ACQUISITION LOGISTICS FOR THE REST OF US

An Assessment Tool From A to IOC

NAVSO P-3690
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Office of the Assistant Secretary
of the Navy (RD&A)
Acquisition and Business Management

Preface

I urge our Navy and Marine Corps acquisition team to read this guide. Why? Simply put, our goal is to field weapon systems that are superior, sustainable and affordable to our war-fighters.

Our focus has always been to rapidly field technologically superior systems for our sailors, marines, soldiers and airmen. A worthy objective! However, we all understand that roughly eighty percent of the life cycle cost of a weapon system happens after it is fielded. Yet, the decisions that can help reduce this cost are made long before. Additionally, a technologically superior weapon is only successful if it can be sustained for the duration of the conflict. What can be done to help reduce life cycle cost while improving sustainability? In two words: **acquisition logistics**. Acquisition logistics provides us the means to tackle these problems ultimately resulting in a better and more cost-effective weapon to our war-fighters.

I had this guide developed to help us better understand what acquisition logistics is and how it can be measured. To ensure availability for all members of our acquisition community, the guide is posted on the ABM homepage www.abm.rda.hq.navy.mil. I hope you find it useful.

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Table of Contents

Objective

The purpose of this guide is to provide acquisition logistics practitioners with an assessment tool to aid in measuring logistics progress from program start through initial operational capability. Logistics program success is primarily driven by various design, test, and production practices conducted during the acquisition phase. The relationships between these practices and their impact on logistics are addressed in this guide. Metrics that benchmark sound practices have been identified for each program logistics activity. They are presented in a format that can be measured and maintained in a database as an historical file. However, these metrics are not time phased as the degree of planning and implementation typically varies from one phase to another or from program to program. As assessments are periodically performed at various program milestones, an audit trail of logistics progress can be established and logistics risk assessed. In addition, chapters on contractual information, "Watch Out Fors" and logistics resources and tools are provided.

Part I
Fundamental Principles

The following are fundamental to a successful acquisition logistics program:

1. Logistics planning is part of the systems engineering process and cannot be accomplished independently.

2. Development of a detailed, supportable Logistics Funding and Requirements Summary is necessary to establish and retain logistics funding.

3. Supportability requirements are specified as integral elements of a performance specification for a total system solution to program requirements.

4. Reliability and maintainability engineering are cornerstones of a successful logistics program.

5. Logistics requirements must be included in the contract to ensure logistics success.

6. Failure to comply with Environmental, Safety and Occupational Health requirements could delay a program from proceeding to the next milestone regardless of the "goodness" of the other logistics elements.

7. Diminishing manufacturing sources and material shortages must be identified early in the program in order to be successfully managed.

8. Conduct logistics assessments during the same time frame as design reviews so issues affecting logistics can be addressed.

Basic "Law" of Acquisition Logistics

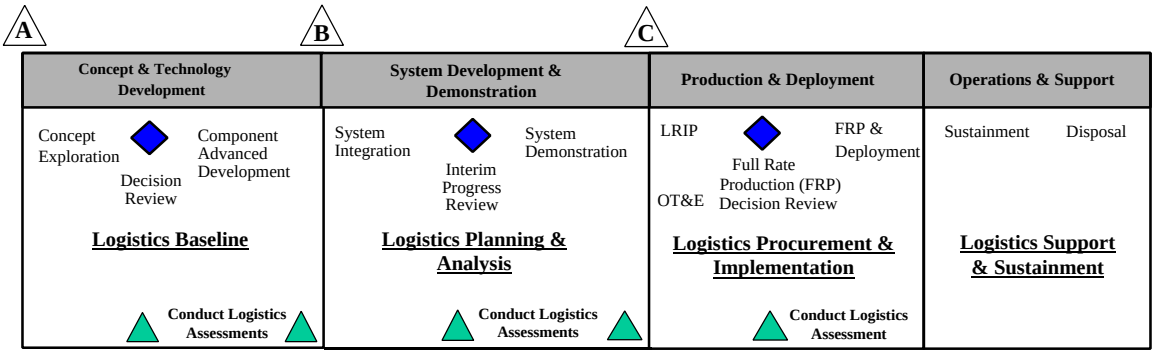
Acquisition logistics risk must be measured!

