based upon support systems and resources that will be available when the new system/equipment is fielded. These may be less than, equal to, or greater than the corresponding capabilities for current systems. When supportability analyses have been performed prior to formal

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program initiation during mission area or system analysis, the range and scope of activities in this activity paragraph should be appropriately tailored to prevent doing the same analysis twice.

5.3.2 Application assessment (Activity 4). The application assessment is the prerequisite analysis activity to all others in a PSA program. It should be done in conjunction with the JCIDS process to provide the basis for all IPS planning and readiness analyses for the new system/equipment. The operational concept specifies how the new system/equipment will be integrated into the force structure and deployed and operated in peacetime and wartime to satisfy the mission need (Activity 4.1). This concept provides the framework around which the support system should be developed. The application assessment analysis establishes the quantitative supportability factors (Activity 4.2) required for readiness and IPS resource projections. Because of the significant impact of the operational concept on readiness analyses and IPS planning, the application assessment should look at both the most probable and worst case scenarios for peacetime and wartime employment of the new system/equipment. Field visits (Activity 4.3) to operational units and depots can provide a significant input into the application assessment in terms of identifying existing capabilities, resources, and problems. Field visits can be useful once the operational environment for the new system/equipment is identified in sufficient detail to determine existing operational units and depots that would most likely be involved in the operations and support of the new system/equipment.

5.3.2.1 Overview. The goal of Activity 4 is to identify and document the supportability factors related to the application of the new product.

5.3.2.1.1 Purpose. To identify support factors related to the system's intended use. Also to document quantitative data results which should be considered when developing support alternatives.

5.3.2.1.2 Required for. Quantitative support factors (operating requirements, Operational Availability (A_o), transportation modes/times, allowable maintenance periods, and environmental requirements which include hazardous materials, hazardous waste, and other pollutants), identified by the assessment are incorporated in the Capability Development Document (CDD) and Capability Production Document (CPD). Failure to accomplish this activity could result in an ICD/CCD that does not define the system support objectives of the new system.

5.3.2.1.3 When required. The application assessment is a prerequisite to all other analysis activity; therefore, it should be initiated in the MSA phase. Updates of the assessment are applicable in the Technology Development (TD) Phase and continue through the EMD Phase. Once planned operational and support environments of the new system are identified, visits to existing units and depots which simulate those environments can provide significant input into assessment updates.

5.3.2.1.4 Responsibility. Activity 4 is the responsibility of the government through the TD phase. The contractor has update responsibility during EMD.

5.3.2.2 Intended use and capabilities report (Activity 4.4). The content of the report is dependent upon each program's unique requirement. The following, while not all inclusive, is a list of recommended items that the government may wish to include.

a. Identification of the product, procuring activity, preparing activity, and contract number.
b. Pertinent supportability parameters related to the intended use of the product in both peacetime and wartime environments. Quantitative data should include the following:
    (1) Operating requirements consisting of the number of missions per unit of time, mission duration, and number of operating days, miles, hours, firings, flights, or cycles per unit of time.
    (2) Number of products supported.
    (3) Transportation factors (e.g., mode, type, quantity to be transported, destinations, transport time and schedule).
    (4) Allowable maintenance periods.
    (5) Environmental requirements.
c. Results of field visits to operational units and support activities.

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5.3.3 Support system standardization (Activity 5). In many cases, utilization of existing product support resources can substantially reduce life cycle cost, enhance readiness, minimize the impact of introduction of the new system/equipment, and increase the mobility of the operational unit using the new system/equipment. Factors that support these potential benefits are the following by:

a. Use of existing items avoids the development costs that would be incurred to develop new items.
b. Cost to develop new training programs may be avoided.
c. The probability that the resource will be available for use may be greater.
d. Commonality of support items between end items in an operational unit may require fewer items to be moved in times of mobilization, thereby increasing the operation units' readiness.
e. Personnel proficiency in using common support and test equipment can be increased through an increase in frequency of use of the same item, rather than having to learn how to use different items.

5.3.3.1 Overview. Standardization reduces life cycle cost and logistics footprint.

5.3.3.1.1 Purpose. To define support and support related design constraints based upon support standardization considerations. It also provides support related input to standardization efforts.

5.3.3.1.2 Required for. Initial activity results support the Technology Development Strategy. Results of further iterations of this activity are used in the CDD and CPD. Failure to accomplish this activity may result in the development of unnecessary support items and lack of standardization of support items across products.

5.3.3.1.3 When required. Activity 5 is initiated during MSA to establish support system standardization requirements prior to initiation of the design effort. This activity continues to be iterated to progressively lower hardware levels through EMD. During the P&D phase, Activity 5 is generally applicable to design changes only.

5.3.3.1.4 Responsibility. Activity 5 is the responsibility of the government during MSA. During EMD and subsequent phases the contractor has responsibility for this activity. Data required for the latter part of Activity 5 can normally be provided by the standardization program and the parts control program. Coordination with these programs is required to avoid duplication of effort.

5.3.3.2 Support system standardization requirements. The same potential benefits may apply to using resources under development. In this case, the cost of development may be spread over a number of end items. However, the risk involved is increased because the developmental item is unproven in an operational environment and is subject to program delays or cancellation. Support system standardization requirements can also arise from DoD or Service support policies. Examples of these requirements can include standard software language requirements or use of standard multi-system test equipment.

5.3.3.3 Supportability and supportability related design requirements (Activity 5.1). Once existing and planned resources have been analyzed and the benefits determined, then system/equipment requirements and constraints should be identified and documented to achieve the benefits. Supportability and supportability related design requirements to achieve the benefits from support system standardization should be established prior to initiation of the design effort so that the cost of redesigning to meet requirements can be minimized. At the same time, performance of this activity should only define requirements to the level necessary based on the projected level of design effort. For example, only system and subsystem level support standardization requirements should be identified if only system and subsystem level design alternatives are to be developed and evaluated.

5.3.3.4 Resource identification. Identification of existing product support resources available can be accomplished through use of DoD and service level handbooks, catalogs, and registers which identify available support equipment; test, measurement, and diagnostic equipment; tools and tool kit contents; personnel skills; and other resources. Field visits conducted as part of the application assessment can also identify existing capabilities and resources available to support the new item.

5.3.3.5 Standardization. Standardization through mission hardware and software standardization programs (DoD 4120.24-M Defense Standardization Program Policies and Procedures, MIL-STD-3018 Parts Management,

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and SD-19 Parts Management Guide) can help minimize equipment and parts proliferation, reduce life cycle costs, increase system readiness, and increase standardization and interoperability levels between services and countries. A comprehensive standardization program will include participation from supportability activities as well as the other system engineering disciplines, due to the impacts of standardization on mission performance, reliability, maintainability, safety, quality, and survivability. Standardization approaches will generally be investigated starting in the MSA Phase due to standardization and interoperability considerations and continue to progressively lower levels of indenture throughout the acquisition program. This effort is normally included as a separate contract requirement and care should be exercised in citing Activity 5 (Activity 5.2 and 5.3) to avoid duplication of effort. The standardization program can normally provide the required data for Activities 5.2 and 5.3. Additionally, care should be exercised in the performance of this activity to assure that standardization requirements are not established on poor performance items or items which can be significantly improved.

5.3.4 Comparative analysis (Activity 6). A major key to having an effective PSA program is the efficient analysis and use of the data obtained on comparative systems. This process is also called a historical data review. It involves making good use of experience information available from other systems/equipment so that the new system/equipment will be an improvement in supportability as well as performance. When a realistic comparative system can be established, information on the comparative system helps identify the following:

a. High failure rate potential of subsystems and components.
b. Major downtime contributors.
c. Design features which enhance supportability.
d. Potential supportability problem areas to include design features which degrade supportability.
e. Design concepts with potential safety or human factors impacts.
f. Gross requirements for product support resources.
g. Design, operational, and support concepts which drive the product support requirements, O&S costs, and achieved readiness levels of the system/equipment.
h. Corrosion prevention and mitigation lessons learned.

5.3.4.1 Overview. During this activity, select or develop a Baseline Comparison System (BCS) representing characteristics of the new product for (1) projecting supportability related parameters, making judgments concerning the feasibility of the new product supportability parameters, and identifying targets for improvement, and (2) determining the supportability, cost, and readiness drivers of the new product.

5.3.4.1.1 Purpose. There are three major purposes for accomplishing Activity 6:

a. To define a sound analytical foundation for making projections for new system/equipment parameters and identifying targets of improvement.
b. To identify the supportability, cost, and readiness drivers for the new system/equipment.
c. To identify risks involved in using comparative system data in subsequent analyses.

5.3.4.1.2 Required for. Initial activity results are used to develop the supportability factors to be incorporated in the CDD and CPD. The results of subsequent comparative analyses are included in the CDD and CPD. Analysis results are also used to develop PSA input data required for application of product support modeling techniques. Failure to accomplish this activity in conjunction with analysis of alternatives may result in a ICD/CDD that does not optimally define the system support objectives of the new system.

5.3.4.1.3 When required. Supportability factors to be included in the CDD and CPD should be identified during the MSA phase. Comparative analysis reports are updated through the EMD phase.

5.3.4.1.4 Responsibility. The government is responsible for Activity 6 during the determination of mission need and the MSA phase. The contractor is responsible for Activity 6 during the TD and EMD phases.

5.3.4.2 BCS. Identifying comparative systems and subsystems and establishing BCS's requires a general knowledge of the design, operational, and support characteristics of the new system/equipment and the type of

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parameter to be projected. When design parameters (Reliability and Maintainability, etc.) are to be projected, then current operational systems/equipment which are similar in design characteristics to the new system/equipment's design characteristics should be identified. When major subsystems have been identified for the new system, the BCS for projecting design parameters may be a composite of subsystems from more than one system. When support parameters (resupply time, turnaround times, transportation times, personnel constraints, etc.) are to be projected, then current systems (support systems) which are similar to the new system/equipment's support concept should be identified. This may be a support system completely different than the one supporting similar systems/equipment in design characteristics.

5.3.4.2.1 Level of detail in a BCS. The level of detail required in describing comparative systems will vary depending on the amount of detail known on the new system/equipment's design, operational, and support characteristics and the accuracy required in the estimates for new system/equipment parameters. Comparative systems and subsystems are normally identified by the requiring authority. BCS's should be established at a level commensurate with expected design progression. When the performing activity is a contractor, the level of comparison should be specified, as well as data sources to be used. Activity 6 contains two activities (6.1 and 6.2) which are designed to provide for different levels of detail in identifying comparative systems. For example, if the design concept for the new system/equipment is very general, then only a general level comparative system description (Activity 6.1) should be established. When more detail and accuracy are required, then Activity 6.2 should be used. However, as more detail is required the cost of the analysis increases, therefore, the appropriate activity should be selected accordingly.

5.3.4.3 Assumptions and risks. Assumptions made in establishing a comparative system and associated risks (Activity 6.8) involved play an important role in determining the accuracy of the new system/equipment projections. Low similarity between the new system/equipment's design, operation, or support concept and existing systems should be documented and new system/equipment projections treated accordingly. Additionally, inherent risks are involved in constructing composite comparative systems unless operational environment differences are identified and the supportability, cost, and readiness values adjusted accordingly.

5.3.4.4 Qualitative supportability problems (Activity 6.4). Qualitative supportability problems (Activity 6.4) on existing systems should be thoroughly analyzed to provide insight into areas for improvement during the development of the new system/equipment or required to achieve metrics.

5.3.4.5 Supportability, cost, and readiness drivers are identified (Activities 6.3, 6.5 and 6.6). Supportability, cost, and readiness drivers are identified (Activities 6.5 and 6.6) so that areas of improvement can be identified and supportability related design constraints can be formulated to achieve the improvements. Major problems on existing systems should be identified and approaches to eliminate or reduce these problems should be developed. As with other activities in this handbook, the timing and scope of this effort should be commensurate with the timing and scope of the system/equipment design effort for the constraints to be effective. MSA Phase and TD Phase analyses would be at the system and subsystem level so that system and subsystem level constraints could be defined prior to entry into the EMD Phase.

5.3.4.6 IPS elements. Supportability, cost, and readiness drivers may be identified from a number of perspectives: drivers could be specific IPS elements; specific support functions (e.g., alignment or calibration requirements); specific mission subsystems/components; or specific features of the operational scenario/requirement. Proper driver identification is a prerequisite to establishment of the most effective constraints for achieving improvements. Care should be exercised to assure that true drivers are identified and not the effects of a driver. For example, supply support cost is not a cost driver if it is a result of poor reliability of a subsystem. In this case, the subsystem reliability would be the cost driver. The identification of drivers is dependent upon the availability of data on comparative systems. When citing Activities 6.5 and 6.6, the requiring authority should consider the databases available to support driver identification. Additionally, this activity can be performed by specialty areas and the results consolidated under the PSA program. For example, manpower, personnel, and training analysis may be performed by human engineering and training specialists, and maintainability comparisons may be done under the maintainability program.

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5.3.4.7 Comparative system report. To document the results of Activity 6 consider developing a Comparative Analysis Report. The content of the report is dependent upon each program's unique requirement. The following, while not all inclusive, is a list of recommended items that the government may wish to include.

a. Identification of the product, procuring activity, preparing activity, and contract number.
b. Identification of existing systems and subsystems (hardware, operational, and support) useful for comparative purposes with new product alternatives.
c. O&S costs, product support resource requirements, reliability and maintainability (R&M) values, and readiness values of the comparative systems and subsystems along with an identification of the data sources used in developing the data.
d. Qualitative supportability problems on comparative systems which should be prevented on the new product.
e. Supportability, cost, and readiness drivers for the new product and rationale used in identifying the drivers.
f. Any risks and assumptions associated with the comparative system and their associated parameters.

5.3.5 Technological opportunities (Activity 7). This activity should be performed by design personnel in conjunction with supportability specialists. Activity 7.1 is designed to identify potential technological approaches to achieve new system/equipment supportability improvements. It will identify the expected effect of improvements on supportability, cost, and readiness values so that supportability and supportability related design objectives for the new system/equipment can be established. Particular attention should be devoted to the application of technological advancements to system/equipment drivers and areas where qualitative problems were identified on comparative systems. Improvements can be developed at any level (system, subsystem, or below), however, they should be prioritized based on the contribution of each to system and subsystem level supportability values. Activity 7.2 focuses on the continuous updating of all aspects of Activity 7. Technological advances occur throughout system development and must be considered throughout the life cycle. Activity 7.3 identifies any risks in adopting new technology for a particular system design. In addition to identifying those risks, a mitigation plan should be developed for any risks deemed acceptable.

5.3.5.1 Overview. This activity identifies and evaluates design opportunities for improvement of supportability characteristics and requirements in the new product.

5.3.5.1.1 Purpose. To identify technological advancements and state-of-the-art design approaches offering opportunities to achieve new system support improvements. Use of available technology is emphasized to improve projected safety, cost, support, and readiness values, which reduce a new system's environmental impact, and resolve qualitative support problems or constraints identified.

5.3.5.1.2 Required for. Recommended design objectives and associated risks identified by Activity 7 are included in the CDD. Updated design objectives are incorporated in the CDD and CPD. Failure to accomplish this activity may result in a less than capable product and corresponding support system.

5.3.5.1.3 When required. Activity 7 is initiated during the MSA phase and updated during the TD phase. This activity is only selectively applicable during EMD.

5.3.5.1.4 Responsibility. The government is responsible for Activity 7 during MSA, with the contractor assuming responsibility for this activity during TD and if applicable, during EMD.

5.3.5.2 Technological opportunities report. This report will identify design opportunities which can be incorporated into new weapon products to achieve improvement in supportability characteristics. The content of the report is dependent upon each program's unique requirement. The following, while not all inclusive, is a list of recommended items that the government may wish to include.

a. Identification of the product, procuring activity, preparing activity, and contract number.
b. Identification of technological advancements and other design improvements which can be exploited in the new product which have the potential for reducing product support resource requirements, reducing costs, or enhancing system readiness.

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c. Estimates of the resultant improvements that would be achieved in supportability cost, and readiness values of the new product if proposed design technology approaches were implemented.

d. Identification of design improvements that can be applied to the product support elements of the new product to improve the effectiveness of the support system or enhance readiness.

e. Description of any risks associated with design technology approaches established.

f. Identification of any development and evaluation approaches needed to verify the improvement potential.

g. Identification of any cost or schedule impacts to implement the potential improvements.

5.3.6 Supportability and supportability related design factors (Activity 8). This activity establishes the supportability parameters governing the new system/equipment's development. These parameters will include objectives, thresholds, qualitative and quantitative constraints and system/equipment specification requirements. Activity 8.1 quantifies the supportability impacts of alternative concepts which serve as a basis for the remaining activities. Activity 8 provides a sensitivity analysis for supportability, cost, and readiness drivers for the new product (Activity 8.2). Activity 8.3 identifies any design rights constraints imposed by proprietary source control laws and regulations. Any risks or issues pertaining to the supportability design parameters should also be documented (Activity 8.4) and a risk mitigation strategy should also be considered during this activity. Activity 8.5 documents key performance parameters and addresses hazardous and environmental considerations and Activity 8.6 identifies commercial market considerations and constraints. Supportability and supportability related design factors are updated in Activity 8.7.

5.3.6.1 Overview. This activity establishes the quantitative operations and support characteristics of alternative design and operational concepts; and support related design objectives, goals and thresholds, and constraints for inclusion in requirement, decision, and program documents and specifications.

5.3.6.1.1 Purpose. To establish quantitative operations and support characteristics of alternative design and operational concepts; and support related design objectives, goals and thresholds, and constraints for inclusion in requirement, decision, and program documents and specifications.

5.3.6.1.2 Required for. Input to the CDD and CPD. The translation of these support related design objectives, goals, and thresholds into support requirements for inclusion in specifications is a critical element of this task. Failure to accomplish this activity may result in an ICD/CCD that does not optimally define the system support objectives and product metrics for the new system.

5.3.6.1.3 When required. Most of Activity 8 is initiated during MSA and updated during TD. Activity 8.7 Update Key Performance Parameters is only applicable during the TD phase.

5.3.6.1.4 Responsibility. The government is responsible for Activity 8 during MSA. The contractor assumes activity responsibility during TD and subsequent phases.

5.3.6.1.5 Documentation. Logistics Product Data (GEIA-STD-0007) entities impacted are Operations and Maintenance (A Entities) and Cross Functional Requirements (X Entities).

5.3.6.2 Supportability objectives. The type of parameter developed as a result of performing Activity 8 will depend on the phase of development. Generally, prior to Milestone A, supportability objectives will be established (Activity 8.4). These objectives are established based on the results of previous mission and support systems definition tasks, especially the opportunities identified as a result of Activity 7, and are subject to tradeoffs to achieve the most cost effective solution to the mission need. After Milestone A and prior to Milestone B, goals and thresholds are established which are not subject to tradeoff. Thresholds represent the minimum essential levels of performance that must be satisfied at specified points in the acquisition.

5.3.6.3 Product objectives. Overall product objectives or goals and thresholds must be allocated and translated to arrive at supportability requirements to be included in the system, subsystem, or support system specification or other document for contract compliance (Activity 8.5). This activity is necessary to assure that specification or contract parameters include only those parameters which the performing activity can control through design and support system development. The support burden and other effects of the GFE/GFM, administrative

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logistic delay time, and other items outside the control of the performing activity must be accounted for in this process. For example, if the overall threshold for manpower is 100 manhours/system/year, and a government furnished subsystem requires 25 manhours/system/year, then the contract should reflect a threshold of 75 manhours/system/year for performing activity developed hardware. This translation from supportability objectives or goals and thresholds to specification requirements is also important for readiness parameters. When the item under procurement is a complete weapon system, then applicable readiness parameters may be suitable for inclusion in the system specification. However, if the item under procurement is less than a weapon system (i.e., subsystem or equipment going into a weapon system) then other parameters would be more appropriate (e.g., logistic related R&M parameters).

5.3.6.4 Supportability incentives. When performing Activity 8.5, thorough consideration should be given to possible supportability incentives which may be included in the contract. However, incentives should be at the system level (possibly subsystem for some acquisitions) to prevent optimization approaches at lower levels which do not represent optimum system level solutions. This should not preclude component level initiatives such as reliability improvement warranties.

5.4 Preparation and evaluation of alternatives.

5.4.1 General considerations. Design alternatives for each of the system's functional elements are identified and analyzed. The results are used to select the best combination of element designs to achieve the system objective. System analysis and control activities in a program serve as a basis for evaluating alternatives, selecting the best solution, measuring progress, and documenting design decisions.

5.4.1.1 Iterations. The activities contained in this section are highly iterative in nature and are applicable in each phase of the life cycle. Additionally, they are generally performed in sequence, that is, functions are identified (Activity 9), alternatives are developed to satisfy the functions (Activity 10), and evaluations and tradeoffs are conducted (Activity 11). This process is then iterated to increasingly lower 1evels of indenture and detail in the classic system engineering manner.

5.4.1.2 Timing. The identification of functions, development of alternatives, and tradeoff analyses should be conducted to a level of detail and at a time consistent with the design and operational concept development. The determination of level of detail required should be made in coordination with representatives from the engineering/functional specialties which will utilize the resulting data. In the early phases of the life cycle, functions and alternatives should only be developed to the level required to analyze differences and conduct tradeoffs. More detail can be developed after tradeoffs are made and the range of alternatives is narrowed. At the same time, the support plan should be finalized at a time which allows for the development and testing of the necessary IPS element resources to carry out the support plan.

5.4.2 Functional requirements (Activity 9). Identification of the operating and maintenance functions for the new system/equipment should coincide with critical design decisions to assure development of a system which achieves the best balance between cost, schedule, performance, and supportability. Apply the concept of Affordable System Operational Effectiveness (ASOE) to these functions to explain the dependency and interplay between system performance, availability (reliability, maintainability, and supportability), process efficiency (system operations, maintenance and product support), and system life cycle. Special emphasis should be placed on the functional requirements which are supportability, cost, or readiness drivers for the new system/equipment or which are new functions that should be performed based on new design technology or new operational concepts Identify the design margins and support system resources that will respond to the customer's Mission Profile requirements. Activity 9.3 identifies the functions which are drivers and provides a basis for developing new support approaches or design concepts to enhance the supportability of the new system/equipment. These functions should be updated as the system/equipment becomes better defined and data is more readily available (Activity 9.10). Identification of the new functional requirements (Activity 9.2) provides the basis for management attention due to the potential supportability risks. Activity 9.4 identifies any risks in achieving the functional requirements of the new product. Functional flow block diagrams are a useful tool in identifying functional requirements and establishing relationships between functions. Additionally, other system engineering programs provide a significant input to the functional requirements identification process. For example, human engineering specialists may be best qualified to identify and analyze operations functions, transportation specialists may be best qualified to identify and analyze

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transportation requirements, etc. The PSA program under Activity 9 consolidates the functional requirements developed by the appropriate specialty areas to assure the support system developed for the new system/equipment satisfies all functional requirements. In addition to the specific task activities identified below, consider reviewing MIL-HDBK-470A for various types of maintainability analyses, i.e., Equipment Downtime Analysis, Maintainability Design Evaluation, Testability Analysis, etc.

5.4.2.1 Overview. This activity identifies the operations, maintenance, and support functions (Activity 9.1 and 9.2) that will be performed in the intended environment for each product alternative under consideration; identifies the human performance requirements for operations, maintenance and support; and documents the requirements in a task inventory.

5.4.2.1.1 Purpose. To identify missions (e.g., shoot, move, communicate), maintenance, and support (transport, maintain, dispose) functions that should be performed for each system/equipment alternative in the intended environment. It also identifies requirements for operations, maintenance and support, and documenting task performance requirements in a task inventory.

5.4.2.1.2 Required for. Identification of functional requirements and risks involved in meeting them (Activity 9.4) are included in the CDD. Detailed operations and maintenance task identification and the formulation of design alternatives are normally included in the CDD and CPD. Failure to accomplish this activity prohibitively affects the optimization of the maintenance and support system performed in conjunction with Activities 10 and 11.

5.4.2.1.3 When required. Activity 9 usually begins in the MSA phase. Activities 9.5, 9.6, 9.7, 9.8 and 9.9 may be deferred to the TD phase. Applicable activities are updated during EMD. During PD Activity 9 is generally only applicable to design changes.

5.4.2.1.4 Responsibility. The government is responsible for Activity 9.1 during MSA. The contractor assumes responsibility for all other activities applicable during MSA and subsequent acquisition phases. All activities require major government and contractor input.

5.4.2.1.5 Documentation. Logistics Product Data (GEIA-STD-0007) entities impacted are Reliability Requirements and Analysis (B Entities) and Task Analysis (C Entities).

5.4.2.2 System and subsystem levels. Activity 9 is designed to provide for varying levels of detail from system and subsystem level functions (Activity 9.1 through Activity 9.3) to detailed operations and maintenance tasks requirements (Activity 9.4). Appropriate subtask requirements should be identified based on the level of design definition and schedule requirements. In addition, Activity 9.4 prescribes the use of a task taxonomy for development of task descriptions. The level of detail to which this taxonomy is met must be based on the level of product definition and design, scenario development, and anticipated task criticality.

5.4.2.3 Task inventory (Activity 9.8). Task inventory is identified using three analysis techniques: (1) Failure Analysis (FMECA and FTA), (2) RCM analysis, and (3) a detailed review of the system/equipment functional requirements. The Failure Analysis identifies the failure modes of the system and its components thus identifying the corrective maintenance requirements. RCM uses a system based methodical approach to determine causes of failure, failure consequences, and a logic tree analysis to identify the most applicable and effective maintenance task(s) to prevent failure, if possible. RCM also provides rules for determining evidence of need for condition based maintenance plus (CBM+) to perform maintenance only upon evidence of need. CBM+ is a strategy and method for improving the reliability and maintenance effectiveness of DoD systems and components. Refer to DoDI 4151.22 for more information on CBM+. The review of the system/equipment's functional requirements identifies those activities which are neither corrective nor preventive but should be performed for the system/equipment to operate as intended in its environment. These activities include operations, turnaround activities, reloading, mission profile changes, transportation activities, etc.

5.4.2.4 FMECA (Activity 9.5). A FMECA systematically identifies the likely modes of failure, the possible effects of each failure, and the criticality of each effect on mission completion, environmental impacts, health hazards, and system safety. The FMECA requirements will generally be included under the Reliability Program. However, FMECA requirements for a system should be developed in conjunction with the PSA program

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requirements due to the necessity of having FMECA results to conduct some PSA activities. In particular, the FMECA provides the basis for built-in and external test specification and evaluation. This coordination should consider the timing of the FMECA, level of detail, and documentation requirements. ANSI/AIAA S-102.2.4 is an example of an industry standard that establishes uniform performance-based FMECA requirements and criteria. The FMECA product defined in the standard is comprised of three major components: failure mode and effects analysis (FMEA), Criticality Analysis (CA) and Risk Priority Analysis (RPA), and Critical Item Analysis (CIA) and Failure Compensation Analysis (FCA).

5.4.2.5 FTA (Activity 9.6). FTA involves using deductive logic to determine the possible causes of a defined undesired operational result. It is a top down failure analysis of a system that analyzes a series of lower-level events. The FTA methods of analysis are useful in functional paths of high complexity in which the outcome of one or more combinations of noncritical events may produce an undesirable critical event. Typical candidates for FTA are functional paths or interfaces which could have critical impact on the environment, flight safety, system safety, munitions handling safety, safety of operating and maintenance personnel, and probability of error free command in automated systems in which a multiplicity of redundant and overlapping outputs may be involved. ANSI/AIAA S-102.2.18 and IEC 61025 are examples of industry standards that establish standardized requirements for developing a performance-based FTA. These standards describe the modeling components, symbols, and analytical objectives without mandating a particular computerized methodology or tool.

5.4.2.6 RCM analysis (Activity 9.7). RCM analysis consists of a systematic approach of analyzing system/equipment reliability and system safety data to determine the feasibility and desirability of preventive maintenance activities, to highlight maintenance problem areas for design review consideration, and to establish the most effective preventive maintenance program for the new system/equipment. RCM logic is applied to the individual failure modes of each reparable item in the system/equipment identified during the FMECA, through a progressive determination of how impending failures can be detected and corrected to preserve, to the degree possible, the inherent levels of reliability and safety in the system/equipment. DoDI 4151.22-M provides guidance for the RCM process to achieve inherent reliability and restore deteriorated reliability for DoD materiel. The manual describes the essential elements of RCM and offers guidance on establishing and sustaining an RCM program. MIL-STD-3034 describes the DoD approved RCM methodology used for the determination of maintenance requirements. The standard also provides the procedure to develop preventive, corrective, and inactive equipment maintenance within a planned maintenance management system. In addition to DoD guidance and standards, SAE JA1011 and SAE JA1012 are examples of industry standards that provide RCM evaluation criteria and processes.

5.4.2.7 Task requirements. Task requirements to satisfy the system/equipment's functional requirements which are not identified during the FMECA, FTA, and RCM analysis are generally system level activities. These activities should be analyzed relatively early in the life cycle (MSA and TD Phases) so that the system/equipment's design can be appropriately defined to preclude supportability problems. These activities are often constrained by system/equipment requirements (e.g., mission response or turnaround time cannot exceed a certain value or the system should be transportable via a given mode) and the detailed activity analysis should be conducted in a timely fashion so that design corrections can be made when the requirements are exceeded.

5.4.3 Support system alternatives (Activity 10). Support alternatives (Activity 10.1) for a new system/equipment should cover each element of IPS, and satisfy all functional requirements. Initial support alternatives will be system level support concepts which address the supportability, cost, and readiness drivers and the unique functional requirements of the new system. After tradeoff and evaluation of these alternatives (Activity 11), alternatives will be formulated at a lower level for further tradeoffs and evaluations. Conducting this analysis in an iterative fashion from the top down helps assure efficient use of resources in conducting the Product Support Analysis. Support alternatives should be formulated to equivalent levels of detail for tradeoffs and evaluation, and then further detail developed after the tradeoff analysis is conducted. This process (Activity 10.2) continues in an iterative manner throughout the materiel acquisition process until the system level support concept is refined into a detailed support plan covering all levels of maintenance, all items of hardware and software requiring support, and all operations and maintenance activities. Where applicable, depot maintenance inter-servicing considerations should be included in alternative support concepts. DoDI 4151.20 provides specific guidance for determining core depot-level maintenance requirements, by work breakdown structure, expressed in direct labor hours. Alternative support plans should be developed (Activity 10.3) as support alternatives are formulated and should be updated (Activity 10.4) as tradeoffs are conducted.

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5.4.3.1 Overview. During performance of this activity, viable support system alternatives for the new product for evaluation and tradeoff analysis will be established.

5.4.3.1.1 Purpose. To establish support system alternatives for evaluation, tradeoff analysis, develop a detailed support plan, and determination of the best system to be developed.

5.4.3.1.2 Required for. These alternative support system concepts/plans and associated risks (Activity 10.5) are addressed in the CDD and CPD. As tradeoffs are made, support system alternatives are refined, updated, and included in the CDD and CPD. Failure to accomplish this activity may result in a support structure that is less than optimum and may preclude achievement of the performance requirements for the equipment.

5.4.3.1.3 When required. Those activities which establish support system alternatives and risks are required prior to and during MSA. Activities which provide for alternative support plans and updates are generally applicable in EMD.

5.4.3.1.4 Responsibility. The contractor, with major support from the government, is responsible for Activity 10 prior to and during MSA and subsequent life cycle phases.

5.4.3.2 Alternative support systems. Alternative support systems are formulated by synthesizing alternatives for individual IPS elements into support systems. During this process, the following two points must be considered. First, interrelationships that exist between the IPS elements (e.g., manpower, personnel, and training alternatives may depend upon support equipment alternatives. Secondly, formulation of detailed alternatives for one element of IPS may not be cost effective until higher level system alternatives are evaluated and selected.

5.4.3.3 Tradeoff analysis. Formulating support alternatives may be an inherent feature of models used in the evaluation and tradeoff process. This is especially true for many repair level analysis models used during EMD Phase where repair versus discard alternatives and alternative maintenance levels for repair and discard are automatically formulated and analyzed during execution of the model. Citing Activity 11 and specifying the use of a specific model must insure that the model can accommodate all of the support alternatives required by Activity 10.

