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| SYSTEMS MANAGEMENT STANDARD | TA-STD-0017™ | REV. A |
| | Issued 2012-11 Revised 2022-03 | |
| | Superseding TA-STD-0017 | |
| (R) Product Support Analysis | | |

RATIONALE

This standard has been reformatted from TechAmerica to SAE style formats and rules and has been revised to incorporate updates to various Product Support Analysis (PSA) activities.

FOREWORD (INFORMATIVE)

This standard provides general requirements and activity descriptions governing performance of Product Support Analysis (PSA) during the life cycle of products. This standard applies to all system acquisition programs, major modification programs, and applicable research and development projects through all phases of the product life cycle. This standard is for use by both industry and Government activities performing PSA on products to which this standard applies.

This standard was developed by the SAE Life Cycle Logistics Supportability (LCLS) Committee. For further information about SAE TA-STD-0017 or how to participate in the SAE LCLS, please refer to the following URL: <https://www.sae.org/works/committeeHome.do?comtID=SMCLCLS>.

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SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

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| CHANGE LOG | | |
|------------|--|---------|
| REVISION | DESCRIPTION OF CHANGE | DATE |
| - | INITIAL RELEASE | 2012 |
| A | <ul style="list-style-type: none"> • Implemented new numbering scheme • <u>Added Foreword</u> • <u>Added Rationale</u> • <u>Added Acronym List</u> • <u>Updated Definitions</u> • <u>Updated References</u> • <u>Updated Product Support Analysis section</u> • <u>Updated Product Support Analysis Documentation section</u> • <u>Updated Recycled, Recovered, or Environmentally Preferable Materials section</u> • <u>Added Support System Standardization section</u> • <u>Added Integrated Data Environment for Product Support (IDE-PS) section</u> • <u>Added DevSecOps section</u> • <u>Added Digital Thread section</u> • <u>Updated Quantitative Factors section</u> • <u>Updated Support Resource Standardization section</u> • <u>Updated Standardization Costs section</u> • <u>Updated Comparative Products section</u> • <u>Updated BCS Supportability, Costs, and Readiness Drivers section</u> • <u>Updated BCS Updates section</u> • <u>Updated Supportability Characteristics section</u> • <u>Updated Intellectual Property and Data Rights section</u> • <u>Updated Key Performance Parameters section</u> • <u>Updated Objectives, Goals, and Thresholds section</u> • <u>Added Advanced Manufacturing section</u> • <u>Added Failure Modes and Effects Analysis section</u> • <u>Updated Fault Tree Analysis section</u> • <u>Updated Design Alternatives section</u> • <u>Updated Function Updates section</u> • <u>Updated Diagnostics Tradeoffs section</u> • <u>Updated Tradeoff/Evaluation Performance section</u> • <u>Updated Support System Tradeoffs section</u> • <u>Added Environment, Safety and Occupational Health (ESOH) Analysis section</u> • <u>Updated DMSMS Management, Obsolescence Management, and Counterfeit Prevention section</u> • <u>Added Counterfeit Prevention section</u> • <u>Added Management of Reliability Drivers through Failure Reporting Analysis and Corrective Action System (FRACAS) section</u> • <u>Updated Disposal Analysis section</u> • <u>Added In-Service Supportability section</u> • <u>Added Supportability in Mission Planning section</u> • <u>Added Supportability in Engineering Change section</u> • <u>Added Supportability Performance Assessment section</u> • <u>Added Establish Performance Measurement Framework section</u> • <u>Added Measure and Compile Supportability Performance Data section</u> • <u>Added Analyze Performance Levels section</u> • <u>Added Propose Changes to Support Solution section</u> | 2020/21 |

| CHANGE LOG | | |
|------------|--|------|
| REVISION | DESCRIPTION OF CHANGE | DATE |
| | <ul style="list-style-type: none">• <u>Added Update Performance Measurement Framework, PSP, and LPD section</u>• <u>Added Annex A – Activity Cross-reference</u>• <u>Added Annex B – Product Support Analysis Life Cycle Phases</u>• <u>Added Annex C – PSA Standards Evolution</u> | |

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1. SCOPE

This standard establishes general principles and descriptions of activities which, when performed in a logical and iterative nature, comprise the Product Support Analysis (PSA) process.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

| | |
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| AS1390 | Level of Repair Analysis (LORA) |
| AS6174 | Counterfeit Materiel; Assuring Acquisition of Authentic and Conforming Materiel |
| GEIA-STD-0007 | Logistics Product Data |
| GEIA-STD-0009 | Reliability Program Standard for Systems Design, Development, and Manufacturing |
| SAE1010 | Best Practice Standard for Manpower and Personnel |
| SAE6906 | Standard Practice for Human Systems Integration (HSI) |
| STD-0016 | Standard for Preparing a DMSMS Management Plan |
| TA-HB-0007-1 | Logistics Product Data Reports Handbook |

2.1.2 U.S. Government Publications

Available from Defense Standardization Program Office, 8725 John J. Kingman Road, Stop 5100 Fort Belvoir, VA 22060-6220.

| | |
|----------|--|
| 5000.02T | Operation of the Defense Acquisition System |
| SD-22 | Diminishing Manufacturing Sources and Material Shortages Guidebook |
| SD-26 | DMSMS Contract Language Guide Book |

Available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Telephone: 215-697-6257, Web address: <http://quicksearch.dla.mil/qsSearch.aspx>.

| | |
|---------------|--------------------------|
| MIL-HDBK-1390 | Level of Repair Analysis |
| MIL-STD-882 | System Safety |

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

| | |
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| ARP5580 | Recommended Failure Modes and Effects Analysis (FMEA) Practices for Non-Automobile Applications |
| AS6140 | Nut, Spanner Bearing Retaining, Phosphate Treated Aeronautical, UNS G41400 |
| AS6171 | Test Methods Standard, General Requirements, Suspect/Counterfeit, Electrical, Electronic, and Electromechanical Parts |
| EIA-649 | Configuration Management Standard |
| EIA-836 | Configuration Management Data Exchange and Interoperability |
| GEB1 | Diminishing Manufacturing Sources and Material Shortages (DMSMS) Management Practices |
| GEIA-HB-0007 | Logistics Product Data Handbook |
| JA1011 | Evaluation Criteria for Reliability-Centered Maintenance (RCM) Processes |
| JA1012 | A Guide to the Reliability-Centered Maintenance (RCM) Standard |
| SAE1001 | Integrated Project Processes for Engineering a System |

2.3 Definitions

ACTIVITY: A unit of specific work behavior with a clear beginning and ending point. However during the course of the product's life cycle each activity may occur multiple times due to a variety of reasons, such as redesign, program schedule changes, life cycle extensions, etc. The activity should be directly observable or an otherwise measurable process, frequently resulting in a product that can be evaluated for quantity, quality, and accuracy.

ADDITIVE MANUFACTURING: Additive Manufacturing refers to manufacturing or fabrication processes that involve the joining of materials to make objects from three dimensional model data, usually layer upon layer, as opposed to subtractive manufacturing and formative manufacturing methodologies. Examples of available additive manufacturing technologies are 3D printing, powder bed fusion, and cold spray.

ADVANCED MANUFACTURING: Advanced Manufacturing refers to activities that depend on the use and coordination of information, automation, computation, software, sensing and networking and/or make use of cutting edge materials and emerging capabilities enabled by the physical and biological sciences. It involves both new techniques to manufacture existing products and the manufacture of new products emerging from new advanced technologies. It includes, but is not limited to, additive manufacturing (also known as three-dimensional, or "3D," printing), artificial intelligence, robotics, and advanced composite materials.

AVAILABILITY: A measure of the degree to which a product is in an operable and committable state. Availability is typically expressed in terms of two components: Materiel Availability, which is a fleet-wide measure, and Operational Availability, which is an operational unit-level measure. Establishing an acceptable level of operational availability is an integral step in determining fleet-wide availability.

BASELINE COMPARISON SYSTEM (BCS): The Baseline Comparison System facilitates comparative decision making by modelling alternatives against a current design (the baseline) to estimate supportability performance characteristics (e.g., system readiness, support resource levels, and ownership costs). The initial BCS is developed from a current operational product or a composite of current operational products, the design, operational, and support characteristics of which most closely represent those of the new products under development. The product and support solution design will be represented as a functional, physical, and logistical breakdown working within an expected operational requirement. The BCS is updated as the new product becomes more clearly defined. The maturing baselines of the BCS establish the current known definition of the new support solution.

COLLABORATIVE ENVIRONMENT (CE): Tools or services that help people work together on activities (e.g., online software, project management software, whiteboards, flipcharts, online software, email).

COLLECTIVE TASK: A task that requires more than one individual to complete with each individual performing a discrete part of the collective task.

COMPARATIVE ANALYSIS: An examination of two or more products and their relationships to discover resemblances or differences.

CONSTRAINTS: Restrictions or key boundary conditions that impact overall capability, priority, and resources in system acquisition.

CONTRACTOR: The organization that provides goods or services as defined in a written agreement.

CONTRACTOR FURNISHED MATERIAL: Material provided by the contractor to a customer to be incorporated in, attached to, used with, or in support of a product to be delivered to the customer.

CONTRACTOR LOGISTICS SUPPORT (CLS): A Product Support Strategy (PSS) that contracts the responsibility of sustaining a product by performing or integrating various support functions such as maintenance, engineering, and/or materiel management.

CORRECTIVE MAINTENANCE: All actions performed in order to restore a product to a specified condition after a failure has occurred.

CUSTOMER: An organization purchasing or requiring Product Support Analysis.

CUSTOMER FURNISHED MATERIAL: Material provided by the customer to a contractor to be incorporated in, attached to, used with, or in support of a product to be delivered to the customer.

DESIGN PARAMETERS: Qualitative, quantitative, physical, and functional value characteristics that are inputs to the design process, for use in design tradeoffs, risk analyses, and development of a product that is responsive to product requirements.

DEVSECOPS: DevSecOps is an organizational software engineering culture and practice that combines software development (Dev), security (Sec), and operations (Ops). The product's security and function capabilities are tested and built simultaneously, and typically iteratively, throughout the life cycle phases.

DIGITAL THREAD: An extensible, configurable, or component enterprise-level analytical framework that seamlessly expedites the controlled interplay of authoritative technical data, software, information, and knowledge in the enterprise data, information and knowledge systems, based on the Digital System Model template, to inform decision makers throughout a system's life cycle by providing the capability to access, integrate, and transform disparate data into actionable information.

DIGITAL TWIN: A highly complex virtual model that is the exact counterpart (or twin) of a physical object or process. This pairing of the virtual and physical worlds allows analysis of data and monitoring of systems to head off problems before they even occur, prevent downtime, develop new opportunities, and even plan for the future by using simulations.

ELECTRONIC DATA EXCHANGE (EDE): The transfer of data from one computer system to another by standardized message formatting, without the need for human intervention. EDE is synonymous with Electronic Data Interchange.

ENGINEERING DATA FOR PROVISIONING (EDFP): The engineering data used in the initial provisioning of support resources. This technical data provides definitive identification of dimensional, material, mechanical, electrical, or other characteristics adequate for the provisioning of support items for the end item(s) on contract. EDFP includes data needed to indicate the physical characteristics, location, and function of the item. EDFP may also include government or industry specifications or standards, engineering drawings, production or commercial drawings and associated lists, commercial catalogs, and sketches or photographs with descriptive characteristics. EDFP is also used synonymously with the term form, fit, and function data.

ELECTRONIC DATA INTERCHANGE (EDI): The transfer of data from one computer system to another by standardized message formatting, without the need for human intervention. EDI is synonymous with Electronic Data Exchange.

ENTERPRISE RESOURCE PLANNING (ERP): The integrated management of key business processes, frequently in real-time and mediated by software and technology.

ENVIRONMENT, SAFETY, AND OCCUPATIONAL HEALTH (ESOH): The combination of disciplines that encompasses the processes and approaches for addressing laws, regulations, Executive Orders, customer policies, environmental compliance, and hazards associated with environmental impacts, system safety (e.g., platforms, systems, system-of-systems, weapons, explosives, software, ordnance, combat systems), occupational safety and health, hazardous materials management, and pollution prevention. DoD customers please refer to MIL-STD-882.

FACILITIES: The permanent, semi-permanent, or temporary real property assets required to operate, support, and sustain the new or modified product.

FAILURE MODES AND EFFECTS ANALYSIS (FMEA): The procedure by which each potential failure mode defined for the product is analyzed to determine its effects on the product.

FAILURE MODES, EFFECTS, AND CRITICALITY ANALYSIS (FMECA): The procedure by which each potential failure mode is analyzed to determine its effects on the product and then classified according to its severity.

FAILURE REPORTING, ANALYSIS, AND CORRECTIVE ACTION SYSTEM (FRACAS): A closed loop failure reporting, analysis, and corrective action system where failures and faults of both hardware and software are formally reported, analysis is performed to the extent such that the failure cause is understood, and positive corrective actions are identified, implemented, and verified to prevent further recurrence of the failure.

FAULT TREE ANALYSIS (FTA): A top-down model that graphically depicts all known events or combinations of events that can occur regarding a specific undesirable event (i.e., a failure).

HUMAN SYSTEMS INTEGRATION (HSI): A comprehensive management and technical approach applied to systems development and integration as part of a wider Systems Engineering process to ensure that human performance is optimized to increase total system performance and minimize the total system ownership cost. HSI efforts accomplish this by ensuring that the human is fully and continuously considered as part of the total system in the development and acquisition of all systems. HSI considerations comprise Human Factors Engineering, Safety and Occupational Health, Habitability, Force Protection and Survivability, Manpower, Personnel, and Training. Refer to SAE6906 Best Practice Standard for Human Systems Integration for more information.