Part II
Supportability Analysis

The supportability analysis is a planned series of tasks performed to examine all elements of a proposed system in order to:

- Determine the logistics support required to keep the system useable for its intended purpose.
- Ensure that the design process results in a system that can be supported at a reasonable cost.

The supportability analysis process should begin using requirements from the Mission Needs Statement, Operational Requirements Document, Acquisition Program Baseline and the Design Reference Mission Profile. Operational and maintenance constraints must be identified early for inclusion into the design. As the design progresses, the supportability analysis process evolves from a general concept to a detailed definition of the logistics elements. The supportability analysis strategy is refined through comparative product analysis, use studies and trade studies. The resulting operational, maintenance and diagnostics concepts influence system requirements and directly impact all logistics elements. The following figure identifies the primary areas of logistics emphasis and their relationship to the defense acquisition phases.



Part III
Metrics for Assessing Logistic Program Activities

The tables contained in this section provide metrics for measuring and rating program activities associated with each of twelve critical logistics elements. Maintenance planning is incorporated primarily into the support equipment, supply support and manpower and personnel areas, rather than as a standalone element. These critical logistics elements are:

Funding - Realistic funding requirements are dependent on the thoroughness of planning and analysis with the critical logistics elements. Proper time phasing of funding is critical for optimum design influence/trade-offs and minimizing life cycle cost.

Design Interface - Design interface impacts all other logistics elements. Design interface functions are those systems engineering activities that most significantly impact supportability.

Support Equipment - The ability to perform required maintenance and to provide essential operational support of a weapon system depends on having the appropriate support equipment, including tools, calibration equipment, performance monitoring equipment, fault isolation equipment and material handling devices.

Supply Support - Supply support involves ensuring that spares and repair parts required to operate and maintain the system are provided on a timely basis. Consumable or expendable items are also included in this category. Hardware supply support consists of a provisioning phase followed by routine replenishment. Software supply support includes software and firmware provisioning for and re-supply of media used to transfer or transport computer programs.

Manpower and Personnel - Manpower and personnel encompasses determining the needs for military and civilian manning with the skills and grades required to operate, maintain and support the system over its lifetime at peacetime and wartime rates.

Training - Training involves processes, procedures, devices and equipment used to train civilian, active duty and reserve military personnel to operate and maintain the system. This includes individual and crew training, as well as formal and on the job training.

Packaging, Handling, Storage and Transportation - This element consists of evaluating and protecting system designs against packaging/handling/transportation and storage environments that are inherent in the production, deployment and sustainment of the weapon systems, support equipment and components.

Configuration Management - Configuration control should maintain the desired configuration (form, fit, function and interface), facilitate tracking of fielded units, provide necessary spares, meet contingency requirements, maintain technical data, provide upgrades and improvements that enhance system availability and lower life cycle cost.

Technical Data - Logistics technical data includes technical manuals, engineering drawings, technical repair standards and other related technical documentation for operating, testing, repairing and maintaining systems, subsystems and components.

Environmental, Safety and Occupational Health - Navy weapon system acquisition programs are required to comply with DoD and SECNAVINST 5000 series Environmental, Safety and Occupational Health (ESOH) requirements, as well as Federal, state, interstate and local environmental laws, regulations, treaties and agreements. These considerations are a critical part of the logistics process, having a significant impact on where a system can be produced, tested, operated, maintained and disposed.

Facilities - The program must demonstrate that the facilities required to support the new or modified system are properly planned, designed and acquired to be in place when the system is delivered to the fleet. Facilities required to support the system must be planned and acquired as an integral part of the weapons system acquisition process.

Computer Life Cycle Support – This element includes all mission critical and non-mission critical computer support resources. System design and supportability tradeoffs must consider software and firmware impact on each logistics element.

Each logistics element encompasses key program activities whose output/performance collectively determine the success or failure for that given element; thus, impacting the success or failure of the entire supportability program. The current best practices for performing each key program activity are provided as metrics in the following tables, along with a column for entering a numerical rating representing assessed actual performance. This assessment process is further discussed in Part IV, "Assessing Logistics Risk." All logistics areas contain some overlap. To avoid duplication, the main logistics issues will be generally limited to the primary section they fall under. For example, ESOH considerations are discussed only under the ESOH element even though they have application under most other elements.