5.4.4 Evaluation of alternatives and tradeoff analysis (Activity 11). Tradeoff analysis between design, operational, and support alternatives is an inherent part of system development. Optimum benefits are realized when these analyses are conducted considering all system factors (cost, schedule, performance, and supportability) before the system is finalized. The nature of the tradeoff models and techniques used and the magnitude, scope, and level of detail of the analysis will depend upon both the acquisition phase and the system complexity. Tradeoffs early in the program will generally be interdisciplinary and broad in scope. As development progresses, tradeoffs are progressively refined, inputs become more specific, and outputs influence a smaller number of related parameters.

5.4.4.1 Overview. This task is performed to determine the preferred support system alternative(s) for each product alternative and to participate in alternative product tradeoffs to determine the best approach (support, design, and operation) which satisfies the need with the best balance between cost, schedule, performance, readiness, and supportability.

5.4.4.1.1 Purpose. To determine the preferred support system alternative(s) and their associated risks for each proposed system; and determine, through tradeoff analysis, the best approach to satisfying the need (the one that provides the best balance between risk, cost, environmental impact, schedule, performance, readiness, and support).

5.4.4.1.2 Required for. Logistics influence on design is achieved by including early tradeoff analysis results in requirements documents such as the CDD and program documents such as the LCSP and SEP. Results of later tradeoff analyses are incorporated into the CPD. Failure to accomplish this activity may result in a support structure that is less than optimum and may preclude achievement of the performance requirements for the equipment.

5.4.4.1.3 When required. Activity 11 is generally initiated during MSA, with the exception of Activity 11.7, which is generally applicable during TD. Both system and support system tradeoffs continue to be iterated through EMD; other key tradeoffs are only selectively applied during EMD.

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5.4.4.1.4 Responsibility. The government is responsible for all applicable activities during MSA; however, major contractor support may be required. The contractor then assumes responsibility for all activities during TD and, as applicable, during subsequent phases.

5.4.4.2 General requirements for evaluation and tradeoff analysis. Activity 11.1 provides the general requirements for each evaluation and tradeoff performed under Activity 11. Activities 11.2 and 11.3 are continuing requirements throughout a system/equipment's life cycle to analyze alternative support approaches and alternative design, operations, and support approaches, respectively. The remaining activities represent key tradeoffs and evaluations that are frequently applicable during given phases of the life cycle. For a given acquisition program, the range of potential tradeoffs and evaluations is essentially limitless. Procedures should be established between the requiring authority and performing activity to allow for specific evaluations and tradeoffs to be identified and conducted as required throughout the acquisition process. In selecting and conducting tradeoffs and evaluations for a given acquisition program, the following factors should be considered:

a. Corrosion prevention and mitigation factors should be considered when conducting tradeoff evaluations as directed by DoDD 5000.01.
b. Sensitivity of support tradeoffs (Activity 11.4) should always be considered a high priority.
c. Select the tradeoff activities which deal with the supportability, cost, and readiness drivers of the system (Activity 11.9). Additionally, the scope of the selected tradeoff and evaluation activities can be limited to the drivers. Consider energy tradeoffs (Activity 11.10), damage/repair tradeoffs (Activity 11.11), transportability tradeoffs (Activity 11.12), and facility tradeoffs (Activity 11.13) when selecting tradeoff activities.
d. Some tradeoffs and evaluations lend themselves to being performed by a specific community for input into the PSA program. For example, the Diagnostics Tradeoffs (Activity 11.8) may best be performed under the Maintainability Program, and the Training Tradeoffs (Activity 11.6) may best be performed by training specialists, etc.
e. Care should be exercised in using man-hours as a criteria parameter for manpower trades (Activity 11.5) because of two factors. First, each integral number of people has a range of man-hours associated with it. Adding or reducing man-hours has no effect on the number of people required until either the upper or lower limit of the range is breached. Then, and only then, does the number of people required change. Second, there is not a direct correlation between man-hours and number of people required unless personnel skills are considered. For example, the same number of man-hours may equate to one person required or many people required depending on the number of different skills required.
f. A key element of PSA is determining the most effective and efficient echelon to perform maintenance on systems and a key aspect of this process is to conduct a Level of Repair Analysis (LORA) (Activity 11.7). The objective of performing a LORA is to ensure that operational readiness is achieved throughout a system’s life cycle in an optimal, least cost fashion. Starting the LORA process early in a system’s development, and continuous evaluation throughout its life cycle, can ensure a LORA influences the system’s design and the maintenance planning by producing an effective support solution. Initially, a LORA considers cost, performance, schedule, and supportability to aid in finalizing an effective and supportable design solution. After the system has been fielded, follow-on analyses should be scheduled that include the use of field feedback data. It should be noted that the LORA Strategy and LORA Plan are understood to be included in the PSA Strategy and PSA Plan discussed in 5.2.2 and 5.2.3, respectively. Refer to Appendix C for additional guidance concerning the implementation of LORA program requirements.
g. Where applicable (e.g., in doing contractor versus organic support alternatives), assure that realistic personnel costs are used. Often Service published personnel costs do not include costs associated with recruitment, washouts, retention, etc., and use of these personnel costs may bias the tradeoff results.

5.4.4.3 Cost effectiveness analysis. An excellent tool to assist in the performance of the evaluation and tradeoff analysis is to perform a Cost Effectiveness Analysis. OMB Circular A-94 can be used to fulfill the need and standardize the process to conduct analyses of costs, benefits and risks.

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5.5 Determinations of product support resource requirements.

5.5.1 General considerations. Product support resource requirements associated with proposed system/equipment alternatives should be identified and refined as the system/equipment progresses through its development. The extent of identification depends upon the magnitude and complexity of the new system/equipment and the phase of the acquisition cycle. As development progresses and the basic design and operational characteristics are established, this determination becomes a process of analyzing specific design and operational data to more completely identify detailed product support resource requirements. This portion of the PSA defines the requirements of the principal elements of IPS. This analysis can be very costly and involve development of a considerable amount of documentation. In determining the timing and scope of analysis activities in this section, the following should be considered:

a. Early identification of product support resource requirements should be limited to new or critical requirements so that available resources are effectively used and sufficient acquisition time is allocated to the development and testing of these requirements. This identification should be accomplished as part of Activity 11.2 and documentation should be limited to the minimum essential data.
b. Resource requirements for different system alternatives should only be identified to the level required for evaluation and tradeoff of the alternatives.
c. Product support resource requirements should be identified in a time frame which considers the schedule for developing the required documentation for each element of IPS. Schedule accomplishment of these activities considering the time required to provision, develop technical manuals, establish training programs, etc.
d. There are different levels of documentation that can be applied to the identification of product support resource requirements. (For example, supply support requirements can be identified through documentation of only a few data elements early in a program while later the total range of data elements required to accomplish initial provisioning can be documented.)
e. Detailed input data for identification of product support resource requirements is generated by many system engineering functions. Therefore, analysis and documentation requirements and timing should be a coordinated effort between the PSA program and other system engineering processes to avoid duplication of effort and assure timely availability of required input data.

5.5.2 Task analysis (Activity 12). Activity 12.1 provides the detailed identification of requirements for all elements of IPS to operate and support the new system/equipment. It also includes an analysis of requirements to identify areas where supportability enhancements can be achieved. During performance of this activity, the following will be determined for each operations and maintenance activity:

a. Maintenance level, using the results of the LORA or similar analysis.
b. Number of personnel, skill levels, skill specialties, man-hours, and elapsed time.
c. Spares, repair parts, and consumables required. DoDI 4140.1-R, DoDI 4140.26-M, and Joint Publication AMC-R 700-9, NAVSUPINST 4790.7, AFLCR 400-21, MCO P4410.22C provide guidance for initial supply requirements determination to achieve weapon system supply support.
d. Support equipment; Test, Measurement, and Diagnostic Equipment (TMDE); Calibration; and Test Program Sets (TPS) required.
e. Training and training materiel required along with recommended training locations and rationale (Activity 12.4).
f. Facilities required.
g. Interval for and the frequency of activity performance in the intended operational environment. The annual operating basis for activity frequencies should be carefully selected and widely understood to prevent misuse of the information generated by this activity.
h. Packaging, handling, storage, and transportation requirements (PHS&T).
i. Identification of the environmental impacts of the task, including the use of hazardous materials, generation of hazardous waste, and release of air and water pollutants.
j. Product disposal.

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5.5.2.1 Overview. Product support resource requirements associated with new system/equipment alternatives should be identified and refined as the system/equipment progresses through its development. The extent of identification depends upon the magnitude and complexity of the new system/equipment and the phase of the acquisition cycle.

5.5.2.1.1 Purpose. To analyze required operations, maintenance, and support tasks to: identify resources required for each task; highlight resource requirements which are new or critical (Activity 12.3) and any risks associated with those resource requirements (Activity 12.6), including hazardous materials/waste and their environmental impact; define transportability requirements (Activity 12.7); identify support requirements exceeding established goals/thresholds/constraints; provide data supporting recommended design alternatives to improve supportability/enhance readiness (Activity 12.5); and provide source data to develop required documents, e.g., Maintenance Plans, Maintenance Allocation Charts, Technical Manuals, Provisioning documentation, etc.

5.5.2.1.2 Required for. Task analysis, when properly interfaced with system engineering disciplines and other IPS functional element inputs, effectively integrates/translates these inputs into IPS documentation output products. Failure to accomplish this activity may result in little or no documentation of the required maintenance and support procedures required to sustain the equipment. For a contractor logistics support strategy, failure to acquire the support products may significantly impact the ability to establish alternate sources for support during the life of the equipment leading to higher life cycle costs.

5.5.2.1.3 When required. The overall program schedule, level of design, and operation definition govern the timing and scope of the task analysis. The time period during which performance of this task can be cost effective is limited. It begins with availability of required input from design activities, and extends only to that point which allows time for analysis results to be used to develop IPS documents and acquire the identified support resources. Selective use of this activity during TD should be limited to identification/documentation of new/critical resources. Activity 12 is generally applicable during EMD.

5.5.2.1.4 Responsibility. The contractor is responsible for detailed task analysis during EMD as applicable.

5.5.2.1.5 Documentation (Activities 12.2 and 12.9). All Logistics Product Data (GEIA-STD-0007) entities are impacted (depending on the service specific requirements) except for the A Entities, Operations and Maintenance. All of the reports defined in TA-HB-0007-1 Logistics Product Data Reports Handbook are applicable. Draft options should be used for those reports that have draft options until the end of EMD phase. At that time data development should be near completion and proof reports should be developed. The data should continue to be updated as better information becomes available (Activity 12.10)

5.5.2.2 Task analysis and IPS elements. The timing and depth for performance of Activity 12 is governed by the level of design and operation definition and by the program schedule. The analysis cannot be cost effectively performed until required input information from the design activity is available and cannot be delayed beyond a point that does not allow sufficient time to conduct the activity analysis and use the results to develop IPS element documentation (e.g., technical manuals, personnel requirements list, etc.) in a timely manner. TD Phase efforts should be limited to only essential information. During EMD this activity would be performed for all system/equipment components. During the P&D Phase, this activity would be performed on any design changes.

5.5.2.3 Scope of activity 12. The scope of this activity can be tailored to cost effectively meet program needs through identification of system hardware and software on which the analysis will be performed, identification of indenture level to which the analysis will be carried, identification of the maintenance levels that will be included in the analysis, and the identification of the range of documentation required. This tailoring process should be done in conjunction with other system engineering programs and should consider the requirements of each IPS functional element. The system/equipment maintenance must be considered during task analysis activity.

5.5.2.4 Importance of task analysis. Task analysis is probably the area of a PSA program which requires the most coordination and interfacing. It involves essentially every system engineering discipline and IPS functional element manager. When properly interfaced, task analysis provides a very cost effective means for assuring supportability of the system/equipment and developing an integrated support system for the system/equipment. When not properly interfaced, activity analysis can be a very costly process which duplicates other analyses and

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generates incompatible IPS products. Design, reliability, maintainability, human engineering, environment, safety, PHS&T, and occupational health (ESOH) are all involved in satisfying the activity analysis requirements of Activity 12. The PSA program integrates and translates these inputs into output products required for preparation of IPS documents.

5.5.3 Early distribution analysis (Activity 13). This activity is designed to assure an effective fielding of the new system/equipment with all required resources. Activity 13.1 is designed to quantify the effect on existing systems from the new system/equipment's deployment. This impact determination is necessary for the acquisition decision process to result in improved overall force capability and to assure planning to accommodate the new system/equipment effectively. Activity 13.2 specifically addresses the manpower and personnel impact of the deployment. This Activity identifies where the necessary people and skills will come from for the new system/equipment, and what impact will be felt from this on other systems. Activity 13.3 identifies the effect on system readiness for varying levels of product support resources. This analysis forms the quantitative basis for budget requirements. Activity 13.4 identifies product support resource requirements in alternative operational environments and provides the basis for wartime reserve stocks and mobilization plans and requirements. Activity 13.5 requires plans to be developed to alleviate any potential fielding problems for the new system/equipment. These activities should only be selectively applied to equipment level acquisitions.

5.5.3.1 Overview. Early fielding analysis reviews the impact a newly fielded system has on existing fielded systems. Identification of these potential deployment issues is critical to the success of the system.

5.5.3.1.1 Purpose. To assess new system impact on existing systems to include quantifying risk levels which surround system performance/supportability; to identify sources of manpower/personnel skills to meet new system requirements; to determine impact of failure to obtain necessary product support resource requirements.

5.5.3.1.2 Required for. Ensure the new system is fielded with all required resources. Failure to accomplish this activity may result in fielding delays and the absence of required support. These shortfalls would then affect the performance of the equipment in the field.

5.5.3.1.3 When required. The early fielding analysis is conducted during the EMD phase.

5.5.3.1.4 Responsibility. The contractor is responsible for ensuring early fielding analysis is performed during EMD. This analysis should be coordinated with and confirmed by the government.

5.6 Product operational management.

5.6.1 General considerations. The activities in this section are intended to insure that operational support problems are identified and addressed. Re-procurement problems, closing of production lines, obsolescence of design, expected discontinuances of business by manufacturers, etc. in the operational environment cause problems in assuring sufficient supply of spare and repair parts (Obsolescence and Diminishing Manufacturing Sources and Material Shortages (DMSMS)). If these factors are determined to present potential problems, plans should be established early to assure that effective operational support will be available for the new system/equipment. Analysis of feedback data from the operational environment is necessary in verifying that the system/equipment has met its objectives and in evaluating the operational support. In some cases, this assessment can be made using field feedback data that is routinely available from standard supply and maintenance reporting systems; while in other cases, data from standard reporting systems should be supplemented to meet the verification objective within acceptable confidence levels. Any requirement for supplemental data should be weighed against the cost and resources to obtain the data and any impact upon using organizations to gather the data.

5.6.2 DMSMS/obsolescence analysis (Activity 14). Activity 14.1 establishes an Obsolescence and DMSMS analysis process for identifying the loss, or impending loss, of manufacturers or suppliers of components, assemblies, sub-assemblies, piece parts and material required to operate and/or maintain the system/equipment. Original equipment manufacturer (OEM) components and assemblies are often the most cost effective sources of continuing supply to support the system/end item. Likewise, alternate or substitute components and assemblies that meet the engineering requirements of the OEM may offer additional low cost alternate sources of supply that insure continuing support during operation of the system/end item. Absent these sources of supply an analysis of other

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alternatives should be conducted. Life of type buys that take into account the useful life of the system/end item is the first step in this analysis process. Other alternatives include emulation, reverse engineering and minor/major redesign. Each of these alternatives is progressively more costly and requires significantly more lead time. The key to this activity is the early establishment of a DMSMS program plan that proactively monitors candidate components and assemblies via engineering bill of materials and analyzes the best method to mitigate the loss of sources of supply, and creating a risk mitigation plan to counterfeit items. Establishment of a DMSMS program should be accomplished in conjunction with the requirements contained in TA-STD-0016. SD-22, Diminishing Manufacturing Sources and Material Shortages, A handbook of Best Practices and Tools for Implementing a Proactive DMSMS Management Program should be considered for accomplishing Activity 14.

5.6.2.1 Overview. To minimize the impact of DMSMS, agencies and organizations must be able to incorporate timely and cost-effective engineering practices during development, production, and sustainment.

5.6.2.1.1 Purpose. To analyze the loss or impending loss of manufacturers or suppliers of parts and material required to operate and sustain the system/equipment and support development of a program to establish alternate sources of supply.

5.6.2.1.2 Required for. To identify the obsolescence, loss, or impending loss, of manufacturers or suppliers of components, assemblies, sub-assemblies, piece parts and material required to operate and/or maintain the system/equipment. Establish strategies/alternate solutions for mitigating obsolescent parts and shortages. Failure to accomplish this activity may affect the performance of the equipment and affect the timely maintenance of the equipment due to shortages of parts or materials.

5.6.2.1.3 When required. Initiated in the TD Phase when components and manufacturers of components are selected and design can still be influenced to lessen or eliminate potential problems. The process is continued throughout the P&D and O&S Phases.

5.6.2.1.4 Responsibility. The government is responsible for insuring that a DMSMS/obsolescence analysis is conducted and a DMSMS/obsolescence program is established to insure uninterrupted sources of supply.

5.6.3 Field feedback (Activity 15). A system's ultimate measure of supportability is determined by how well it performs in its operational environment. Field feedback data can provide a vital source to the analysis of how well the support structure is performing. Activity 15 addresses the viability of existing feedback systems to provide the required data for analysis (Activity 15.2) and the need to augment the existing feedback systems with additional data to measure the supportability of a system. Each of the DoD services has field feedback systems in place that provide operational data (e.g. fuel consumption, miles driven, flight hours, etc.), maintenance data (e.g. maintenance activities performed, elapsed time to perform, parts consumed, etc.), parts requisitioning data (e.g. demands), readiness data, design/quality issues data, prognostics and diagnostics data and interactive electronic manuals/technical publication issues data. Prior to fielding of a new system/equipment the existing field feedback system should be assessed to insure that all the data needed to verify the support objectives are available. Additional field feedback data not currently being acquired but needed to analyze the support objectives would be a byproduct of this effort. Modification of the existing field feedback system versus the cost of the modification and impact on resources should be a part of the analysis to determine the cost effectiveness of acquiring the additional data. Field feedback data for systems/equipment that will be supported by the contractor as part of a Performance Based Agreement (PBA) strategy will likely limit the feedback data to the information required to insure the objectives of the contract are being met. This could be accomplished by requiring a contractor to use the existing DoD service reporting system or through identification and delivery of specific data in contractor format. Each approach should be weighed against the cost to implement the data collection process and the return on investment.

5.6.3.1 Overview. Field Feedback is an evaluation that compares the conditions prior to the implementation of the system/equipment with the actual results achieved by the system/equipment.

5.6.3.1.1 Purpose. To correct potential post production support problems prior to closing production lines and to develop a plan to ensure effective support of the system during its life cycle. Post production support plan should identify single/dual source items and those for which the government has no data rights. Plans should include available organic support assets, production line buy-out, or contractor logistics support agreements.

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5.6.3.1.2 Required for. Plans should document identified problems (e.g. inadequate sources of supply/repair); analyze alternative solutions, their associated costs and risks; and outline estimated funding and actions required to implement the preferred solution(s). Failure to accomplish this activity in a comprehensive manner will affect the performance and safety of the equipment and the cost effective maintenance of the equipment. Without the analysis of field feedback information, sound and cost effective adjustments to the maintenance and support of the equipment may not be accomplished and may result in higher life cycle costs.

5.6.3.1.3 When required. This activity is only applicable during the P&D phase and the O&S phase.

5.6.3.1.4 Responsibility. The post production support analysis is the responsibility of the contractor during production. The government assesses and verifies the completeness of all activities accomplished by the contractor.

5.6.4 Disposal analysis (Activity 16). "At the end of its useful life, a system shall be demilitarized and disposed of in accordance with all legal and regulatory requirements and policy relating to safety (including explosives safety), security, and the environment" (DODI 5000.02). During the design process hazardous materials contained in the system in the Programmatic Environment, Safety, and Occupational Health Evaluation (PESHE) should be documented and the system's demilitarization and safe disposal must be estimated and planned. Defense Logistics Agency (DLA) Guidelines reference DoD 4160.21-M Defense Materiel Disposition Manual and DoDI 4160.28, DoD Demilitarization (DEMIL) Program for DoD specific demilitarization requirements.

5.6.4.1 Overview. Activities 16.1 and 16.2 are used to identify applicable demilitarization requirements necessary to eliminate the functional or military capabilities of assets and determine reutilization and hazardous-property disposal requirements for system/equipment and by-products.

5.6.4.1.1 Purpose. To identify the disposal/de-militarization procedures associated with a system/end item including facility equipment that focuses on those components, assemblies, sub-assemblies, parts and materials that contain hazardous materials, wastes and pollutants. Additionally, to identify those items that can be recycled, reused or salvaged.

5.6.4.1.2 Required for. Establish and document technical procedures for the disposal of components, assemblies, sub-assemblies, parts and materials that contain hazardous materials, wastes or pollutants. Document the end of life disposal/de-militarization procedures required to deactivate the system/end item. Failure to accomplish this activity may affect the health and safety of all personnel involved in the operations and sustainment of the equipment. Demilitarization of the equipment and its components is a matter of national security and must be accomplished to insure classified items are not compromised.

5.6.4.1.3 When required. Selective use of this activity (in conjunction with Activity 12) during TD Phase should be limited to the identification of new/critical resources that contain hazardous materials, wastes or pollutants. This activity is generally applicable during the EMD Phase for components, assemblies, sub-assemblies, parts and materials. Disposal/de-militarization procedures for the system/end item are established during the system design process.

5.6.4.1.4 Responsibility. The contractor is responsible for the detailed technical procedures for the disposal of components, assemblies, sub-assemblies, parts and materials that contain hazardous materials, wastes and pollutants. The government is responsible for the disposal/de-militarization procedures for the system/end item.

5.6.4.1.5 Documentation. Logistics Product Data (GEIA-STD-0007) entities impacted are Task Analysis (C Entities).

5.6.4.2 Disposal analysis plan. A specific plan should be completed prior to the Operational Test and Evaluation (OT&E) milestone. Plans should be straight forward addressing the demilitarization and disposal requirements for the entire system, as well as subsystems, components, etc. (which may require individual unique demilitarization and disposal process requirements). For each item to be disposed of, the plan should address as a minimum the following:

a. Identification of the item.

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b. Intended use of the item.

c. Item components and materials.

d. Disassembly instructions.

e. Related safety requirements.

f. Environmental considerations.

5.6.4.3 Addressing demilitarization and disposal requirements. Addressing demilitarization and disposal requirements is typically a logistics function best addressed by the service and system's logisticians, as well as the Defense Logistics Agency (DLA). The PM is required to apply DEMIL requirements during the entire system design process and prepare programmatic and procedural DEMIL plans and related documentation. A DEMIL plan is a set of procedures and information to assist in the performance of physical DEMIL or the programmatic conduct of analysis and planning for DEMIL. A DEMIL plan is a living document that should be updated throughout the total life cycle systems management process. There are two types of plans; procedural and programmatic. A procedural DEMIL plan provides information to support the performance of physical DEMIL and is needed before DoD personal property will be subject to a disposal requirement. The Programmatic DEMIL plan is tailored to each acquisition program that may be addressed as a stand-alone or integrated with other plans. It addresses how DEMIL considerations will be integrated into system engineering processes. It should be noted that for munitions programs demilitarization and disposal documentation should be in place before the start of developmental test and evaluation and prior to releasing the munitions in a non-military setting. Whichever approach is taken, the PM should ensure Environment, Safety, and Occupational Health (ESOH) requirements are integral when defining the demilitarization, disposition, and disposal requirements.

5.6.4.4 Update demilitarization and disposal plan. The demilitarization and disposal plan should be updated throughout the life of the system. An additional review of the demilitarization and disposal process should be completed 6-8 years prior to the end of the projected service life of the system (3-5 years prior for a short service life). The PM should plan and budget for the disposal and begin obtaining service specific approvals.

5.7 Suitability assessment.

5.7.1 General considerations. The activities in this section are intended to insure that suitability problems are identified and addressed.

5.7.1.1 Types of assessment. There are two general areas of operational suitability assessment covered in this section; assessment as part of the formal test and evaluation program, and assessment after deployment through analysis of operational, maintenance, and supply data on the system/equipment in its operational environment. In the first case, the assessments are made prior to deployment and, where applicable, upon initial deployment during follow-on test and evaluation. In the second case, the assessments are made based upon data available on the system/equipment in its normal operating environment.

5.7.1.2 Test and evaluation. The supportability test and evaluation program should serve three objectives: (1) provide measured data for supportability and supportability related design parameters for input into system level estimates of readiness, O&S costs, and product support resource requirements; (2) expose supportability problems so that they can be corrected prior to deployment; and (3) demonstrate contractual compliance with quantitative supportability and supportability related design requirements. Test and evaluation planning, scheduling, and cost investment should be related to these objectives to maximize the return on investment. Development of an effective test and evaluation program requires close coordination of efforts between all system engineering disciplines to prevent duplication of tests and to maximize test program effectiveness. Reliability tests, maintainability demonstrations, publications validation/verification efforts, environmental tests, endurance/durability tests, and other tests should be used in satisfying supportability assessment requirements. A well integrated test program involves establishing test conditions that maximize the utility of the test results. This is an important factor considering that the availability of hardware and time to conduct tests and evaluations are generally at a premium for most acquisitions, and that test results are a vital feedback loop because they represent the first hard data available for the new system/equipment.

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5.7.1.3 Test environment. One major factor that determines the utility of test results to satisfy the objectives of the supportability test and evaluation program is the test environment. Historically, there has been a large gap between test results and field-observed parameters. This wide gap is to a large degree caused by conducting tests in ideal environments, using contractor technicians to perform maintenance during test, ignoring some test results (non-chargeable failures), and not using the planned resources (technical manuals, tools, test equipment, personnel, etc.) during the tests. Realistic test environments should be established considering the intended operational environment and the intended product support resources (all elements of IPS) that will be available to operate and maintain the system/equipment after deployment. While a total simulation of the field environment may not be practical or cost effective, test environments should be established to be as close as possible and known differences between the test and field environments should be accounted for in using test results to update system level projections for readiness, O&S costs, and product support resource requirements. Additionally, expected levels of maturation to supportability parameters should be applied to test and evaluation results to get a good projection of expected supportability.

5.7.1.4 Post-deployment assessments. A system's ultimate measure of supportability is determined by how well it performs in its environment after deployment. Analysis of feedback data from the operational environment is the necessary final step in verifying that the system/equipment has met its objectives and in evaluating post deployment support. In some cases, this assessment can be made using field feedback data that is routinely available from standard readiness, supply, and maintenance reporting systems. In other cases, data from standard reporting systems should be supplemented to meet the verification objective within acceptable confidence levels. Any requirement for supplemental data should be weighed against the cost and resources to obtain the data and any impact upon using units to gather the data.

5.7.2 Operational suitability test, evaluation, verification and validation (Activity 17). Initial suitability test and evaluation planning (Activity 17.1) occurs prior to the life cycle phase in which the tests will be conducted. This planning should include identification of the resources (hardware, time, and support) required for testing. Test and evaluation strategies should be based on the supportability and supportability related design requirements; the supportability cost, and readiness drivers; and areas with a high degree of risk associated with them. Test and evaluation plans should include supportability objectives and criteria integrated with other system engineering test requirements. MSA Phase planning should include strategies for evaluation (during TD Phase testing) of design and operational features that affect the feasibility of the system/equipment's supportability, cost, and readiness objectives. Pre-Milestone B planning should include strategies for demonstrating (during Engineering, Manufacturing Development testing) established supportability and supportability related design objectives within stated confidence levels through the support maintenance level; evaluation of operability and operator training; demonstration of the adequacy of the product support plan to include all elements of IPS; and quantification of requirements for fuel, ordnance, supply, and other IPS elements. Preproduction planning should include strategies for assessing (during FOT&E) mission hardware, software, and support items not fully tested prior to production; demonstration, in an operational environment, that initial production items meet the thresholds for mature systems; refinement of operating tactics, training requirements, and force unit organizational concepts as required.

5.7.2.1 Overview. Supportability test, evaluation, and verification is the process by which a system or components are compared against requirements and specifications through testing. The results are evaluated to assess progress of design, performance, supportability, etc.

5.7.2.1.1 Purpose. To assess achievement of support parameters specified; identify reasons for deviations from projections; and recommend changes to correct deficiencies and improve system readiness.

5.7.2.1.2 Required for. The formal Test and Evaluation (T&E) program. This activity is used early on to develop a strategy for testing the support parameters of a system which are input to the system T&E Master Plan (TEMP). Criteria are established to identify test resources, procedures, and schedules required to meet TEMP input objectives; and to analyze T&E results, develop corrective action, and update the LCSP and LPD. Post deployment supportability assessment is obtained by analyzing the operational system maintenance and supply data. Without supportability testing, the risks associated with fielding the equipment from a performance and safety standpoint increase significantly.

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5.7.2.1.3 When required. Activity 17.1 usually begins during MSA. Activities 17.2, 17.3, 17.4 and 17.5 are generally applicable during TD and EMD.

5.7.2.1.4 Responsibility. The contractor has primary responsibility for Activity 17 in all applicable life cycle phases. However, supportability testing issues are developed in coordination with the government. The contractor is responsible for technical test and coordinating preparation of the TEMP. The government is responsible for user test and preparation of that portion of the TEMP.

5.7.2.1.5 Documentation. All Logistics Product Data (GEIA-STD-0007) entities are impacted. All of the reports defined in TA-HB-0007-1, Logistics Product Data Reports Handbook are applicable.

5.7.2.2 Detailed test plans and criteria. Detailed test plans and criteria are established (Activity 17.3) based on the test and evaluation objectives of the system/equipment. An important category of data that should be provided by the PSA program is the identification of the IPS elements that should be provided to testing activities for test and evaluation. This identification is an integral part of Activities 9, 11, and 12. Activity 17 provides detailed plans for test and evaluation of these resources. Data resulting from testing will be analyzed as part of Activity 17.4 to accomplish the following:

a. Correct deficiencies discovered during test and validate corrective actions implemented to eliminate deficiencies identified during previous tests.
b. Update system level projections for readiness, O&S costs, and product support resource requirements.
c. Identify the amount of improvement required in supportability and supportability related design parameters to meet established goals and thresholds.
d. Identify achievement or non-achievement of contractual requirements.
e. Provide an assessment of supportability for input into the materiel acquisition decision process.
f. Update LPD.
g. Provide a database of experience information for subsequent comparative analyses on future system/equipment acquisitions.

5.7.2.3 Requirements for post deployment assessment of the new system/equipment. Requirements for post deployment assessment of the new system/equipment are provided for in Activity 17.4. In those cases where existing standard field reporting systems will not provide the necessary data or accuracy to conduct this analysis, then supplemental data collection programs should be planned, approved, budgeted for, and implemented. Planning activities would normally occur prior to production, and data review and analysis would occur following deployment. Care should be exercised in planning this activity to assure that field results are collected during field operations. Collecting data immediately after deployment may be biased if any of the following situations are in effect:

a. New equipment fielding teams are with the system/equipment.
b. Operator and maintenance personnel received training from other than the intended normal training sources.
c. Initial supply support was obtained from other than standard supply systems.
d. Interim support resources are being used pending deployment of other items (e.g., support and test equipment).

5.7.2.4 Analysis use. Analysis of data obtained from field reporting systems can provide significant information for system/equipment enhancements through product support resource modifications, product improvement programs, or modifications of operating tactics. Additionally, comparative analysis between field results, test and evaluation results, and engineering estimates can provide information for use on future acquisition programs to better project supportability, cost, and readiness parameters.