INTEGRATED DATA ENVIRONMENT FOR PRODUCT SUPPORT (IDE-PS): A common information technology environment that integrates product support data, computer software, and processes throughout a product life cycle.

INTEGRATED PRODUCT/PROCESS TEAM (IPT): A team composed of representatives from multiple functional disciplines which develops and follows an integrated process for a particular product.

INTEGRATED PRODUCT SUPPORT (IPS) ELEMENTS: Those critical functions related to product readiness including, but not limited to, materiel management, distribution, technical data management, maintenance, training, cataloging, configuration management, engineering support, repair parts management, failure reporting and analysis, reliability growth tracking, and the logistics components (e.g., support equipment, spares) required to accomplish the functions. All of the IPS elements shall be considered during the development of the Product Support (PS) strategy. The IPS elements consist of the following: Product Support Management; Supply Support; Packaging, Handling, Storage & Transportation; Maintenance Planning & Management; Design Interface; Sustaining Engineering; Technical Data; IT Systems Continuous Support; Facilities & Infrastructure; Manpower & Personnel; Support Equipment; and Training & Training Support.

INTELLECTUAL PROPERTY (IP): A work or invention that is the result of creativity that has commercial value, and to which one has rights. IP includes inventions, trademarks, patents, industrial designs, copyrights, data rights, intellectual property, and technical information including software, data designs, technical expertise, manufacturing information and expertise, techniques, Technical Data Packages, manufacturing data packages, and trade secrets.

INTERIM SUPPORT ITEMS CONFERENCE: A conference in which the customer reviews, selects, and approves the items recommended by the contractor for use in interim contractor support. The primary purpose of this conference is to establish the cost effectiveness of procuring the items prior to the time provisioning for operational requirements has been accomplished and a provisioned item order (PIO) has been provided.

INTEROPERABILITY: The ability of products, units, or organizations to provide information or services to and accept the same from other products, units, or organizations and to use the shared information or services to enable them to operate effectively together.

LEVEL OF REPAIR ANALYSIS (LORA): An analytical methodology used to assist in developing maintenance concepts, influencing design, and establishing the maintenance level at which components will be replaced, repaired, or discarded based on economic constraints, non-economic constraints, and operational readiness requirements.

LIFE CYCLE COST (LCC): Life Cycle Cost consists of Research and Development (R&D) costs, investment costs, Operating and Support (O&S) costs, and disposal costs over the entire life cycle.

LIFE CYCLE MANAGEMENT (LCM): A management process applied throughout the life of a product that bases all programmatic decisions on the anticipated usage and economic benefits derived over the life of the product.

LOGISTICS PRODUCT DATA (LPD): That portion of Product Support Analysis (PSA) documentation consisting of detailed data pertaining to the system and equipment design characteristics, including failure modes, reliability and maintainability, maintenance, supply support, human factors, PHS&T, and ESOH which contributes to the identification of the required Product Support resources and sustainment requirements of the products.

LONG LEAD TIME ITEMS PROVISIONING CONFERENCE: A conference for the customer personnel to review and select the long lead time items required for support of the product.

MAINTAINABILITY: The design characteristics that determine the ability of a product to be retained in, or restored to, a specified condition when maintenance is performed by personnel having specified skill levels, using prescribed procedures and resources at each prescribed level of maintenance and repair.

MAINTENANCE LEVELS: The basic levels of maintenance into which all maintenance activity is divided.

MAINTENANCE PLANNING: The process conducted to evolve and establish maintenance/support concepts and requirements for the life cycle of a product.

MANPOWER: A quantitative term referring to the amount of people or amount of time required by a person or persons to perform an identified task, i.e., 20 personnel to operate and maintain a product, 100 man-hours to accomplish an inspection.

MANPOWER AND PERSONNEL: A term used to identify the amount of personnel resources and their specialized capability and experience required to operate, maintain, and support a product over its expected life cycle.

MANPOWER AND PERSONNEL ANALYSIS: The process of reviewing job content and context as it pertains to an emerging product design to classify units of work (duties, or primary skills, and tasks, or discrete skills) within a job, and not to acquire the required qualified personnel to operate and support a product over its lifetime in the defined operational environment.

MATERIAL: Elements, constituents, or substances from which something is composed or can be made. Not to be confused with "materiel."

MATERIEL: Equipment, apparatus, and supplies used by an organization or institution. Not to be confused with "material."

MOBILITY: A term used by military forces to describe the timely movement, positioning, and sustainment of personnel, materiel and forces to, from, or within a theater of operations.

NON-OPERATING RELIABILITY: The reliability of a system after taking the effects of expected dormancy and/or storage into account.

OPERATING AND SUPPORT (O&S) COSTS: The cost of operation, maintenance, manpower, infrastructure, and follow-on product support of the product and its associated support systems.

OPERATIONAL CONCEPT: A general description of the way in which an entity is used or operates.

OPERATIONAL ENVIRONMENT: An environment that addresses all operational requirements and specifications required of the final product, to include its platform and packaging. May include factors such as physical environment, operational or nonoperating use, operational scenarios, EMI/EMC, ESD, compatibility issues, interoperability issues, and geographical location.

OPERATIONAL RELIABILITY: A measure of the system's or product's performance during the item's operational life that includes the combined effect of the item's design, installation, quality, environment, operation, maintenance, and repair.

OPERATIONAL SCENARIO: A description of a sequence of events that includes the interaction of the product with its environment in accordance with an operational concept.

PACKAGING, HANDLING, STORAGE, AND TRANSPORTATION (PHS&T): The resources, processes, procedures, design considerations, and methods to ensure that all product, equipment, and support items are preserved, packaged, handled, and transported properly including environmental considerations and preservation requirements for short and long term storage, and transportability.

PERFORMANCE MEASUREMENT FRAMEWORK: A consistent approach for systematically collecting, analyzing, utilizing, and reporting on the performance of a product.

PERFORMANCE SUPPORT: Interventions delivered in the context of performance of a target activity designed to promote successful completion of the target activity. Performance Support focuses on work itself while training focuses on the knowledge, skills, and attitudes required to do the work. Performance Support methods include Job Aids, Interactive Electronic Technical Manuals, Augmented Reality, and Tutors.

PERSONNEL: Individuals, identified by specialty or classification, skill, skill level, and grade, rate, or position, required to satisfy the manpower demand associated with a product.

PREVENTIVE MAINTENANCE: All actions performed in an attempt to retain a product in specified condition by providing systematic inspection, detection, and prevention of incipient failures.

PRODUCT: The result of Research, Development, Test, and Evaluation (RDT&E) in terms of hardware or software being produced or manufactured, also known as an end item. In addition, a product is the item stipulated in a contract to be delivered under the contract (i.e., service, study, or hardware).

PRODUCT READINESS: A measure or measures of the ability of a product to undertake and support its designed function over its lifetime operational environment.

PRODUCT SUPPORT (PS): A unified and iterative approach to the management and technical activities needed to influence operational and materiel requirements and design specifications, define the support requirements best related to product design and to each other, develop and acquire the required support, provide required operational support at lowest cost of ownership, improve readiness and Life Cycle Cost (LCC) in the product and support systems during the operational life cycle, and repeatedly examine support requirements throughout the service life of the product.

PRODUCT SUPPORT ANALYSIS (PSA): The selective application of scientific, engineering, and logistics assessment activities undertaken throughout the life cycle, as part of the system engineering design and sustainment process.

PRODUCT SUPPORT ANALYSIS DOCUMENTATION: All data (reports, files, regulatory compliance, etc.) resulting from performance of PSA activities conducted under this standard.

PRODUCT SUPPORT ANALYSIS GUIDANCE CONFERENCE: A conference used to ensure that the contractor and the customer have a firm and common understanding of the relationship of the PSA activities to the PSA documentation, milestones, and funding levels contractually required. The provisioning guidance conference may be held in conjunction with or as a part of the PSA guidance conference if the provisioning activity agrees.

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.

PRODUCT SUPPORTABILITY BASELINE (PSB): The agreed and approved set of Product Support Analysis (PSA) documentation, subject to configuration control and data management, and continuously updated throughout the product's life cycle based on accepted design and support changes.

PRODUCT SUPPORT STRATEGY (PSS): The PSS outlines the execution of the support package and will describe sustainment requirements in system design and the technical, business, and management activities to develop, implement, and deliver a support package that achieves effective and affordable operational materiel readiness outcomes.

PROGNOSTICS AND HEALTH MANAGEMENT (PHM): The engineering discipline associated with the design and use of monitoring capabilities on a system, and the analysis of the data thereof, to make informed decisions regarding the management of maintenance actions that must be performed on the product.

PROVISIONED ITEM ORDER (PIO): A formal requirements document furnished to the contract administration activity to identify items to be bought through the provisioning process on a contract, providing the specific items to be ordered, the estimated cost, and the required delivery schedule and destination.

PROVISIONING: The process of determining and acquiring the range and quantity (also called "depth") of spares and repair parts, and support and test equipment required to operate and maintain a product of materiel for an initial period of service.

PROVISIONING CONFERENCE: A conference for reviewing provisioning technical data and related engineering data for provisioning, customer validation of support items, and the assignment of technical and management codes made during the PSA process, when specified by the provisioning activity analyst. Existing drawings and provisioning and technical data are reviewed and requirements for revisions to data scope are determined. The PSA is the analytical source from which the provisioning decisions are made.

PROVISIONING GUIDANCE CONFERENCE: After contract award, a provisioning guidance conference is conducted. Normally the provisioning guidance conference is required within 90 days after production contract award for all major acquisitions and any nonmajor programs that require provisioning technical data. The program manager, the contracting officer, the provisioning activity, and all personnel who will prepare provisioning documentation must attend. The focus must be to ensure an understanding of the contract provisioning requirements and responsibilities among program team members. It should include discussions on maintenance concepts, provisioning techniques, level of detail, item identification, design changes, and provisioning technical data delivery schedules. Attendees should review the contract requirements and prepare to present any provisioning requirement questions and recommendations.

PROVISIONING PREPAREDNESS REVIEW CONFERENCE: This conference is held for the customer to determine the adequacy of the provisioning documentation, facilities, and the overall preparations made by the contractor to conduct a provisioning conference.

READINESS DRIVERS: Those product characteristics which have the largest effect on a product's readiness values.

RECOVERABILITY: The ability to restore and maintain a product's functionality after sustaining damage. Recoverability is considered a subset of survivability.

RELIABILITY: Reliability is the ability/probability of failure free performance of the system/product, over the expected service use profile and environmental conditions over a given period of time. Reliability is expressed in terms of operational reliability and non-operating reliability.

RELIABILITY CENTERED MAINTENANCE (RCM): A logical, structured process used to determine the optimal failure management strategies for any product based upon product reliability characteristics and the intended operating context.

REPAIR PARTS: Individual non-repairable parts or non-repairable subassemblies required for the repair of spares or major products.

RESEARCH & DEVELOPMENT (R&D): Includes all scientific study and experimentation directed toward increasing knowledge and understanding in the fields of the physical, engineering, environmental, and life sciences.

RESEARCH & DEVELOPMENT (R&D) COSTS: Those costs primarily associated with R&D efforts including the development of a new or improved capability to the point where it is appropriate for operational use.

RESEARCH, DEVELOPMENT, TEST, AND EVALUATION (RDT&E): Activities for the development of a new product or to expand the performance of established products.

RISK: A future event or condition that may have a negative effect on achieving program objectives for cost and/or schedule and/or performance. Also, a measure of future uncertainty.

SENSITIVITY ANALYSIS: An analysis concerned with determining the amount by which model parameter estimates can be in error before the generated decision alternative will no longer be superior to others.

SPARES: Repairable items within a product architecture that are an integral part of the product.

STANDARDIZATION: The process by which members achieve the closest practicable cooperation—the most efficient use of research, development, and production resources—and agree to adopt on the broadest possible basis the use of (1) common or compatible operational, administrative, and logistics procedures; (2) common or compatible technical procedures and criteria; (3) common, compatible, or interchangeable supplies, components, or equipment; and (4) common or compatible doctrine with corresponding organizational compatibility.

SUITABILITY: The degree to which a system can be satisfactorily placed in use with consideration to a composite of support considerations. Suitability comprises performance and supportability.

SUPPLY SUPPORT: The process conducted to determine, acquire, catalog, receive, store, transfer, issue, replenish, and dispose of secondary items necessary for the support of products and support items.

SUPPORT CONCEPT: A complete system level description of a support system that meets the functional support requirements and is in harmony with the design, maintenance, and operational concepts.

SUPPORT EQUIPMENT: All equipment and tools (mobile or fixed), not integral to a product, but required to support its operation and maintenance.

SUPPORT ITEMS: Items subordinate to, or associated with, a product (i.e., spares, repair parts, tools, support and test equipment, and sundry materials) and required to operate, service, repair, or overhaul a product.

SUPPORT PLAN: A detailed description of a support system covering each element of PS and having consistency between the elements of PS.

SUPPORT RESOURCES: The materiel, infrastructure, and personnel elements required to operate and maintain a product to meet readiness and supportability requirements.

SUPPORT SOLUTION: The integrated design and coherent support provided throughout the life cycle of a system that is realized in its integrated support system and the associated technical data. The support solution comprises the sum of the services, resources, and information required to effectively support the equipment throughout its in-service life.

SUPPORT SYSTEM: A composite of all the services and resources that shall be acquired for operating and maintaining a product throughout its life cycle.

SUPPORTABILITY: A key component of availability and suitability. It includes design, technical support data, and maintenance procedures to facilitate detection, isolation, and timely repair and/or replacement of product anomalies.

SUPPORTABILITY ASSESSMENT: An evaluation of how well the composite of support considerations necessary to achieve the effective and economical support of a product for its life cycle meets stated quantitative and qualitative requirements.