Funding

Program Activity	Metrics	Rating
1. Logistics Requirements and Funding Summary - or equivalent identifies current and future funding requirements for planned logistics activities. Analyses are developed to support the time-phased funding requirements and to describe the impact if the funding requirements are not met.	1.1 Budget requirements are developed using cost as an independent variable and risk management principles. 1.2 The Logistics Requirements and Funding Summary supports the requirements of the acquisition logistics support plan. 1.3 The correct appropriations are identified for each logistics requirement. 1.4 Accepted cost estimating methods are used to establish logistics funding requirements. 1.5 Funding shortfalls are identified and prioritized. 1.6 Funding requirements are appropriately time-phased. 1.7 To optimize total ownership costs and schedules, life cycle cost reduction efforts have been considered.	
	Activity	
	Element	

Design Interface

Program Activity	Metrics	Rating
1. Analysis of Alternatives - is performed to identify the best approach for meeting mission needs. It provides inputs into program milestone decisions based on analysis of potential alternative systems, including operation and support concepts. It provides comparisons of their risks, total ownership costs, advantages and disadvantages.	1.1 Logistics support concepts and assumptions are specified for each alternative and are based, where feasible, on similarity to other systems. 1.2 Sensitivity analyses are performed on key supportability assumptions or variables.	
	Activity	
2. Trade Studies - are iterative studies performed to evaluate and validate concepts representing new technologies, design alternatives, design simplification, logistics alternatives and compatibility with the production process. Trade studies continue through the entire acquisition process as a logical approach to selecting the best supportable design.	2.1 Trade studies have been conducted to ensure the lowest total ownership cost while achieving required performance. 2.2 The trade studies must consider production and operational support as part of the study. 2.3 Trade studies include sensitivity analyses of key performance and support parameters. 2.4 Trade studies are conducted on a continuous basis to ensure that performance and supportability goals are met.	
	Activity	
3. Risk Management – identifies, assesses, mitigates and tracks technical, schedule, cost and logistics risk.	3.1 A risk management program has been established. 3.2 Logistics program risks have been identified and assessed. 3.3 The risk program includes both Government and contractor participation.	
	Activity	
4. Design Reference Mission Profile - is developed concurrent with the Operational Requirements Document (ORD) and establishes the best engineering definition of the usage profile of the system throughout its life cycle, including storage and transportation. It defines the requirements that drive the design interface analyses and the resultant logistics support requirements.	4.1 The environmental profile includes the system's production, operation, and support environments with their associated time-lines. The operating and non-operating requirements may include temperature, vibration, electromagnetic interference/electrostatic discharge, humidity, altitude, salt spray, fog, nuclear, chemical and biological, sand/dust, foreign object damage, production contaminants, etc. 4.2 Functional profiles are prepared and detailed as the system design progresses to the subsystem, assembly, and part levels. It describes the system functional requirements and their associated mission and life cycle time-lines. 4.3 Logistics use profiles and associated timelines are prepared and updated over the life cycle based on the system detail design and maintenance plan.	
(continued on next page)	***Activity***	

A good guide to measure the risk management program is NAVSO P-3686, "Top Eleven Ways to Manage Technical Risk." (See Part VII).

Design Interface *- continued*

Program Activity	Metrics	Rating
5. Reliability, Maintainability, Quality and Availability - are requirements imposed or analyses performed to insure that the system is operationally ready for use when needed, will successfully perform assigned functions, and can be operated and maintained within the scope of the logistics concept and plan.	5.1 The following measures of effectiveness or equivalent are identified in measurable quantifiable terms based on similar systems and available detail design information: – Availability. – Mean Time Between Failures (MTBF). – Mean Time To Repair (MTTR). – Frequency and duration of preventive or scheduled maintenance. – Battle damage repair capability. – Readiness thresholds for all system downtime, including scheduled maintenance. 5.2 Reliability, maintainability and availability of the system are continually assessed through analyses and testing to ensure life cycle objectives will be met. 5.3 Design and layout minimizes unnecessary removal of items to gain access for maintenance and minimizes design of special tools. 5.4 Maintainability predictions and task time analyses are completed for organizational level or shipboard maintenance as a minimum. 5.5 Mock-ups, prototypes and/or simulations to assess accessibility are completed as part of design. 5.6 Accessibility and maintainability are validated through tests. 5.7 A quality program is established to assure implementation of design requirements into process control characteristics.	
	Activity	
6. Design Analyses – are planned and conducted to assess the strengths and weaknesses of the design and its effect on supportability.	6.1 Top-down analyses (e.g., failure modes, effects and criticality analysis; single point failure analysis; fault tree analysis) from system level to lowest part level are performed as the design progresses. 6.2 Sneak circuit analysis is performed as a minimum on critical circuits, circuits that perform frequent switching functions, and areas of safety concern. 6.3 Thermal analysis includes results from analyses of the detail designs, thermal surveys/tests, and operational tests. 6.4 Stress analyses (mechanical/finite element, electrical, and thermal) are conducted against derating guidelines. 6.5 Worst case analyses are performed to identify tolerance stack-up and drift in circuit parameters. Calibration and measurement systems are included in these analyses.	
(continued on next page)	***Activity***	