5.8 Tailoring. Tailoring is the process of evaluating individual requirements to determine if they are pertinent and cost-effective for a specific acquisition and then modifying the requirements to ensure they are kept to a minimum to meet actual needs and that they contribute to a balance between needs and costs. Rewriting, extracting, or eliminating requirements accomplishes tailoring of standardization documents. This section of the

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handbook is intentionally structured to discourage indiscriminate blanket applications of PSA activities. Tailoring is forced by requiring that specific activities be selected and that certain essential information relative to implementation of the selected activities be provided by the requiring authority. The contractor may, and is encouraged to, suggest alternative means of satisfying requirements to make information more readily available and to utilize more efficient business practices by:

a. Evaluating each requirement in a standard or Data Item Description (DID) to determine whether it is necessary and cost effective for a given program.

b. For standards and specifications, omitting, or adding to the requirements, as appropriate.

c. For DIDs, omitting or adding requirements in a manner that does not increase required workload.

5.8.1 Purpose and scope. This section provides guidance on how to tailor TA-STD-0017, Product Support Analysis. It also suggests criteria for selection by the government of the activities to be performed. The entity acquiring the analysis data is required to carefully review their respective needs for data. This guidance provides the government an opportunity to specify the activities to be performed during the acquisition of a system based on the type of acquisition and the time within the system's life cycle. Application guidance and rationale for selecting activities and tailoring activity descriptions to fit the needs of a particular program are contained in this handbook. PSA is intended to be tailored for each type of activity to which it is applied.

5.8.2 Considerations. There are many different aspects to take into consideration when tailoring TA-STD-0017. The following items should be taken into consideration. These items are not all-inclusive.

5.8.3 Acquisition phase. The current Acquisition Phase will dictate which activities should be performed and which activities may be tailored out. For instance, during the MSA Phase, Task Analysis (Activity 12), may not need to be performed as a materiel solution has not yet been decided; therefore maintenance activities will not yet be known.

5.8.4 Unique manufacturing process. A goal of any acquisition is to keep costs at a minimum. Using standard or commonly used parts whenever possible improves system dependability and readiness, benefiting the user. Maximizing the use of DoD owned inventory, standard or commonly used parts whenever possible improves system dependability and readiness, benefiting the users. A single source of supply can be more expensive than if contractors have an incentive to lower prices based on competition. This can also result in delays of critical parts and cause system safety concerns for the user.

5.8.5 Technology. Opportunities to use technologies should always be a consideration to improve supportability (Activity 7). However, using technologies that are not mature may have more risks associated than those technologies that have a higher technology readiness level (TRL). Lower TRL levels may also cost more in terms of development time and money. For instance, considering the use of a new, unproven technology that has no previous DoD implementation, may require more testing for fit than a more mature technology. Associated with Product Support specifically, an unproven technology, may pose risks in developing maintenance plans and safety assessments.

5.8.6 Complexity. Complexity of the system often dictates how easy the system is to operate and maintain. Complex systems often have a higher price tag. Where possible, the government should evaluate trade-offs related to the complexity of the system in providing the best and most reliable system with the lowest price tag (Activity 11). The level of detail required in describing complex systems will vary depending on the amount of detail known on the new system/equipment's design, operational and support characteristics and the accuracy required in the estimates for new system/equipment parameters.

5.8.7 Criticality of performance. How critical the performance of the part is to availability plays a major role in determining which activities should be performed. For example, a FMECA (Activity 9.5) identifies the likely modes of failure, the possible effects of each failure, and the criticality of each effect on mission completion, system safety, environment, or some other outcome of significance. The determination of whether or not to perform a FMECA and when depends on the criticality of performance of the hardware and the current phase of the acquisition life cycle.

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5.8.8 Quantity/rate of production/price goals. Buying in bulk is often less expensive than buying small lots or single items. Buying in bulk also reduces the amount of time it takes to get a replacement part or tool to the warfighter as there are more parts in inventory at a given time. However, inventory can be costly if the parts become obsolete before they are used. Also the cost of storing parts is expensive, especially those items that must have special storage considerations. It is therefore important for evaluation of current and future needs in terms of availability and cost. (Activities 12.8, 12.11 and 14)

5.8.9 Product support concept. There are several possible scenarios for providing Product Support; PBL, Contractor Logistics Support (CLS), organic support, a mix of contractor and organic support, etc. The government's preferred approach for product support is PBL. In the case of a contractor only, it is called CLS. In the PBL product support, the government takes on a more managerial role and the contractor must provide the service dictated by a set of performance parameters rather than a contract that specifies actions. Tailoring of TA-STD-0017 for a PBL contract might include only contracting for updating the Product Support Strategy (Activity 1.3), providing a PSAP and updating as needed (Activities 2.1 and 2.2), providing Program and Design Review documentation and participation in meetings (Activity 3), etc.

5.8.10 Who performs tailoring. Tailoring is a team effort. The preceding paragraphs show both the government and the contractor participating in the tailoring. The government should also solicit participation from other interested parties, such as Technical Staff, Systems Engineering, Configuration Management, Quality Assurance, Test Personnel, Contracting and Contract Administration Personnel, Use Personnel, and Support Personnel. The team approach has significant benefits. It ensures that each organization affected by the contract has an opportunity to state its needs, and it takes advantage of the combined expertise of all participants. Ultimately, all final decisions about tailoring remain the responsibility of the government.

5.8.11 Why tailor. Tailoring invokes only those minimum requirements which are absolutely necessary for program success. Unnecessary requirements cause cost and schedule overruns and can ultimately cause a program to fail. The goal of tailoring is to evaluate program performance/execution risk against cost and schedule to determine those activities that are necessary for the program success and the user's safety. In making tailoring decisions, it is important to perform a risk analysis to balance near-term savings of cost and schedule against long-term risks.

5.8.11.1 DoD directed. DoDI 5000.02 authorizes Milestone Decision Authorities (MDAs) to tailor the regulatory information requirements and acquisition process procedures in this instruction to achieve cost, schedule, and performance goals.

5.8.11.2 Cost avoidance. Tailoring avoids unneeded activities, controls, and practices. It can also eliminate duplicative requirements that may be invoked when multiple standards are on contract. These measures result in cost avoidance.

5.8.11.3 Shorter schedules. By avoiding unnecessary requirements, projects can be performed more quickly and their products delivered and fielded sooner.

5.8.12 When is tailoring performed. Tailoring begins even before the acquisition cycle starts. During requirements development, the government will determine its needs based on the type of acquisition; Modification, Commercial Item, Non-developmental Item or Developmental Item, or Service. A developmental item may require more PSA activities be placed on-contract, than a Commercial Item. During the contracting process, more tailoring is performed through preparation of the Request for Proposal (RFP), during proposals and negotiations. Finally, throughout the performance of the contract, tailoring often continues as reexamination of the program requirements is recurring especially at major milestones. Tailoring is performed from requirements development through RFP, proposals, final offers, negotiations and throughout the project.

5.8.12.1 Contract requirements development. The key to a productive but cost effective analysis effort is the concentration of available resources on activities which most benefit the program. Such concentration might be called the analysis strategy. This involves the establishment of an analysis program which will evolve achievable supportability and support system objectives. The broad objectives of PSA are to influence hardware design, structure the most effective support concept, and to define product support resource requirements. These general objectives must be translated into more specific objectives for individual projects, particularly in early phases when

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maximum flexibility exists. Objectives are iterated and refined until they become firm program goals or requirements. Development of an analysis strategy is a very difficult task involving a large number of interacting variables. Strategy considerations and the possible impact of these variables must be addressed in the tailoring process. Analysis activities should be tailored and scheduled to meet project decision points. The guidance included here is designed to assist in the tailoring process; however, it is not all inclusive and requires adaptation to specific programs.

5.8.12.2 During RFP development and responses. Initial tailoring is often performed during preparation of a draft RFP as described in 5.8.12.1. The government assesses the program and its objectives and determines the necessary requirements from the PSA standard. The government then selects the appropriate DIDs to be included in the draft SOWs. The required standard should be referenced in the SOW. Experience has shown successful tailoring has included the government inviting potential contractors to submit recommendations, suggestions, or alternatives in preparation of the draft RFP. It is important to remember to start the tailoring process within the draft RFP and the tailoring will be more defined as the contract process is awarded. It is strongly recommended that the draft RFP requests feedback on the tailoring as well as on other aspects of the procurement. Any and all technical data rights should have been identified in the Technical Data Rights Strategy (TDRS) and should be a direct comparison between the TDRS and what is found in the RFP. During RFP response, prospective bidders should include proposed revisions to the draft RFP in their comments which further defines specific tailoring of requirements and the DIDs. This tailoring provides each prospective bidder's view as to the most cost-effective manner to perform the project given program requirements and the particular methods and tools used by that bidder. During the iteration process that is the RFP development, the RFP is often revised from the draft based on input from the prospective bidders. After reviewing all offers, the government develops a list that reflects the best of all of the offers. This best of breed RFP becomes the final RFP on which bidders will base their proposals.

5.8.12.3 During proposals and best and final offers. Bidders' proposals may contain additional or revised tailoring if permitted by the final RFP. In addition, bidders are often encouraged to suggest alternative standards and practices in place of military standards cited as requirements or guidance in the RFP. The amount and type of tailoring submitted in this step will depend upon how the procurement is worded. Often, the bidders may identify redundant requirements or requirements that were not previously identified. This is called tailoring down or tailoring up. Depending upon the procurement, bidders may perform additional tailoring with the presentation of their Best and Final Offers. Once the Best and Final Offer RFP is released, tailoring may still continue.

5.8.12.4 During contract negotiations and throughout the project. Additional tailoring may occur as part of contract negotiations with the winning bidder. By this stage of the contract negotiations the tailoring of the standard is at a very specific level. As the project proceeds, both the government and the contractor will learn more about the effort to be performed and the activities. It is expected that this ongoing learning experience will be reflected in revised tailoring of both TA-STD-0017 and DIDs. Reexamination is especially appropriate at significant project markers.

5.8.13 How is tailoring performed. The tailoring information provides the government an opportunity to specify the activities to be performed during the acquisition of a system based on the type of acquisition and the time within the system's life cycle. Individual activities contained in this document will be selected and the selected activity descriptions tailored to specific acquisition program characteristics and life cycle phase.

5.8.13.1 Tailoring standards, specifications and statements of work. As appropriate, an agency may tailor by evaluating each standard to delete, modify or add requirements. Located in Section C of the RFP is the SOW. The SOW indicates the activities to be performed by the contractor. TA-STD-0017 is the default standard for the acquisition of PSA data. 5.8.13.1.1 and 5.8.13.1.2 provide examples of using the SOW to tailor TA-STD-0017.

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5.8.13.1.1 Non modification of requirements. If the decision is not to modify an activity along with its associated sub-activities, as stated within TA-STD-0017, state the following in the SOW. CDRL A056 can be seen on FIGURE 3.

> "The contractor shall perform a Support System Alternative Analysis (Activity 10) in accordance with TA-STD-0017 including the five sub-activities on the ABCD System and be delivered IAW CDRL A056."

5.8.13.1.2 Modification of requirements. If it is decided to modify an activity and perform only a partial subset of the activities, state the following within the SOW. CDRL A056 can be seen on FIGURE 3.

> "The contractor shall perform a partial Support System Alternative Analysis (Activity 10) IAW TA-STD-0017, but shall only perform activities 10.1, 10.2, and 10.5 on the ABCD System and be delivered IAW CDRL A056."

5.8.13.2 Using CDRLs to tailor the DID. As appropriate, an agency may tailor Data Item Descriptions (DID) by deleting unnecessary requirements or modifying requirements in a manner that does not increase the workload. When PSA activities are performed by a contractor, activity documentation that is required for delivery to the government will be specified on the CDRL, DD Form 1423, with appropriate DID's being cited. The CDRL will identify data and information that the contractor will be obligated to deliver under the contract. DIDs are used to define and describe the data required to be furnished by the contractor. Applicable DIDs that describe the data resulting from performance of the PSA activities contained in TA-STD-0017 are identified in TABLE A-I. Each paragraph containing format and content instructions should be identified by number or letter to permit tailoring by reference. This is normally done by referencing appropriate paragraph identifiers in Block 16 of the CDRL for deletion or application. For example, if the requiring authority wants a System/Design Trade Study Report which only covers the tradeoff analysis results (Activity 11) or the data from only one of the tradeoff Activities (e.g., 11.7, Level of Repair Analysis), this can be accomplished through appropriate entries on the CDRL. By appropriately completing the CDRL and referencing only those paragraphs of the DID applicable to the deliverable, the requiring authority can structure the deliverable data products to cost effectively meet program requirements.

5.8.13.3 Relationship of the SOW to the CDRL and DID. The SOW establishes a specific work requirement. The associated CDRL orders delivery of data products, summaries, reports, products and other information and identifies due date(s), frequency for submission, distribution, tailoring requirements, etc. The DID provides the format and content requirements for a particular training data.

5.8.13.4 Tailoring DID. The DIDs for PSA vary. Several DIDs were created to accompany the standard while utilizing existing DIDs that currently satisfy the standards requirements. For example, DID-MISC-80711B (Scientific and Technical Reports) can be used as a summary for some of the analysis. While other analysis can be delivered in GEIA-STD-0007 format and use either DI-SESS-81758 (Logistics Product Data) for the data or DI-SESS-81759 (Logistics Product Data Summaries) for the summaries. Review each DID to identify applicable data formats. The CDRL (DD Form 1423) Block 16 is used to specify which format(s) is required for a specific application.

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5.8.13.4.1 Non modification of requirement. FIGURE 2 is an example of a CDRL with a DID that will place TA-STD-0017 Activity 10 on contract. The example is associated with SOW example in 5.8.13.1.1.

CONTRACT DATA REQUIREMENTS LIST *(1 Data Item)*								Form Approved OMB No. 0704-0188
Public reporting burden for this collection of information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA. 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503. Please DO NOT RETURN your form to either of these addresses. Send completed form to the Government Issuing Contracting Officer for Contract/PR No. listed in Block E.								
A. CONTRACT LINE ITEM NO.		B. EXHIBIT **A**		C. CATEGORY: TDP TM OTHER ADMIN/MGMT DATA				
D. SYSTEM/ITEM **ABCD System**			E. CONTRACT/PR NO. **W32T6H-12-E-0723**			F. CONTRACTOR **Rusty Nails, Inc.**		
1. DATA ITEM NO. **A056**	2. TITLE OF DATA ITEM **Technical Report – Study/Services**					3. SUBTITLE **Support System Alternatives Analysis**		
4. AUTHORITY *(Data Acquisition Document No* **DI-MISC-80508B**			5. CONTRACT REFERENCE **2.1**			6. REQUIRING OFFICE **AMXLS-AL**		
7. DD 250 REQ **N/A**	9.DIST STATEMENT REQUIRED **A**	10. FREQUENCY **ONE/R**		12. DATE OF FIRST SUBMISSION **14 DAC**		14. DISTRIBUTION		
8. APP CODE **A**		11. AS OF DATE **N/A**		13. DATE OF SUBSEQUENT SUBMISSION **AS NEEDED**		a. ADDRESSEE	b. Copies Draft	Final Reg / Final Repro
16. REMARKS: **Requires government approval. Deliver in digital form that is readable by Microsoft products.** **Deliver results of Activity 10 IAW TA-STD-0017**						**LOGSA ATM**	**0**	**1**
						15. TOTAL	**0**	**1** / **0**
G. PREPARED BY **Scot Motquin**		H. DATE 04 Jun 12		I. APPROVED BY **Greg Tarver**			J. DATE 12 Jun 12	

FIGURE 2. CDRL example, non modification of requirements

5.8.13.4.2 Modification of requirement. FIGURE 3 provides an example of a CDRL which contains a DID that will enable TA-STD-0017 Activity 10 to be placed on contract. The example is associated with SOW example in 5.8.13.1.2.

CONTRACT DATA REQUIREMENTS LIST *(1 Data Item)*								Form Approved OMB No. 0704-0188
Public reporting burden for this collection of information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA. 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503. Please DO NOT RETURN your form to either of these addresses. Send completed form to the Government Issuing Contracting Officer for Contract/PR No. listed in Block E.								
A. CONTRACT LINE ITEM NO.		B. EXHIBIT **A**		C. CATEGORY: TDP TM OTHER ADMIN/MGMT DATA				
D. SYSTEM/ITEM **ABCD System**			E. CONTRACT/PR NO. **W32T6H-12-E-0723**			F. CONTRACTOR **Rusty Nails, Inc.**		
1. DATA ITEM NO. **A056**	2. TITLE OF DATA ITEM **Technical Report – Study/Services**					3. SUBTITLE **Support System Alternatives Analysis**		
4. AUTHORITY *(Data Acquisition Document No* **DI-MISC-80508B**			5. CONTRACT REFERENCE **2.1**			6. REQUIRING OFFICE **AMXLS-AL**		
7. DD 250 REQ **N/A**	9.DIST STATEMENT REQUIRED **A**	10. FREQUENCY **ONE/R**		12. DATE OF FIRST SUBMISSION **14 DAC**		14. DISTRIBUTION		
8. APP CODE **A**		11. AS OF DATE **N/A**		13. DATE OF SUBSEQUENT SUBMISSION **AS NEEDED**		a. ADDRESSEE	b. Copies Draft	Final Reg / Final Repro
16. REMARKS: **Requires government approval. Deliver in digital form that is readable by Microsoft products.** **Tailor** **Deliver results of Activity 10.1, 10.2, & 10.5 IAW TA-STD-0017**						**LOGSA ATM**	**0**	**1**
						15. TOTAL	**0**	**1** / **0**
G. PREPARED BY **Scot Motquin**		H. DATE 04 Jun 12		I. APPROVED BY **Greg Tarver**			J. DATE 12 Jun 12	

FIGURE 3. CDRL example, modification of requirements

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5.8.13.5 During the acquisition life cycle. A systematic and comprehensive analysis should be conducted on an iterative basis through all phases of the system/equipment life cycle to satisfy sustainment objectives. The level of detail of the analyses and the timing of activity performance will be tailored to each system/equipment and will be responsive to program schedules and milestones. TABLE I should be used as a reference for identifying the TA-STD-0017 activities and activities listed on FIGURES 4 through 7.

TABLE I. TA-STD-0017 activity key

TA-STD-0017 Activity Key			
1	**Product Support Strategy**	**10**	**Support System Alternatives**
1.1	Develop Potential Supportability Objectives	10.1	Support Alternatives
1.2	Identification of Cost Drivers	10.2	Update Support Alternatives
1.3	Update the Product Support Strategy	10.3	Viable Support Plans
2	**Product Support Analysis Planning**	10.4	Updated Viable Support Plans
2.1	Product Support Analysis Plan	10.5	Support Plan Risks
2.2	Plan Update	**11**	**Evaluation Of Alternatives And Tradeoff Analysis**
3	**Program and Design Reviews**	11.1	Tradeoff Analysis
3.1	Design Review Procedures	11.2	New/critical Support Tradeoffs
3.2	Design Review	11.3	Design/Support Tradeoffs
3.3	Supportability and Supportability Related Design Reviews	11.4	Sensitivity of Support Tradeoffs
3.4	PSA Technical Interchange Meetings	11.5	Manpower/Personnel Tradeoffs
4	**Application Assessment**	11.6	Job/Duty Tradeoffs
4.1	Intended Use/Capabilities	11.7	Level of Repair Analysis
4.2	Quantitative Factors	11.8	Diagnostics Tradeoffs
4.3	Field Visits	11.9	BCS/New System Tradeoffs
4.4	Intended Use/Capabilities Report	11.10	Energy Tradeoffs
5	**Support System Standardization**	11.11	Damage/Repair Tradeoffs
5.1	Support Standardization Constraints	11.12	Transportability Tradeoffs
5.2	Standardization Costs	11.13	Facility Tradeoffs
5.3	Hardware/Software Standardization Approaches	**12**	**Task Analysis**
5.4	Standardization Risks	12.1	Task Analysis
6	**Comparative Analysis**	12.2	Document Task Analysis
6.1	Existing Products	12.3	New/Critical Resources
6.2	Baseline Comparative System	12.4	Training Requirements
6.3	BCS Logistics Requirements	12.5	Design Influence
6.4	BCS Qualitative Constraints	12.6	Risk Reduction
6.5	BCS Drivers	12.7	Transportability Analysis
6.6	Identify Subsystems With no BCS	12.8	Supply Support
6.7	BCS Updates	12.9	Logistics Products
6.8	BCS Risks	12.10	Task Analysis Updates
7	**Technological Opportunities**	12.11	Parts Screening
7.1	Identify Potential Technology	**13**	**Early Distribution Analysis**
7.2	Update Design Objectives	13.1	New Products Impacts
7.3	Technology Risks	13.2	Impacts on Manpower
8	**Supportability and Supportability Related Design Factors**	13.3	Readiness Impacts
8.1	Operations and Support Capabilities	13.4	Survivability Analyses
8.2	Sensitivity Analysis	13.5	Impact Solutions
8.3	Data Rights	**14**	**Diminishing Manufacturing Sources and Material Shortages Management (DMSMS) Obsolescence Analysis**
8.4	Capability Risks	14.1	DMSMS/Obsolescence
8.5	Key Performance Parameters	**15**	**Field Feedback**
8.6	Market Limitations	15.1	Feedback Sources
8.7	Update Key Performance Parameters	15.2	Feedback Analysis
9	**Functional Analysis**	**16**	**Disposal Analysis**
9.1	Identify Functions	16.1	Component Disposal
9.2	Unique Item Functions	16.2	Product Disposal
9.3	Function Drivers	**17**	**Operational Suitability Test, Evaluation, Verification And Validation**
9.4	Function Risks	17.1	Test Strategy
9.5	Failure Mode, Effects, and Criticality Analysis	17.2	Product Support Package
9.6	Fault Tree Analysis	17.3	Test Objectives/Resources
9.7	Reliability Centered Maintenance Analysis	17.4	Conduct Tests
9.8	Task Inventory	17.5	Analyze Test Results
9.9	Design Alternatives		
9.10	Function Updates		

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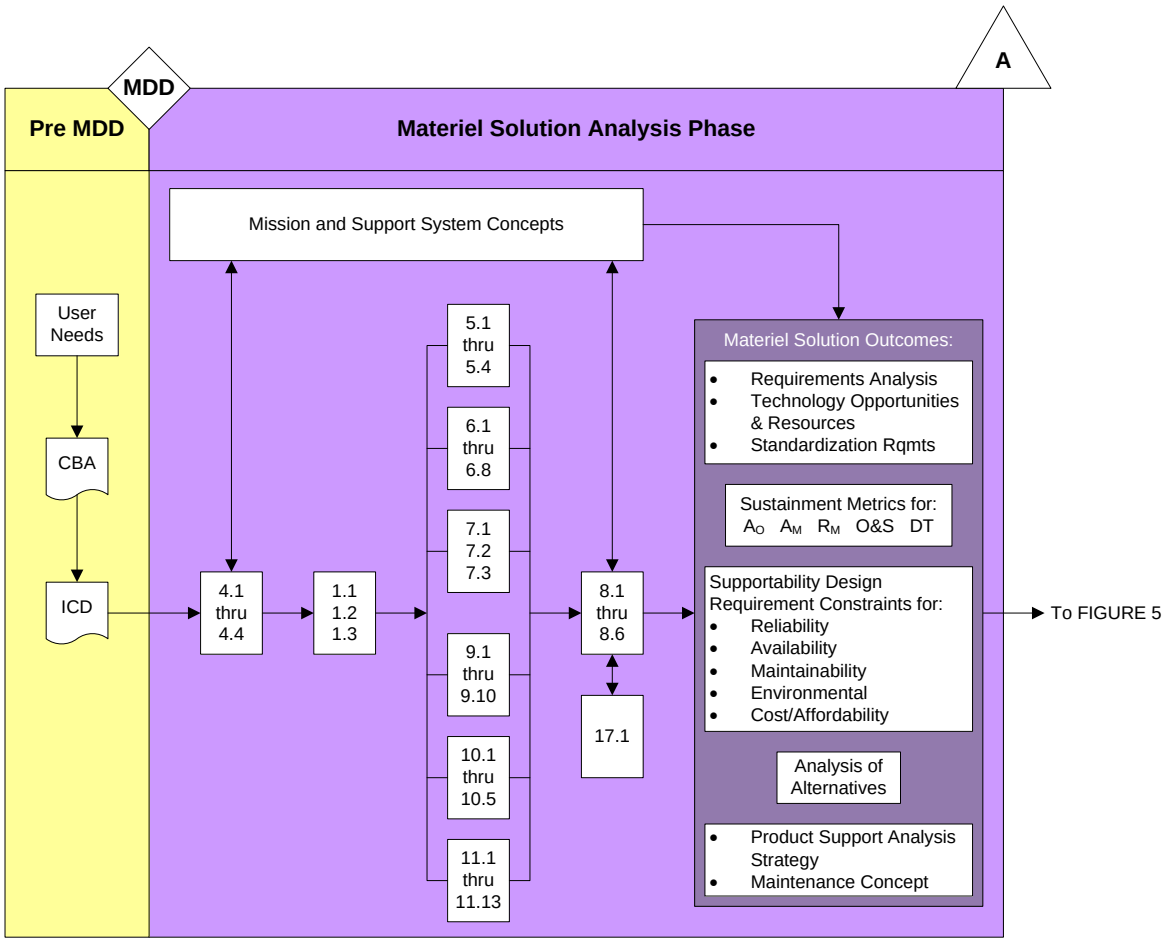
5.8.13.6 Conventional PSA process flow for the pre materiel development decision (MDD) and MSA phases. The decision to proceed into the MSA Phase is made during the Pre MDD Phase based upon the Capability-Based Assessment (CBA) and ICD. The ICD identifies a desired capability that is to be satisfied by the acquisition of a specific system/equipment. Entering the MSA phase is contingent upon approval of the Initial Capabilities Document (ICD). The MSA Phase will assess and recommend materiel solutions for the capability need identified in the ICD. Along with the approval of the materiel solution to the capability need in the ICD, Milestone A approves entry into the TD Phase. This is accomplished by stepping through Activities 4 and 1 prior to beginning the initial set of parallel Activities (5, 6, 7, 9, 10 and 11). This is followed by the iterative process contained between Activities 8 and 17. It should be noted that Activity 3 is a management activity that is an integral part of the PSA process though not shown in FIGURE 4. Each one of the activities, indicated by the boxes in FIGURE 4, can be tailored even further to fit the program needs.



NOTE:

1. Activities 9.5, 9.6, and 9.7 may be deferred to the TD Phase.

FIGURE 4. Conventional PSA process flow for Pre MDD and MSA phases

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5.8.13.7 Conventional PSA process flow for the TD phase. The TD Phase is initiated by a successful Milestone A decision. The goal of the TD Phase is to reduce technology cost and schedule risk, demonstrate critical technology through competitive prototyping, complete preliminary design and determine the appropriate set of technologies to be integrated into the full system. To proceed to the next phase, the TD Phase should demonstrate the technology in a relevant environment and identify manufacturing risks. An approved CDD is also necessary to proceed beyond Milestone B.

5.8.13.7.1 Tailoring during the TD phase. This process begins with Activities 1, 2 and 4 prior to updating the set of parallel Activities (5, 6, 7, 9, 10 and 11) to account for any changes. Activity 12 follows the parallel set and leads into another parallel set of Activities (14 and 16). The iterative process contained between Activities 8 and 17 is next. It should be noted that Activity 13 is not performed in the TD Phase. However, it will be performed in the EMD Phase. It should be noted that Activity 3 is a management activity that is an integral part of the PSA process though not shown on Figure 5. Again, each one of the activities indicated by the boxes on Figure 5 can be tailored even further to fit program needs.

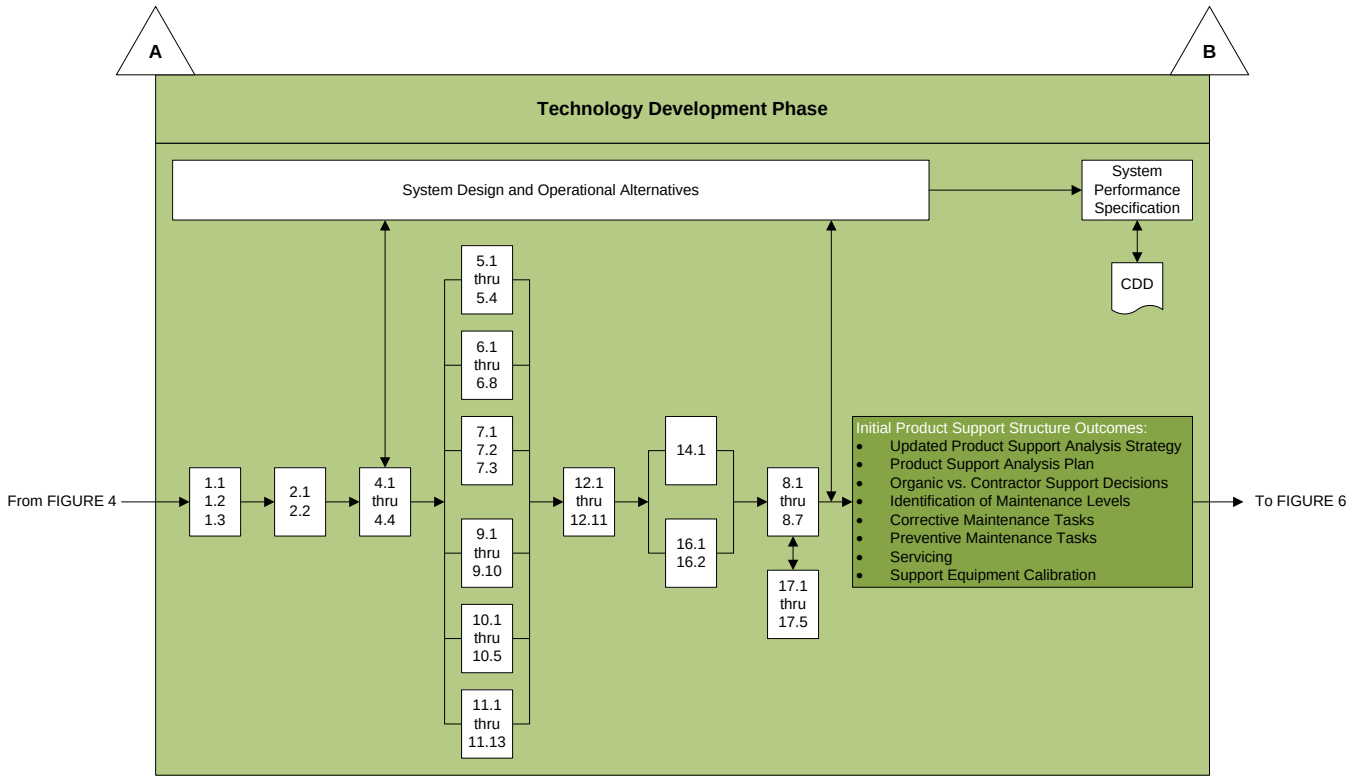

FIGURE 5. Conventional PSA process flow for TD phase

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5.8.13.8 Conventional PSA process flow for the EMD phase. The EMD Phase is initiated by a successful Milestone B decision and normally serves as the formal program initiation. Guided by the CDD, the purpose of the EMD Phase is to develop the Product Support Package; complete the development of a system or increment of capability, leveraging design considerations; complete full system integration; develop affordable and executable manufacturing processes; and complete system fabrication, test and evaluation. A key emphasis during EMD is to ensure operational supportability with particular attention to minimizing the logistics footprint. Before proceeding beyond Milestone C, an approved CPD is required.

5.8.13.8.1 Tailoring during the EMD phase. The activities conducted in the EMD Phase mirror those conducted previously in the TD Phase with the addition of Activity 13. Activity 13 is performed in parallel with Activity 12 during the EMD Phase. It should be noted that Activity 3 is a management activity that is an integral part of the PSA process though not shown in Figure 6.