SUPPORTABILITY FACTORS: Qualitative and quantitative indicators of supportability.

SUPPORTABILITY-RELATED DESIGN FACTORS: Those supportability factors which include only the effects of a product's design. Examples include reliability and maintainability values, testability values, and transportability characteristics.

SURVIVABILITY: The capability of a system or its crew to avoid or withstand a manmade hostile environment without suffering an abortive impairment of its ability to accomplish its designated mission.

SUSCEPTIBILITY: The degree to which a device, equipment, or weapon system is open to effective attack as a result of one or more inherent weaknesses. Susceptibility is a function of operational tactics, countermeasures, probability of enemy fielding a threat, etc. Susceptibility is considered a subset of survivability.

SYSTEM OPERATIONAL EFFECTIVENESS: A measure of the degree to which a system achieves a set of mission requirements regarded as the product of three factors: Readiness, reliability, and capability.

SYSTEM ENGINEERING PROCESS: A logical sequence of activities and decisions transforming an operational need into a description of product performance parameters and a preferred product configuration.

TASK ANALYSIS: The process that is initiated when a maintenance action is prescribed to include both preventive and corrective maintenance actions. It identifies maintainer steps, sub-steps, and resources required to include spares, materials, tools (common and peculiar), spares, support equipment, and facility requirements. This process also identifies personnel skill designation(s), manpower requirements, and estimates of time to complete the required steps.

TASK INVENTORY: A comprehensive listing of all tasks performed by personnel to operate and maintain the product.

TECHNICAL DATA: Recorded information regardless of form or character (e.g., manuals, drawings) of a scientific or technical nature.

TESTABILITY: A design characteristic that allows the status (operable, inoperable, or degraded) of a product and the location of any faults within the product to be confidently determined in a timely fashion.

THRESHOLD: The threshold value for an attribute is the minimum acceptable value considered achievable within the available cost, schedule, and technology at low-to-moderate risk.

TRADEOFF: The determination of the optimum balance between product characteristics. Cost, schedule, performance, and supportability are the most relevant characteristics for product support considerations.

TRAINING: The structured process by which individuals are provided with the skills necessary for successful performance in their job, slot, billet, or specialty.

TRANSPORTABILITY: The design characteristics determining the inherent capability to move materiel to specified locations with available and projected transportation assets to meet planned delivery schedules and/or mobility plans. It includes consideration of the limitations and restrictions of the transportation assets and modes in conjunction with the required product equipment and support items required to enable the movement of the materiel.

VULNERABILITY: The characteristics of a system that cause it to suffer a definite degradation (loss or reduction of capability to perform the designated mission) as a result of having been subjected to a certain (defined) level of effects in an unnatural (man-made) hostile environment. Vulnerability is considered a subset of survivability.

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2.4 Acronyms

| | |
|-----------|--|
| 3-D | Three-Dimensional |
| BCS | Baseline Comparison System |
| BIT | Built-in-Test |
| CE | Collaborative Environment |
| CLS | Contractor Logistics Support |
| DAPS | Document Automation and Production Service |
| DEVSECOPS | Development/Security/Operations |
| DMSMS | Diminishing Manufacturing Sources and Material Shortages |
| DoD | United States Department of Defense |
| EC | Engineering Change |
| EDE | Electronic Data Exchange |
| EDFP | Engineering Data for Provisioning |
| EDI | Electronic Data Interchange |
| ERP | Enterprise Resource Planning |
| ESOH | Environment, Safety, and Occupational Health |
| FMEA | Failure Modes and Effects Analysis |
| FMECA | Failure Modes, Effects, and Criticality Analysis |
| FRACAS | Failure Reporting, Analysis and Corrective Action System |
| FTA | Fault Tree Analysis |
| GIDEP | Government-Industry Data Exchange Program |
| HSI | Human Systems Integration |
| IDE-PS | Integrated Data Environment for Product Support |
| IP | Intellectual Property |
| IPS | Integrated Product Support |
| IPT | Integrated Product/Process Team |
| KPP | Key Performance Parameter |
| LCLS | Life Cycle Logistics Supportability Committee |
| LCC | Life Cycle Cost |
| LCM | Life Cycle Management |
| LORA | Level of Repair Analysis |
| LPD | Logistics Product Data |

| | |
|-------|--|
| O&M | Operations and Maintenance |
| O&S | Operating and Support |
| PHS&T | Packaging, Handling, Storage, and Transportation |
| PHM | Prognostics & Health Management |
| PIO | Provisioned Item Order |
| POL | Petroleum, Oil, and Lubricants |
| PS | Product Support |
| PSA | Product Support Analysis |
| PSAP | Product Support Analysis Plan |
| PSB | Product Supportability Baseline |
| PSP | Product Support Package |
| PSS | Product Support Strategy |
| RCM | Reliability Centered Maintenance |
| R&D | Research & Development |
| R&M | Reliability and Maintainability |
| RDT&E | Research, Development, Test and Evaluation |
| REACH | Registration, Evaluation, Authorization and Restriction of Chemicals |
| RoHS | Restriction of Hazardous Substances |
| SLCM | System Life Cycle Management |
| SOE | System Operational Effectiveness |
| T&E | Test and Evaluation |
| TES | Test and Evaluation Strategy |
| XML | Extensible Markup Language |

3. GENERAL REQUIREMENTS

3.1 Product Support Analysis Program

An effective PSA program shall be established and maintained as part of the System Life Cycle Management (SLCM) program. It shall be planned, integrated, developed, and conducted in conjunction with other requirements definition, design, development, production, deployment, operations and sustainment functions to achieve overall program objectives cost effectively. The PSA program shall be established in a manner consistent with the type and phase of the acquisition and sustainment program, and procedures shall be established to ensure that the PSA program is an integral part of the system engineering and logistics product resources development and sustainment processes. Interfaces between the PSA program and other system engineering and logistics sustainment programs shall be identified. The PSA program shall include the management and technical resources, plans, procedures, schedules, and controls for the performance of PSA requirements throughout the life cycle of the system or product.

3.1.1 Program Interfaces and Coordination

Maximum use of analyses and data resulting from requirements of other system engineering programs to satisfy PSA input requirements shall be made. PSA data shall be based upon, and traceable to, other system engineering data and activities where applicable. Design and performance information shall be captured, disseminated, and formally controlled from the beginning of the design effort to serve as the design audit trail for product support resource planning, design tradeoff study inputs, and PSA documentation preparation.

3.1.2 Product Support Analysis Process

A systematic and comprehensive set of analyses shall be conducted on an iterative basis through all phases of the product life cycle to satisfy supportability objectives. The level of detail of the analyses and the timing of activity performance shall be tailored to each product. The tailoring shall be done with respect to program budget, schedule, and milestone constraints.

3.2 Quantitative Requirements

Quantitative supportability and supportability-related design requirements for the product shall be included in appropriate sections of the product specifications, other requirements documents, or contracts, as appropriate. Sub-tier values not established by the customer shall be established by the contractor to achieve affordable System Operational Effectiveness (SOE). Requirements shall be defined in terms related to operational availability, materiel availability, reliability, ownership costs, or mean down time.

3.3 Management, Surveillance, and Control

Management procedures shall be established to ensure continuing assessment of analysis results and to allow for product design and PSA program adjustments as required. Feedback and corrective action procedures shall be established which include controls to ensure that deficiencies are documented and corrected. Assessments, validations, and verifications shall be conducted throughout the product life cycle to demonstrate, within stated confidence levels, the validity of the analyses performed and the products developed from the analyses. The analysis results and products shall be adjusted as applicable.

3.4 Product Support Analysis Documentation

PSA documentation shall consist of all data resulting from analysis activities conducted under this standard and shall be the primary source of validated, integrated design-related supportability data throughout the product's life cycle. PSA documentation shall be developed and maintained commensurate with design, redesign, support, and operational concept development, and shall be updated to reflect changes or availability of more extensive information based on testing, configuration changes, operational concept changes, and support concept changes during the product's entire life cycle.

Accumulated PSA documentation shall provide an audit trail of supportability and supportability-related design analyses and decisions, and shall be the basis for actions and documents related to manpower and personnel requirements, training programs, provisioning, maintenance planning, resources allocation, funding decisions, and other product support resource requirements. Configuration control procedures shall be established over PSA documentation updates to ensure proper coordination among other system engineering programs, the PSA program, and the development of other documents using PSA data.

Logistics Product Data (LPD) is a subset of PSA documentation; LPD elements shall conform to the requirements of SAE GEIA-STD-0007.

The agreed and approved set of PSA documentation shall establish a baseline definition of the supportability data and documentation for the product. This definition is known as the Product Supportability Baseline (PSB) and shall be subject to configuration control and data management. The PSB shall be the comparative baseline at all decision points for assessment and continual improvement activities. The PSB shall be continuously updated throughout the product's life cycle based on accepted design and support changes throughout the product's life.

3.5 Recycled, Recovered, or Environmentally Preferable Materials

Recycled, recovered, or environmentally preferable materials shall be used to the maximum extent possible, and the use of hazardous materials in the design, manufacture, operation, maintenance and support of the equipment shall be minimized. All of the materials selected shall meet or exceed the operational and maintenance requirements, and promote economically advantageous Life Cycle Costs (LCC).

3.6 Support System Standardization

In many cases, utilization of existing product support resources and spare parts conforming to industry or military specifications can substantially reduce life cycle cost, enhance readiness, minimize the impact of introducing the new system/equipment, and decrease the logistics footprint of the operational unit using the new system/equipment.

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4. ACTIVITY DESCRIPTIONS

4.1 General

The Product Support Analysis is divided into six general Activity Groups, each of which has its own activities and sub-activities that are typically accomplished iteratively throughout the life cycle of the prime product.

Revision A of this document has a new structure intended to highlight the six general Activity Groups. The new structure also allows room for the addition or subtraction of activities in future revisions without changing the base numbering scheme. In addition, it removes the implication that the activities are completed in a sequential order. An activity cross-reference between this standard, its predecessor, and MIL-STD-1388-1A is provided in Annex A. The six general Activity Groups are:

- Program Management, Surveillance, and Control,
- Supportability Objectives,
- Preparation and Evaluation of Alternatives,
- Determination of Product Support Resource Requirements,
- Product Operational In-Service Support, and
- Supportability and Suitability Assessment.

4.1.1 Program Management, Surveillance, and Control

The purpose of the Program Management, Surveillance, and Control Activity Group is to define a uniform approach to the establishment of the Product Support program ensuring that product availability is maximized while minimizing the cost and logistics footprint. The program's objectives provide the framework to accomplish the development, production, deployment and sustainment of systems to meet user's operational needs. This Activity Group is comprised of the following activities:

- Product Support Strategy,
- Product Support Analysis Planning,
- Program and Design Reviews, and
- Integrated Data Environment for Product Support (IDE-PS).

4.1.2 Supportability Objectives

The purpose of the Supportability Objectives Activity Group is to identify constraints, thresholds, and areas of improvement to provide supportability input into early tradeoffs. The Supportability Objectives Activity Group is critical in the early stages of an acquisition program, where opportunities to influence design from a supportability standpoint are the most significant and numerous. This Activity Group is comprised of the following activities:

- Application Assessment,
- Support System Standardization,
- Comparative Analysis,
- Technological Opportunities, and
- Supportability and Supportability-Related Design Factors.

4.1.3 Preparation and Evaluation of Alternatives

The purpose of the Preparation and Evaluation of Alternatives Activity Group is to optimize the support system and develop a solution that achieves the best balance between life cycle costs, schedule, performance, and supportability. This Activity Group is used for the identification and evaluation of the alternatives for design and support of the product. This Activity Group is comprised of the following activities:

- Functional Requirements,
- Support System Alternatives, and
- Evaluation of Alternatives and Tradeoff Analysis.

4.1.4 Determination of Product Support Resource Requirements

The purpose of the Determination of Product Support Resource Requirements Activity Group is to identify the product support resource requirements of the new product in its intended environment(s). In addition, this Activity Group assesses the impacts of the introduction of a new product(s) on existing product(s), identifies sources of manpower and personnel to meet the requirements of the new product, determines the impact of a failure to obtain the necessary support resources for the new product, and determines essential support resource requirements for use in the intended environment. This Activity Group is comprised of the following activities:

- Task Analysis, and
- Early Distribution and Fielding Analysis.

4.1.5 Product Operational In-Service Support

The purpose of the Product Operational In-Service Support Activity Group is to ensure optimal sustainment of the product in its operational environment(s). Collection and analysis of field feedback data provides the opportunity to affect supportability-related design changes and improves the sustaining product support products. Proactive DMSMS Management, Obsolescence Management, and Counterfeit Prevention ensures continued availability and supportability of the product. This Activity Group is comprised of the following activities:

- DMSMS Management, Obsolescence Management, and Counterfeit Prevention
- Field Feedback, and
- Disposal Analysis.

4.1.6 Supportability and Suitability Assessment

The Supportability and Suitability Assessment Activity Group ensures that the support developed for the product is tested, deficiencies corrected, and a completely usable Product Support Package (PSP) is available to satisfy product requirements. This Activity Group is comprised of the following activities:

- Supportability and Suitability Test, Evaluation, Verification and Validation, and
- Supportability Performance Assessment.

4.2 Activity Structure

Each individual activity is divided into three parts: Sub-Activities, Activity Inputs, and Activity Outputs. It is not intended that all activities be accomplished in the sequence presented. The sequence in which activities are accomplished shall be tailored to the individual acquisition program. Consequently, the performance of some activities may not be required for a given contract period.

The activity inputs identify the general information required to define the scope of, and to perform each activity. When an element of the activity inputs is only applicable to certain sub-activities, the applicable sub-activities' numbers are identified. Where an element is applicable to all sub-activities listed under a specific activity description, the word "All" is used.