The measures of material readiness or reliability should be specified and defined in the ORD.

Design Interface *- continued*

Program Activity	Metrics	Rating
7. Failure Reporting, Analysis and Corrective Action System (FRACAS) - is developed and implemented with the objective of documenting failures, analyze their cause, determining corrective actions and disseminating the data.	7.1 All failures are reported in the FRACAS. 7.2 Performed on engineering development models, pre-production units and production units. 7.3 All failures and related information are reported in the system database. 7.4 Built-in-test indications and false alarms are analyzed for corrective action. 7.5 Software trouble reports are analyzed for corrective actions.	
	Activity	
8. Parts and Materials Selection - utilizes a disciplined design process including adherence to specific derating guidelines and the use of Qualified Manufacturers Lists to standardize parts selection.	8.1 Guidance and/or requirements should be documented in a parts and materials design guide before the start of design, addressing parts selection, derating and testability factors. Adherence to the guidelines should be verified at design reviews. 8.2 The order of precedence for parts selection emphasizes the use of Qualified Manufacturers Lists parts, particularly for applications requiring extended temperature ranges. 8.3 Parts and materials selected are qualified to the worst case Design Reference Mission Profile and detail design environments. Uprating or upscreening of parts is not a best practice and should not be performed. 8.4 Parts derating is required for all electronic/electrical components. Electrical parameters of parts are characterized to requirements derived from the Design Reference Mission Profile to ensure that all selected parts are reliable for the proposed application. 8.5 A Preferred Parts List is required prior to detailed design. 8.6 Highly integrated parts (e.g., application specific integrated circuits) are used to reduce: – The number of individual discrete parts/chips. – The number of interconnections. – Size, power consumption and cooling requirements. – Failure rates. 8.7 A parts obsolescence and technology insertion plan has been developed and implemented. 8.8 A parts review board is implemented to assure proper selection and application of parts and materials to meet performance and Design Reference Mission Profile requirements. 8.9 The Critical Items List must include: – Any item of high technical risk with no workaround. – Items with schedule/delivery risk.	

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Design Interface - *continued*

Program Activity	Metrics	Rating
	– Sole source items. – High failure rate items. – Safety of flight items.	
	Activity	
9. Design Limit/Life Testing - is conducted to measure actual hardware and software configuration items performance for compliance with performance/design specifications, software requirements and interface requirement specification.	9.1 Qualification testing is conducted to measure system hardware compliance with performance and design requirements. 9.2 Accelerated life testing has been conducted to estimate the life of an item under normal operating conditions, by identifying potentially detrimental product characteristics. 9.3 Step stress testing/accelerated life testing has been conducted to determine short-term failure mechanisms by identifying load/stress limit conditions to determine design margins.	
	Activity	
10. Design for Testing/Built-In-Test (BIT) - objectives are to achieve the required performance monitoring, fault detection and fault isolation capabilities at the appropriate maintenance levels with the optimum mix of BIT, semi-automatic test and general purpose manual test equipment.	10.1 The testability/BIT concept is defined with the operation concept and the maintenance concept for all levels of maintenance. 10.2 Testability analyses have been conducted concurrently with design at all hardware and all maintenance levels. 10.3 Fault tree analysis, dependency modeling and analysis, and failure modes, effects and criticality analysis has been used to determine test point requirements and fault ambiguity group sizes. 10.4 The level of repair analysis is completed for each configuration item for each maintenance level to identify optimum mix of BIT, semi-automatic test equipment and general purpose test equipment. 10.5 Optimized BIT meets operational maintainability requirements and typically provides as a minimum: – 98% detection of all failures. – Isolation to the lowest replaceable unit. – Less than 1% false alarms. 10.6 Other automatic test equipment and BIT are compatible. 10.7 Preliminary BIT/testability analysis is completed by preliminary design review. 10.8 Detailed BIT/testability analysis is completed by critical design review. 10.9 Effectiveness of BIT is validated with tests. 10.11 Failure of the BIT circuitry does not precipitate other hardware/software failures. 10.12 Built-In-Test filtering is applied to minimize false alarms. 10.13 System anomalies and intermittents are analyzed	

Effective Design for Testing/ BIT is a critical factor in determining manpower and training requirements.