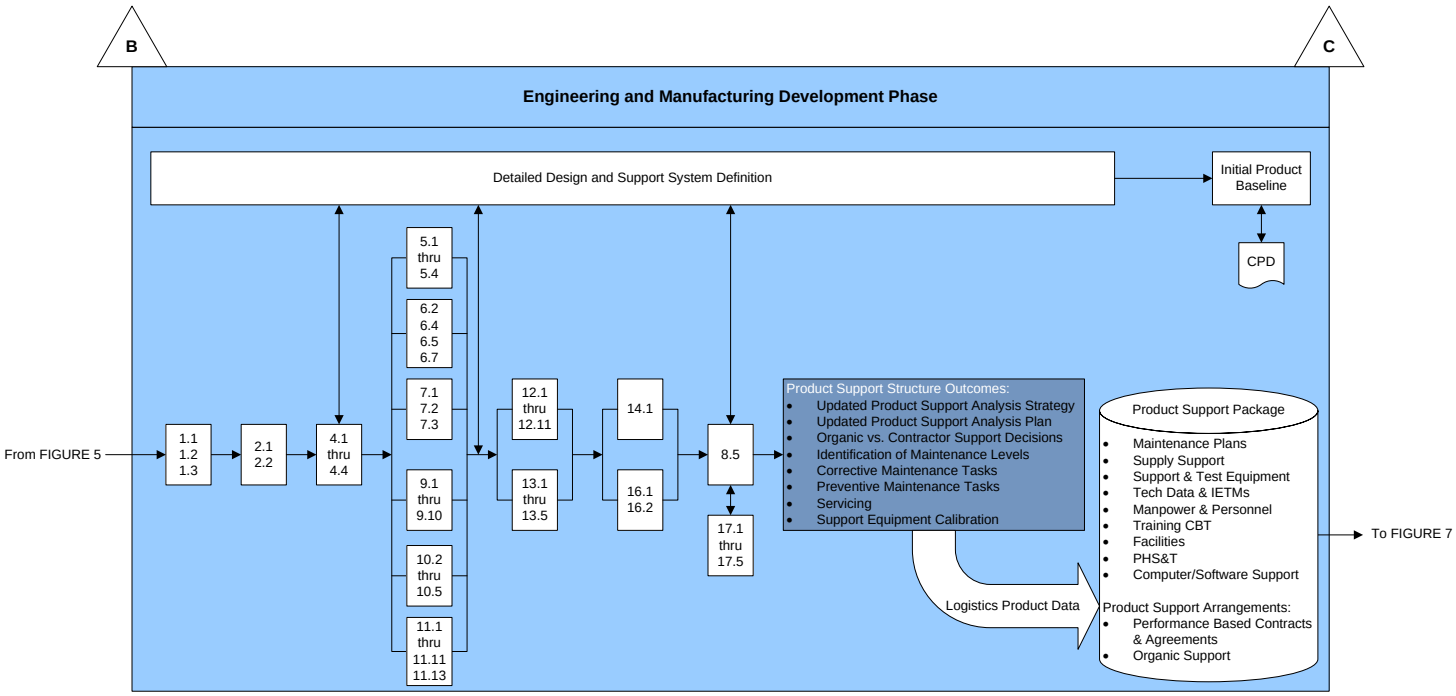

FIGURE 6. Conventional PSA process flow for EMD phase

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5.8.13.9 Conventional PSA process flow for the P&D and O&S phases. The P&D Phase is initiated by a successful Milestone C decision. With an approved CPD, the P&D Phase is designed to achieve an operational capability that satisfies the mission need. The P&D Phase shares some activities with the subsequent O&S Phase. The O&S Phase is to execute a support program that meets materiel readiness and operational support performance requirements to sustain the system/equipment in the most cost-effective manner over its life cycle.

5.8.13.9.1 Tailoring during P&D and O&S phases. The process begins with an update to Activity 5 followed by Activity 8. Activities 9, 10 and 12 are then conducted. Activities 9 and 12 also feed the logistics product database. The next Activities (11 and 17) are performed in an iterative manner and provide updated information back to Activity 9. This loop generated by the process flow from Activities 9 thru 12, the iterations between 11 and 17, and the resulting update to Activity 9, serves to not only keep the logistics product database current, but also to update the Product Support Package. In addition to updating the Product Support Package, this loop works to update the package as changes are made to the design of the system/equipment. Once the Product Support Package is finalized, the next set of parallel Activities (13 through 16) can be completed. The last activity to be addressed is the final update of Activity 17. It should be noted that Activity 3 is a management activity that is an integral part of the PSA process though not shown in FIGURE 7. Again each one of the activities, indicated by the boxes in FIGURE 7, can be tailored even further to fit the program needs.

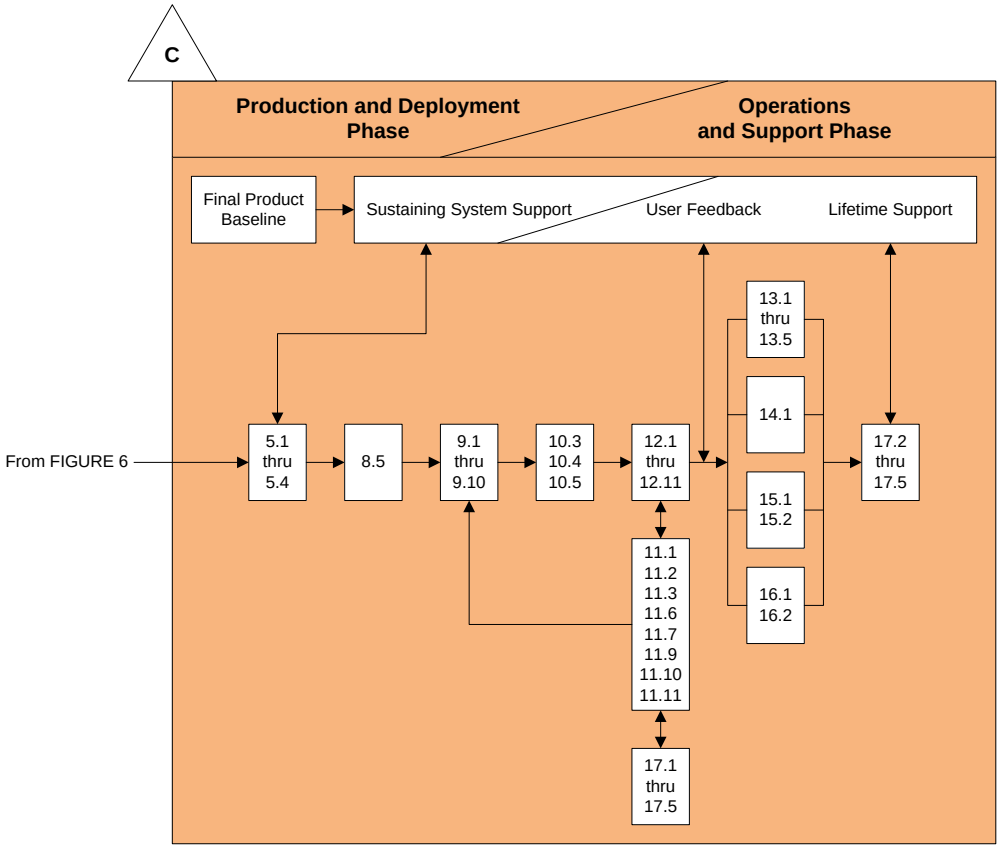

FIGURE 7. Conventional PSA process flow for P&D and O&S phase

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5.8.14 Tailoring specific sub-activities. Selection of analysis requirements should take place at the sub-activity level since the sub-activities are generally written for specific phases and types of programs. The rationale for selecting particular sub-activities involves a wide range of considerations.

5.8.14.1 Activity selection. TABLES II - XXXI identify activities applicable by phase of development and engineering activity. The guidance in TABLES II - XXXI may require adjustment for specific acquisition programs since it is based on typical theoretical programs, and since it is not unusual for some aspects of a development program to be in one phase and other aspects in another. The determination of which activities to use requires more than an assessment of which analysis satisfies which PSA activities. The entire spectrum of the activity as it relates to the system under analysis and the intended location at which the activity will be used, should be evaluated. To aid in this process, 5.8.14.2 through 5.8.14.11are provided as examples of what should be asked prior to a decision on which activity should be used.

5.8.14.2 Amount of design freedom. The amount of design freedom is a key consideration in sub-activity selection. Design freedom is related to program considerations such as phasing. The objective of most of the front-end analysis sub-activities is to influence selection of design characteristics to achieve improvements in readiness, supportability, and cost. If the design is fixed, there may be little benefit from doing these activities. Product improvement might limit design freedom to specific subsystems unless areas of no or minor change are open to redesign opportunity to reduce product support burdens. Fast track programs tend to move up or back various possible analysis sub-activities, but fast track programs also tend to use existing technology and plan on preplanned product improvement rather than employ new technology. The point of design freedom thus shifts. Design freedom may exist for the support system but not the mission system. PSA effort and objectives should be focused accordingly. The PSA objective of causing supportability requirements to be an integral part of the design can best be achieved if designers are oriented toward supportability objectives commencing with the design effort. Technical information generated and documented during the design process will be disseminated among designers and supportability specialists to surface interface problems between design concepts and operators, maintainers, and support equipment technicians. Technical design information such as diagnostic features, electro/mechanical interfaces, reliability estimates, item functions, adjustment requirements, and connector and pin assignments, which determines supportability, should be an integral part of design documentation. When design freedom exists, the performing activity's PSA plan should describe the generation, control, and approval of this type of information.

5.8.14.3 Work already performed. Work already accomplished can impact sub-activity selection. Activities such as comparative analysis, cost and readiness driver identification, and improvement initiatives may already have been done as inputs to the preparation of program initiation or other requirements documents. The quality of this work should be assessed. If adequate, it may need updating rather than a complete revision. Likewise, program initiation or other requirements documents may prescribe objectives or constraints which tend to bound the scope of the analysis effort. However, it is essential to test the realism of such constraints or objectives and the analysis which supported their specification prior to accepting them.

5.8.14.4 Assumptions and constraints. Assumptions are factors believed to be true, but not confirmed. Constraints can be business or technical in nature and are defined as restrictions or limitations on possible solutions. The budget, time restrictions, and technical architecture decisions are all examples of constraints. Assumptions add risk to a project since it is possible that they will turn out to be false. Assumptions can impact any part of the project life cycle and resulting solution implementation, so it is important to document and analyze them. Business constraints limit the solution based upon the current organizational state. They usually focus on the available time, money and resources for a project. Common business constraints include budget and time restrictions, resource limitations, and resource skill limitations. Technical constraints often focus on decisions that limit your solution design. They tend to be inflexible and unchanging, and can have an impact on your solution implementation. They include areas such as hardware, other infrastructure, and software that should be used for the project.

5.8.14.5 Limitations of the activity. Not all activities are performed in each phase of the life cycle. For example, Develop Potential Supportability Objectives, Activity 1.1, is typically performed in the MSA Phase or the TD Phase. This task is not typically performed during the EMD Phase or the P&D Phase. Also, some activities are applied differently during different phases as data and documentation is updated through the life cycle. See 5.8.14.11, Focusing.

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5.8.14.6 Quantity and accuracy of data/documentation. Documentation or recording of data should coincide with the generation of such data in the design and analysis sequences that such data will not have to be recreated at added expense at a later date. Delivery of data should be postponed until actual need date to acquire data in its most complete form without repetitive updates. Additionally, availability and accuracy of data can be costly. For example, poorly prepared or inaccurate schematics will increase the cost of technical manuals.

5.8.14.7 Cost. If program funds are short, it may be possible to perform some activities, such as early scoping of the analysis effort, comparative analysis, and driver identification, by use of in-house capabilities. Another possible approach when funds are short is to capitalize on the interrelationships between some activities. For example, the comparative analysis feeds driver identification, which in turn feeds selection of targets for improvement. If for some reason only one of these activities could be afforded, then the targets for improvement would be the logical pick of the three. Such an approach obviously loses precision since judgments are substituted for hard data on the deleted activities. It should, therefore, be employed only as a last resort. If the in-house capability is limited but funds are available, such activities might also be accomplished by "study" contractors with special expertise.

5.8.14.8 Past experience and historical data. The availability, accuracy, and relevancy of experience and historical databases on similar existing systems is crucial for accomplishment of some activities in this standard. Available databases should be examined to determine if extensive work is needed to provide focus or relevancy. If such databases are not available, a special "sample data" effort should be considered, particularly if the needed data is in an area of possible high leverage.

5.8.14.9 Time and resources available. To influence design, product support analyses require time and resources. Do not specify an activity whose results would not be available in time to affect design unless the potential improvement can be scheduled as part of a preplanned product improvement. "Fast track" programs, as their name implies, tend to reduce the time to do "design influence" analysis activities. A possible offset to time restrictions is the accomplishment of some analysis activity off-line as "off-the-shelf" assets to be employed at the appropriate time. The accomplishment of "design influence" product support analyses requires resources in the form of people and money. It is DoD policy to fund readiness and support considerations in the front end of programs. Nevertheless, resources are constrained in practice.

5.8.14.10 Contracting considerations. The requiring authority should initially decide and specify the PSA activities that are to be done solely by the government or independent agency, those that are to be shared between the government and the system/equipment developer, and those that are to be performed solely by the system/equipment developer. Once done, the PSA portion of the contracting plan can be developed and work requirements written into the procurement documentation. It is very useful to allow the prospective performing activities, under the bidding terms of the procurement, to recommend adding or deleting PSA activities and to provide a more detailed activity definition and schedule. Additionally, prospective performing activities should be encouraged to make use of cost effective data generation procedures. The prospective performing activity's tailoring process and cost reduction efforts should become a factor in the assessment of its capability to perform the PSA program. Acquisition program objectives must be considered in preparing procurement documents. For example, in a technology demonstration procurement, one may specifically exclude certain PSA activity requirements. Supportability objectives for this type of procurement would best be served through design influence and generation of a PSA database for subsequent detailed analysis effort when the technology is utilized. If the acquisition program is oriented to develop and procure a system/equipment, then other PSA activities become equally important. The nature of the procurement may force the performing activity to do some analysis activity to make a rational bid. More procurement considerations are discussed in Section 6.

5.8.14.11 Focusing. After the initial selection of activities is completed, further focusing is needed to concentrate effort in high leverage areas and to specify other requirements. Often 10-20% of the subsystems control 80-90% of the support demands. Some Activity 11 evaluations and tradeoffs are very general and would benefit from greater specificity to focus on key areas. Models and definitions, particularly for life cycle cost, to be used for a particular analysis should be specified, if possible, especially if there is competition. Considerations under focusing should include:

a. Modification or restriction of the sub-activity to significant areas.

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b. Specification of sub-activities such that they can easily be assigned to the most appropriate community.

c. Specification of models and associated data to be used.

d. Specification of areas or activity requiring requester approval. The requiring authority should be as specific as possible in defining analysis needs for activities under the activity input to be specified.

5.8.14.12 Activity tailoring decision guide. FIGURE 8 portrays a general tailoring logic tree which should be followed in selecting activities. The initial selection of activities can be adjusted for the amount of design freedom and time phasing adjustments if program is "fast track."

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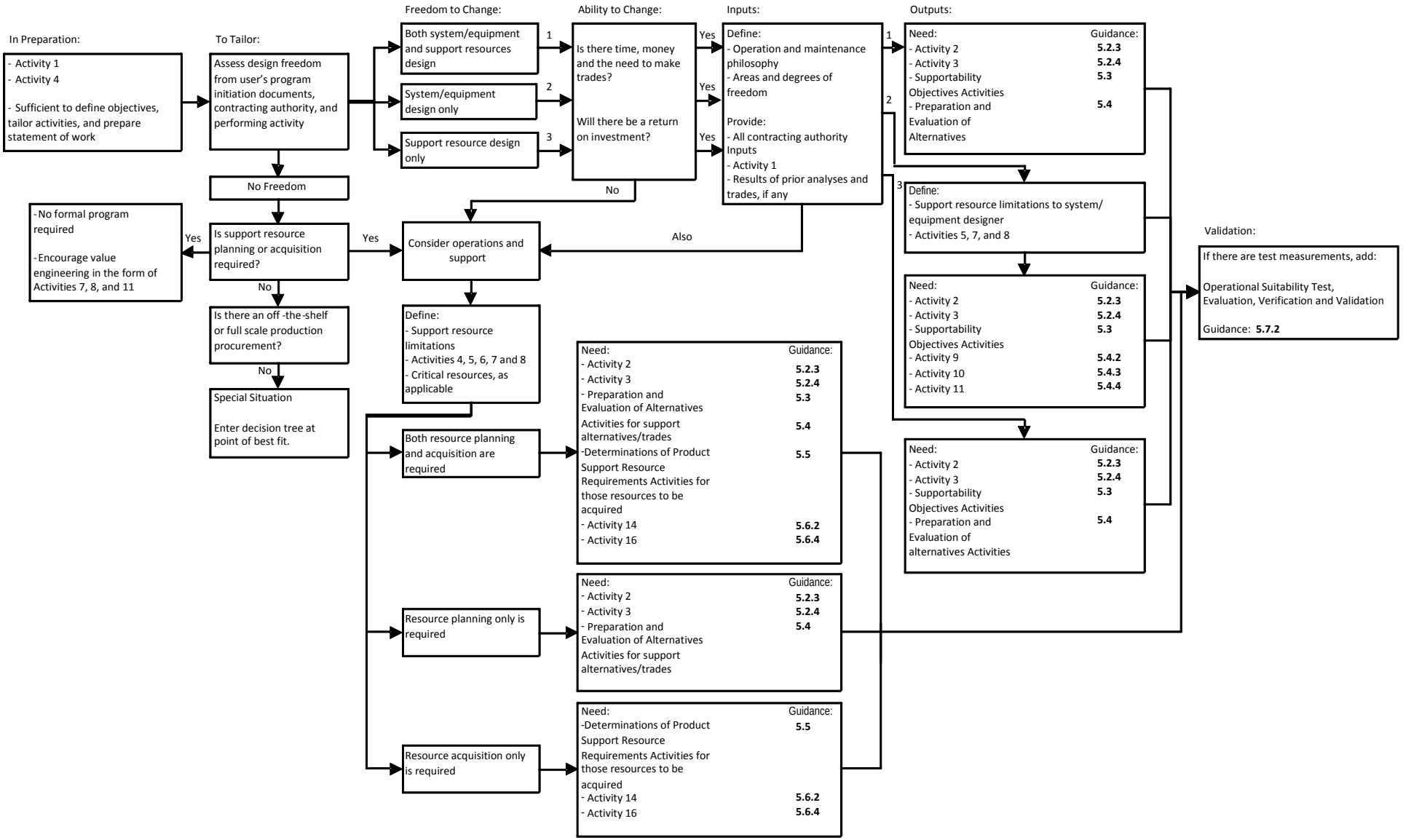

FIGURE 8. Activity tailoring decision guide

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5.8.15 Tailoring tables. TABLE II – TABLE XXXI are matrices to enable the government to determine which Product Support Analyses the contractor will execute for a particular system depending on the type of acquisition and life cycle phase. These tables are a starting point. Again, the government should evaluate every input, criteria, complexity, cost, timing, and output of each activity and sub-activity to identify activities that are necessary or not, depending on program needs.

5.8.15.1 Understanding the tailoring tables. On the left-hand side of the matrix are the PSA activities. On the top of the matrix is the type of acquisition; modification, commercial item, non development item and a development item. Each table is divided into the phase of the life cycle: MSA, TD, EMD, and O&S. Based on the acquisition, life cycle phase, and activity, a series of two letters will be contained. The first letter will indicate if the activity should or should not be performed. The second letter indicates who is the overall responsible for performing the activity. The letter “E” indicates the activities are “essential” in performing. The letters “NR” indicates the activities are “not required” and for that particular case. The letter “T” indicates the activity is “tailorable” and depending on the government individual requirements will depend if the activity will be preformed. The letter “C” indicates that the contractor is responsible for the activity and that activity will be placed on contract. The letter “G” indicates that the government is responsible for the activity. The letter "O" indicates that either the government or contractor will perform activity depending on the situation. The letter "J" indicates that both the government and contractor will perform the activity together. To help illustrate tailoring of the activities using the tables for guidance, we have provided a few in the proceeding paragraphs.

5.8.15.2 Activity selection for PSA management, surveillance, and control. TABLE II - TABLE VI are provided to guide users through choosing activities during PSA management, surveillance, and control.

5.8.15.2.1 Activity tailoring example 1. At the beginning of any system (modification, commercial item, non-developmental item, or developmental item) it is essential that the Product Support Strategy is developed. Initially, the potential supportability objectives are developed (Activity 1.1), Cost Drivers are identified (Activity 1.2), and the Product Support Strategy is updated (Activity 1.3). The outputs of these activities are extremely valuable in developing the Product Support Strategy. For our example, imagine we are modifying an existing system and we are writing a contract to provide supportability for our modification. We would check TABLE II to see if a Product Support Strategy is necessary for a modification and who would perform Activity 1, Product Support Strategy. Looking at TABLE II and TABLE III, we can see that Activities 1.1 through 1.3 are all essential as indicated by the “E” next to the activity. We can also see that Activities 1.1 and 1.2 are performed by the government as indicated by the “G”. We can also see that later in the MSA Phase, Activity 1.3, Update the PSAP, while essential, it is typically performed by both government and contract as indicated by the “J” (Joint).

TABLE II. PSA management, surveillance, and control in the MSA phase (Activities 1 through 3)

MATERIEL SOLUTION ANALYSIS PHASE					
NUMBER	PSA MANAGEMENT, SURVEILLANCE, & CONTROL ACTIVITIES	MOD	COM	NDI	DEV
1	PRODUCT SUPPORT STRATEGY				
1.1	Develop Potential Supportability Objectives	E, G	E, G	E, G	E, G
1.2	Identification of Cost Drivers	E, G	E, G	E, G	E, G
1.3	Update the Product Support Strategy	E, J	E, J	E, J	E, J
2	PRODUCT SUPPORT ANALYSIS PLANNING				
2.1	Product Support Analysis (PSA) Plan	NR	NR	NR	NR
2.2	Update PSA Plan	NR	NR	NR	NR
3	PROGRAM AND DESIGN REVIEWS				
3.1	Design Review Procedures	T, G	T, G	T, G	T, G
3.2	Design Reviews	E, G	E, G	E, G	E, G
3.3	Supportability and Supportability Related Design Reviews	T, G	T, G	T, G	T, G
3.4	PSA Technical Interchange Meetings	T, G	T, G	T, G	T, G
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

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5.8.15.2.2 Activity tailoring example 2. As a program enters the TD Phase, on a modification of an existing system, the Logistics Engineer (LE) may require a PSAP (Activity 2.1). The PSAP describes how the PSA program will be conducted to meet program requirements. However, it may not be prudent to require a PSAP for a modification; the existing PSAP for the initial development maybe sufficient or the modification may not be significant enough to warrant a new PSAP. In this case, the LE would not place activity 2.1 on contract and may instead require an updated PSAP, (Activity 2.2.) Using the tailoring TABLE III, we can see that in the TD Phase, under MOD (modification), a "T" and "C" are in the row next to PSAP and Update PSAP. The "T" indicates this activity is tailorable and the C indicates the contractor typically performs this activity.

TABLE III. PSA management, surveillance, and control in the TD phase (Activities 1 through 3)

TECHNOLOGY DEVELOPMENT PHASE					
NUMBER	PSA MANAGEMENT, SURVEILLANCE, & CONTROL ACTIVITIES	MOD	COM	NDI	DEV
1	PRODUCT SUPPORT STRATEGY				
1.1	Develop Potential Supportability Objectives	NR	NR	NR	NR
1.2	Identification of Cost Drivers	NR	NR	NR	NR
1.3	Update the Product Support Strategy	E, G	E, J	E, O	E, J
2	PRODUCT SUPPORT ANALYSIS PLANNING				
2.1	Product Support Analysis Plan (PSAP)	T, C	NR	NR	T, C
2.2	Update PSA Plan	T, C	NR	NR	T, C
3	PROGRAM AND DESIGN REVIEWS				
3.1	Design Review Procedures	T, O	T, O	T, O	T, O
3.2	Design Reviews	T, J	T, J	T,C	T, J
3.3	Supportability and Supportability Related Design Reviews	T, J	T, J	T, J	T, J
3.4	PSA Technical Interchange Meetings	T, J	T, J	T, J	T, J
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

5.8.15.2.3 Activity tailoring example 3. Continuing our example of a modification to an existing system, we are now writing our contract for the EMD Phase. We are trying to determine which Program and Design Reviews should be performed and by whom. The Program and Design Reviews establish a requirement for the contractor to plan and provide for official review and control of released design information with PSA program participation in a timely and controlled manner and to assure that the PSA program is proceeding in accordance with the contractual milestones so that the supportability and supportability related design requirements will be achieved. Design Review procedures (Activity 3.1) establish and document design review procedures (where procedures do not already exist) which provide for official review and control of released design information with PSA program participation in a timely and controlled manner. For our modification, our current Design Review Procedures may be sufficient and may not require changes. However, Design Reviews, Supportability and Supportability Related Design Reviews and especially PSA Technical Interchange Meetings (Activities 3.1 through 3.4) may be needed in identifying any changes to the product support and to ensure the system is in track for schedule, cost and performance. Using TABLE IV, we can see that under and MOD, Activities 3.1 - 3.4 are tailorable as indicated by the "T". Additionally, Activity 3.1, Design Review Procedures, when performed is typically performed by either government or contractor – "O". However, for Activities 3.2 - 3.4, the government plays are larger role in these reviews as these activities are performed jointly by the government and contractor.

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TABLE IV. PSA management, surveillance, and control in the EMD phase (Activities 1 through 3)

ENGINEERING & MANUFACTURING DEV PHASE					
NUMBER	PSA MANAGEMENT, SURVEILLANCE, & CONTROL ACTIVITIES	MOD	COM	NDI	DEV
1	PRODUCT SUPPORT STRATEGY				
1.1	Develop Potential Supportability Objectives	NR	NR	NR	NR
1.2	Identification of Cost Drivers	NR	NR	NR	NR
1.3	Update the Product Support Strategy	T, J	T, J	T, J	T, J
2	PRODUCT SUPPORT ANALYSIS PLANNING				
2.1	Product Support Analysis Plan (PSAP)	NR	NR	NR	NR
2.2	Update PSA Plan	T, C	NR	NR	T, C
3	PROGRAM AND DESIGN REVIEWS				
3.1	Design Review Procedures	T, O	NR	NR	T, O
3.2	Design Reviews	T, J	T, J	T, J	T, J
3.3	Supportability and Supportability Related Design Reviews	T, J	NR	NR	T, J
3.4	PSA Technical Interchange Meetings	T, J	T, J	T, J	T, J
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

TABLE V. PSA management, surveillance, and control in the P&D phase (Activities 1 through 3)

PRODUCTION & DEPLOYMENT PHASE					
NUMBER	PSA MANAGEMENT, SURVEILLANCE, & CONTROL ACTIVITIES	MOD	COM	NDI	DEV
1	PRODUCT SUPPORT STRATEGY				
1.1	Develop Potential Supportability Objectives	NR	NR	NR	NR
1.2	Identification of Cost Drivers	NR	NR	NR	NR
1.3	Update the Product Support Strategy	T, J	T, J	T, J	T, J
2	PRODUCT SUPPORT ANALYSIS PLANNING				
2.1	Product Support Analysis Plan (PSAP)	NR	NR	NR	NR
2.2	Update PSA Plan	T, C	NR	NR	T, C
3	PROGRAM AND DESIGN REVIEWS				
3.1	Design Review Procedures	T, O	NR	NR	T, O
3.2	Design Reviews	T, J	T, J	T, J	T, J
3.3	Supportability and Supportability Related Design Reviews	T, J	NR	NR	T, J
3.4	PSA Technical Interchange Meetings	T, J	T, J	T, J	T, J
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

TABLE VI. PSA management, surveillance, and control in the O&S phase (Activities 1 through 3)

OPERATIONS & SUPPORT PHASE					
NUMBER	PSA MANAGEMENT, SURVEILLANCE, & CONTROL ACTIVITIES	MOD	COM	NDI	DEV
1	PRODUCT SUPPORT STRATEGY				
1.1	Develop Potential Supportability Objectives	NR	NR	NR	NR
1.2	Identification of Cost Drivers	NR	NR	NR	NR
1.3	Update the Product Support Strategy	T, J	NR	NR	T, J
2	PRODUCT SUPPORT ANALYSIS PLANNING				
2.1	Product Support Analysis Plan (PSAP)	NR	NR	NR	NR
2.2	Update PSA Plan	T, C	NR	NR	T, C
3	PROGRAM AND DESIGN REVIEWS				
3.1	Design Review Procedures	NR	NR	NR	NR
3.2	Design Reviews	NR	NR	NR	NR
3.3	Supportability and Supportability Related Design Reviews	NR	NR	NR	NR
3.4	PSA Technical Interchange Meetings	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

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5.8.15.3 Activity selection for supportability objectives. TABLE VII - TABLE XI are provided to guide users through choosing activities for supportability objectives.