The activity outputs identify the expected results from the performance of each activity. Each output is linked to the applicable sub-activity by identifying the sub-activity.

5. ACTIVITY GROUP A – PROGRAM MANAGEMENT, SURVEILLANCE, AND CONTROL

Activity Group A defines a uniform approach to the establishment of the Product Support program ensuring that total product availability is optimized while minimizing the cost and logistics footprint.

Activity A.1 – Product Support Strategy

Develop a PS program strategy for use early in an acquisition program, and identify the PSA activities and sub-activities that provide the best return on investment.

Activity A.1.1 – Develop Supportability Objectives

Prepare supportability objectives for the new product, identify and document the risk of not accomplishing these objectives, and identify proposed PSA activities and sub-activities to be performed. Identify the organizations to perform each of the activities and sub-activities. The proposed supportability objectives and analysis activities and sub-activities shall be based on the following factors:

- a. The probable design, maintenance concept, and operational approaches for the new product and gross estimates of the reliability and maintainability, Operations and Support (O&S) costs, product support resources, and readiness characteristics of each design and operational approach.
- b. The availability, accuracy, and relevance of readiness, O&S cost, and product support resource data required to perform the proposed PSA activities and sub-activities.
- c. The potential design impact of performing the PSA activities and sub-activities.
- d. The large contribution of personnel-related costs (e.g., recruiting, training, housing, etc.) to overall O&S costs.

Activity A.1.2 – Identification and Measurement of Cost Drivers

Estimate the cost to perform each activity and sub-activity identified during Activity A.1.1 and the cost effectiveness of performing each, given the projected costs and schedule constraints.

Activity A.1.3 – Update the Product Support Strategy

Update the Product Support strategy as required based on analysis results, program schedule modifications, and program decisions.

Table 1 - Activity A.1, Product Support Strategy Inputs

| Activity Inputs | Activity |
|--|----------|
| Expected mission and functional requirements for the new product. | All |
| Expected program funding and schedule constraints along with other known key resource constraints that would impact support of the product (e.g., projected deficits in numbers or skills of available personnel, and limited priorities on strategic materiel). | All |
| Delivery identification of any data item required. | All |
| Previously conducted purpose and product analyses which are pertinent to the new product. | All |

Table 2 - Activity A.1, Product Support Strategy Outputs

| Activity Outputs | Activity |
|--|--------------|
| PS strategy outlining proposed supportability objectives for the new product and proposed PSA activities and sub-activities to be performed which provide the best return on investment. | A.1.1, A.1.2 |
| PS strategy updates as applicable. | A.1.3 |

Activity A.2 – Product Support Analysis Planning

Develop and maintain Product Support Analysis Plan (PSAP) which identifies and integrates all PSA activities, identifies management responsibilities and activities, and outlines the approach toward accomplishing analysis activities.

Activity A.2.1 – Product Support Analysis Plan (PSAP)

Prepare a plan that describes how the Product Support Analysis (PSA) program will be conducted to meet program requirements. The plan shall include the following elements of information:

- a. A description of how the PSA program will be conducted to meet the product and logistic requirements.
- b. Identification of each PSA activity that will be accomplished and how each will be performed. Identify the major tradeoffs to be performed under [Activity C.3.1.3](#), when applicable.
- c. A schedule with estimated start and completion points for the PSA program. Schedule relationships with other PS program requirements and associated system engineering activities shall be identified.
- d. Identification of the methodology for delivery of the supportability data and documentation, including but not limited to, the SAE GEIA-STD-0007 LPD Extensible Markup Language (XML) files.
- e. A description of how PSA activities and data will interface with other PS and product oriented activities and data. This description considers required analysis and data interfaces with the following programs, as applicable. The following list is not all-encompassing. It is meant to serve as a representative sample only.
 - Design Program.
 - Reliability Program.
 - Maintainability Program.
 - Human Systems Integration Program.
 - Contractor Logistics Support (CLS).
 - Environment, Safety, and Occupational Health Program (ESOH).
 - Systems Engineering.
 - Program Parts Selection and Control Program.
 - Failure Reporting, Analysis, and Corrective Action Systems (FRACAS).
 - DMSMS Management, Obsolescence Management, and Counterfeit Prevention.
- f. Procedures for updating and validating the LPD, including related configuration control procedures. PSA requirements on customer furnished equipment/material and the contractor/vendor furnished material including end items of support equipment.
- g. The procedures, methods, and controls for identifying and recording design problems or deficiencies affecting supportability, corrective actions required, and the status of actions taken to resolve the problems.

Activity A.2.2 – Plan Update

Update the PSAP as required, subject to customer approval, based on analysis results, program schedule modifications, and program decisions.

Table 3 - Activity A.2, Product Support Analysis Planning Inputs

| Activity Inputs | Activity |
|--|----------|
| Identification of each PSA activity required under this standard and any additional activity to be performed as part of the PSA program. | All |
| Identification of the contractual status of the PSAP and approval procedures for update. | All |
| Identification of any specific indoctrination or PSA training to be provided. | All |
| Duration of the PSAP to be developed. | All |
| Product requirements and development schedule. | All |
| Activity and Sub-activity requirements specified in the Product Support Strategy from Activity A.1 . | All |

Table 4 - Activity A.2, Product Support Analysis Planning Outputs

| Activity Outputs | Activity |
|--|----------|
| Product Support Analysis Plan. | A.2.1 |
| Product Support Analysis Plan updates as applicable. | A.2.2 |

Activity A.3 – Program and Design Reviews

Establish a requirement 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 ensure that the PSA program is proceeding in accordance with the contractual milestones so that the supportability and supportability-related design requirements will be achieved.

Activity A.3.1 – Design Review Procedures

Establish and document design review procedures (where procedures do not already exist) which provide for the official review and control of released design information with PSA program participation in a timely and controlled manner. These procedures shall define acceptance and rejection criteria pertaining to supportability requirements, the method of documenting reviews, the types of design documentation subject to review, and the degree of authority of each reviewing activity.

Activity A.3.2 – Design Review

During design reviews, each product shall be formally reviewed and assessed for supportability and supportability-related design contract requirements. Reviews shall be scheduled and all interested parties informed in advance of each review. Results of each product design review shall be documented. Design reviews shall identify and discuss all pertinent aspects of the PSA program. Typical design review topics may include:

- a. PSA conducted by activity and engineering breakdown element.
- b. A supportability assessment of the proposed design features including supportability, cost, and readiness drivers and new or critical product support resource requirements.
- c. Corrective actions considered, proposed, or taken.
- d. Progress toward establishing or achieving supportability goals.
- e. PSA documentation status.
- f. Design, schedule, or analysis problems affecting the ability to meet supportability goals.
- g. Identification of supportability-related design recommendations to include a description of the recommendation, whether it has been approved or remains pending, and the rationale for approval (e.g., cost savings, maintenance burden reductions, supply support reductions, reliability improvements, safety or health hazard reduction, and environmental risks).
- h. How the design meets the requirements of any and all Key Performance Parameters (KPPs).
- i. Other topics and issues as appropriate.

Activity A.3.3 – Program Reviews

Formal review and assessment of supportability and supportability-related design contract requirements shall be an integral part of each product program review specified by the contract. Program reviews include, but are not limited to, Product Support management team meetings, reliability program reviews, maintainability program reviews, technical data reviews, test integration reviews, training program reviews, Human Systems Integration Program reviews, system safety program reviews, and supply support reviews. Agendas shall be developed and coordinated to address, at a minimum, the topics listed under [Activity A.3.2](#) as they apply to the activity phase and the review being conducted.

Activity A.3.4 – Technical Interchange Meetings

The PSA program shall be planned and scheduled to permit the contractor and the customer to review program status.

Activity A.3.4.1 – Guidance Conferences

PSA guidance conferences, a meeting with key stakeholders in attendance, shall be planned and scheduled to permit the contractor and the customer to formally assess the relationship of the PSA documentation, activity milestones, and funding levels contractually required. Agendas shall be developed and coordinated to address at least the topics listed under [Activity A.2.1](#) as they apply to the activity phase. Minutes for the conferences shall be published as necessary to establish and communicate agreed approaches and requirements.

Additional functional area guidance conferences shall be planned and held as part of the PSA guidance conference or scheduled to occur after the PSA guidance conference. A list of candidate conferences is as follows:

- a. Provisioning Guidance Conference.
- b. Provisioning Preparedness Review Conference.
- c. Long Lead Time Item Provisioning Conference.
- d. Provisioning Conference.
- e. Interim Support Items Conference.
- f. General Conference.

See Section 2.3 of this document for conference definitions.

Activity A.3.4.2 – Reviews

The status of the PSA program shall be assessed at PSA reviews specified by the contract. Results of each PSA review shall be documented. PSA reviews shall identify and discuss all pertinent aspects of the PSA program to a more detailed level than that covered at design and program reviews. Agendas shall be developed and coordinated to address at least the topics listed under [Activity A.3.2](#) as they apply to the activity phase and the review being conducted. Agendas shall be developed and coordinated to address at least the topics listed under [Activity A.2.1](#) as they apply to the activity phase.

Table 5 - Activity A.3, Program and Design Reviews Inputs

| Activity Inputs | Activity |
|--|----------|
| Identification and location of design, program, and PSA reviews required. | All |
| Advance notification requirements to the customer of all scheduled reviews. | All |
| Recording procedures for the results of the reviews. | All |
| Identification of customer and contractor follow-up methods on review of open items. | All |

Table 6 - Activity A.3, Program and Design Reviews Outputs

| Activity Outputs | Activity |
|---|----------|
| Design review procedures that provide for official review and control of released design information with PSA program participation in a timely and controlled manner. | A.3.1 |
| Agendas for and documented results of each design review to include all pertinent aspects of the PSA program identified in accordance with Activity A.3.2 (a) through (h) | A.3.2 |
| Agendas for and documented results of each product's program review. | A.3.3 |
| Agendas for and documented results of each product's PSA Technical Interchange Meeting. | A.3.4 |

NOTE: A major management activity is the establishment and maintenance of a new integrated information environment for product support.

Activity A.4 – Integrated Data Environment for Product Support (IDE-PS)

The pre-existing data environments of production, support, and customer stakeholders shall be merged and complemented with new IDE-PS components unique to the product and its support. Data sharing and transfer/transformation/interfacing procedures shall be established and executed. Data from product support analyses shall be accessed and exchanged within the IDE-PS and synchronized with data from interfacing system engineering and support delivery information systems.

An IDE-PS can add two distinct new IDE-PS components that are used to enable product support data sharing between stakeholder information systems:

- a. A Collaborative Environment (CE) for data exchanges and file sharing between stakeholders. A CE can include two main components:
 1. Expanded and controlled access into pre-existing systems (e.g., customer view/markup of drawings within a provider Computer-Aided Design system, or industry support provider access to report maintenance in a customer Enterprise Resource Planning (ERP) system), and
 2. File sharing sites and applications to transfer files between stakeholders (e.g., an internet ftp site to exchange LPD files and reports), and
- b. An Electronic Data Exchange (EDE), also known as Electronic Data Interchange (EDI), which transforms specific transactions between stakeholders (e.g., a customer parts request in their ERP automatically becoming a parts order in a linked industry support provider's ERP).

The IDE-PS shall be integrated with equivalent IDEs established for the overall engineering effort and the project/program.

Activity A.4.1 – Examine Stakeholder Information Environments

Existing and forecast information environments for each IPS stakeholder shall be examined to identify IDE-PS gaps and necessary requirements for effective and efficient exchange of product support information.

Activity A.4.2 – Create the Integrated Data Environment for Product Support

The required IDE-PS to meet PSA and support needs across the life cycle shall be specified, designed, and implemented. This will include interfacing related information systems between stakeholders and defining the processes/procedures and data flows to link them into an effective IDE-PS. As needed changes are identified, these shall be developed and introduced into the IDE-PS.

Activity A.4.3 – Update the Integrated Data Environment for Product Support

The IDE-PS performance shall be monitored and adjusted to address issues and changes in the diverse stakeholders and their information systems over the life of the product. Variances and issues shall be analyzed, and new collaborative technologies may need to be introduced.

Activity A.4.4 – DevSecOps

Identify opportunities to integrate security practices throughout the software development and operations life cycle, in order to automate and improve security/testing quality and delivery speed.

Activity A.4.5 – Digital Thread

Consider the utilization of Digital Thread technology by providing a framework to seamlessly integrate the capability to access and transform disparate data into actionable information.

Table 7 - Activity A.4, Integrated Data Environment for Product Support Inputs

| Activity Inputs | Activity |
|---|----------|
| Identification of existing stakeholder information systems and transfer files related to product support. | A.4.1 |
| IDE-PS Gap Analysis and Requirements. | A.4.2 |
| IDE-PS Problem Reports. | A.4.3 |
| Stakeholder Information Environment Change Plans and Reports. | A.4.3 |
| Identify opportunities to integrate security practices throughout the software development and operations life cycle. | A.4.4 |

Table 8 - Activity A.4, Integrated Data Environment for Product Support Outputs

| Activity Outputs | Activity |
|--|----------|
| IDE-PS Gap Analysis and Requirements. | A.4.1 |
| IDE-PS Development Plan. | A.4.2 |
| IDE-PS Interface Control Documents. | A.4.2 |
| IDE-PS Procedures. | A.4.2 |
| IDE-PS Performance Reports. | A.4.3 |
| IDE-PS Change Requirements. | A.4.3 |
| Applied DevSecOps by integrating security practices throughout the software development and operations life cycle. | A.4.4 |

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6. ACTIVITY GROUP B – SUPPORTABILITY OBJECTIVES

Activity Group B identifies constraints, thresholds, and areas of improvement to provide supportability input into early tradeoffs. The early phases of an acquisition program provide the greatest opportunity to influence design from a supportability standpoint.