(continued on next page)

Design Interface *- continued*

Program Activity	Metrics	Rating
	for possible changes to the BIT design, thresholds/tolerances and/or filtering. 10.14 Software can be revised independently and without change to the operating software.	
	Activity	
11. Manufacturing Plan/Screening - integrates actions required to produce, test and deliver acceptable systems on schedule and at minimum cost.	11.1 A manufacturing plan has been developed and approved for the current program. 11.2 Environmental stress screening has been conducted to precipitate latent, intermittent, or incipient defects or flaws introduced during the manufacturing process.	
	Activity	
12. System Reviews - include: • Functional Configuration Audit (FCA) – performance requirements, design analyses, test plans and results and other evidence are reviewed to determine if the product performs as specified. • Physical Configuration Audit (PCA) – physical inspection of product and design information is performed to assure accuracy, consistency and conformance with configuration baselines. • Design Review - is a process in which design analysis results, design margins, design and supportability maturity are evaluated to identify areas of risk, such as technology, design stresses, producibility and supportability prior to proceeding to the next phase of the development process. • Production Readiness Review - identifies risks and evaluates the readiness of the contractor for production. • Logistics Assessments - conducted during the same time frame as design reviews so design issues affecting logistics can be addressed.	12.1 FCA: Typically conducted at the end of the System Development and Demonstration phase on each configuration item. 12.2 PCA: Conducted on the first production unit. 12.3 The preliminary design review has been conducted. – 20% of the design should be complete. 12.4 The detailed design review has been conducted. – 50% of the design should be complete. 12.5 The critical design review has been conducted. – 95% of the design should be complete. 12.6 Design review requirements are flowed to subcontractors. 12.7 The production readiness review has been performed to include an assessment of system supportability requirements. 12.8 Logistics assessments identify program risks and mitigation actions.	
	Activity	
	Element	

Reference TRI-Service Brief 002-93-08 and ASN(RD&A) Technical Brief "Accelerated Tests" for more information on manufacturing screening (See Part VII).

Support Equipment

Program Activity	Metrics	Rating
1. Maintenance Plan - includes documentation of the Support Equipment (SE) concept as a result of the level of repair analysis, organic repair/contractor support and the sparing concept.	1.1 Establishes the diagnostics concept. 1.2 Identifies test and fault isolation capabilities desired of automatic, semi-automatic and manual test equipment at all maintenance levels, expressed in terms of realistic and affordable probabilities and confidence levels. 1.3 Identifies the SE associated with the most economical level of repair (usually determined in the level of repair analysis) unless over-ridden because of non-economic factors. 1.4 Identifies manpower, training and maintenance task requirements. 1.5 Identifies required technical documentation to support the SE. 1.6 Identifies the level of maintenance at which the various SE is required (e.g., organizational, intermediate and depot level maintenance). 1.7 Types and quantity of SE for each location has been established. 1.8 Calibration requirements are specified. 1.9 Support Equipment Requirements Document is submitted by the contractor to justify SE requirements and initiate follow-on support activities.	
	Activity	
2. Design - should implement the same practices and procedures used in the design of the weapon system. Sound design practices of SE ensures that reliable, maintainable, low risk, supportable and mature designs are released.	2.1 Includes documentation of the test/diagnostics requirements. 2.2 Includes test measurement and diagnostic equipment calibration requirements and associated technical parameters. 2.3 Includes test fixtures and/or interfaces to connect the system to the test equipment. 2.4 Includes procedures to perform the required diagnostics. 2.5 Includes maintenance tasks supported by the SE. 2.6 The environmental and physical constraints, such as size, weight, power, temperatures, interfaces, etc. have been factored into SE design. 2.7 Analyses to identify the optimum mix of automatic and manual fault detection and isolation equipment at each applicable maintenance level has been conducted.	
(continued on next page)	***Activity***	