TABLE VII. Supportability objectives in the MSA phase (Activities 4 through 8)

MATERIEL SOLUTION ANALYSIS PHASE					
Number	SUPPORTABILITY OBJECTIVES ACTIVITIES	MOD	COM	NDI	DEV
4	APPLICATION ASSESSMENT				
4.1	Intended Use/Capabilities	E, G	E, G	E, G	E, G
4.2	Quantitative Factors	E, G	E, G	E, G	E, G
4.3	Field Visits	E, O	E, O	E, O	E, O
4.4	Intended Use/Capabilities Reports	E, O	E, O	E, O	E, O
5	SUPPORT SYSTEM STANDARDIZATION				
5.1	Support Standardization Constraints	E, G	E, G	E, G	E, G
5.2	Standardization Costs	E, G	E, G	E, G	E, G
5.3	Hardware/Software Standardization Approaches	E, G	E, G	E, G	E, G
5.4	Standardization Risks	E, G	E, G	E, G	E, G
6	COMPARATIVE ANALYSIS				
6.1	Existing Systems	E, O	E, G	E, G	E, O
6.2	Baseline Comparative System (BCS)	E, O	E, G	E, G	E, O
6.3	BCS Logistics Requirements	E, O	E, G	E, G	E, O
6.4	BCS Qualitative Constraints	E, O	E, G	E, G	E, O
6.5	BCS Drivers	E, O	E, G	E, G	E, O
6.6	Identify Subsystems With no BCS	E, O	E, G	E, G	E, O
6.7	BCS Updates	E, O	E, G	E, G	E, O
6.8	BCS Risks	E, O	E, G	E, G	E, O
7	TECHNOLOGICAL OPPORTUNITIES				
7.1	Identify Potential Technology	E, J	E, J	E, J	E, J
7.2	Update Design Objectives	E, J	E, J	E, J	E, J
7.3	Technology Risks	E, J	E, J	E, J	E, J
8	SUPPORTABILITY AND SUPPORTABILITY RELATED DESIGN FACTORS				
8.1	Operations and Support Capabilities	E, O	E, O	E, O	E, O
8.2	Sensitivity Analysis	E, O	E, O	E, O	E, O
8.3	Data Rights	E, J	E, J	E, J	E, O
8.4	Capability Risks	E, G	E, G	E, G	E, G
8.5	Key Performance Parameters	NR	E, G	E, G	NR
8.6	Market Limitations	E, G	E, G	E, G	E, G
8.7	Update Key Performance Parameters	NR	E, O	E, G	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

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TABLE VIII. Supportability objectives in the TD phase (Activities 4 through 8)

TECHNOLOGY DEVELOPMENT PHASE					
Number	SUPPORTABILITY OBJECTIVES ACTIVITIES	MOD	COM	NDI	DEV
4	APPLICATION ASSESSMENT				
4.1	Intended Use/Capabilities	E, G	NR	NR	E, G
4.2	Quantitative Factors	E, G	NR	NR	E, G
4.3	Field Visits	E, O	NR	NR	E, O
4.4	Intended Use/Capabilities Reports	E, O	NR	NR	E, O
5	SUPPORT SYSTEM STANDARDIZATION				
5.1	Support Standardization Constraints	T, C	NR	T, C	E, C
5.2	Standardization Costs	T, C	NR	T, C	E, C
5.3	Hardware/Software Standardization Approaches	T, C	NR	T, C	E, C
5.4	Standardization Risks	T, C	NR	T, C	E, C
6	COMPARATIVE ANALYSIS				
6.1	Existing Systems	E, G	NR	NR	E, O
6.2	Baseline Comparative System (BCS)	E, G	NR	NR	E, O
6.3	BCS Logistics Requirements	E, G	NR	NR	E, O
6.4	BCS Qualitative Constraints	E, G	NR	NR	E, O
6.5	BCS Drivers	E, G	NR	NR	E, O
6.6	Identify Subsystems With no BCS	E, G	NR	NR	E, O
6.7	BCS Updates	E, G	NR	NR	E, O
6.8	BCS Risks	E, G	NR	NR	E, O
7	TECHNOLOGICAL OPPORTUNITIES				
7.1	Identify Potential Technology	E, J	E, J	E, J	E, J
7.2	Update Design Objectives	E, J	E, J	E, J	E, J
7.3	Technology Risks	E, J	E, J	E, J	E, J
8	SUPPORTABILITY AND SUPPORTABILITY RELATED DESIGN FACTORS				
8.1	Operations and Support Capabilities	E, O	NR	NR	E, O
8.2	Sensitivity Analysis	E, O	NR	NR	E, O
8	SUPPORTABILITY AND SUPPORTABILITY RELATED DESIGN FACTORS				
8.3	Data Rights	E, J	E,G	E,G	E, J
8.4	Capability Risks	E, G	NR	NR	E, G
8.5	Key Performance Parameters	E, G	NR	NR	E, G
8.6	Market Limitations	E, G	NR	NR	E, G
8.7	Update Key Performance Parameters	E, G	NR	NR	E, G
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

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TABLE IX. Supportability objectives in the EMD phase (Activities 4 through 8)

ENGINEERING & MANUFACTURING DEVELOPMENT PHASE					
Number	SUPPORTABILITY OBJECTIVES ACTIVITIES	MOD	COM	NDI	DEV
4	APPLICATION ASSESSMENT				
4.1	Intended Use/Capabilities	T, O	NR	NR	T, O
4.2	Quantitative Factors	T, O	NR	NR	T, O
4.3	Field Visits	T, O	NR	NR	T, O
4.4	Intended Use/Capabilities Reports	T, O	NR	NR	T, O
5	SUPPORT SYSTEM STANDARDIZATION				
5.1	Support Standardization Constraints	T, C	NR	NR	T, C
5.2	Standardization Costs	T, C	NR	NR	T, C
5.3	Hardware/Software Standardization Approaches	T, C	NR	NR	T, C
5.4	Standardization Risks	T, C	NR	NR	T, C
6	COMPARATIVE ANALYSIS				
6.1	Existing Systems	NR	NR	NR	NR
6.2	Baseline Comparative System (BCS)	NR	NR	NR	NR
6.3	BCS Logistics Requirements	NR	NR	NR	NR
6.4	BCS Qualitative Constraints	NR	NR	NR	NR
6.5	BCS Drivers	NR	NR	NR	NR
6.6	Identify Subsystems With no BCS	NR	NR	NR	NR
6.7	BCS Updates	T, C	NR	NR	T, C
6.8	BCS Risks	T, C	NR	NR	T, C
7	TECHNOLOGICAL OPPORTUNITIES				
7.1	Identify Potential Technology	T, C	NR	NR	T, C
7.2	Update Design Objectives	T, C	NR	NR	T, C
7.3	Technology Risks	T, C	NR	NR	T, C
8	SUPPORTABILITY AND SUPPORTABILITY RELATED DESIGN FACTORS				
8.1	Operations and Support Capabilities	NR	NR	NR	NR
8.2	Sensitivity Analysis	NR	NR	NR	NR
8.3	Data Rights	E, J	E, J	E, J	E, J
8.4	Capability Risks	NR	NR	NR	NR
8.5	Key Performance Parameters	NR	NR	NR	NR
8.6	Market Limitations	NR	NR	NR	NR
8.7	Update Key Performance Parameters	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

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TABLE X. Supportability objectives in the P&D phase (Activities 4 through 8)

PRODUCTION & DEPLOYMENT PHASE					
Number	SUPPORTABILITY OBJECTIVES ACTIVITIES	MOD	COM	NDI	DEV
4	APPLICATION ASSESSMENT				
4.1	Intended Use/Capabilities	NR	NR	NR	NR
4.2	Quantitative Factors	NR	NR	NR	NR
4.3	Field Visits	NR	NR	NR	NR
4.4	Intended Use/Capabilities Reports	NR	NR	NR	NR
5	SUPPORT SYSTEM STANDARDIZATION				
5.1	Support Standardization Constraints	T, C	NR	NR	T, C
5.2	Standardization Costs	T, C	NR	NR	T, C
5.3	Hardware/Software Standardization Approaches	T, C	NR	NR	T, C
5.4	Standardization Risks	T, C	NR	NR	T, C
6	COMPARATIVE ANALYSIS				
6.1	Existing Systems	NR	NR	NR	NR
6.2	Baseline Comparative System (BCS)	NR	NR	NR	NR
6.3	BCS Logistics Requirements	NR	NR	NR	NR
6.4	BCS Qualitative Constraints	NR	NR	NR	NR
6.5	BCS Drivers	NR	NR	NR	NR
6.6	Identify Subsystems With no BCS	NR	NR	NR	NR
6.7	BCS Updates	NR	NR	NR	NR
6.8	BCS Risks	NR	NR	NR	NR
7	TECHNOLOGICAL OPPORTUNITIES				
7.1	Identify Potential Technology	NR	NR	NR	NR
7.2	Update Design Objectives	NR	NR	NR	NR
7.3	Technology Risks	NR	NR	NR	NR
8	SUPPORTABILITY AND SUPPORTABILITY RELATED DESIGN FACTORS				
8.1	Operations and Support Capabilities	NR	NR	NR	NR
8.2	Sensitivity Analysis	NR	NR	NR	NR
8.3	Data Rights	E, J	E, J	E, J	E, J
8.4	Capability Risks	NR	NR	NR	NR
8.5	Key Performance Parameters	NR	NR	NR	NR
8.6	Market Limitations	NR	NR	NR	NR
8.7	Update Key Performance Parameters	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

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TABLE XI. Supportability objectives in the O&S phase (Activities 4 through 8)

OPERATIONS & SUPPORT PHASE					
Number	SUPPORTABILITY OBJECTIVES ACTIVITIES	MOD	COM	NDI	DEV
4	APPLICATION ASSESSMENT				
4.1	Intended Use/Capabilities	NR	NR	NR	NR
4.2	Quantitative Factors	NR	NR	NR	NR
4.3	Field Visits	T, G	NR	NR	T, G
4.4	Intended Use/Capabilities Reports	NR	NR	NR	NR
5	SUPPORT SYSTEM STANDARDIZATION				
5.1	Support Standardization Constraints	T, C	NR	NR	T, C
5.2	Standardization Costs	T, C	NR	NR	T, C
5.3	Hardware/Software Standardization Approaches	T, C	NR	NR	T, C
5.4	Standardization Risks	T, C	NR	NR	T, C
6	COMPARATIVE ANALYSIS				
6.1	Existing Systems	NR	NR	NR	NR
6.2	Baseline Comparative System (BCS)	NR	NR	NR	NR
6.3	BCS Logistics Requirements	NR	NR	NR	NR
6.4	BCS Qualitative Constraints	NR	NR	NR	NR
6.5	BCS Drivers	NR	NR	NR	NR
6.6	Identify Subsystems With no BCS	NR	NR	NR	NR
6.7	BCS Updates	NR	NR	NR	NR
6.8	BCS Risks	NR	NR	NR	NR
7	TECHNOLOGICAL OPPORTUNITIES				
7.1	Identify Potential Technology	NR	NR	NR	NR
7.2	Update Design Objectives	NR	NR	NR	NR
7.3	Technology Risks	NR	NR	NR	NR
8	SUPPORTABILITY AND SUPPORTABILITY RELATED DESIGN FACTORS				
8.1	Operations and Support Capabilities	NR	NR	NR	NR
8.2	Sensitivity Analysis	NR	NR	NR	NR
8.3	Data Rights	E, J	E, J	E, J	E, J
8.4	Capability Risks	NR	NR	NR	NR
8.5	Key Performance Parameters	NR	NR	NR	NR
8.6	Market Limitations	NR	NR	NR	NR
8.7	Update Key Performance Parameters	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

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5.8.15.4 Activity selection for preparation and evaluation of alternatives. TABLE XII - TABLE XVI are provided to guide users through choosing activities for preparation and evaluation of alternatives.

TABLE XII. Preparation and evaluation of alternatives in the MSA phase (Activities 9 through 11)

MATERIEL SOLUTION ANALYSIS PHASE					
Number	PREPARATION AND EVALUATION OF ALTERNATIVE ACTIVITIES	MOD	COM	NDI	DEV
9	FUNCTIONAL REQUIREMENTS				
9.1	Identify Functions	E, G	NR	NR	E, G
9.2	Unique Item Functions	E, G	NR	NR	E, G
9.3	Function Drivers	E, G	NR	NR	E, G
9.4	Function Risks	T, G	NR	NR	T,G
9.5	Failure Mode, Effects, and Criticality Analysis	NR	NR	NR	NR
9.6	Fault Tree Analysis	NR	NR	NR	NR
9.7	Reliability Centered Maintenance Analysis	NR	NR	NR	NR
9.8	Task Inventory	NR	NR	NR	NR
9.9	Design Alternatives	T, G	NR	NR	T,G
9.10	Function Updates	NR	NR	NR	NR
10	SUPPORT SYSTEM ALTERNATIVES				
10.1	Support Alternatives	E, G	E, G	E, G	E, G
10.2	Update Support Alternatives	E, G	E, G	E, G	E, G
10.3	Viable Support Plans	T,G	T,G	T,G	T,G
10.4	Update Viable Support Plans	T,G	T,G	T,G	T,G
10.5	Support Plan Risks	E, G	E, G	E, G	E, G
11	EVALUATION OF ALTERNATIVES AND TRADEOFF ANALYSIS				
11.1	Tradeoff Analysis	E, G	NR	NR	E, G
11.2	New/Critical Support Tradeoffs	E, G	NR	NR	E, G
11.3	Design/Support Tradeoffs	E, G	NR	NR	E, G
11.4	Sensitivity of Support Tradeoffs	E, G	NR	NR	E, G
11.5	Manpower/Personnel Tradeoffs	E, G	NR	NR	E, G
11.6	Job/Duty Tradeoffs	E, G	NR	NR	E, G
11.7	Level of Repair Analysis	T, G	NR	NR	T, G
11.8	Diagnostics Tradeoffs	E, G	NR	NR	E, G
11.9	BCS/New System Tradeoffs	E, G	NR	NR	E, G
11.10	Energy Tradeoffs	E, G	NR	NR	E, G
11.11	Damage/Repair Tradeoffs	E, G	NR	NR	E, G
11.12	Transportability Tradeoffs	E, G	NR	NR	E, G
11.13	Facility Tradeoffs	E, G	NR	NR	E, G
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

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TABLE XIII. Preparation and evaluation of alternatives in the TD phase (Activities 9 through 11)

TECHNOLOGY DEVELOPMENT PHASE					
Number	PREPARATION AND EVALUATION OF ALTERNATIVE ACTIVITIES	MOD	COM	NDI	DEV
9	FUNCTIONAL REQUIREMENTS				
9.1	Identify Functions	E, C	E, C	E, C	E, C
9.2	Unique Item Functions	E, C	E, C	E, C	E, C
9.3	Function Drivers	E, C	E, C	E, C	E, C
9.4	Function Risks	E, C	T, C	T, C	E, C
9.5	Failure Mode, Effects, and Criticality Analysis	E, C	T, C	T, C	E, C
9.6	Fault Tree Analysis	E, C	T, C	T, C	E, C
9.7	Reliability Centered Maintenance Analysis	E, C	T, C	T, C	E, C
9.8	Task Inventory	E, C	T, C	T, C	E, C
9.9	Design Alternatives	E, C	T, C	T, C	E, C
9.10	Function Updates	E, C	T, C	T, C	E, C
10	SUPPORT SYSTEM ALTERNATIVES				
10.1	Support Alternatives	E, O	E, O	E, O	E, O
10.2	Update Support Alternatives	E, O	E, O	E, O	E, O
10.3	Viable Support Plans	T, O	E, O	T, O	T, O
10.4	Update Viable Support Plans	T, O	T, O	T, O	T, O
10.5	Support Plan Risks	E, O	T, O	T, O	T, O
11	EVALUATION OF ALTERNATIVES AND TRADEOFF ANALYSIS				
11.1	Tradeoff Analysis	E, O	T, O	T, O	E, O
11.2	New/Critical Support Tradeoffs	T, O	T, O	T, O	T, O
11.3	Design/Support Tradeoffs	T, J	T, J	T, J	T, J
11.4	Sensitivity of Support Tradeoffs	T, O	T, O	T, O	T, O
11.5	Manpower/Personnel Tradeoffs	T, O	T,C	T, O	T, O
11.6	Job/Duty Tradeoffs	T, O	T,C	T, O	T, O
11.7	Level of Repair Analysis	E, O	T,C	T, O	E, O
11.8	Diagnostics Tradeoffs	T, J	T, J	T, J	T, J
11.9	BCS/New System Tradeoffs	T, O	T,C	T, O	T, O
11.10	Energy Tradeoffs	T, O	T,C	T, O	T, O
11.11	Damage/Repair Tradeoffs	T, O	T,C	T, O	T, O
11.12	Transportability Tradeoffs	T, O	T,C	T, O	T, O
11.13	Facility Tradeoffs	T, O	T,C	T, O	T, O
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

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TABLE XIV. Preparation and evaluation of alternatives in the EMD phase (Activities 9 through 11)

ENGINEERING & MANUFACTURING DEVELOPMENT PHASE					
Number	PREPARATION AND EVALUATION OF ALTERNATIVE ACTIVITIES	MOD	COM	NDI	DEV
9	FUNCTIONAL REQUIREMENTS				
9.1	Identify Functions	T, C	E, C	E, C	T, C
9.2	Unique Item Functions	T, C	E, C	E, C	T, C
9.3	Function Drivers	T, C	E, C	E, C	T, C
9.4	Function Risks	T, C	T, C	T, C	T, C
9.5	Failure Mode, Effects, and Criticality Analysis	T, C	T, C	T, C	T, C
9.6	Fault Tree Analysis	T, C	T, C	T, C	T, C
9.7	Reliability Centered Maintenance Analysis	T, C	T, C	T, C	T, C
9.8	Task Inventory	T, C	T, C	T, C	T, C
9.9	Design Alternatives	T, C	T, C	T, C	T, C
9.10	Function Updates	T, C	T, C	T, C	T, C
10	SUPPORT SYSTEM ALTERNATIVES				
10.1	Support Alternatives	NR	T, O	T, O	NR
10.2	Update Support Alternatives	T, O	T, O	T, O	T,C
10.3	Viable Support Plans	E, O	T, O	T, O	E, C
10.4	Update Viable Support Plans	E, O	T, O	T, O	E, C
10.5	Support Plan Risks	E, O	T, O	T, O	E, C
11	EVALUATION OF ALTERNATIVES AND TRADEOFF ANALYSIS				
11.1	Tradeoff Analysis	E, O	T, O	T, O	E, O
11.2	New/Critical Support Tradeoffs	T, O	T, O	T, O	T, O
11.3	Design/Support Tradeoffs	T, J	T, J	T, J	T, J
11.4	Sensitivity of Support Tradeoffs	T, O	T, O	T, O	T, O
11.5	Manpower/Personnel Tradeoffs	T, O	T,C	T, O	T, O
11.6	Job/Duty Tradeoffs	T, O	T,C	T, O	T, O
11.7	Level of Repair Analysis	E, O	T,C	T, O	E, O
11.8	Diagnostics Tradeoffs	T, J	T, J	T, J	T, J
11.9	BCS/New System Tradeoffs	T, O	T,C	T, O	T, O
11.10	Energy Tradeoffs	T, O	T,C	T, O	T, O
11.11	Damage/Repair Tradeoffs	T, O	T,C	T, O	T, O
11.12	Transportability Tradeoffs	T, O	T,C	T, O	T, O
11.13	Facility Tradeoffs	T, O	T,C	T, O	T, O
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

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TABLE XV. Preparation and evaluation of alternatives in the P&D phase (Activities 9 through 11)

PRODUCTION & DEPLOYMENT PHASE					
Number	PREPARATION AND EVALUATION OF ALTERNATIVE ACTIVITIES	MOD	COM	NDI	DEV
9	FUNCTIONAL REQUIREMENTS				
9.1	Identify Functions	NR	NR	NR	NR
9.2	Unique Item Functions	NR	NR	NR	NR
9.3	Function Drivers	NR	NR	NR	NR
9.4	Function Risks	NR	NR	NR	NR
9.5	Failure Mode, Effects, and Criticality Analysis	NR	NR	NR	NR
9.6	Fault Tree Analysis	NR	NR	NR	NR
9.7	Reliability Centered Maintenance Analysis	NR	NR	NR	NR
9.8	Task Inventory	NR	NR	NR	NR
9.9	Design Alternatives	NR	NR	NR	NR
9.10	Function Updates	T, C	NR	NR	T, C
10	SUPPORT SYSTEM ALTERNATIVES				
10.1	Support Alternatives	NR	NR	NR	NR
10.2	Update Support Alternatives	NR	NR	NR	NR
10.3	Viable Support Plans	NR	NR	NR	NR
10.4	Update Viable Support Plans	NR	NR	NR	NR
10.5	Support Plan Risks	T, O	NR	NR	T, O
11	EVALUATION OF ALTERNATIVES AND TRADEOFF ANALYSIS				
11.1	Tradeoff Analysis	T, O	T, O	T, O	T, O
11.2	New/Critical Support Tradeoffs	T, O	T, O	T, O	T, O
11.3	Design/Support Tradeoffs	T, J	T, J	T, J	T, J
11.4	Sensitivity of Support Tradeoffs	NR	T, O	T, O	NR
11.5	Manpower/Personnel Tradeoffs	NR	T, O	T, O	NR
11.6	Job/Duty Tradeoffs	T, O	T, O	T, O	T, O
11.7	Level of Repair Analysis	T, O	T, O	T, O	T, O
11.8	Diagnostics Tradeoffs	NR	T, J	T, J	NR
11.9	BCS/New System Tradeoffs	T, O	T, O	T, O	T, O
11.10	Energy Tradeoffs	T, O	T, O	T, O	T, O
11.11	Damage/Repair Tradeoffs	T, O	T, O	T, O	T, O
11.12	Transportability Tradeoffs	NR	NR	NR	NR
11.13	Facility Tradeoffs	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

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TABLE XVI. Preparation and evaluation of alternatives in the O&S phase (Activities 9 through 11)

OPERATIONS & SUPPORT PHASE					
Number	PREPARATION AND EVALUATION OF ALTERNATIVE ACTIVITIES	MOD	COM	NDI	DEV
9	FUNCTIONAL REQUIREMENTS				
9.1	Identify Functions	NR	NR	NR	NR
9.2	Unique Item Functions	NR	NR	NR	NR
9.3	Function Drivers	NR	NR	NR	NR
9.4	Function Risks	NR	NR	NR	NR
9.5	Failure Mode, Effects, and Criticality Analysis	NR	NR	NR	NR
9.6	Fault Tree Analysis	NR	NR	NR	NR
9.7	Reliability Centered Maintenance Analysis	NR	NR	NR	NR
9.8	Task Inventory	NR	NR	NR	NR
9.9	Design Alternatives	NR	NR	NR	NR
9.10	Function Updates	T, O	NR	NR	T, C
10	SUPPORT SYSTEM ALTERNATIVES				
10.1	Support Alternatives	NR	NR	NR	NR
10.2	Update Support Alternatives	NR	NR	NR	NR
10.3	Viable Support Plans	NR	NR	NR	NR
10.4	Update Viable Support Plans	T, C	NR	NR	T, C
10.5	Support Plan Risks	NR	NR	NR	NR
11	EVALUATION OF ALTERNATIVES AND TRADEOFF ANALYSIS				
11.1	Tradeoff Analysis	NR	NR	NR	NR
11.2	New/Critical Support Tradeoffs	NR	NR	NR	NR
11.3	Design/Support Tradeoffs	NR	NR	NR	NR
11.4	Sensitivity of Support Tradeoffs	NR	NR	NR	NR
11.5	Manpower/Personnel Tradeoffs	NR	NR	NR	NR
11.6	Job/Duty Tradeoffs	NR	NR	NR	NR
11.7	Level of Repair Analysis	T, O	T, O	T, O	T, O
11.8	Diagnostics Tradeoffs	NR	NR	NR	NR
11.9	BCS/New System Tradeoffs	NR	NR	NR	NR
11.10	Energy Tradeoffs	NR	NR	NR	NR
11.11	Damage/Repair Tradeoffs	NR	NR	NR	NR
11.12	Transportability Tradeoffs	NR	NR	NR	NR
11.13	Facility Tradeoffs	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

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5.8.15.5 Activity selection for determination of product support resource requirements. TABLE XVII - TABLE XXI are provided to guide users through choosing activities for determining product support resource requirements.

TABLE XVII. Determination of product support resource requirements in the MSA phase (Activities 12 through 13)

MATERIEL SOLUTION ANALYSIS PHASE					
NUMBER	DETERMINATION OF PS RESOURCE REQUIREMENTS ACTIVITIES	MOD	COM	NDI	DEV
12	TASK ANALYSIS				
12.1	Task Analysis	NR	NR	NR	NR
12.2	Document Task Analysis	NR	NR	NR	NR
12.3	New/Critical Resources	NR	NR	NR	NR
12.4	Training Requirements	NR	NR	NR	NR
12.5	Design Influence	NR	NR	NR	NR
12.6	Risk Reduction	NR	NR	NR	NR
12.7	Transportability Analysis	NR	NR	NR	NR
12.8	Supply Support	NR	NR	NR	NR
12.9	Logistics Products	NR	NR	NR	NR
12.10	Task Analysis Updates	NR	NR	NR	NR
12.11	Parts Screening	NR	NR	NR	NR
13	EARLY DISTRIBUTION ANLYSIS				
13.1	New System Impacts	NR	NR	NR	NR
13.2	Impacts on Manpower	NR	NR	NR	NR
13.3	Readiness Impacts	NR	NR	NR	NR
13.4	Survivability Analysis	NR	NR	NR	NR
13.5	Impact Solutions	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

TABLE XVIII. Determination of product support resource requirements in the TD phase (Activities 12 through 13)

TECHNOLOGY DEVELOPMENT PHASE					
NUMBER	DETERMINATION OF PS RESOURCE REQUIREMENTS ACTIVITIES	MOD	COM	NDI	DEV
12	TASK ANALYSIS				
12.1	Task Analysis	T, C	NR	NR	T, C
12.2	Document Task Analysis	T, C	NR	NR	T, C
12.3	New/Critical Resources	T, C	NR	NR	T, C
12.4	Training Requirements	T, O	NR	NR	T, O
12.5	Design Influence	T, O	NR	NR	T, O
12.6	Risk Reduction	T, O	NR	NR	T, O
12.7	Transportability Analysis	T, J	NR	NR	T, J
12.8	Supply Support	T, O	NR	NR	T, O
12.9	Logistics Products	T, O	NR	NR	T, O
12.10	Task Analysis Updates	T, C	NR	NR	T, C
12.11	Parts Screening	T,C	NR	NR	T, C
13	EARLY DISTRIBUTION ANLYSIS				
13.1	New System Impacts	NR	NR	NR	NR
13.2	Impacts on Manpower	NR	NR	NR	NR
13.3	Readiness Impacts	NR	NR	NR	NR
13.4	Survivability Analysis	NR	NR	NR	NR
13.5	Impact Solutions	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

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TABLE XIX. Determination of product support resource requirements in the EMD phase (Activities 12 through 13)

ENGINEERING & MANUFACTURING DEVELOPMENT PHASE					
NUMBER	DETERMINATION OF PS RESOURCE REQUIREMENTS ACTIVITIES	MOD	COM	NDI	DEV
12	TASK ANALYSIS				
12.1	Task Analysis	T,C	T, C	T, C	T,C
12.2	Document Task Analysis	T,C	T, C	T, C	T,C
12.3	New/Critical Resources	T,C	T, C	T, C	T,C
12.4	Training Requirements	T, O	T, O	T, O	T, O
12.5	Design Influence	T, O	NR	NR	T, O
12.6	Risk Reduction	T, O	NR	NR	T, O
12.7	Transportability Analysis	T, J	T, J	T, J	T, J
12.8	Supply Support	E, C	E, J	E, J	E, C
12.9	Logistics Products	T, O	NR	NR	T, O
12.10	Task Analysis Updates	T, C	NR	NR	T, C
12.11	Parts Screening	T, C	T, C	T, C	T, C
13	EARLY DISTRIBUTION ANLYSIS				
13.1	New System Impacts	T, G	E, G	E, G	E, G
13.2	Impacts on Manpower	T, G	E, G	E, G	E, G
13.3	Readiness Impacts	T, O	E, O	E, O	E, O
13.4	Survivability Analysis	T, G	E, G	E, G	E, G
13.5	Impact Solutions	T, G	E, G	E, G	E, G
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

TABLE XX. Determination product support resource requirements in the P&D phase (Activities 12 through 13)

PRODUCTION & DEPLOYMENT PHASE					
NUMBER	DETERMINATION OF PS RESOURCE REQUIREMENTS ACTIVITIES	MOD	COM	NDI	DEV
12	TASK ANALYSIS				
12.1	Task Analysis	T,C	T, C	T, C	T,C
12.2	Document Task Analysis	T,C	T, C	T, C	T,C
12.3	New/Critical Resources	T,C	T, C	T, C	T,C
12.4	Training Requirements	T, O	T, O	T, O	T, O
12.5	Design Influence	T, O	NR	NR	T, O
12.6	Risk Reduction	T, O	NR	NR	T, O
12.7	Transportability Analysis	T, J	T, J	T, J	T, J
12.8	Supply Support	E, C	E, C	E, C	E, C
12.9	Logistics Products	T, O	NR	NR	T, O
12.10	Task Analysis Updates	T, C	NR	NR	T, C
12.11	Parts Screening	T, C	T, C	T, C	T, C
13	EARLY DISTRIBUTION ANLYSIS				
13.1	New System Impacts	T, G	T, G	T, G	T, G
13.2	Impacts on Manpower	T, G	T, G	T, G	T, G
13.3	Readiness Impacts	T, O	T, O	T, O	T, O
13.4	Survivability Analysis	T, G	T, G	T, G	T, G
13.5	Impact Solutions	T, G	T, G	T, G	T, G
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

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TABLE XXI. Determination of product support resource requirements in the O&S phase (Activities 12 through 13)

OPERATIONS & SUPPORT PHASE					
NUMBER	DETERMINATION OF PS RESOURCE REQUIREMENTS ACTIVITIES	MOD	COM	NDI	DEV
12	TASK ANALYSIS				
12.1	Task Analysis	NR	NR	NR	NR
12.2	Document Task Analysis	NR	NR	NR	NR
12.3	New/Critical Resources	NR	NR	NR	NR
12.4	Training Requirements	NR	NR	NR	NR
12.5	Design Influence	NR	NR	NR	NR
12.6	Risk Reduction	NR	NR	NR	NR
12.7	Transportability Analysis	NR	NR	NR	NR
12.8	Supply Support	T, C	NR	NR	T, C
12.9	Logistics Products	NR	NR	NR	NR
12.10	Task Analysis Updates	T, C	NR	NR	T, C
12.11	Parts Screening	NR	NR	NR	NR
13	EARLY DISTRIBUTION ANLYSIS				
13.1	New System Impacts	NR	NR	NR	NR
13.2	Impacts on Manpower	NR	NR	NR	NR
13.3	Readiness Impacts	NR	NR	NR	NR
13.4	Survivability Analysis	NR	NR	NR	NR
13.5	Impact Solutions	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

5.8.15.6 Activity selection for product operational management. TABLE XXII - TABLE XXVI are provided to guide users through choosing activities for product operational management.

TABLE XXII. Product operational management in the MSA phase (Activities 14 through 16)

MATERIEL SOLUTION ANALYSIS PHASE					
Number	PRODUCT OPERATIONAL MANAGEMENT ACTIVITIES	MOD	COM	NDI	DEV
14	DIMINISHING MANUFACTURING SOURCES AND MATERIAL SHORTAGES MANAGEMENT (DMSMS) / OBSOLESLENCE ANALYSIS				
14.1	DMSMS/Obsolescence Analysis	NR	NR	NR	NR
15	FIELD FEEDBACK				
15.1	Feedback Sources	NR	NR	NR	NR
15.2	Feedback Analysis	NR	NR	NR	NR
16	DISPOSAL ANALYSIS				
16.1	Component Disposal	NR	NR	NR	NR
16.2	Product Disposal	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

TABLE XXIII. Product operational management in the TD phase (Activities 14 through 16)

TECHNOLOGY DEVELOPMENT PHASE					
Number	PRODUCT OPERATIONAL MANAGEMENT ACTIVITIES	MOD	COM	NDI	DEV
14	DIMINISHING MANUFACTURING SOURCES AND MATERIAL SHORTAGES MANAGEMENT (DMSMS) / OBSOLESLENCE ANALYSIS				
14.1	DMSMS/Obsolescence Analysis	NR	NR	NR	NR
15	FIELD FEEDBACK				
15.1	Feedback Sources	NR	NR	NR	NR
15.2	Feedback Analysis	NR	NR	NR	NR
16	DISPOSAL ANALYSIS				
16.1	Component Disposal	NR	NR	NR	NR
16.2	Product Disposal	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

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TABLE XXIV. Product operational management in the EMD phase (Activities 14 through 16)

ENGINEERING & MANUFACTURING DEVELOPMENT PHASE					
Number	PRODUCT OPERATIONAL MANAGEMENT ACTIVITIES	MOD	COM	NDI	DEV
14	DIMINISHING MANUFACTURING SOURCES AND MATERIAL SHORTAGES MANAGEMENT (DMSMS) / OBSOLESLENCE ANALYSIS				
14.1	DMSMS/Obsolescence Analysis	T, O	E, O	E, O	E, O
15	FIELD FEEDBACK				
15.1	Feedback Sources	E, C	E, C	E, C	E, C
15.2	Feedback Analysis	NR	NR	NR	NR
16	DISPOSAL ANALYSIS				
16.1	Component Disposal	E, C	E, C	E, C	E, C
16.2	Product Disposal	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

TABLE XXV. Product operational management in the P&D phase (Activities 14 through 16)

PRODUCTION & DEPLOYMENT PHASE					
Number	PRODUCT OPERATIONAL MANAGEMENT ACTIVITIES	MOD	COM	NDI	DEV
14	DIMINISHING MANUFACTURING SOURCES AND MATERIAL SHORTAGES MANAGEMENT (DMSMS) / OBSOLESLENCE ANALYSIS				
14.1	DMSMS/Obsolescence Analysis	T, O	E, O	E, O	E, O
15	FIELD FEEDBACK				
15.1	Feedback Sources	T, C	T, C	T, C	T, C
15.2	Feedback Analysis	E, C	E, C	E, C	E, C
16	DISPOSAL ANALYSIS				
16.1	Component Disposal	E, C	E, C	E, C	E, C
16.2	Product Disposal	E, C	E, C	E, C	E, C
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

TABLE XXVI. Product operational management in the O&S phase (Activities 14 through 16)

OPERATIONS & SUPPORT PHASE					
Number	PRODUCT OPERATIONAL MANAGEMENT ACTIVITIES	MOD	COM	NDI	DEV
14	DIMINISHING MANUFACTURING SOURCES AND MATERIAL SHORTAGES MANAGEMENT (DMSMS) / OBSOLESLENCE ANALYSIS				
14.1	DMSMS/Obsolescence Analysis	E,O	E, O	E, O	E, O
15	FIELD FEEDBACK				
15.1	Feedback Sources	NR	NR	NR	NR
15.2	Feedback Analysis	E, O	E, O	E, O	E, O
16	DISPOSAL ANALYSIS				
16.1	Component Disposal	E, C	E, C	E, C	E, C
16.2	Product Disposal	E, O	E, O	E, O	E, O
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV DEVELOPMENT					

5.8.15.7 Activity selection for suitability assessment. TABLE XXVII - TABLE XXXI are provided to guide users through choosing activities for suitability assessment.