Activity B.1 – Application and Usage Assessment

Identify and document the supportability factors related to the application of the new product.

Activity B.1.1 – Intended Use/Capabilities

Identify and document the supportability factors related to the application of the new product. Factors to be considered include, but are not limited to, mobility requirements, application scenarios, task frequency and duration, basing concepts, anticipated service life, interoperability, operational environment, human capabilities and limitations, planned usage and employment, and preplanned product improvement. Previously conducted analyses that have quantified interoperability on antecedent products shall be identified and documented.

Activity B.1.2 – Quantitative Factors

For each factor, develop quantitative data, supported by operationally-oriented analyses, which takes into account technology maturity, fiscal constraints, and timeframe requirements. Establish a threshold value and an objective value for each factor with respect to risks in cost, schedule and technology. Consider best, most probable, and worst operating scenarios.

Possible factors to be considered include:

- Mobility requirements (e.g., mode, type, quantity to be transported, destinations, transport time and schedule).
- Application scenarios.
- Task frequency and duration (e.g., number of missions per unit of time, mission duration, and number of operating days, miles, hours, firings, flights, or cycles per unit of time).
- Basing concepts.
- Anticipated service life.
- Interoperability.
- Operational environment.
- Physical environment (e.g., temperature, humidity).
- Human capabilities and limitations (e.g., number of operators, maintainers, and support personnel available to support the requirements of the new system).
- Planned usage and employment.
- Preplanned product improvement.
- Number of systems supported.
- Allowable maintenance periods.
- Hazardous materials.
- Environmental pollutants.
- Hazardous waste.

Activity B.1.3 – Field Visits

Conduct field visits to those operational and support activities of existing products that most closely represent the planned O&S environment for the new product.

Activity B.1.4 – Intended Use/Capabilities Report

Develop a report documenting the information developed during the performance of Activities B.1.1, B.1.2, and B.1.3. Update the report as more detailed information on the intended use of the new product becomes available.

Table 9 - Activity B.1, Application Assessment Inputs

| Activity Inputs | Activity |
|--|----------|
| Intended application and use information on the new product. | All |
| Source documentation available related to the intended use of the product. | All |
| Antecedent product analyses with quantified interoperability relationships from Activity B.3.2 . | All |
| Locations for field visits. | All |

Table 10 - Activity B.1, Application Assessment Outputs

| Activity Outputs | Activity |
|---|----------|
| Pertinent supportability factors related to the intended use of the new product. | B.1.1 |
| Quantitative data which shall be considered in conducting support analyses and developing support alternatives. | B.1.2 |
| Field visit reports. | B.1.3 |
| Report documenting the information developed and updates to the report as more extensive information becomes available. | B.1.4 |

Activity B.2 – Support System Standardization

Define supportability and supportability-related design constraints for the new product based on initial, existing, and planned product support strategy and resources which have benefits due to cost, manpower, personnel, readiness, or support policy considerations, and provide input into mission hardware and software standardization efforts.

Activity B.2.1 – Support Resource Standardization

Identify existing product support resources and those planned by other programs that have potential benefits for use on each product concept under consideration. Define, in quantitative terms, supportability and supportability-related design constraints for the support resources selected to become program constraints due to cost, manpower, personnel, readiness, environmental, logistics footprint, or product support policy considerations and benefits.

Activity B.2.2 – Standardization Costs

Provide supportability, cost, and readiness-related information for standardization efforts. Perform any required digital data transformation and integration activities, including the preparation of the data for incorporation into a standardized LPD. This input shall be provided to a level commensurate with the level of mission hardware, software, and data standardization being pursued.

Activity B.2.3 – Hardware/Software Standardization Approaches

Identify recommended standardization approaches that have utility due to cost, readiness, or supportability considerations and participate in the product standardization effort. This activity shall be performed to a level of indenture commensurate with the design development.

Activity B.2.4 – Standardization Risks

Identify any risks associated with each constraint established. For example, known or projected scarcities, and developmental product support resources would represent possible risk areas when establishing standardization constraints.

Table 11 - Activity B.2, Support System Standardization Inputs

| Activity Inputs | Activity |
|---|----------|
| Mandatory supportability and supportability-related design constraints for the new product due to standardization requirements. These would include any standardization and interoperability constraints. | All |
| Information available from the customer relative to existing and planned product support resources to include a target audience description. | All |
| Mandatory standardization requirements. | All |
| Alternative product concepts under consideration. | All |
| Report from Activity B.1 . | All |

Table 12 - Activity B.2, Support System Standardization Outputs

| Activity Outputs | Activity |
|--|----------|
| Quantitative supportability and supportability-related design constraints for the new product based upon support standardization considerations. | B.2.1 |
| Supportability, cost, and readiness characteristics of mission hardware and software standardization approaches under consideration. | B.2.2 |
| Recommended mission hardware and software standardization approaches that have utility due to cost, readiness, or supportability considerations. | B.2.3 |
| Documented risks associated with each constraint established. | B.2.4 |

Activity B.3 – Comparative Analysis

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.

Activity B.3.1 – Comparative Products

Identify comparative products (hardware, operational, and support) useful for comparative purposes with new product alternatives. Different comparative products shall be identified when new product alternatives vary significantly in design, operation, or support concepts, or where different existing products are required to compare all parameters of interest adequately.

Activity B.3.2 – Baseline Comparative System

Select or develop a BCS for use in comparative analyses and identifying supportability, cost, and readiness drivers of each significantly different new product alternative. A BCS may be developed using a composite of elements from different existing products when a composite most closely represents the design, operation, and support characteristics of a new product alternative. Different BCSs or composites may be useful for comparing different parameters of interest. Previously developed BCSs shall be assessed to determine the extent to which they can fill the need for the new product.

Activity B.3.3 – BCS Logistics Requirements

Determine the O&S costs, product support resource requirements, Reliability and Maintainability (R&M) values, and readiness values of the comparative products identified. Identify these values for each BCS established. Values shall be adjusted to account for differences between the comparative product's use profile and the new product's use profile where appropriate.

Activity B.3.4 – BCS Qualitative Constraints

Identify qualitative environmental, health-hazard, safety, and supportability problems on comparative products that should be avoided in the design of the new product.

Activity B.3.5 – BCS Supportability, Costs, and Readiness Drivers

Determine the supportability, cost, and readiness drivers of each comparative product or BCS. These drivers may come from the design, operating, or support characteristics of the comparative products and represent drivers for the new product. For example, repair cycle time may be the prime readiness driver, a particular hardware product may be the prime manpower driver, or energy cost may be the prime cost driver.

BCS analysis should include a lessons learned file that shall address the following information: BCS cost, schedule and performance attainment; compliance with specified developmental timelines; areas needed for improvement; and the evaluation of supporting logistics infrastructure to meet operational demands.

Activity B.3.6 – Unique System Drivers

Identify and document any supportability, cost, or readiness drivers for the new product resulting from subsystems or equipment in the new product for which there are no comparable subsystems or equipment in comparative products.

Activity B.3.7 – BCS Updates

Update the comparative products, their associated parameters, and the supportability, cost, and readiness drivers as the new product alternatives become more clearly defined, or as data that is more accurate are obtained on the comparative products. The updated BCS shall be used as the new baseline comparison system for ongoing comparative analysis, and ultimately shall represent the new product once it is commissioned for service.

Activity B.3.8 – BCS Risks

Identify and document any risks and assumptions associated with the comparative products, and their associated parameters and drivers, such as a low degree of similarity between the new product and existing products or the lack of accurate data on existing products.

Table 13 - Activity B.3, Comparative Analysis Inputs

| Activity Inputs | Activity |
|--|--------------|
| Information available from the customer relative to current, operational products. | All |
| Level of detail required for comparative product descriptions. | B.3.1, B.3.2 |
| Description of new product alternatives under consideration. | All |
| Report from Activity B.1 . | All |
| Previously developed BCSs that are relevant to the new product. | All |

Table 14 - Activity B.3, Comparative Analysis Outputs

| Activity Outputs | Activity |
|--|---------------------|
| Identification of existing products useful for comparative analysis with new product alternatives. | B.3.1, B.3.2 |
| O&S costs, product support resource requirements, R&M, and readiness values of the comparative products. | B.3.3 |
| Identification of qualitative environmental, health hazard, safety, and supportability problems on comparative products that should be prevented in the new product design. This includes identification of Operations and Maintenance (O&M) tasks that adversely affect system performance due to a potentially suboptimal design of the comparative product. | B.3.4 |
| Supportability, cost, and readiness drivers of the new product based on comparative product. | B.3.5 |
| Personnel-related costs, including Operations, Maintenance and Support. | B.3.5, B.3.6, B.3.8 |
| Updates to comparative product descriptions and their associated parameters. | B.3.7 |
| Risks and assumptions associated with the use of the comparative products and the parameters established for them. | B.3.8 |

Activity B.4 – Technological Opportunities

Identify and evaluate design opportunities for improving supportability characteristics and requirements in the new product.

Activity B.4.1 – Identify Potential Technology

Establish design technology approaches to achieve supportability improvements on the new product over existing products. These design approaches shall be established through the following:

- Identifying technological advancements and other design improvements which can be exploited in the new product's development and which have the potential for reducing product support resource requirements, reducing costs, reducing environmental impact, improving safety, or enhancing product readiness.
- Estimating the resultant improvements that would be achieved in the supportability, cost, environmental impact, safety, and readiness values.
- Identifying design improvements to logistic elements (such as support equipment and training devices) that can be applied during the new product's development to increase the effectiveness of the support system or enhance readiness.
- Identifying technological advancements in engineering design approaches, such as the use of digital twin or digital thread technologies.
- Identifying technological advancements in manufacturing approaches, such as advanced manufacturing or additive manufacturing.

Activity B.4.2 – Update Design Objectives

Update the design objectives as new product alternatives become more clearly defined.

Activity B.4.3 – Technology Risks

Identify any risks associated with the design objectives established, any development and evaluation approaches needed to verify the improvement potential, and any cost or schedule impacts that would result from the implementation of the potential improvements.

Table 15 - Activity B.4, Technological Opportunities Inputs

| Activity Inputs | Activity |
|---|----------|
| Information available from the customer relative to technology evaluations and improvements. | All |
| Current reliability, maintainability, and support system design approaches for state-of-the-art products. | All |
| Supportability, cost, and readiness values and drivers of comparative baseline products from Activity B.3 . | All |
| Qualitative supportability problems on existing products from Activity B.3 . | All |

Table 16 - Activity B.4, Technological Opportunities Outputs

| Activity Outputs | Activity |
|---|----------|
| Recommended design specifications to achieve improvements on the new product. | B.4.1 |
| Identify impacts of technology advancements on Human Systems Integration (e.g., manpower, personnel, training, human factors, safety, habitability, survivability). | B.4.1 |
| Updated design objectives | B.4.2 |
| Any additional findings, requirements, risks associated with the design objectives established, any development and evaluation approaches needed to verify the improvement potential, and any cost or schedule impacts that would result from the implementation of potential improvements. | B.4.3 |

Activity B.5 – Supportability and Supportability-Related Design Factors

Establish quantitative operations and support characteristics of alternative design and operational concepts, along with support-related design objectives, goals, thresholds and constraints to be included in requirements, decisions, and program documents and specifications.

Activity B.5.1 – Supportability Characteristics

Identify the quantitative operations and support characteristics resulting from alternative design and operational concepts for the new product. Operational characteristics shall be expressed in terms of manpower and personnel per product, aptitude and skill requirements of each job, and performance standards for each task. Supportability capabilities shall be expressed in terms of feasible support concepts, estimates of manpower requirements, aptitude and skill requirements for each job associated with the product, performance standards for each task, R&M parameters, product readiness, O&S cost, and product support resource requirements. Supportability capabilities shall include any potential changes to the existing logistics footprint requirements, as well as changes to all existing or planned real property facilities. All intended operational and support environments shall be included.

Activity B.5.2 – Sensitivity Analysis

Conduct sensitivity analyses on the variables associated with the supportability, cost, and readiness drivers identified for the new product.

Activity B.5.3 – Intellectual Property (IP) and Data Rights

Identify any patents, copyrights, trade secrets, technical data, data rights, Intellectual Property (IP), hardware or software for which the customer will not or might not have full design rights due to constraints imposed by regulations or laws limiting the information the contractor is required to furnish because of proprietary or other source control considerations. Include alternatives and their cost, schedule, and function impacts.

Activity B.5.4 – Identify Risks

Identify the risks and uncertainties involved in achieving the objectives established. Identify any risks associated with new technology planned for the new product.

Activity B.5.5 – Key Performance Parameters

Establish supportability, costs, environmental impact, and readiness objectives for the new product. The key performance parameters associated with environmental impact will address, but are not limited to, limitations related to hazardous material, hazardous waste, and environmental pollutants. These constraints shall include both quantitative and qualitative constraints.

Activity B.5.6 – Market Limitations

Identify any constraints that limit the market for the new product.

Activity B.5.7 – Update Objectives, Goals, and Thresholds

Update supportability and supportability-related key performance parameters for the new product for inclusion in specifications, other requirements documents, or contracts as appropriate as new product alternatives become more clearly defined.

Activity B.5.8 – Advanced Manufacturing

Advancements in manufacturing methods, such as additive manufacturing, shall be considered as an alternative support concept when updating these objectives. While the implementation and use of additive manufacturing impacts the supportability-related design factors of a component, additive manufacturing offers certain benefits, such as providing the capability to overcome some of the limitations present in traditional manufacturing methods and offering a possible means to address components with a high likelihood of obsolescence, as well as other scenarios affecting mission readiness.