Support Equipment- *continued*

Program Activity	Metrics	Rating
3. Test Validation/Verification Plan – validates that the SE will perform to the weapon systems interface and performance requirements.	3.1 Identifies physical/functional characteristics of the unit being tested. 3.2 Identifies interface requirements. 3.3 Identifies detailed test information. 3.4 Identifies assembly drawings. 3.5 Identifies test flow charts and diagrams. 3.6 Identifies calibration and measurement requirements and equipment.	
	Activity	
4. Provisioning Requirements – are addressed to assure that SE can be supported by the supply system and can be reprocured as necessary (also see supply support provisioning requirements).	4.1 Provisioning documentation identifies tools and test equipment by task function and maintenance level. 4.2 Category codes (e.g., source, maintenance and recoverability codes) are identified for SE. 4.3 Provisioning documentation includes: – Manufacturers part numbers. – Nomenclatures. – Descriptions. – Estimated prices. – Recommended SE quantities.	
	Activity	
	Element	

Supply Support

Program Activity	Metrics	Rating
1. Maintenance Plan - includes documentation of the supply support concept as a result of the level of repair analysis, organic repair/contractor support and the sparing concept. *(continued on next page)*	1.1 Establishes the maintenance philosophy and level of repair. 1.2 Defines the sparing concept (e.g., direct vendor delivery, inventory control point reprocurement and provisioning). 1.3 Specifies the type of repair (e.g., inspect/repair as necessary, disposal or overhaul).	
	Activity	

Supply Support – *Continued*

Program Activity	Metrics	Rating
2. Sparing Analyses - sparing models are developed to assist in establishing requirements.	2.1 A readiness based spares model (e.g., TIGER and Availability Centered Inventory Model (ACIM) models) is used to compute spares requirements, which includes: – Failure rates. – Repair times. – Maintenance/repair limitations. – Downtimes. – Criticality of the spare to the mission. – Required Ao and mission times. 2.2 The optimum maintenance concept has been identified. – Reliability centered maintenance. – Condition based maintenance. – Time based maintenance.	
	Activity	
3. Supply Support Plan - describes how the program will manage and control supply support requirements. It addresses the identification of logistics requirements and efforts, and the criteria used to measure their accomplishment.	3.1 Identifies if interim support will be required. 3.2 Identifies the support cost drivers. 3.3 A plan of action and milestones has been generated that includes key activities and milestones such as Material Support Dates/Navy Support Date and independent logistics assessments. 3.4 Addresses responsibility for warehousing and transportation.	
	Activity	
4. Parts and Materials Selection - utilizes a disciplined design process including adherence to specific derating guidelines to standardize parts selection. Appropriate selections reduce provisioning requirements as a result of improved reliability, standardization and obsolescence management.	4.1 A Diminishing Manufacturing Sources and Material Shortages (DMSMS) program has been established. 4.2 Qualified Manufacturers List parts have been selected. 4.3 Commercial-off-the-shelf/non development item parts and their applications meet Design Reference Mission Profile requirements. 4.4 Shelf and operating life requirements have been identified. 4.5 Storage and transportation requirements, such as electrostatic discharge and other environments, have been identified.	
	Activity	
5. Asset Management Program - determines how inventories will be stored, managed, reprocured and how allowances will be maintained. *(continued on next page)*	5.1 Asset visibility is fully maintained on Navy Inventory Control Point (NAVICP) files. 5.2 Requisitions pass through the NAVICP for referral to the contractor. 5.3 The NAVICP maintains backorders. 5.4 The inventory of spares to be procured has been determined. 5.5 Adequate funding for replenishment has been identified.	

A good source of DMSMS information is GIDEP (See Part VII).