TABLE XXVII. Suitability assessment in the MSA phase (Activity 17)

MATERIEL SOLUTION ANALYSIS PHASE					
NUMBER	SUITABILITY ASSESSMENT ACTIVITIES	MOD	COM	NDI	DEV
17	OPERATIONAL SUITABILITY, TEST, EVALUATION, VERIFICATION AND VALIDATION				
17.1	Test Strategy	T, J	T, J	T, J	T, J
17.2	Product Support Package	NR	NR	NR	NR
17.3	Test Objectives/Resources	NR	NR	NR	NR
17.4	Conduct Test	NR	NR	NR	NR
17.5	Analyze Test Results	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV-DEVELOPMENT					

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TABLE XXVIII. Suitability assessment in the TD phase (Activity 17)

TECHNOLOGY DEVELOPMENT PHASE					
NUMBER	SUITABILITY ASSESSMENT ACTIVITIES	MOD	COM	NDI	DEV
17	OPERATIONAL SUITABILITY, TEST, EVALUATION, VERIFICATION AND VALIDATION				
17.1	Test Strategy	E, J	E, J	E, J	E, J
17.2	Product Support Package	E, G	E, G	E, G	E, G
17.3	Test Objectives/Resources	E, G	E, G	E, G	E, G
17.4	Conduct Test	NR	NR	NR	NR
17.5	Analyze Test Results	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV-DEVELOPMENT					

TABLE XXIX. Suitability assessment in the EMD phase (Activity 17)

ENGINEERING & MANUFACTURING DEVELOPMENT PHASE					
NUMBER	SUITABILITY ASSESSMENT ACTIVITIES	MOD	COM	NDI	DEV
17	OPERATIONAL SUITABILITY, TEST, EVALUATION, VERIFICATION AND VALIDATION				
17.1	Test Strategy	T, J	T, J	T, J	T, J
17.2	Product Support Package	T, G	T, G	T, G	T, G
17.3	Test Objectives/Resources	E, G	E, G	E, G	E, G
17.4	Conduct Test	NR	NR	NR	NR
17.5	Analyze Test Results	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV- DEVELOPMENT					

TABLE XXX. Suitability assessment in the P&D phase (Activity 17)

PRODUCTION & DEPLOYMENT PHASE					
NUMBER	SUITABILITY ASSESSMENT ACTIVITIES	MOD	COM	NDI	DEV
17	OPERATIONAL SUITABILITY, TEST, EVALUATION, VERIFICATION AND VALIDATION				
17.1	Test Strategy	NR	NR	NR	NR
17.2	Product Support Package	NR	NR	NR	NR
17.3	Test Objectives/Resources	NR	NR	NR	NR
17.4	Conduct Test	NR	NR	NR	NR
17.5	Analyze Test Results	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV-DEVELOPMENT					

TABLE XXXI. Suitability assessment in the O&S phase (Activity 17)

OPERATIONS & SUPPORT PHASE					
NUMBER	SUITABILITY ASSESSMENT ACTIVITIES	MOD	COM	NDI	DEV
17	OPERATIONAL SUITABILITY, TEST, EVALUATION, VERIFICATION AND VALIDATION				
17.1	Test Strategy	NR	NR	NR	NR
17.2	Product Support Package	NR	NR	NR	NR
17.3	Test Objectives/Resources	NR	NR	NR	NR
17.4	Conduct Test	NR	NR	NR	NR
17.5	Analyze Test Results	NR	NR	NR	NR
E-ESSENTIAL, NR-NOT REQUIRED, T-TAILORABLE, G-GOVERNMENT, C-CONTRACTOR, O-EITHER GOVERNMENT OR CONTRACTOR, J-JOINT GOVERNMENT AND CONTRACTOR, MOD-MODIFICATION, COM-COMMERCIAL ITEM, NDI-NON DEVELOPMENTAL ITEM, DEV-DEVELOPMENT					

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6 CONTRACTING GUIDANCE

6.1 Contracting for product support.

6.1.1 Purpose and scope. The contracting process offers an excellent opportunity to execute the PSA strategy by involvement of potential performing activities when competition is present. PMs (in coordination with their Program Executive Officers (PEOs) and Resource Manager) should develop a post-award strategy to ensure they are identifying their intellectual property rights (IPR) as defined by the Federal Acquisition Regulations (FAR) and Defense Federal Acquisition Regulation Supplement (DFARS). Historically, the DoD and Military Departments have not effectively defined or managed the IPR procured by the government or identified by contractors in their proposals by not including effective CDRLs and DIDs in contracts. The SOW establishes the product/system development requirements; the CDRL orders the delivery of the data according to the SOW, and the DID describes the format and content of the data/products ordered by the CDRL as articulated in the FAR and DFARS. It is incumbent upon the government, including PSMs/logisticians, and the PM and Contracting Officer's Representative (COR) specifically, to review each deliverable and report unjustified/nonconforming or other inappropriate markings on delivered data to the Contracting Officer to ensure the PEO is able to take full advantage of the government's rights. Consistent with the requirements of the contract, the Contracting Officer, with the assistance of Legal Counsel, is responsible for enforcement of the DFARS provisions and other key terms and conditions of the contract. The logistician provides input on the various contracting sections as explained in this section.

6.1.2 Organization of this section. The Contracting Section is divided into five sections. Four of the five sections contain suggested language for RFP Sections C, H and I, L, and M. This material can be tailored for use in the specific phase of an acquisition program. It can also be tailored for use in contract modifications. In addition, there is a short section on developing Contract Line Item Numbers (CLINs). Note that Appendix A contains suggested - DIDs for use in preparing the CDRL and for identifying other contractual deliverables. Appendix B provides information on Data Rights for the government including FAR and DFARS clauses specifying the government's rights to acquire data.

6.1.3 Acquisition strategy and business strategy guides for product support input. The acquisition strategy drives the selection of the specific requirements that are included in the contract. The business strategy is the specific acquisition approach for each element of support. These strategies determine the structure of Sections B, C, and H of the contract. The acquisition and business strategies are translated into Section B by breaking down each strategy into requirements by year and by support element. Section B is organized by contract line item and contract year. The Program Manager is responsible for ensuring that all essential requirements of the acquisition strategy are included in the contract. Since product support needs are spread throughout the solicitation/contract, the acquisition logistician is concerned with the entire document. Specifically, the logistician, as the requirements activity, should provide inputs to the RFP, SOW, CDRLs, choosing of DIDs and submitting to PM and COR for consideration. Figure 9, shows the part and section format for a solicitation and contract as required by the Federal Acquisition Regulation. As supportability and product support needs are defined, it is extremely important to keep the solicitation parts consistent. The sections should complement each other, and not contradict. Express requirements clearly, to potential offerors and to establish enforceable contracts. In the solicitation, the objectives for product support are to:

a. Integrate product support needs wherever support may be required.
b. Identify, analyze, and resolve support deficiencies.
c. Systematically identify and evaluate support system alternatives.
d. Manage support acquisition throughout the contracting process.
e. Track and review deliverables.
f. Report deficiencies to the PM and COR.
g. Provide inputs on contractor performance in the periodic contractor status reports, financial reports, and Contractor Performance Assessment Reporting System (CPARS).
h. Develop a timely, effective support capability at an economical life cycle cost.

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UNIFORM CONTRACT FORMAT

CONTRACT SECTION

PART I. THE SCHEDULE

A SOLICITATION / CONTRACT FORM:
The SF 33 is used as solicitation, offer, and award. Standard Form 26 Award/ Contract can also be used as the face page of the contract.

B SUPPLIES OR SERVICES AND PRICES:
This section will contain a brief description of the supplies or services and quantity.

C DESCRIPTION / SPECIFICATIONS:
This section contains a detailed description of the requirement and may contain references to the statement of work and other sections of the contract.

D PACKAGING AND MARKING:
This section provides packaging, packing, preservation, and marking requirements.

E INSPECTION AND ACCEPTANCE:
This section contains inspection, acceptance, quality assurance, and reliability requirements.

F DELIVERIES OR PERFORMANCE:
This section specifies the time, place, and method of delivery or performance.

G CONTRACT ADMINISTRATION DATA:
This section includes any required accounting and appropriation data and required contract administration information or instructions other than those on the solicitation form.

H SPECIAL CONTRACT REQUIREMENTS:
This section contains a clear statement of any special contract requirements that are not included in Section I, Contract Clauses, or in any other sections of the contract.

PART II. CONTRACT CLAUSES

I CONTRACT CLAUSES:
The contracting officer will include the clauses required by the Federal Acquisition Regulations.

PART III. LIST OF DOCUMENTS, EXHIBITS, AND OTHER ATTACHMENTS

J LIST OF DOCUMENTS, EXHIBITS, AND OTHER ATTACHMENTS:
The contracting officer will list the title of each exhibit or attachment in this section.

PART IV. REPRESENTATIONS AND INSTRUCTIONS (INCLUDED IN SOLICITATIONS / RFPs ONLY)

K REPRESENTATIONS, CERTIFICATIONS, AND OTHER STATEMENTS OF BIDDERS:
This section includes those solicitation provisions that require representations, certifications, or the submission of other information by bidders, offerors, or quoters.

L INSTRUCTIONS, CONDITIONS, AND NOTICES TO BIDDERS:
This section contains information to guide bidders, offerors, or quoters in the preparation of bids, offers, or quotations, respectively.

M EVALUATION FACTORS FOR AWARD:
This section contains the evaluation factors and significant subfactors by which offers will be evaluated and the relative importance that the Government places on these evaluation factors and subfactors.

SOW
- Scope
- Reference Documents
- Requirements

Contract
- Delivery
- Dates

CLINs
- Performance
- Time Frame

Inspection and Acceptance Criteria Applicable to the Logistics Line Items

Special Clearances
Geographic Location
Unique Requirements

Clauses Required by Procurement Regulations or Law Which Pertains to This Procurement
Buy American Act Provision

List Contains:
- Security Form
- Data Orders
- CDRL
- SOW
- Specification
- Financial Data
  - Sheet
  - Exhibits

Offeror's Type of Business
Cost Accounting Standards
Notices

Type of Contract
Solicitation Definitions
Proposal Requests
Progress Payment

How Proposal Will be Evaluated?

FIGURE 9. Uniform contract format

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6.1.4 RFP section inputs. The table below summarizes possible product support content of each section. Remember that product support implications should be addressed in nearly every section of the solicitation/contract.

TABLE XXXII. Product support content of each section of the solicitation or contract

SECTION	EXAMPLE OF PRODUCT SUPPORT INPUTS
A.	None
B.	All line items needed for completing required product support deliverables by the end of the applicable acquisition phase, including option and warranty needs when applicable.
C.	1. Description (specifications), to the extent needed beyond the description of line items in Section B, of product support end items.
	2. Work effort descriptions, considering life cycle costs, for use in statement of work translating/relating.
D.	All packaging and marking not included in Sections C.
E.	Any peculiar inspection and/or acceptance criteria applicable to the product support line items in Section B.
F.	The desired or required time period when each product support line item in Section B is to be delivered.
G.	Normally none, unless determined by Contracting Officer.
H.	1. Title and/or description and any special language needed for Government Furnished Property and for controlling or incentivizing product support, technical, cost, or schedule performance, including special design to cost, incentive, and warranty provisions.
	2. Specific paragraphs for use in any special provision for making sure product support administration is accomplished.
I.	Normally none.
J.	1. The product support portion of the preliminary contract work breakdown structure, including the interfaces among deliverable and non-deliverable product support elements, and descriptions of each product support element.
	2. Support related inputs to life cycle-cost mathematical models.
	3. DID inputs for technical data or product support management data needs, including configuration control data and integrated support plan.
	4. Planned or assumed concepts, ranges, schedules, etc., and inputs to assumptions.
	5. Support equipment exhibits.
	6. Provisioning requirements.
K.	Identify support related certification requirements.
L.	1. Any instruction for making sure proposals: a. Are responsive to product support needs, b. Provide alternative support solutions, and c. Provide information required for evaluating product support under Section M.
	2. Notification of any product support conditions or constraints.
	3. Any historical information required for the proposals.
M.	The product support evaluation factors for award, their order of priority, and the recommend relative order of their importance in comparison to all non-product support evaluation factors.

6.1.5 Acquisition policy. The Undersecretary of Defense (Acquisition, Technology and Logistics) (USD)(AT&L)'s Memorandum for Acquisition Professionals (dated November 13, 2012 (http://www.acq.osd.mil/)) provided specific guidance related to delivering better value to the taxpayer and warfighter by improving the way the DoD does business. One of the five main themes of the Memorandum is promotion of real competition across the entire DoD Enterprise. A critical element for enabling competition is the use of acquisition and contracting language that addresses the business and technical principles that comprise and will lead to a strong support structure and minimize vendor locked situations to maximize acquisition choice and flexibility.

6.1.6 Incentivizing technical excellence. Incentivizing technical excellence. Incentivizing technical excellence in the program is an important aspect of the program AS and can be applied through the major contract types to motivate the contactor. The incentive arrangement should be designed to motivate contractor performance that might not otherwise be emphasized. The incentive approach allows the government to motivate exceptional contractor performance considering the conditions under which it was achieved. These conditions are normally in such areas as adherence to PSA technical and business practices, cooperative behavior with other vendors, as well as the more usual quality, timeliness, technical progress, technical ingenuity, and cost-effective management requirements. The award fee or term criteria should be based on the requirements described in the contract. The most effective criteria are objective in nature. When possible, criteria should be expressed in quantifiable terms. Some PSA technical criteria are inherently mixed with and supportive of PSA business practices.

6.1.7 Statements of work language.

6.1.7.1 Purpose and scope. During proposal evaluation and source selection, the statement of work (SOW) plays a significant role. Failure to sufficiently describe the scope of work often results in delay and extra administration effort during the source selection process. The ability to clearly define the desired end product in a

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clear, precise manner affects the type of contract. After contract award, the SOW becomes the standard for measuring contractor performance. As the effort progresses, both the government and the contractor constantly refer to the SOW to determine their respective rights and obligations with regard to the contract. When a question arises concerning an apparent increase in the scope of work to be performed, the SOW is the baseline document that should be used to resolve the issue. Language that defines the limits of the contractor's effort is of critical importance. If the limits were poorly established, it will be difficult to determine if or when there has been an increase in scope. As a result, effective negotiations on cost and schedule will be impaired, if not impossible.

6.1.7.2 Work statements. A SOW further defines the scope of work when a supply or service cannot be sufficiently defined in Section B and the specification. SOWs are usually prepared using the Work Breakdown Structure described in MIL-STD-881. The philosophy is for a SOW to be stated in performance terms (objectives or requirements) as much as possible. Other approaches are also being considered in upper levels within the Office of the Secretary of Defense. These include issuing government developed draft SOWs for contractors to respond to, or just providing a system specification or requirements document without a SOW being utilized at all.

6.1.7.3 Section C of the request for proposal (RFP). Section C of the RFP and the resulting contract contains the detailed description of the products to be delivered or the work to be performed under the contract. Section C typically includes a SOW for the RFP/contract. The SOW is a clear and concise statement that delineates the program objectives and the overall program approach, including the outcome desired. The SOW, along with the preliminary system performance specification (covering the technical performance requirements), provides offerors guidance for proposing a solution to meet the user's needs. An additional helpful reference is the "Department of Defense Handbook for Preparation of Statement of Work (SOW)".

6.1.7.4 Pre-proposal and bidders conferences. Properly structured pre-proposal and bidders conference can provide opportunities for feedback from potential bidders on selecting and focusing analysis activity and data item requirements. This helps assure the requiring authority that it has not included inappropriate RFP requirements, such as trades in areas where there is no freedom to trade, or data requirements which are premature or duplicative.

6.1.7.5 Preparing PSA RFP requirements. The RFP is normally the first formal communication between the government and industry. It is, therefore, a key document in the acquisition process. Industry interprets an RFP to be an expression of all the items of importance to the government since it will be around these items that a contract will be written. Industry taxes its ingenuity to provide a competitive product that meets the stated requirements. This section discusses some suggested practices in preparing the RFP.

6.1.7.5.1 Broad versus specifics. Give the total support picture as early as possible. Structure the RFP to pose the broad problem to be addressed by the Product PSA program and provide information on absolutely necessary analysis activities and data required. Do not go into unnecessary detail in establishing requirements at too early a time, especially if the scenarios are conceptual and design is still only crudely defined. Describe the freedom the bidder has for feedback. The bidder can then draw from experience and innovation to fine tune the requirements. Bidder feedback should be considered as recommendations only to preclude legal problems. Do not destroy credibility by asking for inputs which are inconsequential in source selection or to the program as a whole.

6.1.7.5.2 Interweave supportability requirements and constraints. Structure the RFP in such a way that supportability constraints and supportability related design requirements are interwoven into the appropriate system/development specification sections or other system/equipment description. This gives everyone involved with the design an appreciation of the supportability constraints and requirements. A properly structured RFP requires readiness and supportability inputs into many sections of the RFP. Consequently, more than just the product support portions of the SOW and contract data requirements list should be addressed. The major areas for supportability input into an RFP include the following:

a. Section B, Supplies/Services and Prices. Establish supportability work efforts and requirements as separate contract line items where possible.
b. Section C, Description/Specifications. Enter supportability work efforts and supportability design requirements.

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c. Section E, Inspection and Acceptance. Enter any peculiar inspection and/or acceptance criteria applicable to the product support line items in Section B.

d. Section F, Deliveries or Performance. Consider statement that delivery of the system/equipment will not be accepted without concurrent delivery of required logistic products.

e. Section H, Special Contract Requirements. Consider inclusion of supportability incentives such as a design to life cycle cost goal.

f. Section I, Contract Clauses. Ensure that applicable Defense Acquisition Regulation clause(s) on rights in technical data and computer software are included.

g. Section L, Instructions, Conditions, and Notices to Bidders. Ensure proposal preparation instructions relative to supportability aspect of the RFP are detailed and clearly written. Consider a separate proposal section for supportability.

h. Section M, Evaluation Factors for Awards given to supportability.

6.1.7.5.3 Relative importance of requirements. State the order of importance of the supportability related parameters being requested to the source selection criteria. This permits the PSA team to make an honest effort to provide the best PSA activity selection for the least cost. For example, indicate that reliability and maintainability (R&M) are to be of high priority, and size and weight to be of low priority only if it is true; not when the size and weight requirements are inflexible and paramount. Identify any requirements which are soft, and in which the requester would consider slight reductions for other significant benefits. Contractors should be made aware of their responsibility to obligate their vendor/subcontractors to fulfill the applicable requirements, procedures, terms, conditions, and data requirements stated within this document.

6.1.7.6 Support related design drivers. Consistent with the degree of design freedom, ask the bidder to identify those design attributes which may prove to be the key influencing factors in readiness, acquisition cost, O&S cost, and product support resource demands. Have the bidder identify the PSA activities that will be used to analyze these requirements.

6.1.8 Developing contract line item numbers.

6.1.8.1 Section B – supplies or services and prices. The Logistics Engineer (LE) or PSM is responsible for preparing Section B's product support requirements. Since Section B determines the direction and emphasis of the procurement request, the LE or PSM should develop the product support acquisition strategy and requirements to guide the planning and procurement of maintenance and support. The requirements and strategy derive from previous management activities and the product support strategy.

6.1.8.2 The ordering clause. The ordering clause governs the ordering of supplies or services detailed in Section B. specifically, this clause governs the acquisition of supplies or services specified in provisioned CLINs in Section B. This clause is important to the logistician because its terms determine how flexibly product support CLINs can be activated. There are several variations on the basic FAR 52.216-18 "Ordering" clause. As prescribed in 16.505(a), the following clause is inserted in solicitations and contracts when a definite-quantity contract, a requirements contract, or an indefinite-quantity contract is considered.

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Ordering (Oct 1995)

(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued from _____ through _____ *[insert dates]*.

(b) All delivery orders or task orders are subject to the terms and conditions of this contract. In the event of conflict between a delivery order or task order and this contract, the contract shall control.

(c) If mailed, a delivery order or task order is considered "issued" when the Government deposits the order in the mail. Orders may be issued orally, by facsimile, or by electronic commerce methods only if authorized in the Schedule.

(End of Clause)

FIGURE 10. FAR 52.216-18 ordering clause

6.1.8.3 What is being procured. Section B (along with Section C, Description/Specifications, which was discussed in detail in the previous section), represents the cornerstone of the procurement request. Sections B and C are prepared before the other sections. Section B lists all supplies, data, and services to be acquired. Specifically, Section B:

a. Lists what is being procured (supplies, data, services).
b. Identifies each requirement as a Contract Line Item with a CLIN.
c. Determines the direction and emphasis of the procurement request.
d. Constitutes the basis for cross-referencing for all subsequent sections since all subsequent sections have to refer to the Section B CLINs.

6.1.8.4 CLIN defined. A CLIN is a process of assigning unique numbers to specific contract elements. This is to ensure that all contracted requirements are identified. Each CLIN should be defined and described in detail. This prevents confusion when ordering or tracking of parts or items of a contract. The CLIN identifies each supply or service recorded in the database. The number will appear once for each separate item, even if multiple schedules apply. Separate contract line items are established for:

a. Trade Studies
b. Product Support Research and Development
c. Support Equipment (peculiar and common)
d. Supply Support (spare and repair parts, including spares acquisition integrated with production)
e. Training
f. Services
g. Equipment
h. Contractor Support
i. Data
j. Product Performance Agreements (including warranties/guarantees)
k. Testing
l. Facilities
m. Product Support Management Systems
n. Simulators
o. Computer Resources
p. Configuration Management
q. Technical Manuals
r. Packaging, Handling, Storage, and Transportation

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6.1.8.5 CLIN format. Establish separate CLINs for technical data to be delivered under a contract as required by DFARS 227. Solicitations and contracts should also include priced contract option CLINs for future delivery of technical data that were not acquired upon initial contract award. Priced contract option CLINs should also be included for technical data rights licenses when the government desires additional rights in technical data. Consult with the cognizant counsel for preparation of CLINs and option CLINs.

6.1.9 Section E – inspection and acceptance. Section E of the RFP includes inspection, acceptance, quality assurance, and reliability requirements. A question for consideration is: Has the acquisition team developed a tailored quality assurance surveillance plan to monitor contractor performance? This section should describe the organization and procedures to perform the R&M task. The following FAR and DFARS clauses can be added for assurance of product quality: FAR 46.2, 52.246, Requirements for Product Verification Testing to include First Article testing, Change of Supplier Notice, Non-conforming Material Notification, Certificate of Conformance requirements, DFARS 252.246-7003 Notification of Potential Safety Issues, Drawings for inspection, Inspection of Equipment interchangeability of Components, Final Inspection Report (FIR).

6.1.10 Special contract language.

6.1.10.1 Sections H and I – policy and regulatory requirements. Section H and Section I are the primary sections whereby policy and regulatory requirements are incorporated as enforceable elements of a contract. New policies and regulations continuously grow from Congressional legislation, executive branch administration actions, and DoD initiatives. Section H defines special contract requirements, as explained below. Section I lists general contract clauses applicable to the contract, as published in the FAR, DFARS, and service-specific policy issuances.

6.1.10.1.1 The role of the logistician in development of sections H and I. The logistician, along with the Systems Engineers and IPT members, has two major roles: procurement request development responsibilities, and contract administration responsibilities. The LE's role varies based on the contract. On the procurement request development team, the LE influences the structure of Sections H and I through input to the Acquisition Plan and the Product Support Analysis Plan. In developing Sections H and I, the Logistics Engineer may:

a. Translate the product support strategy into special clause requirements.
b. Define the quantity requirements for product support supplies and services.
c. Define options for product support supplies and services.
d. Define the product support-related government furnished equipment for a contract.
e. Define the rights in data.
f. Draft clause requirements to support the system maintenance concept.
g. Support the negotiation team and source selection team by evaluating the product support impacts of contract changes proposed during negotiation.
h. Serve as the product support representative on the procurement request development team.

6.1.10.1.2 Section H – special contract requirements. Section H defines special contract requirements such as ordering options, safety, human factors, radioactive materials, security, release of information to the public, labor category descriptions, payment schedule, and expected minimum and maximum costs. The special contract requirements clauses for Section H are based on the acquisition strategy and the product support strategy. The information in the earlier sections, particularly Section B, will guide contracts personnel in developing a draft Section H. The LE, along with the Systems Engineers and IPT members, should help select the applicable clauses to support special product support- related requirements for the procurement.

6.1.10.1.3 Section H of the request for proposal (RFP) language. A helpful reference is the "Department of Defense Handbook for Preparation of Statement of Work (SOW)". "Section H Special Provisions" should only be developed and used in close coordination with Legal Counsel. Legal Counsel should review and approve all Section H Special Provisions. The program should consider developing a "Section H Special Provision" that, at a minimum, incorporates the offeror's proposal relating to a Product Support Analysis Plan into the resultant contracts and requires government concurrence prior to any change in that plan.

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6.1.10.1.4 Clause H – requirement for a PSAP. The PSAP is the basic tool for establishing and executing an effective PSA program. It should effectively document what PSA activities are to be accomplished, when each activity will be accomplished, what organizational units will be responsible for their accomplishment, and how the results of each activity will be used. Plans submitted in response to solicitation documents assist the requiring authority in evaluating the prospective performing activity's approach to and understanding of the PSA activity requirements, and the organizational structure for performing PSA activities. The PSAP is generally submitted in response to a solicitation document and generally becomes a part of the SOW when approved by the requiring authority. When requiring a PSAP, the requiring authority should allow the performing activity to propose additional activities or activity modifications, with supporting rationale to show overall program benefits, to those activities contained in the solicitation document. The PSAP should be a dynamic document that reflects current program status and planned actions. Accordingly, procedures should be established for updates and approval of updates by the requiring authority when conditions warrant. Program schedule changes, test results, or PSA activity results may dictate a change in the PSAP for it to be used effectively as a management document.

6.2 Obtaining engineering data for provisioning. Engineering data for provisioning is technical data which provides definitive identification of dimensional, materiel, mechanical, electrical, or other characteristics sufficient for provisioning of the support items of the end item(s) on contract. This data is used to accomplish the provisioning process and is required to perform provisioning for all systems and equipment, as well as to support the PSA. The SOW/contract should mention that the engineering data should be adequate to identify, catalogue, and procure each part in the end item and their relationship to other parts in the equipment. Activities 12.8 and 12.10 of TA-STD-0017 may be utilized on the SOW/contract when contracting for engineering data for provisioning. The DoD preference is to use the contract DID, DI-SESS-81874 Engineering Data for Provisioning, to support the provisioning process. The SOW/contract order of precedence for engineering data for provisioning should be first, product engineering drawings, secondly, in process/incomplete product engineering drawings sufficient for the provisioning process and finally, commercial drawings or associated lists.

6.3 Instructions for bidders language.

6.3.1 Section L – instructions, conditions and notices to bidders. Section L of the RFP provides proposal instructions, conditions and notices to bidders.

6.3.1.1 Content of section L. Bidders should be encouraged to clearly demonstrate, through their use of similar technologies previously developed, the ability to meet the design, development, testing, and production requirements of the solicitation, in particular its approach to a modular open system design, in the quantities and schedules specified in the RFP. Section L should be carefully structured to address only those elements determined to be keys to success.

6.3.1.2 Goals of section L. Section L is designed to accomplish two major tasks. First, it gives contractors the background information they will need to understand the overall scope of the program. Second, it gives specific instructions for the preparation of their proposals. The LE supplies solicitation instructions on logistics matters related to these activities. Information should be sufficiently detailed to let the bidders:

a. Identify the general characteristics of the logistics scenario.
b. Establish the types of maintenance support at each site.
c. Set up the level of availability to be maintained.
d. Make or develop estimates to set up probable frequencies or occurrence of events.
e. Identify basic and alternative flows of support resources to and from each site.
f. Set up manning, skill, and facility needs for each site.
g. Identify concepts and needs for reliability, maintainability, supportability, and testability.
h. Perform availability, supportability, and cost studies to trade off alternate support, hardware, and software concepts.

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6.3.2 Life cycle supportability. Also contained in section L of the RFP is a detailed description of how the offeror intends to enhance life cycle supportability by implementing performance-based logistics arrangements to sustain the components through their life cycle. Program sustainment strategies such as PBA should be tailored to its specific requirements. A Business Case Analysis (BCA) should be done in conjunction with development of these strategies to ensure that they are appropriate for the business and technical model being incorporated in the program.

6.3.3 Traceability of system requirements. A detailed description of the bidder's approach for ensuring that all supportability requirements are accounted for through a demonstrated ability to trace each requirement to one or more deliverables.

6.3.3.1 Sharing documentation across activities. Documentation is shared across multiple activities. For instance, task documentation should be developed to the degree that will allow another activity to use the task results as input data to perform other PSA activities, or as input to conduct the same task to a more detailed level in a later acquisition phase. When some activities are performed by the government and others are performed by a contractor, procedures should be established to provide for the interchange of data or information between the performing activities. For example, activities performed by government activities should be documented equivalent to the applicable DID requirements to assure compatibility of documentation. When PSA activities are performed by a contractor, task documentation that is required for delivery to the government should be specified on the CDRL, DD Form 1423, with appropriate DIDs being cited. The CDRL identifies data and information that the contractor is obligated to deliver under the contract. DIDs are used to define and describe the data required to be furnished by the contractor. DIDs are structured to identify the maximum range of data that can be documented in a report. The requiring authority can tailor down these requirements by deleting unwanted data from the data selection form and making appropriate use of the CDRL. For example, if the requiring authority wants a System/Design Trade Study Report which only covers the tradeoff analysis results (Activity 11.1) or the data from only one of the tradeoff activities (e.g., Activity 11.7, Level of Repair Analysis) this can be accomplished through appropriate entries on the CDRL. By appropriately completing the CDRL and lining out unwanted data in Block 10 of the applicable DIDs, the requiring authority can structure the deliverable data products to cost effectively meet program requirements.

6.3.3.2 The bidder should perform supportability modeling. The utility of models to perform some aspects of PSA is almost in direct proportion to equipment complexity. For complex systems, a model is almost mandatory to relate the system/equipment's design, operational, and support parameters to system performance. Models are defined as systematic, analytical processes used to predict system parameters. They can vary from a simple analytical equation for inherent availability to a complex simulation model covering a multiple end item environment and all levels of maintenance. As a general rule, models used early in the life cycle would be system level models requiring a small amount of input data. Later in the acquisition process, as the design becomes better defined and a support concept is established, a more detailed model might be more applicable. Models used during the PSA process should only be as complex as required to analyze the problem at hand. Simple, easy to apply models requiring little input data should be used whenever possible to enhance the timeliness of the results. When system readiness, life cycle cost, O&S cost, or other models are specified in RFPs, the requiring authority needs to assess the proposal to evaluate the bidder's understanding of the model and its results. Model estimates and data should be traceable from the operational and support concepts to the R&M predictions and design. There should be evidence that design features justify the input data used.

6.3.4 Management approach. Good management of the PSA effort requires: (1) planning which identifies all the required actions, (2) scheduling which identifies the timing of each required action and who is responsible for each action, and (3) execution through timely management decisions. Management procedures should be established to assure that the right information is available at the right time so that timely decisions can be made. PSA planning and management should always be performed by the requiring authority.

6.3.5 Cost proposal (PSA related). There is a considerable distinction between data and the documentation of data. Additionally, there is a large number of different forms of documentation for PSA data which frequently overlap. Because of these factors, PSA program data and data formatting requirements should be carefully scoped to meet program needs in a cost effective manner. Factors which affect data and documentation costs include the following:

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a. Timing of preparation and delivery. Documentation or recording of data should coincide with the generation of such data in the design and analysis sequences that such data will not have to be recreated at added expense at a later date. Delivery of data should be postponed until actual need date to acquire data in its most complete form without repetitive updates.
b. Use of the data by the performing activity. The less use, the more expensive.
c. Special formatting requirements.
d. Degree of detail required.
e. Degree of research required to obtain the data.
f. Accuracy and amount of verification required.
g. Duration of responsibility for data contents.
h. Availability and accuracy of source data from which to construct documentation. For example, poorly prepared or inaccurate schematics will increase the cost of technical manuals.