Table 17 - Activity B.5, Supportability and Supportability-Related Design Factors Inputs

| Activity Inputs | Activity |
|--|----------|
| Applicable program documentation. | All |
| Identification of supportability and supportability-related design factors associated with Customer Furnished Equipment or Material. | A.2.1 |
| Description of new product alternatives under consideration including new technology planned for the new product. | All |
| Supportability, cost, and readiness values and drivers of comparative baseline products from Activity B.3 . | All |
| Technological opportunities for the new product from Activity B.4 . | All |
| Supportability and supportability-related design constraints for the new product based upon support system, mission hardware, or mission software standardization considerations from Activity B.2 . | All |

Table 18 - Activity B.5, Supportability and Supportability-Related Design Factors Outputs

| Activity Outputs | Activity |
|---|---------------------|
| Supportability characteristics resulting from alternative product design and operational concepts including efforts to eliminate design rights limitations. | B.5.1, B.5.2, B.5.3 |
| Supportability, cost, and readiness objectives for the new product and associated risks. Supportability risks associated with new technology planned for the new product. | B.5.4 |
| Qualitative and quantitative supportability and supportability-related key performance parameters and design constraints for the new product. | B.5.5 |
| LPD documenting the quantitative supportability and supportability-related design constraints. | B.5.5 |
| Identification of any constraints that limit the market for the product. | B.5.6 |
| Updated supportability, cost, and readiness objectives. Supportability, cost, and readiness goals and thresholds for the new product. | B.5.7 |

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7. ACTIVITY GROUP C – PREPARATION AND EVALUATION OF ALTERNATIVES

Activity Group C optimizes the new support system to develop the new Product's support solution, which achieves the best balance between life cycle costs, schedule, performance, and supportability. These activities are used for the identification and evaluation of the alternatives for design and support of the new product.

Activity C.1 – Functional Requirements

Identify the operations, maintenance, and support functions that shall be performed in the intended environment for each product alternative under consideration; identify the human performance requirements for operations, maintenance and support; and document the requirements in the task inventory.

Activity C.1.1 – Functional Requirement Identification

Identify and document the functions that shall be performed for the new product to be operated and maintained in its intended environment for each design alternative under consideration. Apply the concept of SOE to these functions to explain the dependency and interplay between product performance, availability (through reliability, maintainability, and supportability), process efficiency (through system operations, maintenance, and product support), and product life cycle. These functions shall be identified to a level commensurate with design and operational scenario development, and shall be traceable to the customer supportability and supportability-related requirements.

Activity C.1.2 – Unique Item Functions

Identify and document the functions that are unique to the new product due to new design technology or operational concepts. Identify the design margins, and support system resources that will respond to the customer's Mission Profile requirements.

Activity C.1.3 – Function Drivers

Identify and document the functions that are supportability, cost, or readiness drivers. Identify potential hazards, including hazardous material, hazardous waste, and environmental pollutants, that are associated with the functions identified. These include, but are not limited to the following:

- Downtime Analysis.
- Maintainability Design Evaluation.
- Testability Analysis.
- Environmental Drivers.
- Operational Usage.
- Materials.
- Human Systems Integration.
- Cyber Security.
- Network Infrastructure.
- Interfaces.
- Hazards.

Activity C.1.4 – Function Risks

Identify any risks involved in satisfying the functional requirements of the new product.

Activity C.1.5 – Failure Modes and Effects Analysis (FMEA)

If not previously performed as part of the customer's reliability engineering program, the FMEA shall be performed to identify the ways in which the product can fail. These identified failure modes will serve as a basis for determining the maintenance

required for the product. The FMEA, or equivalent, shall be documented on product hardware and software and to the indenture level consistent with the design progression.

Activity C.1.6 – Failure Mode, Effects, and Criticality Analysis (FMECA)

If not previously performed as part of the customer's reliability engineering program, a Failure Modes, Effects, and Criticality Analysis (FMECA) shall be performed to identify the ways in which the product can fail, to identify performance consequences, and to serve as basis in the identification of Critical Safety Items and potential areas for preventive and corrective maintenance for the product. The FMECA, or equivalent, shall be documented on product hardware and software and to the indenture level consistent with the design progression. The FMECA shall be documented in the LPD format.

Activity C.1.7 – Fault Tree Analysis (FTA)

If not previously performed as part of the customer's reliability engineering program, a Fault Tree Analysis (FTA) shall be performed to determine possible causes of a defined undesired operational result and assess the safety-critical functions within the product's architecture and design.

Activity C.1.8 – Reliability Centered Maintenance Analysis (RCM)

Preventive maintenance task requirements shall be identified by conducting Reliability Centered Maintenance (RCM) analysis. The RCM analysis shall be based on the available FMEA or FMECA data and documented in the LPD.

Activity C.1.9 – Task Inventory

The task inventory shall be organized in terms of a task classification which defines objectives, scenarios, conditions, functions, jobs, duties, and tasks. A task inventory shall be prepared for the new product or facility being acquired. Insight from analyses previously conducted by Human Factors, Maintainability and/or Training disciplines, should be reviewed and incorporated as appropriate. Tasks shall be identified to a level of detail commensurate with design and operational scenario development. Formulate design alternatives to correct design deficiencies uncovered during the identification of functions or operations and maintenance task requirements. The design alternatives that reduce or simplify functions shall be analyzed to determine the optimal balance between the design requirements for the alternatives compared to the supportability requirements impacted or driven by each design alternative. The task inventory shall be composed of task descriptions, each of which consists of:

- a. An action verb, which identifies what is to be accomplished in the task.
- b. An object, which identifies what is to be acted upon in the task.
- c. Any qualifying phrases that are needed to distinguish the task from related or similar tasks.

The results of the FMECA, FTA, or equivalent analysis, shall be analyzed to identify and document corrective maintenance task requirements.

Operations, maintenance, and other support tasks shall be identified through analysis of the functional requirements of the product taking into account operational analysis and scenarios/conditions under which the product will be operated. The analysis shall examine each function allocated to personnel and determine what operator or support personnel tasks are involved in the performance of each function.

When developing the task inventory, the related assets such as task descriptions, subtask descriptions, warnings, cautions, notes and the like shall be clear, concise, relevant, and written in a language appropriate for the operator or maintainer. Hazardous materials, generation of waste, release of air and water pollutants, and environmental impacts associated with each task shall be identified. Collective tasks will be identified in the task inventory. All verbs shall be unambiguously defined within the task classification. A list of preferred verbs is provided in SAE GEIA-STD-0007, Logistics Product Data (LPD). Task descriptions may be supplemented by graphical displays or timeline charts.

Activity C.1.10 – Design Alternatives

Formulate design alternatives to correct design deficiencies uncovered during the identification of functions or operations and maintenance task requirements. Analyze additional design alternatives that reduce or simplify functions.

Activity C.1.11 – Function Updates

Update the functions and O&M task requirements as the new product becomes more clearly defined and data that is more accurate becomes available.

Table 19 - Activity C.1, Functional Requirements Inputs

| Activity Inputs | Activity |
|---|--|
| Identification of product hardware and software on which this activity will be performed and the indenture levels to which this analysis will be carried. | All |
| Identification of the levels of maintenance that will be analyzed during performance of this activity to identify functions and tasks. | All |
| Description of product concepts under consideration. | All |
| Supportability factors related to the intended use of the new product. | All |
| O&S costs, logistic support resource requirements, R&M, and readiness values of the comparative products. | C.1.1 |
| Supportability, cost, and readiness drivers. | C.1.3 |
| Detailed FMECA, FTA, or equivalent procedures and guidance to be used in performing the analysis. | C.1.6, C.1.7 |
| FMECA, FTA, or equivalent analysis results (if previously performed under the customer's reliability engineering program). | C.1.6, C.1.7, C.1.8, C.1.9, C.1.10, C.1.11 |
| Detailed RCM procedures and logic to be used in conducting the RCM Analysis. | C.1.8 |
| Any documentation requirements over and above the LPD data such as functional flow diagrams or design recommendation data resulting from the task identification process. | C.1.9, C.1.10 |

Table 20 - Activity C.1, Functional Requirements Outputs

| Activity Outputs | Activity |
|---|-----------------------------------|
| Support functions, documented in a format approved by the customer, for new product alternatives to include the results of the SOE analysis. | C.1.1 |
| Support functions, documented in a format approved by the customer, which are unique to the new product. | C.1.2 |
| Support functions, documented in a format approved by the customer, which are supportability, cost, or readiness drivers. | C.1.3 |
| Identification of any risks involved in satisfying the support functions of the new product. | C.1.4 |
| Identification of corrective and preventive maintenance tasks resulting from the FMEA, FMECA, FTA, RCM, or equivalent analysis, and/or functional analysis. | C.1.1, C.1.5, C.1.6, C.1.7, C.1.8 |
| A task inventory documented in the LPD format identifying task requirements, and including task descriptions, on product hardware and software and to the indenture levels specified by the customer. | C.1.9 |
| Identification of design deficiencies requiring redesign as a result of the support functions and O&M task identification process. | C.1.10 |
| Updates to the identified support functions and O&M task requirements as the new product becomes more clearly defined and data that is more accurate becomes available. | C.1.11 |

Activity C.2 – Support System Alternatives

Establish viable support system alternatives for the new product for evaluation and tradeoff analysis.

Activity C.2.1 – Alternative Support Concepts

Develop and document viable alternative support concepts for the new product. The alternatives shall satisfy the functional requirements of the new product within the established supportability-related design constraints. Support concepts shall be developed for all elements of PS applicable to the product. Support concept alternatives shall be prepared to equivalent levels of detail, or to the highest degree of detail possible, for use in the evaluation and tradeoff of the alternatives. The support alternatives shall include an evaluation of the existing supporting infrastructure in order to maximize standardization and interoperability, reduce costs, and minimize logistics footprint. The support alternatives shall not be restricted to existing standard support concepts but shall include identification of innovative concepts that could improve product readiness or reduce the logistics footprint.

Activity C.2.2 – Support Concept Updates

Update the alternative support concepts as product tradeoffs are conducted and new product alternatives become more clearly defined. Alternative support concepts shall be documented and shall address the supportability, cost, and readiness drivers, and unique functional requirements of the new product.

Activity C.2.3 – Alternative Support Plans

Develop and document viable alternative support plans for the new product to a level of detail commensurate with the hardware, software, and operational scenario development.

Activity C.2.4 – Support Plan Updates

Update and refine the alternative support plans as tradeoffs are conducted and the new product's design and operational scenarios become better defined.

Activity C.2.5 – Support Plan Risks

Identify risks associated with each support alternative in terms of cost, performance, schedule, and impact to the other elements of PS.

Table 21 - Activity C.2, Support System Alternatives Inputs

| Activity Inputs | Activity |
|--|----------|
| Functional Requirements for product alternatives under consideration from Activity C.1 . | All |
| Supportability-related design constraints for the new product from Activity C.1 . | All |
| Description of new product alternatives under consideration from Activity C.1 . | All |

Table 22 - Activity C.2, Support System Alternatives Outputs

| Activity Outputs | Activity |
|---|----------|
| Alternative support concepts for new product alternatives. | C.2.1 |
| Updated alternative support concepts as product tradeoffs are conducted and new product alternatives become better defined. | C.2.2 |
| Alternative support plans for the new product commensurate with the hardware, software, and operational scenario development. | C.2.3 |
| Updated alternative support plans as tradeoffs are conducted and the new product becomes better defined. | C.2.4 |
| Risks associated with each support system alternative formulated. | C.2.5 |

Activity C.3 – Evaluation of Alternatives and Tradeoff Analysis

Determine the preferred support system alternative(s) for each product alternative and participate in the assessment of alternative product tradeoffs to determine the approach (support, design, and operation) that has the optimum balance between cost, schedule, performance, readiness, and supportability, while satisfying capability requirements.

Activity C.3.1 – Tradeoff Criteria

Each evaluation and tradeoff to be conducted under this activity shall be conducted within the following criteria and guidance:

Activity C.3.1.1 – Qualitative and Quantitative Criteria

Identify the qualitative and quantitative criteria that will be used to determine the best results. These criteria shall be related to the supportability, cost, environmental impact, and readiness requirements for the product.

Activity C.3.1.2 – Analytical Relationships or Models

Select or construct analytical relationships or models between supportability, design, and operational parameters and those parameters identified for the evaluation criteria. In many cases, the same model or relationship may be suitable to perform multiple evaluations and tradeoffs. Parametric techniques in relation to regression or other statistical methods and cost estimating relationships may be appropriate for use in formulating analytical relationships.

Activity C.3.1.3 – Tradeoff/Evaluation Performance

Conduct the tradeoff or evaluation using the established relationships and models and select the best alternatives based upon the established criteria. The objective shall be to optimize the supportability requirements in order to achieve the required operational capability goals.

Activity C.3.1.4 – Programmatic Assumptions

Address the effects of different cost estimates or programmatic assumptions concerning the acquisition programs in the mission area of interest, and/or perform appropriate sensitivity analyses on those variables. These assumptions have a high degree of risk involved that drive supportability, cost, or readiness for the new support system.

Activity C.3.1.5 – Tradeoff/Evaluation Results

Document the evaluation and tradeoff results including any risks and assumptions involved.

Activity C.3.1.6 – Tradeoff/Evaluation Updates

Update the evaluations and tradeoffs as the product becomes more clearly defined and data that is more accurate becomes available.

Activity C.3.1.7 – Design Supportability

Influence the supportability of the design(s) and the PSP to be cost effective and provide the necessary support to achieve all operational readiness requirements.

Activity C.3.1.8 – Impact on Existing or Planned Products

Assess the impact on existing or planned product, supply, maintenance, and transportation systems based on the tradeoff decision.

Activity C.3.1.9 – DMSMS Management, Obsolescence Management, and Counterfeit Prevention

Assess life cycle support considerations with respect to the inclusion of DMSMS Management, Obsolescence Management, and Counterfeit Prevention.