Supply Support – *Continued*

Program Activity	Metrics	Rating
	5.6 Allowance has been determined. 5.7 A contractor logistics support (e.g., direct vendor delivery) spares concept has been evaluated against traditional support. 5.8 Provisions for surge requirements are identified. 5.9 Provisioning Support Documentation Automated Retrieval and Tracking System is used in budgeting for initial and recurring spares.	
	Activity	
6. Provisioning Requirements - establishes schedules, actions, procedural data and deliverable data for a particular contract. The provisioning conference is key to ensuring the correct level of supply support for the system.	6.1 Provisioning conferences are conducted, as necessary, to determine if the contractor's provisioning preparation, documentation and facilities are adequate. 6.2 Provisioning screening has been conducted to: – Prevent duplicate entries in the DoD supply data system. – Obtain maximum use of existing supply items. 6.3 Item management codes are assigned, which include source, maintenance and recoverability codes. 6.4 Provisioning data reports, such as the following, have been generated: – Recommended Repair Parts List provided for pre-operational repair parts and training equipment. – Provisioning Parts List determines the range and quantity of support items for an initial period. – Interim Support Item List identifies support requirements from a transitional operating period as well as the funding for that support.	
	Activity	
7. Interim Contractor Support - ensures equipment supportability until the prime equipment and its spares are fully integrated into the Government inventory.	7.1 Contractor teams are logistically supporting fielded units if Government support is not available. 7.2 The Government (design agent, in service engineering agent, etc.) or contractor performs analysis of field data.	
	Activity	
8. Post Production Support Plan/Analysis - addresses the need to sustain effective operations and readiness after contractor delivery of the last production system.	8.1 Post production supportability analysis should identify items that are single/dual source or those for which the Government cannot obtain data rights and the associated corrective action plan. 8.2 A Program Manager/NAVSUP Reprocurement Engineering Support Agreement is in place.	
	Activity	
	Element	

If system reliability thresholds change or are not met, spares requirements need to be recalculated using the updated values.

Manpower and Personnel

Program Activity	Metrics	Rating
1. Maintenance Concept/Plan – includes identification of the frequency of failures for maintenance, maintenance task times, maintenance skill levels and number of maintenance personnel required. These factors are critical during the design phase to identify drivers of support and manpower requirements.	1.1 Identifies requirements for: – Special skills. – Maintenance and operator labor hours by rate by year. – Number of personnel by rate by maintenance level by year. 1.2 Identifies requirements for manpower factors that impact system design utilization rates, pilot-to-seat ratios and maintenance ratios. 1.3 Maintenance task times, maintenance skill levels and number of maintenance personnel required have been derived from the following: – Reliability (e.g., MTBF). – Maintainability (e.g., MTTR, maintenance task times). – Availability (e.g., task time limits). – Reliability and maintainability tests. – Performance monitoring/fault detection/fault isolation and diagnostics. – Test conducted under representative operating conditions.	
	Activity	
2. Human Systems Integration Analysis - identifies design trade-offs to reduce skill levels and number of personnel by simplifying man/machine interfaces.	2.1 Human systems integration analysis includes the following: – Accessibility. – Visibility. – Human factors/ergonomics. – Testability/BIT. – Complexity. – Standardization and interchangeability. – Use of mock-ups, modeling and simulation. – Operational experience. 2.2 Broad cognitive, physical and sensory requirements for the operators, maintainers, or support personnel that contribute to, or constrain, total system performance have been analyzed. 2.3 Analysis includes requirements for human performance that will achieve effective human-system interfaces.	
	Activity	
	Element	

Training

Program Activity	Metrics	Rating
1. Navy Training Systems Planning - is normally documented as the Navy Training Systems Plan, which is the principal document that identifies the requirements and resources to establish and maintain an effective training program throughout the acquisition life cycle.	1.1 A Training Planning Process Methodology (formerly HARDMAN methodology) is conducted. 1.2 Resource requirements are specified for: – Training equipment. – Training materials. – Training facilities. – Required training personnel. 1.3 Instruction in formal schools, on-the-job-training and follow-on training includes: – System operation and maintenance levels (e.g., daily, weekly, monthly, quarterly, semi-annually, on condition). – Individual and team training. – Instructor training. 1.4 Training requirements reflect configuration updates to the weapon system.	
	Activity	
2. Training Outline and Curricula Design - are developed based on the training approach defined in the training plan.	2.1 Terminal training objectives are defined in detail. 2.2 Specific criteria are established to determine if the training is successful. 2.3 Operator and maintainer training are embedded in the Interactive Electronic Technical Manual (IETM). job performance aids are included. 2.4 Safety procedures have been incorporated into training curricula.	
	Activity	
3. Training Material – the development of program specific material to aid in communicating the desired training concept.	3.1 Technical manuals are developed prior to the development of training materials. 3.2 Instructor guides, course curriculum and student guides, as well as audio-visual training aids, are developed for classroom training. 3.3 Software is developed to disseminate computer-based training. 3.4 After development, the training material is evaluated for content, clarity and accuracy, typically in a controlled environment of a pilot course.	
(continued on next page)	***Activity***	