6.3.6 Data and data documentation costs control. Data and data documentation costs can be effectively controlled by the following methods:

a. Screening requirements prior to preparation of solicitation documents. Each data requirement should be reviewed for data content, end use, formatting needs, scheduled delivery, and estimated cost to eliminate duplication and assure proper integration and scheduling of requirements. This function is generally performed by IPS management.
b. Using contractor format whenever possible. This generally reduces cost and may also provide important insights to contractor controls, checks, and balances between design and PSA attributes. Additionally, reformatting requirements often result in a distillation of original data which can provide misleading or incomplete information.
c. Involve potential bidders in briefings and planning conferences prior to issuance of a solicitation document. This helps assure that data and data documentation requirements are realistic and that maximum use is made of data already available.

6.3.7 Section M – evaluation factors for award. Section M conveys the basis for evaluation of the proposals received. It should never be used to evaluate criteria aimed at products/services that were not included in the solicitation. Evaluation factors should be measurable, meaningful, traceable, and limited to contractor controllable items. Remember that the solicitation you prepare will be used to evaluate the bidder proposals. The criteria included in the solicitation should be consistent with service policy. This consistency requires tailoring the evaluation criteria or program characteristics. Define the criteria carefully to identify the rank order of importance of technical, product support, costs, schedule, past performance, and other factors as set forth in the source selection plan. If the PSA program is to be meaningful, its rank and value in selection process must be clear. Fully defined criteria:

a. Indicate that the government decision makers have thought out their priorities.
b. Inform the bidders of the order of importance the government has attached to the major needs.

7 NOTES

7.1 Intended use. The purpose of this handbook is to offer guidance on product support as an integral part of the systems engineering process. The information contained herein is applicable, in part or in whole, to all types of materiel and automated information systems and all acquisition strategies. The contractual wording contained herein is not binding, nor can this handbook be placed on contract.

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7.2 Subject term (key word) listing.

Contracting for supportability
Integrated logistics support
Integrated product support
Level of repair analysis
Logistics product data
Logistics support analysis
Maintenance and support alternatives
Maintenance planning
Maintenance task analysis
Product support data
Sensitivity analysis
Technical data for product support

7.3 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

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EXAMPLE CDRLS AND DIDS

A.1 SCOPE

A.1.1 Scope. The section provides CDRL examples and DID suggestions. The CDRLs identify data and information that the contractor will be obligated to deliver under the contract. DID's are used to define and describe the data required to be furnished by the contractor. After selecting the data and information to be delivered, the selections are documented in the SOW and CDRL line item entries. Each CDRL entry should reference the appropriate DID. Note that as part of tailoring, analysis requirements should be selected for specific phases and types of programs.

A.2 APPLICABLE DOCUMENTS

A.2.1 General. The documents listed in this section are specified in Appendix A of this handbook. This section does not include documents cited in other sections of this handbook or recommended for additional information or as examples.

A.2.2 Government documents. The following government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

A.2.2.1 Specifications, standards, and handbooks. The following government documents, drawings, and publication form a part of this document to the extent specified herein. Unless otherwise specified, the issues of those documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-31000 - Technical Data Packages

(Copies of this document are available online at https://assist.dla.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

A.2.2.2 Other Government documents, drawings, and publications. The following other government documents, drawings, and publication form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE MANUALS

DFARS 207 - Additional Requirements for Major Systems

(Copies of DFARS documents are available online at
http://www.acq.osd.mil/dpap/dars/dfarspgi/current/index.html.)

A.3 CDRLS AND DIDS

A.3.1 DID suggestions. When PSA tasks are performed by a contractor, task documentation that is required for delivery to the government will be specified on the CDRL, DD Form 1423, with appropriate DID's being cited. The CDRL will identify data and information that the contractor will be obligated to deliver under the contract. DID's are used to define and describe the data required to be furnished by the contractor. Applicable DID's that describe the data resulting from performance of the PSA activities contained in TA-STD-0017 are identified on TABLE A-I.

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A.3.2 CDRL examples. FIGURE A-1 through FIGURE A-4 are examples of CDRLs and deliverable items, as directed by the SOW, which support PSA and can be incorporated into contracts. This is not intended to be an exhaustive list of all potential deliverable items, but is an attempt to list only a few deliverables believed to significantly support PSA, and can be augmented/reduced as the PM believes is appropriate. The frequency and delivery dates of the deliverables should be specified, along with a list of deliverable recipients.

NOTES

1. The program plan and directive documentation should specify that anything the government paid to develop is available for delivery to the government with all of the developmental artifacts and unlimited usage rights. In addition, the program should require that the deliverables be provided (or deposited) in the appropriate repository (if established) such as the Navy's SHARE Repository or those made available through the DoD's Forge.mil Program (http://www.forge.mil/).

2. To help clearly understand the data rights to be provided to the government, the government recommends that a table listing all the CDRLs be inserted as an attachment to the proposal which includes a column wherein the offeror states the data rights to be provided with that CDRL when delivered.

3. Software should be delivered in a standalone fashion, i.e., not encumbered by any particular configuration management tool. Future sites/locations/programs that ultimately will use the software or artifacts should have the ability to use whatever configuration management tool they desire without any overt or hidden dependencies on a given tool.

4. When citing regulations such as the DFARS and FAR, dates are included where possible to reflect the most recent version of this Handbook. However, Contracting Officers and PMs need to check for current clause dates before using the language in this Handbook.

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CONTRACT DATA REQUIREMENTS LIST *(1 Data Item)*	*Form Approved* *OMB No. 0704-0188*

The public reporting burden for this collection of information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Executive Services Directorate (0704-0188). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please do not return your form to the above organization. Send completed form to the government Issuing Contracting Officer for the Contract/PR No. listed in Block E.

A. CONTRACT LINE ITEM NO. CLIN - 0116, 0212, 0312	**B. EXHIBIT** A	**C. CATEGORY:** TD _X_____ Summary_____ Analysis_____
D. SYSTEM/ITEM XXX	**E. CONTRACT/PR NO.** 123-456-789	**F. CONTRACTOR** Prime Contractor A
1. DATA ITEM NO. A001	**2. TITLE OF DATA ITEM** Logistics Product Data	**3. SUBTITLE** FMECA
4. AUTHORITY *(Data Acquisition Document No.)* DI-SESS-81758 & DI-SESS-81759	**5. CONTRACT REFERENCE** PWS Paragraph 3.6.1.2	**6. REQUIRING OFFICE** Office Symbol

7. DD 250 REQ LT	**9. DIST STATEMENT** C	**10. FREQUENCY** ASREQ	**12. DATE OF 1ST SUBMISSION** SEE BLOCK 16
8. APP CODE A		**11. AS OF DATE**	**13. DATE OF SUBSEQUENT SUBMISSION** ASREQ

14. DISTRIBUTION			
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	Draft	**Final**	
		Reg	**Repro**
SEE BLOCK 16			
15. TOTAL ---------→			0

16. REMARKS

Block 3: LSA-004, Maintenance Allocation Chart
LSA-030, Indentured Parts List
LSA-056, Failure Modes, Effects and Criticality Analysis (FMECA)
LSA-080, Bill of Materials
LSA-151, Provisioning Parts List Index

Block 8: Approval will be required 45 days prior to initiation of system testing.

Block 9: DISTRIBUTION STATEMENT C. Distribution authorized to U.S. Government Agencies and their contractors due to critical technology as of 7 December 2011. Other requests for this document shall be referred to the controlling DOD office.

Block 12: Initial submission shall be due at the first critical design review. The government has 30 days to accept/reject and provide comments. The contractor shall have 20 days to incorporate changes.

Block 13: Subsequent draft submissions shall be due 30 days prior to any design review, demonstration or test event. Final draft submissions shall be due 30 days after any PCA. The government has 30 days to accept/reject and provide comments. The contractor shall have 20 days to incorporate changes. Final delivery shall encompass the entirety of all government tested and approved capabilities and shall be due 90 days prior to the end of the contract. Revisions will be required through the life of the contract.

Block 14. Contractor format is not acceptable. Contractor shall deliver LSA reports in HTML and PDF formats generated using the LSAR database. LPD delivery shall consist of the entire LSAR database, reports, and any supporting documentation in MS Office and PDF formats on a CD-ROM, FTP, or via electronic mail to the Project Director, Acquisition Logistician, and Contract Specialist.

Tailor DI-SESS-81758 as follows:
See Logistics Product Data and Summaries - Attribute Selection Worksheet.
Warranty Data shall be incorporated into the LPD database and reports as applicable.

Tailor DI-SESS-81759 as follows:
Refer to TA-HB-0007-1 Logistics Product Data Reports Handbook

G. PREPARED BY Adam Smith/Data Office	**H. DATE** 07/01/2012	**I. APPROVED BY** Jane Doe / Program Office	**J. DATE** 7/5/2012

FIGURE A-1. CDRL example, LPD data

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The public reporting burden for this collection of information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Executive Services Directorate (0704-0188). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please do not return your form to the above organization. Send completed form to the government Issuing Contracting Officer for the Contract/PR No. listed in Block E.

A. CONTRACT LINE ITEM NO. CLIN - 0116, 0212, 0312	**B. EXHIBIT** A	**C. CATEGORY:** TD_____ Summary___X____ Analysis____X_____
D. SYSTEM/ITEM XXX	**E. CONTRACT/PR NO.** 123-456-789	**F. CONTRACTOR** Prime Contractor A
1. DATA ITEM NO. A002	**2. TITLE OF DATA ITEM** Logistics Product Data Summaries	**3. SUBTITLE** LPD Summaries
4. AUTHORITY *(Data Acquisition Document No.)* DI-SESS-81759	**5. CONTRACT REFERENCE** PWS Paragraph 3.6.1.2	**6. REQUIRING OFFICE** Office Symbol

7. DD 250 REQ	**9. DIST STATEMENT**	**10. FREQUENCY**	**12. DATE OF 1ST SUBMISSION**
SD	A	ASREQ	SEE BLOCK 16
8. APP CODE		**11. AS OF DATE**	**13. DATE OF SUBSEQUENT SUBMISSION**
A			ASREQ

14. DISTRIBUTION

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16. REMARKS

Block 3: Maintenance Planning
Repair Analysis
Support and Test Equipment
Manpower, Personnel, and Training
Facilities
Packaging, Handling, Storage, and Transportation
Post Production Support

Block 4: Content of the LPD summaries shall be tailored for each site and be in accordance with DI-SESS-81759.

Block 8: Approval will be required 45 days prior to initiation of system testing.

Block 9: DISTRIBUTION STATEMENT C. Distribution authorized to U.S. Government Agencies and their contractors due to critical technology as of 7 December 2011. Other requests for this document shall be referred to the controlling DOD office.

Block 12: Initial submission shall be due at the first critical design review. The government has 30 days to accept/reject and provide comments. The contractor shall have 20 days to incorporate changes.

Block 13: Subsequent draft submissions shall be due 30 days prior to any design review, demonstration or test event. Final draft submissions shall be due 30 days after any PCA. The government has 30 days to accept/reject and provide comments. The contractor shall have 20 days to incorporate changes. Final delivery shall encompass the entirety of all government tested and approved capabilities and shall be due 90 days prior to the end of the contract. Revisions will be required through the life of the contract.

G. PREPARED BY	**H. DATE**	**I. APPROVED BY**	**J. DATE**
Adam Smith/Data Office	07/01/2012	Jane Doe / Program Office	7/5/2012

FIGURE A-2. CDRL example, LPD summaries

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CONTRACT DATA REQUIREMENTS LIST *(1 Data Item)*			*Form Approved* *OMB No. 0704-0188*
A. CONTRACT LINE ITEM NO. CLIN - 0116, 0212, 0312	**B. EXHIBIT** A	**C. CATEGORY:** TD_____ Summary___X____ Analysis____X_____	
D. SYSTEM/ITEM XXX	**E. CONTRACT/PR NO.** 123-456-789		**F. CONTRACTOR** Prime Contractor A

16. REMARKS

Block 14: Reproducible documents (text, drawings, tables, charts, graphic packages used to create figures, and other type documents) shall be delivered in an appropriate, applicable and editable format (AutoCAD, ProE, MSVisio, and compatible Microsoft Office 2007 products) on a CD-ROM, FTP, or via electronic mail to the Project Director, Acquisition Logistician, and Contract Specialist. A final approved copy shall be delivered in an editable format and PDF.

Tailor DI-SESS-81759 as follows:
Warranty Data shall be incorporated into the LPD database and reports as applicable.

Supply Support Additional Guidance:
Remove references to Provisioning List Item Sequence Number (PLISN).

Post Production Support Additional Guidance:
Identify any supportability risk items due to limited sources, long lead times, support limitations, obsolescence, or other concerns and suggest support alternatives to overcome them.

Provide overall average annual support cost estimates in current year dollars per site:
a) Hardware Maintenance (labor)
b) Routine replacement of parts (hardware)
c) Software support, including recurring licensing

Provide life expectancy and refresh recommendations (in years) for all major subsystems and components. (e.g. routine technical refresh of computer equipment)

Provide recommendations for when major modification or upgrades may be required (year, component, or subsystem, estimated cost).

Estimate requirements of labor and operations personnel for annual operations, support, and maintenance.
DD

G. PREPARED BY	**H. DATE**	**I. APPROVED BY**	**J. DATE**
Adam Smith/Data Office	07/01/2012	Jane Doe / Program Office	7/5/2012

FIGURE A-2. CDRL example, LPD summaries – continued

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CONTRACT DATA REQUIREMENTS LIST *(1 Data Item)*	*Form Approved* *OMB No. 0704-0188*

The public reporting burden for this collection of information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Executive Services Directorate (0704-0188). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please do not return your form to the above organization. Send completed form to the government Issuing Contracting Officer for the Contract/PR No. listed in Block E.

A. CONTRACT LINE ITEM NO. CLIN - 0116, 0212, 0312	**B. EXHIBIT** A	**C. CATEGORY:** TD _X_____ Summary_____ Analysis_____
D. SYSTEM/ITEM XXX	**E. CONTRACT/PR NO.** 123-456-789	**F. CONTRACTOR** Prime Contractor A
1. DATA ITEM NO. A003	**2. TITLE OF DATA ITEM** PRODUCT DRAWINGS/MODELS AND ASSOCIATED LISTS	**3. SUBTITLE**
4. AUTHORITY *(Data Acquisition Document No.)* DI-MISC-80711A	**5. CONTRACT REFERENCE** 3.1.5.4. Product Definition Data (PDD)	**6. REQUIRING OFFICE** Office Symbol

7. DD 250 REQ DD	**9. DIST STATEMENT** D	**10. FREQUENCY** ASREQ	**12. DATE OF 1ST SUBMISSION** SEE BLOCK 16
8. APP CODE N/A		**11. AS OF DATE**	**13. DATE OF SUBSEQUENT SUBMISSION** ASREQ

16. REMARKS

Block 4: Contractor format is acceptable IAW MIL-STD-31000 TDP Option Selection Worksheet Annex to Exhibit B for Product Drawings/Models and Associated Lists.

Block 9: Distribution Authorized to the Department of Defense (DoD) and U.S. DoD Contractors only due to administrative or operational use, effective DEC-11.
.
Block 12: Preliminaries shall be due 10 days prior to each Preliminary Design Review (PDR), each Critical Design Review (CDR) and each Production Readiness Review (PRR).

Block 13: Final shall be due 10 days after each Physical Configuration Audit (PCA). Government will have 30 days to accept/reject and provide comments. Contractor shall have 30 days to incorporate changes. Revisions will be required through the life of the Delivery Order (DO).

Block 14: Deliverables shall be delivered via electronic mail or 5¼ inch optical disk (CD or DVD) based on documentation size. All documents for government review shall be delivered in PDF format to the controlling DOD office. This includes vector and raster based documents. After government acceptance, all documentation shall be delivered in both PDF and native editable format. Native format is defined as being produced by COTS software (i.e. Microsoft Office, OpenOffice, AutoCAD, Vectorworks, or others).

14. DISTRIBUTION			
a. ADDRESSEE	**b. COPIES**		
	Draft	**Final**	
		Reg	**Repro**
SEE BLOCK 16			
15. TOTAL ---------→			0

G. PREPARED BY Adam Smith/Data Office	**H. DATE** 07/01/2012	**I. APPROVED BY** Jane Doe / Program Office	**J. DATE** 7/5/2012

FIGURE A-3. CDRL example, EDFP

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CONTRACT DATA REQUIREMENTS LIST *(1 Data Item)*	*Form Approved* *OMB No. 0704-0188*

The public reporting burden for this collection of information is estimated to average 110 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Executive Services Directorate (0704-0188). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please do not return your form to the above organization. Send completed form to the government Issuing Contracting Officer for the Contract/PR No. listed in Block E.

A. CONTRACT LINE ITEM NO. CLIN - 0116, 0212, 0312	**B. EXHIBIT** A	**C. CATEGORY:** TD _X_____ Summary_____ Analysis_____

D. SYSTEM/ITEM XXX	**E. CONTRACT/PR NO.** 123-456-789	**F. CONTRACTOR** Prime Contractor A

1. DATA ITEM NO. A004	**2. TITLE OF DATA ITEM** Scientific and Technical Reports	**3. SUBTITLE** Logistics Engineering Report

4. AUTHORITY *(Data Acquisition Document No.)* DI-SESS-81000D	**5. CONTRACT REFERENCE** 3.7. Logistics Engineering	**6. REQUIRING OFFICE** Office Symbol

7. DD 250 REQ LT	**9. DIST STATEMENT** C	**10. FREQUENCY** MNTHLY	**12. DATE OF 1ST SUBMISSION** SEE BLOCK 16
8. APP CODE		**11. AS OF DATE**	**13. DATE OF SUBSEQUENT SUBMISSION** SEE BLOCK 16

14. DISTRIBUTION

a. ADDRESSEE	**b. COPIES**		
	Draft	**Final**	
		Reg	**Repro**
SEE BLOCK 16	1	1	1
15. TOTAL ---------→	1	1	1

16. REMARKS

Block 9: DISTRIBUTION STATEMENT C. Distribution authorized to U.S. Government Agencies and their contractors due to critical technology as of 7 December 2011. Other requests for this document shall be referred to the controlling DOD office.

Block 12: Shall be due 30 days after award of the contract on the 10th day of the month. The government has 15 days to accept/reject and provide comments. The contractor shall have 10 days to incorporate changes.

Block 13: Shall be required monthly through the life of the contract on the 10th day of each month. The government has 15 days to accept/reject and provide comments. The contractor shall have 10 days to incorporate changes. Revisions as required through the life of the contract.

Block 14: Reproducible documents (text, drawings, tables, charts, graphic packages used to create figures, and other type documents) shall be delivered in an appropriate, applicable and editable format (AutoCAD, ProE, MSVisio, and compatible Microsoft Office 2007 products) on a CD-ROM, FTP, or via electronic mail to the Project Director, Acquisition Logistician, and Contract Specialist. A final approved copy shall be delivered in an editable format and PDF.

The contractor shall furnish logistics engineering reports to the government that shall contain, at a minimum, the following information:

G. PREPARED BY Adam Smith/Data Office	**H. DATE** 07/01/2012	**I. APPROVED BY** Jane Doe / Program Office	**J. DATE** 7/5/2012

FIGURE A-4. CDRL example, logistics engineering report

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CONTRACT DATA REQUIREMENTS LIST *(1 Data Item)*			*Form Approved* *OMB No. 0704-0188*
A. CONTRACT LINE ITEM NO. CLIN - 0116, 0212, 0312	**B. EXHIBIT** A	**C. CATEGORY:** TD _ _____ Summary_____ Misc____X_____	
D. SYSTEM/ITEM XXX	**E. CONTRACT/PR NO.** 123-456-789	**F. CONTRACTOR** Prime Contractor A	

16. REMARKS

a. Activities in progress at the end of the reporting period.

b. Actual start date and estimated time remaining until completion of each activity.

c. Activities scheduled to start during the next reporting period.

d. Start date, refined estimates of duration, and estimated completion date for each activity.

e. Other activities not yet started, when known dates are expected to deviate from the baseline start and finish dates reflected in the master schedules; and the expected start date and duration for each activity.

f. The status of the support program by support element.

g. Progress of the product support program, as it applies to each Logistics Support Analysis Control Number (LCN). This shall include activities started, works in progress, activities completed, and completion status by LCN.

h. Drawings status by LCN, to include whether in-progress, preliminary, or released, and any revisions.

i. Status of contractor's progress against established baseline schedules and any revisions or changes to the contractor's originally established milestones.

j. Any update to the contractor's organizational matrix.

k. Status of open, new, changed, and closed design review comment sheets, including status of actions. (All new/revised/closed comment sheets are to be provided.)

l. Identification of all subcontractors and vendors; status of confirmation and status of any source data received.

m. Identification of any design changes during the reporting period that affect the reliability, availability, maintainability, and supportability of the system.

n. Contract Data Requirements List (CDRL) deliverable status to include data delivered, data requiring government response or approval, government response or approval received, delinquent data deliveries, and upcoming submittals.

o. Summary of trade-off analyses performed and a summary of analysis recommendations.

p. Summary of any prediction analysis

q. Identification of digital data made available for on-line access during the reporting period.

r. New or critical resources.

s. Operational scenarios modeled, assumptions made, constraints assumed, and non-economic factors imposed

t. Maintenance alternatives considered

u. Analytical method and models used to perform the economic evaluations

v. Discussion of any reliability, availability, maintainability, and supportability evaluation performed and results obtained

w. Provide any Reliability

G. PREPARED BY	**H. DATE**	**I. APPROVED BY**	**J. DATE**
Adam Smith/Data Office	07/01/2012	Jane Doe / Program Office	7/5/2012

FIGURE A-4. CDRL example, logistics engineering report - continued

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A.3.3 Suggested data item descriptions (DIDs). TABLE A-I contains a list of suggested DIDs per each activity.

TABLE A-I. Suggested DIDs per each activity

Activity	Title	DID Number	DID Title	Comments
1	Product Support Strategy	DI-MISC-80711A	Scientific and Technical Reports	
2	Product Support Analysis Planning	DI-MISC-80711A	Scientific and Technical Reports	
3	Program and Design Reviews	DI-MISC-80711A DI-ADMN-81249A DI-ADMN-81250A	Scientific and Technical Reports Conference Agenda Conference Minutes	
4	Application Assessment	DI-MISC-80711A	Scientific and Technical Reports	
5	Support System Standardization	DI-MISC-80711A DI-SDMP-81748 DI-SESS-81714 DI-MISC-80072E DI-MISC-80071E	Scientific and Technical Reports Parts Management Plan Provisioning Screening Data Program Parts Selection List Parts Approval Requests	
6	Comparative Analysis	DI-MISC-80711A	Scientific and Technical Reports	
7	Technological Opportunities	DI-MISC-80711A	Scientific and Technical Reports	
8	Supportability and Supportability Related Design Factors	DI-MISC-80711A DI-SESS-81758 DI-SESS-81759	Scientific and Technical Reports Logistics Product Data Logistics Product Data Summaries	See GEIA-STD-0007 Logistics Product Data for data element definitions. See TA-HB-0007-1, Logistics Product Data Report Handbook for summary definitions.
9	Functional Requirements	DI-MISC-80711A DI-SESS-81758 DI-SESS-81759 DI-MGMT-81398B DI-MISC-81397B	Scientific and Technical Reports Logistics Product Data Logistics Product Data Summaries HMMP Plan HMMP Report	Data requirements should be coordinated with Reliability, Maintainability, and Human engineering program requirements. See. GEIA-STD-0007 Logistics Product Data for data element definitions. See TA-HB-0007-1 Logistics Product Data Report Handbook for summary definitions.
10	Support System Alternatives	DI-MISC-80711A	Scientific and Technical Reports	
11	Evaluation Of Alternatives And Tradeoff Analysis	DI-MISC-80711A DI-SESS-81872 DI-SESS-81873	Scientific and Technical Reports Level of Repair Analysis Report Level of Repair Analysis Input Data	
12	Task Analysis	DI-MISC-80711A DI-SESS-81714 DI-SESS-81715 DI-SESS-81874 DI-SESS-81758 DI-SESS-81759 DI-MGMT-81398B DI-MISC-81397B	Scientific and Technical Reports Provisioning Screening Data Provisioning Parts List Engineering Data for Provisioning (EDFP) Logistics Product Data Logistics Product Data Summaries HMMP Plan HMMP Report	Data requirements should be coordinated with IPS element data requirements. See GEIA-STD-0007, Logistics Product Data for data element definitions. See TA-HB-0007-1, Logistics Product Data Report Handbook for summary definitions.
13	Early Distribution Analysis	DI-MISC-80711A	Scientific and Technical Reports	
14	Diminishing Manufacturing Sources and Material Shortages Management (DMSMS) Obsolescence Analysis	DI-MISC-80711A DI-SESS-81656	Scientific and Technical Reports Source Data for Forecasting Diminishing Manufacturing Sources and Material Shortages (DMSMS).	
15	Field Feedback	DI-MISC-80711A	Scientific and Technical Reports	
16	Disposal Analysis	DI-MISC-80711A DI-SAFT-80931 DI-SESS-81758 DI-SESS-81759	Scientific and Technical Reports Explosive Ordnance Disposal Data Logistics Product Data Logistics Product Data Summaries	See GEIA-STD-0007, Logistics Product Data for data element definitions. See TA-HB-0007-1, Logistics Product Data Report Handbook for summary definitions.
17	Operational Suitability Test, Evaluation, Verification And Validation	DI-MISC-80711A DI-SESS-81758 DI-SESS-81759	Scientific and Technical Reports Logistics Product Data Logistics Product Data Summaries	These data requirements should be coordinated with other system test planning and reporting requirements. See GEIA-STD-0007, Logistics Product Data for data element definitions. See TA-HB-0007-1, Logistics Product Data Report Handbook for summary definitions.

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ASSESSING A PROGRAM'S INTELLECTUAL PROPERTY RIGHTS AND DEVELOPING A DATA RIGHTS STRATEGY

B.1 SCOPE

B.1.1 Scope. Programs should work within their PEOs and across their Communities of Interest in considering their future needs for data and data rights in a structured, focused manner in an effort to develop a Technical Data Rights Strategy (TDRS). The TDRS includes both technical data and computer software. Much of this appendix was obtained from the DoD Open Systems Architecture Contract Guidebook (Preliminary Draft). For more detailed information, please see the OSA Guidebook (Preliminary Draft) https://acc.dau.mil/CommunityBrowser.aspx?id=489360. As part of this appendix, programs are advised to follow the DFARS provisions and discuss their proposed approach with their legal counsel.

B.2 APPLICABLE DOCUMENTS

B.2.1 General. The documents listed in this section are specified in Appendix B of this handbook. This section does not include documents cited in other sections of this handbook or recommended for additional information or as examples.

B.2.2 Government documents. The following government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE INSTRUCTIONS

DoDI 5230.24	-	Distribution Statements on Technical Documents

(Copies of the Defense Standardization Program Policies and Procedures is available online at https://assist.dla.mil.)

DEPARTMENT OF DEFENSE MANUALS

DoD 5010.12-M	-	Procedures for the Acquisition and Management of Technical Data
DFARS Part 252	-	DFARS for Solicitations, Provisions, and Contract Clauses

(Applications for copies of DoD Manuals are available online at http://www.dtic.mil. Copies of DFARS documents are available online at http://www.acq.osd.mil/dpap/dars/dfarspgi/current/index.html.)

DEPARTMENT OF DEFENSE GUIDEBOOKS

Better Buying Power: Understanding and Leveraging Data Rights in DoD Acquisitions
DoD Open Systems Architecture Contract Guidebook

(The Better Buying Power brochure is available online at https://acc.dau.mil/CommunityBrowser.aspx?id=436672&lang=en-US. The DoD Open Systems Architecture Contract Guidebook (Preliminary Draft) is available online at https://acc.dau.mil/CommunityBrowser.aspx?id=489360)

SOLICITATION FORMS

SF-33	-	Solicitation, Offer and Award
SF-1449	-	Solicitation/Contract/Order for Commercial Items

(Copies of this Standard are available online at www.gsa.gov/portal/forms.)

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FEDERAL PUBLICATION

FAR Part 2 - Federal Acquisition Regulations System (FARS)

(The electronic version of the FAR is available online at http://farsite.hill.af.mil.)

B.3 DATA RIGHTS

B.3.1 DoD data rights guidance. DoD Instruction 5000.02 dated December 2, 2008, and the Under Secretary of Defense (Acquisition, Technology and Logistics) in a Memorandum on Data Management and Technical Data Rights dated July 19, 2007 (available at https://acc.dau.mil/CommunityBrowser.aspx?id=158916), directed programs to take a number of steps related to identifying and managing their intellectual property. The following is a summary of these requirements:

a. PMs for Acquisition Category (ACAT) I and II programs, regardless of planned sustainment approach, will assess the long-term technical data and computer software data needs of their systems and reflect that assessment in a Data Management or Rights Strategy (DMS or DRS).
b. Be integrated with other life cycle sustainment planning and included in the Acquisition Strategy.
c. Assess the data required to design, manufacture and sustain the system as well as to support re-competition for production, sustainment or upgrade.
d. Address the merits of including a priced contract option for the future delivery of data and data rights not acquired upon initial contract award and will consider the contractor's responsibility to verify any assertion of restricted use and release of data.
e. The DRS will be approved in the context of the AS prior to issuing a contract solicitation.

B.3.2 DFARS data rights guidance. Subsequent language included in DFARS 207.106 (S-70) Additional Requirements for Major Systems specifically states: (S-70)(1) In accordance with Section 802(a) of the National Defense Authorization Act for Fiscal Year 2007 (Pub. L. 109-364) and DoD policy requirements, acquisition plans for major systems and subsystems of major systems should:

a. Assess the long-term technical data and computer software needs of those systems and subsystems.
b. Establish acquisition strategies that provide for the technical data and computer software deliverables and associated license rights needed to sustain those systems and subsystems over their life cycle. The strategy may include:
    (1) The development of maintenance, training, configuration management, supply support and other elements capabilities within DoD.
    (2) Competition for contracts for sustainment of the systems or subsystems.
    (3) Assessments and corresponding acquisition strategies developed under this section should:
        i. Be developed before issuance of a solicitation for the system or subsystem.
        ii. Address the merits of including a priced contract option for the future delivery of technical data and computer software, and associated license rights, that were not acquired upon initial contract award.
        iii. Address the potential for changes in the sustainment plan over the life cycle of the system or subsystem.
        iv. Apply to systems and subsystems that are to be supported by performance-based logistics arrangements as well as to systems and subsystems that are to be supported by other sustainment approaches.

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B.3.3 Data rights assessment goal. The goal of this assessment is to identify opportunities or requirements for information and information product sharing as well as “the long-term technical data (and computer software) needs of their systems” and then to structure contracts accordingly. Such an assessment should include both a cross-domain and enterprise-wide review of the component “marketplace”, both supply and demand. The results of this analysis should guide the program in determining the data and data rights that it requires the contractor to deliver in addition to competitively priced options for additional technical data, computer software, and other IPR. For example, the Navy’s policy is to accept only assets with Government Purpose Rights (GPR) or less restrictive rights for incorporation in its asset repositories/libraries.

NOTES

1. The definitions of technical data, computer software, and computer software documentation are found in DFARS 252.227-7013 and also in this handbook. The tables included in this Appendix summarize the different characteristics of each Rights Category along with criteria for their application.

2. When citing regulations such as the DFARS and FAR, dates are included where possible to reflect the most recent version of this Handbook. However, Contracting Officers and PMs need to check for current clause dates before using the language in this Handbook.