Activity C.3.2 – Support System Tradeoffs

Conduct evaluations and tradeoffs between the support system alternatives identified for each product alternative ([Activity C.2](#)). Recommend support system alternatives for each product. For the selected support system alternative(s), identify and document any new or critical product support resource requirements. Any restructured personnel job classification shall be identified as a new resource.

Activity C.3.3 – Sensitivity of Support Tradeoffs

Evaluate the sensitivity of product readiness parameters to variations in key design and support parameters such as Reliability and Maintainability (R&M), spares budgets, resupply time, and manpower and personnel skill availability.

Activity C.3.4 – Manpower/Personnel/Training Tradeoffs

Estimate and evaluate the manpower and personnel implications of alternative product concepts in terms of total numbers of personnel required, job classifications, skill levels, and experience required. This analysis shall include organizational overhead requirements, error rates, and training requirements. Refer to SAE1010 Best Practice Standard for Manpower and Personnel for more information.

Activity C.3.5 – Job/Duty Tradeoffs

Conduct evaluations and tradeoffs between design, operations, training, and personnel job design to determine the optimum solution for attaining and maintaining the required proficiency of operating and support personnel. Training evaluations and trades shall be conducted, and shall consider the shifting of job duties between job classifications, the use of alternative technical publications concepts, and the use of alternative mixes of training modes (e.g., formal training, on-the-job training, unit training, training simulators, etc.)

Activity C.3.6 – Level of Repair Analysis

Conduct a Level of Repair Analysis (LORA) commensurate with the level of design, operation, and support data available. Identify characteristics from the LORA for those items identified on the candidates list per the guidance in SAE AS1390. Such characteristics shall include source of supply, level of maintenance, disposition of unserviceable items, unit cost, and reliability. This analysis includes conducting sensitivity analysis on selected input parameters to assess the impacts on the baseline maintenance concept.

Activity C.3.7 – Diagnostics Tradeoffs

Evaluate alternative diagnostic concepts to include varying degrees of Built-In-Test (BIT), off-line-test, manual testing, automatic testing, Prognostics & Health Management (PHM), and diagnostic connecting points for testing. Identify the optimum diagnostic concept for each product alternative under consideration.

Activity C.3.8 – BCS/New Product Tradeoffs

Conduct comparative evaluations between the supportability, cost, and readiness parameters of the new product and existing comparative products. Assess the risks involved in achieving the supportability, cost, and readiness objectives for the new product based upon the degree of growth over existing products.

Activity C.3.9 – Energy Tradeoffs

Conduct evaluations and tradeoffs between product alternatives and energy requirements. Evaluations should consider use of renewable energy sources. Identify the Petroleum, Oil, and Lubricants (POL) requirements for each product alternative under consideration and conduct sensitivity analyses on POL costs.

Activity C.3.10 – Damage/Repair Tradeoffs

Conduct evaluations and tradeoffs between product alternatives and their survivability, damage, and repair characteristics.

Activity C.3.11 – Transportability Tradeoffs

Conduct evaluations and tradeoffs between product alternatives and transportability requirements. Identify the transportability requirements for each alternative under consideration and the limiting constraints, characteristics, and environments associated with each of the modes of transportation. Example limitations include, special packaging/container requirements, restrictions and/or limitations of transportation modes regarding weight and cube, hazardous cargo, and requirements for materials handling equipment.

Activity C.3.12 – Facility Tradeoffs

Conduct evaluations and tradeoffs between product alternatives and their support facilities requirements, including power, other utilities, and paving requirements.

Table 23 - Activity C.3, Evaluation of Alternatives and Tradeoff Analysis Inputs

| Activity Inputs | Activity |
|---|----------------------------|
| Method of review and approval of identified evaluations and tradeoffs to be performed, evaluation criteria, analytical relationships and models to be used, analysis results, and the sensitivity analyses to be performed. | All |
| Specific evaluations, tradeoffs, or sensitivity analyses to be performed, if applicable. | All |
| Specific analytical relationships or models to be used, if applicable. | All |
| Any limits (numbers or skills) to operator or support personnel for the new product. | All |
| Description of product alternatives under consideration. | All |
| Historical parametric estimating relationships and/or cost estimating relationships that exist which are applicable to the new product. | All |
| Support alternatives for the new product from Activity C.2 . | All |
| Supportability-related design constraints for the new product from Activity C.1 . | All |
| Manpower and personnel costs for use in appropriate tradeoffs and evaluations which include costs related to recruitment, training, retention, development, and attrition rates. | C.3.2, C.3.4, C.3.5 |
| Job and task inventory for applicable personnel job classifications. | C.3.2, C.3.4, C.3.5 |
| The results of the human factors engineering task performance analysis. | C.3.2, C.3.3, C.3.4, C.3.5 |

Table 24 - Activity C.3, Evaluation of Alternatives and Tradeoff Analysis Outputs

| Activity Outputs | Activity |
|--|----------|
| Identification of the evaluation criteria, analytical relationships used, models used, selected alternatives, appropriate sensitivity analysis results, evaluation and tradeoff results, and any risks involved. | All |
| Tradeoff and evaluation updates, as applicable. | All |
| Recommended support system alternatives for each product alternative and identification of new or critical product support resource requirements. | C.3.2 |
| Recommended product alternatives based on cost, schedule, performance, readiness, and supportability factors. | C.3.2 |
| Product readiness sensitivity to variations in key design and support parameters. | C.3.3 |
| Estimates of total manpower and personnel requirements for alternative product concepts. | C.3.4 |
| Optimum training and personnel job design for attaining and maintaining the required proficiency of operating and support personnel. | C.3.5 |
| Level of Repair Analysis results. | C.3.6 |
| Optimum diagnostic concept for each product alternative under consideration. | C.3.7 |
| Comparisons between the supportability, cost, and readiness parameters of the new product and existing comparable products. | C.3.8 |
| Tradeoff results between product alternatives and energy requirements. | C.3.9 |
| Tradeoff results between product alternatives and their survivability and damage reparability characteristics. | C.3.10 |
| Tradeoff results between product alternatives and transportability requirements. | C.3.11 |
| Tradeoff results between product alternatives and facilities requirements. | C.3.12 |

8. ACTIVITY GROUP D – DETERMINATION OF PRODUCT SUPPORT RESOURCE REQUIREMENTS

Activity Group D identifies the product support resource requirements of the new product in its intended environment(s).

Activity D.1 – Task Analysis

Analyze required operations and maintenance tasks for the new product, in order to:

- a. Identify product support resource requirements for each task.
- b. Identify new or critical product support resource requirements.
- c. Identify Packaging, Handling, Storage, and Transportation (PHS&T) requirements.
- d. Identify support requirements that exceed established goals, thresholds, or constraints.
- e. Provide data to support participation in the development of design alternatives to reduce O&S costs, optimize product support resource requirements, or enhance readiness.
- f. Provide detail data for preparation of cost estimates related to technical manuals, training programs, manpower, and personnel lists.
- g. Identify ESOH impacts.
- h. Identify other Human Systems Integration impacts, such as on manpower, personnel, human factors, training, or habitability.

Activity D.1.1 – Conduct Task Analysis

Conduct a detailed analysis of each operation, maintenance, and support task contained in the task inventory ([Activity C.1](#)) and determine the following:

- a. Product support resources required to perform the task.
- b. Task frequency, task interval, elapsed time, and man-hours in the product's intended environment and based on the specified annual operating requirement.
- c. Maintenance level assignment based on the established support plan ([Activity C.3](#)).
- d. Identification of the environmental impacts of the task, including use of hazardous materials, generation of hazardous waste, and release of air and water pollutants.

Activity D.1.2 – Document Task Analysis

Document the results of [Activity D.1.1](#) using the data elements defined in the LPD.

Activity D.1.3 – New/Critical Resources

Identify new or critical product support resources required to perform each task, and any hazardous materials, hazardous waste, and environmental impact requirements associated with these resources. New resources are those that require development to operate or maintain the new product. These can include support and test equipment, facilities, new or special transportation systems, new computer resources, new repair, test or inspection techniques, calibration requirements, or procedures to support new design plans or technology. Critical resources are those that are not new but require special management attention due to schedule constraints, cost implications, or known scarcities. Unless otherwise required, document new and modified product support resources in the LPD to provide a description and justification for the resource requirement.

Activity D.1.4 – Training and Performance Support Requirements

Based upon the identified task procedures and personnel assignments, identify training and performance support requirements specific to skill level, and provide recommendations concerning the best mode(s) of training (formal classroom, Interactive Course Ware, on-the-job, etc.) as well as the rationale behind the recommendations. Document the results in the LPD.

Activity D.1.5 – Design Influence

Analyze the total product support resource requirements for each task and determine which tasks fail to meet established supportability or supportability-related design goals or constraints for the new product. Identify tasks which can be optimized or simplified to reduce O&S costs, optimize product support resource requirements, enhance readiness, and reduce environmental impact, including the reduction of the use of hazardous materials, the reduction of the generation of hazardous waste, and the reduction of the release of air and water pollutants. Propose alternative designs and participate in the development of alternative approaches to optimize and simplify tasks or to bring task requirements within acceptable levels.

Activity D.1.6 – Risk Reduction

Based upon the identified new or critical product support resources, determine what management actions shall be taken to minimize the risks associated with each new or critical resource. These actions could include development of detailed tracking procedures, or schedule and budget modifications. Managers and program decision authorities shall consider the desirability and effectiveness of acquiring replenishment parts concurrent with the production of the product.

Activity D.1.7 – Transportability Analysis

Conduct a transportability analysis on the product. If it has been determined that sectionalization is required for transport, a transportability analysis shall also be conducted on the identified activities. Participate in the development of design alternatives when transportability problem areas arise. Document the transportability engineering characteristics in the LPD.

Activity D.1.8 – Supply Support

For those support resources requiring supply support, document the supply support technical documentation, including Engineering Data for Provisioning (EDFP), in the LPD. The development and maintenance of the supply support technical data shall be scheduled to ensure availability of information for tasks such as LORA, LCC analysis, and the delivery of supply support technical requirements. The supply support technical documentation contained in the LPD shall include all required documentation in a hierarchical (top down/breakdown) sequence for assemblies, subassemblies and bit and piece components for the product being provisioned.

Activity D.1.9 – Logistics Products

Prepare reports to satisfy documentation requirements as specified by SAE TA-HB-0007-1, Logistics Product Data Reports Handbook or customer-specific reports. These shall include all pertinent data using the data defined in the LPD.

Activity D.1.10 – Task Analysis Updates

Update the data defined in the LPD at the time of preparation, as better information becomes available and as applicable input data from other system engineering programs is updated. Following the delivery and acceptance of the initial provisioning data, the contractor shall notify the customer of approved changes to the provisioning data via design changes.

Activity D.1.11 – Parts Screening

Identify the supply support and other pre-procurement data in order to facilitate support system standardization, pre-provisioning screening for sources of supply, and product entry control reviews.

Activity D.1.12 – Environment, Safety and Occupational Health (ESOH) Analysis

The following ESOH information shall be documented in the LPD, or equivalent documentation approved by the customer:

- a. Hazardous materials inherent in the design of the item,

- b. Hazardous materials required for operations and support of the item,
- c. Hazardous waste generated in the operation and support of the item,
- d. Air and water pollutants released during the operation of the item,
- e. Hazardous maintenance procedure codes associated with the maintenance of the item,
- f. Warnings, cautions, and notes identifying critical instructions to be followed during maintenance procedures associated with the item,
- g. Hazardous materials storage, hazardous waste storage and disposal costs for items having non-routine or significant (i.e., serious or high ESOH risk) handling and disposal costs, and
- h. Environmental compliance certification information [i.e., Restriction of Hazardous Substances (RoHS); Registration, Evaluation, Authorization and Restriction of Chemicals (REACH); European Conformity (CE) Marking] for the item.

Table 25 - Activity D.1, Task Analysis Inputs

| Activity Inputs | Activity |
|---|------------------------------|
| Identification of product hardware and software on which this analysis will be performed and the indenture levels to which this analysis will be carried. | All |
| Identification of the levels of maintenance that will be documented during the performance of this activity to identify functions and tasks. | All |
| Known or projected product support resource shortages. | All |
| Schedule and budget ceilings and targets. | All |
| Any supplemental documentation requirements over and above LPD data elements (e.g., special packaging, data rights, commercial products, security, transportability clearance diagrams, and timelines). | All, D.1.12 |
| Information available from the customer relative to existing and planned personnel skills, capabilities, and programs of instruction. | D.1.1, D.1.4 |
| Information available from the customer relative to lists of standard support and test equipment. | All |
| Information available from the customer relative to facilities available. | D.1.5 |
| Information available from the customer relative to training devices available. | D.1.4 |
| Information available from the customer relative to existing transportation systems and capabilities. | D.1.7 |
| Description of personnel capabilities intended to operate and maintain the new product at each level of maintenance. | All |
| Any limits (numbers or skills) to operators or support personnel for the new product. | All |
| Annual operating requirement for task frequencies. | D.1.1, D.1.10, D.1.12 |
| Operations, maintenance, and support task requirements from Activity C.1 . | D.1.1, D.1.5, D.1.10, D.1.12 |
| Results of safety and human factors engineering task performance analysis and assessments. | D.1.1, D.1.4, D.1.10, D.1.12 |
| Recommended support plan for the product from Activity C.3 . | D.1.1, D.1.3, D.1.10, D.1.12 |
| Supportability and supportability-related design goals and requirements from Activity C.1 . | D.1.5, D.1.12 |
| Technical products (e.g., 2D engineering or 3D product model data of the design, developed to support initial provisioning of support items). | D.1.8, D.1.10, D.1.12 |
| Hazardous material information from engineering Bill of Materials, material declaration forms, finish specification reports, hazardous material management program reports (i.e., National Aerospace Standard 411). | D.1.12 |

Table 26 - Activity D.1, Task Analysis Outputs

| Activity Outputs | Activity |
|--|---|
| Completed LPD data on product hardware and software and to the indenture level specified by the customer. | D.1.1, D.1.2, D.1.4, D.1.7, D.1.12 |
| Identification of new or critical product support resources required to operate, maintain, and support the new product. | D.1.3 |
| Alternative design approaches for cases in which tasks fail to meet established goals and constraints for the new product, or where the opportunity exists to reduce O&S costs, optimize product support resource requirements, or enhance readiness. | D.1.5 |
| Identification of management actions to minimize the risks associated with each new or critical product support resource requirement. | D.1.6 |
| Output summaries and reports as specified by the customer containing all pertinent data contained in the LPD at the time of preparation. | D.1.9 |
| Updated LPD data as more detailed information becomes available and as applicable input data from other system engineering programs is updated. | D.1.10 |
| Identification of appropriate part, configuration status, and parts sources based on provisioning data submitted for screening. Screening results will be included within the requested provisioning technical documentation as called out by Activity D.1.8 and Activity D.1.10 . | D.1.11 |
| Identification of ESOH impacts as called out in Activity D.1.12 . | C.1.7, D.1.8, D.1.9, D.1.12, E.3.1, E.3.2 |
| Input for ESOH planning documents (i.e., Programmatic Environment, Safety and Occupational Health Evaluation). | C.1.7, D.1.12 |

Activity D.2 – Early Distribution and Fielding Analysis

Assess the impact of the introduction of the new product on an existing products, identify sources of manpower and personnel to meet the requirements of the new product, determine the impact of a failure to obtain the necessary support resources for the new product, and determine essential support resource requirements for use in the intended environment.