B.3.4 Additional guidance. Additional guidance on data, data rights and data management issues is available from “Acquiring and Enforcing the Government's Rights in Technical Data and Computer Software Under Department of Defense Contracts: A Practical Handbook for Acquisition Professionals” found at https://acc.dau.mil/CommunityBrowser.aspx?id=443043. This handbook is designed to provide a practical "cradle-to-grave" handbook to acquiring technical data and computer software rights. Another resource is a Naval Sea Systems Command manual entitled “NAVSEA SL150-AA-PRO-010/DMP, OPERATIONS AND PROCEDURES MANUAL FOR CONTRACTOR PREPARED DATA”. The manual can be accessed at https://acc.dau.mil/CommunityBrowser.aspx?id=402586. Additionally, DOD 5010.12-M, Procedures for the Acquisition and Management of Technical Data (https://acc.dau.mil/CommunityBrowser.aspx?id=131044) is intended to provide data management tools necessary to minimize and standardize data requirements that will be included in DoD contracts.

NOTES

1. When reviewing a contract, first determine whether it is for commercial items or noncommercial items. This will typically be apparent from the contract cover sheet, the SF-33 form is used for noncommercial procurements and the SF-1449 is used for commercial item procurements. Images of blanks of both forms are available in FAR Part 53.3, and at http://www.gsa.gov/portal/forms/type/TOP. If you are in doubt whether commercial or noncommercial data or software is being acquired, it is helpful to review the definition of "commercial item" at FAR 2.101.

2. The program plan and directive documentation should specify that anything that the government paid 100% of the cost to develop is available for delivery to the government with all of the developmental artifacts and unlimited usage rights. In addition, the PM should require that the deliverables be provided (or deposited) in the appropriate repository (if established), such as the Navy’s SHARE repository or those made available through the DoD’s Forge.mil Program (http://www.forge.mil/).

3. DFARS 252.227-7017 requires that proposals include a table identifying and asserting use, release or disclosure restrictions claimed against the government. To help clearly understand the data rights to be provided to the government, the table should identify the technical data or software item subject to restrictions with the associated CDRL.

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B.3.5 Approach. A data rights assessment should address the following:

a. Does the government already have data rights in existing software or other deliverables that permit the government to leverage that existing software for this new contracting effort?
b. Will obtaining more than restricted/limited rights increase competition and lower life cycle costs, or increase procurement costs without adding value?
c. What are the benefits of broader data rights clauses? For example, will requiring more than restricted/limited rights reduce competition or increase procurement cost without providing value?
d. Will the government obtain at least Government Purpose Rights? If not, is the asset isolated at the lowest component level? If not, is it noncritical? If not, what is the justification for more restrictive rights than GPR?
e. Does the program require the rights to modify (update, correct, enhance, etc.) the deliverables now or in the future?
f. Will the program need to maintain configuration control over the deliverables?
g. Has the program identified potential components and artifacts that can be provided to the offerors as Government Furnished Information (GFI)?
h. Does the government have the right to provide the information to third parties? If not, should the government negotiate a special license for this right?
i. Will the government need to use special licenses? For example, to allow third parties to use or reuse GPR repository assets for a limited basis to support evaluation for potential employment in a proposed solution.

B.3.6 Points to consider. Points to Consider about Data Rights and Rights in Computer Software and Computer Software Documentation. There are some principles to consider when performing a data rights assessment:

a. Data rights issues are complex and require careful examination of the program's requirements and overall "fit" within the Enterprise.
b. Use proper experts to review program data rights requirements – strategy development should involve an intellectual property lawyer, a Contracting Officer and the Program Manager.
c. It is typically very expensive to acquire the broader data rights or to create additional options for software maintenance after the initial contract is in place.
d. Insufficient data rights prevent the government from using deliverables in the most optimal way.
e. Remember that data rights will impact maintenance over 30 or more years of a system's life.
f. It is important to remember that after assessing data and data rights needs, a business case analysis (BCA) should be conducted to determine whether obtaining the desired rights is the correct business decision.

B.3.7 Deferred ordering of technical data or computer software (including design and development artifacts). There may be instances where the government would like to have access and the ability to download design artifacts and other materials that are produced during the development of software but which have not been specifically identified in the CDRLs and Data Item Descriptions (DIDs). These materials may be located in an Integrated Digital Design Environment (IDE). It is recommended that the PM use DFARS 252.227-7027, regarding deferred ordering of technical data, to obtain these materials. Reference to DFARS 252.227-7027, like reference to other FAR and DFARS clauses, should be included in Section I of the contract.

B.3.8 DFARS guidance. DFARS 227.7103-8(b) Deferred Delivery and Deferred Ordering of Technical Data. (b) Deferred Ordering. Use the clause at 252.227-7027, Deferred Ordering of Technical Data or 227.7203-8 for Deferred Ordering of Technical Data, when a firm requirement for a particular data item(s) has not been established prior to contract award but there is a potential need for the data. Under this clause, the Contracting Officer may order any data that has been generated in the performance of the contract or any subcontract thereunder at any time until three years after acceptance of all items (other than technical data) under the contract or contract termination, whichever is later. The obligation of subcontractors to deliver such data expires three years after the date the contractor accepts the last item under the subcontract. When the data are ordered, the delivery dates will be

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negotiated and the contractor compensated only for converting the data into the prescribed form, reproduction costs, and delivery costs.

NOTES

1. The following tables summarize the different characteristics of each data rights category along with criteria for their application. The definitions of technical data, computer software, and computer software documentation found in DFARS 252.227-7013 and -7014 should be referred to as the primary source of information for developing the contract language.

2. Distribution Statements required by DoDI 5230.24 do not correlate to specific data rights categories and vice versa. In most cases, the reason "Proprietary Information" will provide the basis for distribution statements B, E, or F. Data rights allocate the intellectual property interests of both government and industry according to the type of data, the use of the data, and the source of funding for the technology reflected in the deliverable. Distribution Statements may be based upon a number of additional restrictions including information security and export control. There are scenarios where a DoD program would have Unlimited Rights in a deliverable, but would not want to authorize uncontrolled distribution of the deliverable because of such other restrictions and these would be reflected in Distribution Statement limitations. Conversely, a Limited Rights deliverable might have no security or export control reasons for limited distribution. However, since the deliverable was delivered with Limited Rights, the DoD program cannot distribute the deliverable outside the government generally without the developing contractor's written permission. In most cases Proprietary Rights will provide the basis for distribution statements B, E, or F.

B.3.9 Department of defense open architecture team guidance. “Better Buying Power: Understanding and Leveraging Data Rights in DoD Acquisitions”.

B.3.10 Other sources of information about intellectual property rights. The Federal Acquisition Regulations (FAR) and Defense Federal Acquisition Regulation Supplement (DFARS) are the primary sources of information regarding data and intellectual property rights. FIGURE B-1 may be useful when reviewing a proposal to make sure that the appropriate clauses are included:

FAR/DFARS PATENT, TECHNICAL DATA, AND COMPUTER SOFTWARE CLAUSES

TD =TECHNICAL DATA CS =COMPUTER SOFTWARE ICP =ITEM, COMPONENT, OR PROCESS
CSD =COMPUTER SOFTWARE DOCUMENTATION

When to Incorporate Clauses/Provisions 252.227-	7013	7014	7015	7016	7017	7019	7028	7030	7037
Mandatory if TD for noncommercial ICP is to be delivered	X			X	X		X	X	X
Mandatory if noncommercial CS is to be delivered		X		X	X	X	X		
Mandatory if TD for commercial items is to be delivered			X						X
Strongly recommended in all solicitations	X	X	X	X	X	X	X	X	X
Strongly recommended in all contracts	X	X	X	X		X		X	X

SPECIFIC CLAUSES AND THEIR USE {SEE DFARS FOR TITLES}:
252.227-7018 - All SBIR contracts. (Do not use -7013 or -7014.)
252.227-7025 - All if access to less than unlimited rights TD/CS is anticipated. Strongly recommended in all contracts.
252.227-7026 - Voluntary clause used only to specifically identify at award TD & CS which may be ordered later.
252.227-7027 - Voluntary clause used to order additional deliverables for TD & CS "generated" during performance of the instant contract. Strongly recommended in all solicitations and contracts.
52.227-1 - All contracts and solicitations with limited exceptions.
52.227-2 - All contracts and solicitations with limited exceptions.
52.227-3 - Limited mandatory use in sealed bidding for "commercial" supplies/services & construction with many prohibitions on use.
52.227-10 - All which might result in a classified invention/patent.
52.227-11 - All R&D [DOD uses this clause with small business or nonprofit].
252.227-7038 - All R&D except when 52.227-11 used.
252.227-7039 - All if 52.227-11 is used.
252.246-7001 - Strongly urged whenever any technical data or software will be delivered under the contract. Using the clause avoids acceptance being "final" with respect to nonconforming markings. Review 246.708 and 246.710 for applicability. As of 07 Sept 2011.

FIGURE B-1. List of FAR and DFARS clauses for ordering technical data

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APPLICATION GUIDANCE FOR IMPLEMENTATION OF LEVEL OF REPAIR ANALYSIS PROGRAM REQUIREMENTS

C.1 SCOPE

C.1.1 Scope. This appendix provides rationale and guidance for the selection and tailoring of LORA activities in TA-STD-0017 to meet specific program objectives in a cost effective manner. However, it is not to be referenced or implemented in contractual documents. No requirements are contained in this appendix. The users of this appendix may include the DoD contracting activity, government in-house activity, and prime contractor or subcontractor who wishes to impose LORA tasks upon a supplier.

C.2 DEFINITIONS

C.2.1 Economic LORA. An analysis used to determine and identify the most cost effective maintenance concept for all items in the LORA candidate list.

C.2.2 Guidance conference. A conference used to ensure that the contractor and the customer have a firm understanding of the contractual provisioning requirements, establish funding and activity milestones, and formulate firm commitments for optional requirements in accordance with applicable data requirements. A guidance conference may also serve as a LORA Guidance Conference which is used to ensure that the contractor and the customer have a firm understanding of the relationship of the PSA activities to the PSA documentation, milestones, and funding levels contractually required.

C.2.3 LORA candidates list. A list containing all of the items for which the LORA program is being established.

C.2.4 LORA input data. LORA data elements and their corresponding value depicting the design, performance, cost, and support characteristics, factors, and features related to the system/equipment and its support alternatives.

C.2.5 LORA program plan. A description of how the LORA program will be conducted to meet the program requirements. These descriptions include a discussion of how LORA results are utilized in the PSA.

C.2.6 LORA report. A report documenting the results of the LORA program which includes the LORA tasks and evaluations performed, procedures used, and any subsequent recommendations made.

C.2.7 LORA strategy. Identifies the proposed LORA tasks to be performed and the activity responsible for each task.

C.2.8 Noneconomic LORA. An analysis addressing preempting factors which override cost considerations, or existing LORA decisions on similar systems, to determine the maintenance level(s) where repair or discard can be performed. This evaluation is performed without consideration of costs. However, any recommendations or conclusions based upon this evaluation should also include an economic LORA which will assign economic value to the noneconomic decisions.

C.2.9 Sensitivity analysis/evaluation. A means of varying some data elements, in the LORA analysis, to determine the effect on calculated product support costs and corresponding LORA recommendations.

C.3 GENERAL APPLICATION GUIDANCE FOR LORA PROGRAMS

C.3.1 LORA process. The LORA process involves systematic and comprehensive evaluations conducted on an iterative basis throughout the life cycle of the system/equipment. Through the iterative evaluation process, a maintenance and support concept for the system/equipment which is effective, yet economical, can be established.

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The process should integrate design, operations, performance, cost, readiness, and product support characteristics to assist in identifying and refining the maintenance and support concept for the system.

C.3.2 Coordination and interface. The success of a LORA program depends on the coordination efforts which provide integration of LORA activities with PSA and other system engineering analyses. Coordination efforts between all organizations/agencies involved should be described in the LORA Program Plan. The LORA Program Plan should be reviewed to ensure that input and output relationships, responsibilities, software tools, and the program milestones are properly addressed and identified to prevent overlap, duplication, omission, or schedule delays.

C.3.3 Development of LORA requirements. The key to a productive and cost effective LORA effort is the concentration of available resources on activities which will most benefit the overall program.

C.3.3.1 General. The basic objectives of the LORA program are to: (1) analyze maintenance support alternatives based on economic and noneconomic factors relating to the system/equipment; and, (2) use the results of the analysis to influence the design and assist in the maintenance planning process which will achieve the most effective maintenance support structure. The analyses are iterated and refined as the system progresses through the various stages of the life cycle. Development of a LORA strategy involves a large number of variables. Therefore, consideration of significant effects on these variables should be addressed in the tailoring process. The LORA tasks should be tailored and scheduled to meet the project decision milestones. The guidance included in this handbook is designed to assist in tailoring the LORA process.

C.3.3.2 Activity analysis and extent of analysis. The scope of the LORA program should be tailored to the size, complexity, and life cycle phase of the individual system/equipment program. The detail of the program and the rationale for selection of LORA activities is dependent upon many factors which may require tailoring, so that a particular program's dollars are used efficiently. The factors listed in paragraphs C.3.3.2.1 through C.3.3.2.8 will influence the amount of LORA activity administered on a program or restrict the LORA to selective areas (e.g., test program set (TPS) development, repair versus discard, and item analysis).

C.3.3.2.1 Type of program. The type of acquisition program can impact objectives and the degree of the LORA effort. For example: (1) Major modifications may require a new approach to some of the LORA already conducted or it may require a re-initiation of the LORA; (2) a minor materiel change might focus on support risks associated with the changed part of the system/equipment and opportunities for improvement on the total system/equipment through improvements in supportability characteristics; and, (3) in a product improvement program (PIP), a LORA could be performed to determine how the product improvement will affect the maintenance requirements for that system.

C.3.3.2.2 Amount of design freedom. The amount of design freedom is a key consideration in LORA. Design freedom is related to program considerations (i.e., phasing, scheduling). One objective of LORA is to influence selection of design characteristics to achieve improvements in supportability (e.g., design for discard). If the design and maintenance policies for a program are generated concurrently until finalized, the LORA is beneficial in developing an optimal system support package. During the PD and O&S phases, a LORA may be conducted to evaluate the maintenance concept and determine potential benefits to be gained by changing the maintenance concept.

C.3.3.2.3 Availability of relevancy of resources. The accomplishment of LORA requires resources in the form of people with relevant experience and money. It is DoD policy to fund readiness and support considerations up front with sufficient time in system acquisition programs. However, in reality, resources are constrained. If program funds are short, the LORA effort may have to be adjusted to compensate for lack of funds.

C.3.3.2.4 Schedule constraints. Scheduling constraints (such as those imposed by accelerated programs) tend to reduce the time to accomplish design influence analysis tasks such as LORA. Scheduling of the LORA should be considered to ensure a maintenance concept that results in an optimal product support footprint, but also meets statutory and regulatory requirements to avoid program risks.

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C.3.3.2.5 Data availability. The availability and accuracy of historical data on similar systems/equipment are crucial for accomplishing a LORA early in a program. The effectiveness of the LORA effort is impacted if historical data is unavailable.

C.3.3.2.6 Acquisition phase of the program. The extent and detail of LORA should be tailored to the life cycle phase of the program. C.3.3.2.6 (a through d) are for guidance only and may require adjustment for specific acquisition programs. The following information should be used to determine the amount of LORA activity which should be administered in each life cycle phase:

a. MSA phase. A LORA in the MSA phase is selectively applicable and requires tailoring. The design is only conceptual and this phase allows the best opportunity for identifying alternatives, conducting tradeoffs, and influencing design from a supportability standpoint. Since the design is conceptual, the extent of the LORA conducted in this phase depends primarily on the availability of data. An MSA phase LORA is usually conducted to establish a preliminary maintenance concept based upon engineering studies, evaluations, historical data, and expert opinion. MSA phase LORAs should only analyze general concepts.
b. TD phase. A LORA is generally applicable in this phase. In the TD phase, performance characteristics of the system/equipment are more or less established. The actual design is still flexible. Support, design, and operational alternatives are being investigated through tradeoff analysis. In this phase, a LORA is an excellent method for performing these tradeoffs and influencing the design of the system/equipment. When effectively timed and tailored, LORA assists in establishing the maintenance concept; assists in establishing cost effective reliability requirements and allocating these system level requirements to lower indenture levels; acquires essential information to enable a detailed Source of Repair Analysis; and assists in establishing cost effective testability requirements. A TD phase LORA is also conducted to identify items which should clearly be designed for discard, instead of repaired.
c. EMD phase. As in the TD Phase, a LORA is also generally applicable in the EMD phase. The EMD phase results in a prototype system for test and evaluation, including the associated support concept. Detailed design engineering, parts selection, and fine tuning of performance are primary activities of this phase. Design influence is limited to items at the subsystem/item level, as well as to details such as, packaging, partitioning, testability, and accessibility. The support system is fairly well defined. The LORA is used to optimize the support system and determine an optimal maintenance concept for the system to include detail sufficient to complete a Depot Source of Repair Analysis. LORA, in conjunction with detailed engineering design analyses, can verify the economics and engineering viability of repair level or discard alternatives at the module level; and BIT versus automated test equipment (ATE) tradeoffs can result in design optimization. LORAs conducted in this phase are usually detailed and consider both the economic and noneconomic factors of the repair level or discard alternatives.
d. PD/O&S phases. In the PD and O&S phases, the design is fixed and there are limited opportunities for tradeoffs or further optimization of the design. A LORA may be applicable if unanticipated circumstances arise that require design changes be made to the system/equipment. A LORA may also be conducted for update purposes to adjust LORA decisions based on field experience or evaluations on engineering change proposals (ECP) and PIPs.

C.3.3.2.7 Previously performed analyses. Previously conducted analyses can impact task selection. These analyses include LORAs, PSA, and other related system engineering analyses; or, work already accomplished. The previous work should be assessed for accuracy and reliability. If the documented results of the previous work are adequate, the analysis may only require updating as opposed to conducting a new analysis. Program documents may also prescribe objectives or constraints which tend to bind the scope of the LORA effort.

C.3.3.2.8 Procurement considerations. The requiring authority should specify which LORA tasks will be performed and who is responsible for performing each. Acquisition streamlining is encouraged by the prospective performing activities.

C.3.4 Task data and documentation of data. The data and documentation resulting from the LORA tasks contained in this handbook serve the following purposes:

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a. Provide an audit trail of analyses performed assumptions and decisions made affecting the supportability of a system/equipment.
b. Provide analysis results for input to follow-on analysis tasks later in the system/equipment life cycle.
c. Provide input into materiel acquisition program documents.
d. Help prevent duplication of analyses.
e. Provide valid data for use on future acquisition programs.

C.3.4.1 Performing activity. The individual analysis tasks performed as part of a system/equipment's LORA program may be performed in three ways. (1) The first method is when the performing activity is contractually responsible for the complete LORA program. This includes input data compilation, evaluation performance, and LORA report preparation. (2) The second method involves a joint effort between the requiring authority and performing activity. In this method, the performing activity is responsible for gathering and providing the input data, in the form of a LORA input data report. This is then used by the requiring authority to conduct LORA evaluations and prepare the LORA report. (3) The third method is when the requiring authority is solely responsible for performing the complete LORA program. The method is chosen at the discretion of the requiring authority. Whatever method chosen, task documentation should be developed to the degree which will allow another activity to use the task results as input to perform other LORA tasks, or as input to conduct the same tasks to a more detailed level in a later acquisition phase. When certain tasks are performed by the requiring authority and others are performed by the performing activity, procedures should be established to provide for the data interchange between these performing activities. Therefore, tasks performed by the requiring authority should be documented equivalently to the applicable DID requirements to ensure compatibility of the documentation.

C.3.4.2 Identification of requirements. The LORA data and documentation required for delivery to the requiring authority will be specified on the CDRL. The CDRL identifies data, information, and documentation which the performing activity will be obligated to deliver under the contract. DIDs are used to define and describe that data required to be furnished by the performing activity. Applicable DIDs that describe the data resulting from performance of the LORA tasks (Activity 11) contained in TA-STD-0017 are identified in TABLE I of this handbook. These DIDs are structured to identify the maximum range of data which can be documented in a report. The requiring authority can tailor the DIDs by deleting unwanted requirements from the applicable DIDs. The CDRL will specify those requirements of the DIDs that have been deleted.

C.3.4.3 Cost considerations. The procurement of data and documentation should be carefully scoped to meet program objectives in a cost effective manner.

C.3.4.3.1 Factors affecting cost. The following factors may affect data and documentation costs:

a. Timing and preparation of delivery. Documentation or reordering of data should coincide with generation of such data in design and analysis sequence in order that such data, at a later date, will not have to be recreated at added expense. Delivery of data should be postponed until actual need date to acquire data in its most complete form without repetitive updates.
b. Special formatting requirements.
c. Degree of detail required.
d. Degree of research required to obtain the data.
e. Accuracy and amount of verification required.
f. Duration of responsibility for data contents.
g. Availability and accuracy of source data from which to construct documentation.

C.3.4.3.2 Controlling costs. Data and data documentation costs can be controlled by the following methods:

a. Screening requirements prior to preparation of solicitation documents. Each data requirement should be reviewed for data content, end use, formatting needs, scheduled delivery, and estimated cost to eliminate duplication and ensure proper integration/scheduling of requirements.

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b. Involve potential bidders in briefings and planning conferences prior to release of a solicitation document. This helps ensure that data and data documentation requirements are realistic and that the maximum use is made of data already available.

C.4 DETAILED GUIDANCE ON ACTIVITIES AND SUB-ACTIVITIES

C.4.1 General. In the early acquisition phases, the system/equipment's maintenance alternatives are initially being considered. Therefore, to influence design, the LORA activities should be completed on time. This includes having available the most up-to-date documented results of the LORA activities. Later, as the program progresses through the life cycle phases, and the system becomes better defined, the LORA activities and associated documented results should be updated to reflect the current status of the system/equipment under analysis. This iterative process is continuously performed throughout the system/equipment's life cycle and applies to all activities required to be performed during execution of the LORA program.

C.4.2 Program planning and control.

C.4.2.1 General considerations. General considerations of program planning and control include program management, timing, and program execution.

C.4.2.1.1 Program management. Good management of the LORA program requires: (1) planning which identifies all the necessary actions required for program success; (2) scheduling which identifies the timing of each required action and the responsible party for each action; and (3) execution through timely management. Procedures should be established to ensure the right information is available at the scheduled time so that timely decisions can be made.

C.4.2.1.2 Timing. Scheduling activity accomplishments is critical for the LORA program to achieve its objectives. The criteria that should be applied for proper scheduling of LORA actions is to assure that (1) all required actions are completed and data available when it is needed, and (2) only the required actions are done and only the required data is available to prevent wasting resources and time.

C.4.2.1.3 Program execution. Proper program execution is achieved through continuous monitoring of the effort to identify problems as they occur, and having an established procedure to eliminate or minimize problems as they occur. Efficient program execution requires that working arrangements between the LORA program and other system engineering programs be established to identify mutual concerns, maximize the benefits of mutually supporting tasks, and minimize effort overlap.

C.4.2.2 Program strategy and plan (Activities 1 and 2). This activity is the earliest planning activity for a LORA program and is the first step in developing an effective program. While Activity 1 is pertinent for MSA activities, it is also generally applicable prior to preparation of any solicitation documents containing LORA task requirements. The efficient scheduling of tasks and assignment of personnel to perform each task will assure proper execution of the LORA program. Therefore, the program strategy and plan for scheduling of tasks and personnel to perform the tasks should be coordinated with other related system engineering analyses; and with the agencies performing these analyses or similar studies to avoid duplication.

C.4.2.2.1 LORA program plan (Activity 2). The PSA Program Plan, the LORA Program Plan is the basic tool for establishing and executing an effective LORA program.

a. General. The Program Plan should effectively document what LORA tasks are to be accomplished, when each task will be accomplished, what organizational units will be responsible for task accomplishment, and how the results of each task will be used. The LORA Program Plan is a stand-alone document but can be included as part of the PSAP (Activity 2) when a PSAP is required. Plans submitted in response to solicitation documents assist the requiring authority: (1) in evaluating the prospective performing activity's approach to performing LORA task(s); (2) in evaluating the performing activities' understanding of the LORA task(s) requirements and the overall process for performing LORA task(s); and, (3) the organizational structure for performing LORA tasks. The LORA Program Plan should be tailored to meet

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the specified goals of the system/equipment under analysis. In developing a tailored LORA Program Plan, time and resource constraints should be considered. However, when a LORA input data report is required, the tailored LORA Program Plan should state explicitly: (1) what data is to be provided; (2) how data is to be provided (hardcopy, disks, etc.); (3) which items in the LORA candidates list data is to be provided on; (4) the LORA model specified in the contract to which the data will be formatted for; and, (5) when the data is to be provided.

b. Submission and approval. The LORA Program Plan is generally submitted in response to a solicitation document and generally becomes a part of the SOW when approved by the requiring authority. When requiring a LORA Program Plan, the requiring authority should allow the performing activity to propose additional tasks or task modifications, with supporting rationale to show overall program benefits to those tasks contained in the solicitation document. The LORA Program Plan should therefore reflect the current program status and planned actions. The LORA Program Plan should be reviewed and approved by the requiring authority and incorporated into the contract.

C.4.2.3 Program reviews (Activity 3). This activity provides the opportunity for the performing activity and the requiring authority to review the progress of the LORA program and the results at scheduled intervals. Program review is an important management and technical tool of the requiring authority. Program reviews should be specified in SOW's to assure adequate staffing and funding and are typically held periodically during an acquisition program to evaluate the overall program progress, consistency, and technical adequacy. If the performing activity conducts internal reviews with contractors, subcontractors, vendors, or the requiring authority, then the documented results and minutes of these meeting are to be available to the requiring authority upon request.

C.4.2.3.1 LORA guidance conference (Activity 3.4.1). LORA program reviews should be conducted periodically as specified in the contract (generally semi-annually or quarterly). The initial LORA review should be conducted as a detailed guidance conference and held not later than 90 days after award of the contract. The purpose of this conference is to establish review procedures, provide guidance concerning analysis and data requirements, describe procedures for exchange of data between requiring authority and performing activity, and identify any problems. Subsequent LORA reviews should be conducted at appropriate intervals to ensure accomplishment of the LORA review objectives.

C.4.2.3.2 LORA topics (Activities 3.3 and 3.4). The topics included in a LORA review will vary with the type of development effort, the life cycle phase, and the review technique. However, there are core topics that should be covered during a LORA review to ensure the maximum effectiveness of the LORA program. During the review, the topics to be discussed include, but are not limited to:

a. Status of action items from previous meetings.
b. Contract modifications and other program issues impacting the LORA effort.
c. Status of the LORA program task and schedule.
d. Summary of LORA results and recommendations.
e. Issues, risks, and action items.

C.4.3 Data preparation and management. Included in data preparation and management are input compilation, input data for noneconomic evaluations and input data report.

C.4.3.1 Input data compilation. This activity identifies the LORA input data which will be used in the LORA evaluations. The tedious task of data collection can be reduced by examining the data obtained from existing documents, comparative systems/equipment, historical databases, and expert knowledge. When values are unobtainable, engineering estimates or calculated values should be used. However, caution should be exercised to ensure that data values are consistent and reliable. The most current data should be used. Elements related to cost should be expressed in the same base year dollars. This will ensure consistency and accuracy. A major key to having an effective LORA program is the use of the data available on similar systems/equipment to predict a maintenance concept for the system being analyzed. If design parameters are predicted, then current operational systems which are similar to the system/equipment being analyzed should be identified.

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C.4.3.1.1 LORA input data for economic evaluations. This activity identifies values corresponding to the data elements used in the LORA economic and sensitivity evaluations. The data identified is used to establish a baseline maintenance concept. The data should be collected on all items listed in the LORA candidate list.

C.4.3.1.2 LORA input for noneconomic evaluations. The data identified in this activity are constraints, stipulations, special requirements, or other factors which restrict the maintenance concept or limit the support alternatives available (e.g., safety, HAZMAT, calibration, feasibility of repair, etc.). This data is used to perform a LORA noneconomic analysis. Factors which directly affect the repair decisions obtained should be used in conjunction with the LORA economic and sensitivity evaluations to establish an optimal maintenance concept.

C.4.3.1.3 LORA input data report. This activity is generally invoked when another performing activity is responsible for conducting LORA evaluations described in Activity 9. LORA input data should be collected on all items in the LORA candidate list.

C.4.4 Evaluations.

C.4.4.1 General considerations. Included in the general considerations for evaluations are iterations, timing and evaluation performance, assessment and documentation.

C.4.4.1.1 Iterations. The activities contained in this section are iterative, performed in sequence, and are applicable in each phase of the life cycle. This process is performed to increasingly lower levels of indenture and detail.

C.4.4.1.2 Timing. The development of alternatives and evaluations should be conducted to a level consistent with the design and operational concept development. In the early phases of the life cycle, alternatives should only be developed to the level required to analyze differences and conduct tradeoffs. More detail can be developed after tradeoffs are made and the range of alternatives is narrowed. Analysis of support alternatives is an inherent feature of models used in the evaluation and tradeoff process.

C.4.4.2 Evaluation performance, assessment, and documentation. Optimum benefits are realized when LORA is conducted considering cost, schedule, performance, and supportability before the system/equipment design is finalized. The magnitude, scope, and level of detail of the LORA will depend upon both the acquisition phase and the system complexity. As development of the system/equipment progresses and the input data become more reliable, LORAs are progressively updated.

C.4.4.2.1 LORA noneconomic evaluation. This activity uses the data identified to determine the maintenance levels affected or restricted. The activity also determines if the support alternatives are limited and explains the rationale for the restrictions or limitations.

C.4.4.2.2 LORA economic/sensitivity evaluation. The economic analyses of the support alternatives identified are conducted to establish the maintenance concept which is most cost effective. These evaluations are conducted by analyzing different support alternative concepts relating to design, operation, and product support resource factors. The algorithms used to conduct LORA economic and sensitivity evaluations are also used to establish a baseline maintenance concept and in performance of the sensitivity analysis. Sensitivity evaluations are conducted to assess the impact on the baseline maintenance concept. The results, including the rationale for selection and rejection of alternatives, assumptions, and risks involved should be documented for subsequent iterations.

C.4.4.2.3 LORA report. The LORA report should be periodically updated to reflect the current status of the program. The following list is to be used for guidance on submission of LORA reports. Fewer reports may be required when a program's acquisition strategy is shortened. LORA reports conducted on similar systems/equipment are analyzed in the conceptual phase. The LORA report includes summary of results of the LORA evaluations, assumptions made, conclusions, and recommendations. This list should be tailored to fit the goals and objectives of the specific program under analysis:

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a. The LORA process should be initiated during the early stages of the TD phase to influence design, maintenance, and supportability of the system/equipment. The exception would be a selectively applicable LORA in the MSA phase to establish general preliminary maintenance concepts.

b. The first TD LORA report is due prior to performing PSA Activity 12.

c. The second TD LORA report is due after completion of Operational Test (OT) I, but before Defense System Acquisition Review Council design review and contract award.

d. The first EMD LORA report is prepared after the update of the failure analyses performed.

e. The second EMD LORA report is prepared after the OT II, but before the preparation of initial provision parts list and before the formal provisioning review.

f. The final P&D/O&S LORA report is prepared after the final failure analysis is updated and before the performing activity submits a final provisioning parts list (PPL).

C.4.5 Use and implementation.

C.4.5.1 Using results. This activity provides for using results of the evaluations conducted during Activity 9. From the results of the analysis, an optimal maintenance concept will be derived. The results should also be coordinated with systems engineering and other applicable analyses. In early phases of the life cycle, the LORA results can be used to influence design and assist in development of the maintenance concept. The LORA results are also used to develop PSA related products specified in the contract, validate resource requirements, and assist in generating the maintenance allocation chart, as well as the Source, Maintenance, and Recoverability (SMR) codes. The results should also be used to make recommendations for further analyses and to update the LORA. When conducting a LORA on fielded systems/equipment, the LORA results should be used to assess the current maintenance concept and to recommend how it may be improved.

C.4.5.2 Implementation. A free and easy-to-use tool for performing LORA is COMPASS, available at https://www.logsa.army.mil/lec/compass.

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CONCLUDING MATERIAL

Custodians:
Army - TM
Navy – AS
Air Force - 10

Review activities:
Army – AV, CR, MI, PT,
Navy – MC, SH,
Air Force – 1, 11

Preparing activity:
Army – TM
(Project SESS-2012-015)

"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."

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