Activity D.2.1 – System Impacts

Assess the impact on the existing system from the introduction of the new product. This assessment shall examine impacts on shop/depot workload and scheduling, provisioning and inventory factors, automatic test equipment availability and capability, human factors integration, POL and hazardous material requirements, real property, and transportation systems. The assessment shall also identify any changes required to support existing products due to new product requirements.

Activity D.2.2 – Impacts on Manpower and Personnel

Analyze the existing manpower and personnel sources to determine the sources from which the required manpower and personnel for the new product will be obtained. Determine the impact on existing products from using the sources for manpower and personnel identified in the manpower estimate.

Activity D.2.3 – Readiness Impacts

Assess the impact on product readiness resulting from a failure to obtain the required quantities of support resources and then perform a risk assessment on those support resources to determine the overall impacts to the fielding and sustainment of the product.

Activity D.2.4 – Survivability Analyses

Conduct survivability analyses to determine changes in product support resource requirements based on the product's usage in the intended environment. These analyses shall include elements of susceptibility, vulnerability, and recoverability. Identify and document recommended support resources and all other sources to satisfy the requirements.

Activity D.2.5 – Impact Solutions

Develop plans to implement solutions to problems that surfaced in the assessments and analyses that were performed in Activity D.2.

Table 27 - Activity D.2, Early Distribution and Fielding Analysis Inputs

| Activity Inputs | Activity |
|--|----------|
| Information available from the customer relative to existing and planned sources for manpower and personnel skills from Activity C.3 . | D.2.2 |
| Information available from the customer relative to capabilities and requirements of existing and planned products. | All |
| Information available from the customer relative to usage scenarios, product vulnerability, projected attrition rates, and damage/repair capabilities. | D.2.4 |
| Support resource requirements for the new product from Activity D.1 . | D.2.1 |
| Results from Activity C.3 . | All |

Table 28 - Activity D.2, Early Distribution and Fielding Analysis Outputs

| Activity Outputs | Activity |
|--|----------|
| Impact from the introduction of the new product on current and planned products. | D.2.1 |
| Sources of manpower and personnel skills to satisfy the manpower estimate and personnel requirements of the new product. | D.2.2 |
| Product readiness impacts from failure to obtain required product support resources to operate and maintain the new product. | D.2.3 |
| Essential support resource requirements for intended environment use and identification of sources to satisfy these requirements. | D.2.4 |
| Plans to alleviate problems recognized during the performance of Activity D.2.1 through Activity D.2.4 . | D.2.5 |

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9. ACTIVITY GROUP E – PRODUCT OPERATIONAL IN-SERVICE SUPPORT

Activity Group E defines a uniform approach to the establishment of the Product Support program, ensuring that total product availability is optimized while minimizing the cost and logistics footprint.

Activity E.1 – DMSMS Management, Obsolescence Management, and Counterfeit Prevention

Establish a program for the analysis of part supportability and availability and the loss, or impending loss, of manufacturers or suppliers of parts and material required to operate and sustain the product.

The DMSMS Management, Obsolescence Management, and Counterfeit Prevention programs should commence as early as possible during the initial design phase and continue throughout the life cycle until disposal.

Activity E.1.1 – DMSMS and Obsolescence Management

Establish a DMSMS and Obsolescence Management 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 product. At a minimum, the analysis shall address the following:

- a. Means and approach for providing the customer with information regarding DMSMS and Obsolescence issues.
- b. Planned resolution of current DMSMS and obsolescence issues.
- c. Parts list screening and monitoring, including risk mitigation of counterfeit parts.
- d. Processing Government-Industry Data Exchange Program (GIDEP) Alerts.
- e. Predictive analysis and resolution of DMSMS and obsolescence issues.
- f. Identification of DMSMS-resilient designs.

Activity E.1.2 Counterfeit Prevention

Apply prevention and early detection procedures to minimize the presence of counterfeit materiel using AS6174 as a guide.

1. Investigate, analyze, and assess all cases of suspected counterfeit materiel. (link back to PSAP, parts screening, risk reduction, DMSMS Management, and Obsolescence Management activities for input/output table).
2. Document all occurrences of suspect and confirmed counterfeit materiel in appropriate reporting systems [i.e., Government-Industry Data Exchange Program (GIDEP)].
3. Update LPD and other program documentation as applicable.

Table 29 - Activity E.1, DMSMS Management, Obsolescence Management, and Counterfeit Prevention Inputs

| Activity Inputs | Activity |
|---|----------|
| DMSMS and Obsolescence Plan (SAE STD-0016). | All |
| Bills of Materials for the product. | All |
| Identification of potential DMSMS and Obsolescence predictive tools. | All |
| GIDEP Alerts regarding parts and materials contained in the Bills of Materials. | All |
| Expected life of the product. | All |
| Costs associated with potential DMSMS and Obsolescence parts and materials. | All |
| Output of Activity D.1.8 . | All |

Table 30 - Activity E.1, DMSMS Management, Obsolescence Management, and Counterfeit Prevention Outputs

| Activity Outputs | Activity |
|---|----------|
| Update to the DMSMS and Obsolescence Plan. | All |
| Identification of specific predictive tools employed in the analysis process. | All |
| Predictive analysis and resolution of DMSMS and obsolescence parts and materials. | All |
| An annotated Bill of Materials/engineering Bill of Materials list with identified parts and materials that require DMSMS and Obsolescence Management and proposed mitigating solutions. | All |
| Notices and DMSMS alerts from sources such as predictive tools and Government Industry Data Exchange Program (GIDEP). | All |

Activity E.2 – Field Feedback

Analyze the supportability and supportability-related field feedback data to verify achievement of the established objectives/thresholds.

Activity E.2.1 – Feedback Sources

Analyze standard reporting systems to determine the amount and accuracy of supportability information that will be obtained in the intended environment. Identify shortfalls in measuring accomplishments against established objectives/thresholds, or in verifying suitability factors that were not tested during the acquisition phases of the product's life cycle. Develop viable plans for obtaining required suitability data from the intended environment not obtained through standard reporting systems. Conduct tradeoff analyses and document the data collection plan selected to include details concerning cost, duration, method of data collection, operational units, predicted accuracy, and intended use of the data.

Activity E.2.2 – Feedback Analysis

Analyze operational suitability data as it becomes available from standard supply, maintenance, readiness and special data collection programs implemented on the new product. Verify achievement of the established thresholds and/or objectives. Where operational results deviate from projections, determine the root causes for the deviation and identify the applicable corrective actions. Analyze feedback information and identify cost effective improvements. This type of operational usage monitoring activity should continue throughout the remaining life cycle of the system until final disposal to ensure that the product continues to meet the stated design and operational specifications.

Activity E.2.3 – Management of Reliability Drivers through Failure Reporting Analysis and Corrective Action System (FRACAS)

Identify a process or plan for the tracking and monitoring of failure reporting, analyses and corrective actions. The FRACAS process should be supported throughout the product life cycle to influence design, manufacturing, and testing, as well as to promote field feedback analysis.

Table 31 - Activity E.2, Field Feedback Inputs

| Activity Inputs | Activity |
|---|----------|
| Supportability data on the new product in its operational environment from maintenance, supply, and operating reporting systems and any special reporting system developed for the new product. | All |
| Results of Activity D.1 . | All |

Table 32 - Activity E.2, Field Feedback Outputs

| Activity Outputs | Activity |
|--|----------|
| Provide detailed plans to measure operational suitability factors in the operational environment. | E.2.1 |
| Comparison of achieved suitability factors with projections, identification of any deviations between projections and operational results, reasons for the deviations, and recommended changes (design, support, or operational) to correct deficiencies or improve readiness. | E.2.2 |
| Results obtained from the tracking and monitoring of failure reporting, analyses, and corrective actions. | E.2.3 |

Activity E.3 – Disposal Analysis

Identify the disposal procedures associated with a product, including facility equipment, focusing on those components, assemblies, sub-assemblies, parts, and materials that contain hazardous materials, wastes, pollutants, or precious metals, or are under export controls. Additionally, identify those products that can be recycled, reused, or salvaged. Disposal costs may be significant. Disposal requirements must be identified early in the development cycle to enable long-term planning and minimize unnecessary disposal costs.

Activity E.3.1 – Component Disposal

Analyze and document the disposal procedures for components, assemblies, sub-assemblies, parts, and materials that contain hazardous materials, wastes, pollutants, precious metals, or are under export controls. Document the results using the data elements defined in the LPD.

Activity E.3.2 – Product Disposal

Analyze and document the end-of-life disposal procedures required to deactivate the product. Categorize the disposition of each component, assembly, sub-assembly, part, and material as being recyclable, reusable, or salvageable, or requiring special procedures (e.g., contains hazardous materials, wastes, or pollutants). Document the results in a one-time set of disposal instructions.

Table 33 - Activity E.3, Disposal Analysis Inputs

| Activity Inputs | Activity |
|---|----------|
| Identification of product hardware and software on which this analysis will be performed and the indenture levels to which this analysis will be carried. | All |
| Identification of the levels of maintenance that will be documented during performance of this activity. | All |
| Results from Activity D.1.12 . | All |
| Available Technical Data and Safety Data Sheets associated with the hardware on which the analysis will be performed. | All |
| Customer project end-of-life estimates for the product. | All |

Table 34 - Activity E.3, Disposal Analysis Outputs

| Activity Outputs | Activity |
|--|--------------|
| Documented component-level disposal procedures via an LPD. | E.3.1 |
| Documented end-of-life disposal instructions and a Bill of Materials containing the required disposal disposition for each component, assembly, sub-assembly, part, and material comprising the product. | E.3.2 |
| Identification of the appropriate and safe means of decommissioning and disposal for all components, assemblies, sub-assemblies, parts and materials that contain hazardous materials, wastes, and pollutants. | E.3.1, E.3.2 |
| Identification of those items that can be reused, recycled, or salvaged. | E.3.1, E.3.2 |

Activity E.4 – In-Service Supportability

Conduct the In-Service Supportability procedures associated with sustainment of a product, including mission planning and engineering change in any state of operation. Additionally, identify those products that can be recycled, reused, or salvaged.

Activity E.4.1 – Supportability in Mission Planning

Conduct analysis of the support solution modifications required to support planning for discrete mission phases, including preparation, deployment, execution, redeployment and reconstitution. Update the PSP integrated logistics elements, identifying support resources that will be required to complete operational missions. Supportability for mission planning shall include and assess all IPS resources assigned to the support of the mission. Provide mission planning documents recommending the revised support solution that redirects and reallocates the IPS elements to meet the mission needs in each phase.

Activity E.4.2 – Supportability in Engineering Change

Conduct PSA work as part of the Engineering Change (EC) design process. EC shall be applied to the product, the support solution or both. Based on the complexity of the EC, a complete PSA may be required, which would incorporate this standard as tailored work. PSA and supportability engineering shall be applied for all product design changes and support solution updates.

Table 35 - Activity E.4, In-Service Supportability Inputs

| Activity Inputs | Activity |
|---|----------|
| Supportability data on the product in its operational environment from maintenance, supply, and operating reporting systems and any special reporting system developed for the new product. | All |
| Results from Activity D.1 | All |
| Identification of product hardware and software on which this analysis will be performed and the indenture levels to which this analysis will be carried. | All |
| Supplemental documentation requirements over and above LPD data elements (e.g., special packaging, data rights, commercial products, security, transportability clearance diagrams, and timelines). | All |
| Failure data for unscheduled removals (e.g., RCM, FMECA, FMEA, FTA, FRACAS and Field Feedback). | All |

Table 36 - Activity E.4, In-Service Supportability Outputs

| Activity Outputs | Activity |
|--|----------|
| Identification of those items that can be reused, recycled, or salvaged. | E.4 |
| Completed analysis of the required support solution modifications required to support planning for discrete missions, including preparation, deployment, execution, redeployment, and reconstitution phases. | E.4.1 |
| Complete Engineering Changes as needed through the operations and support phase. | E.4.2 |