Training – *Continued*

Program Activity	Metrics	Rating
4. Training Devices/Simulators - (hardware, software, tools and test equipment) should be developed specific to each particular training situation.	4.1 Training devices to support operator or maintainer training are identified. 4.2 A Military Characteristics Document is prepared for each training device, defining its basic physical and functional requirements. 4.3 Maximum embedded on-board training capability in deployed equipment is used. 4.4 Pre-faulted modules or software to simulate faults for diagnostics training are used. 4.5 Simulation of scenarios reflecting the actual operating environment are used for operator training.	
	Activity	
5. Initial Training Requirements - normally funded by the program manager, are provided by the contractor while the organic capability is being developed and phased in. This training may include the maintenance or operation of a system or training devices and typically requires curriculum development, course conduct and advisory services.	5.1 Initial training is provided by a contractor in the operation, maintenance, or employment of a system or training aid. 5.2 Contractor test and evaluation activities are used for validation of training requirements, initial fleet training for Operational Evaluation and fleet introduction.	
	Activity	
	Element	

Commercial packaging practices should be used for all items, unless it is shown that they cannot provide adequate protection and preservation.

Packaging, Handling, Storage and Transportation

Program Activity	Metrics	Rating
1. Packaging, Handling, Storage and Transportation Summary Report - identifies the resources, processes, procedures, design considerations and methods to ensure all systems, equipment and support items are preserved, packaged, handled and transported properly to avoid damage.	1.1 Storage, handling and transportation profiles of the Configuration Items over the system life cycle from acceptance through disposal have been derived from the Design Reference Mission Profile. 1.2 The DoD's computerized Container Design Retrieval System database has been searched, in order to identify any applicable containers or designs in the government system to preclude the design of new specialized containers when suitable ones are already in the system.	

(continued on next page)

Packaging, Handling, Storage and Transportation

- Continued

Program Activity	Metrics	Rating
	1.3 Military Packaging, MIL-STD-2073, has only been considered for: – Items which documented analyses have shown cannot be protected and preserved in a cost-effective manner using commercial packaging. – Items delivered during wartime for deployment with operational units. – Items requiring reusable containers. – Items intended for delivery-at-sea. – Items where the contractor has determined military packaging is the optimal packaging solution. 1.4 Packaging intended for international use has been approved by the Department of Transportation. 1.5 Storage monitoring requirements are incorporated into technical publications. 1.6 Transportability problems are addressed, to include: – Oversized/overweight items. – Items requiring special transportation modes. – Items that are classified. 1.7 Shelf life requirements have been identified.	
	Activity	
2. Special Testing - unique tests may be required to verify design adequacy and for compliance with special regulations on packaging.	2.1 Design validation testing has been conducted on special packaging identified in MIL-PRF–49506. 2.2 Hazardous material packages have been tested in accordance with the applicable requirements for performance packaging contained in the International Air Transport Association Dangerous Goods Regulations or the International Maritime Dangerous Goods Code and with the Code of Federal Regulations (CFR) Title 29, Title 40 and Title 49. 2.3 For ammunition, tests have been conducted to the requirements of MIL-STD-1660.	
	Activity	
	Element	

Configuration Management

Program Activity	Metrics	Rating
1. Configuration Management (CM) Plan - documents the CM processes to control the configuration of the system and supporting elements.	1.1 Contains CM milestone schedule and dated baselines from development through disposal. 1.2 Includes procedures for the configuration identification, control, status accounting, waivers/deviations, engineering changes and verification/audit functions. 1.3 Contains subcontractor CM requirements including information, data and metrics.	
	Activity	
2. Configuration Identification - describes the product through the use of configuration baselines.	2.1 At the appropriate milestones, the following configuration baselines have been established and approved: – Functional. – Allocated. – Product. 2.2 Nomenclature has been established, where appropriate. 2.3 Interfaces are defined using interface control documents, as applicable. 2.4 The hardware/software requirements specification and interface requirements specification have been prepared and approved. 2.5 Each computer software configuration item and its corresponding computer software components and computer software units have been identified. 2.6 A software design document has been written for each computer software configuration item. 2.7 The version, release, change status and other identification details of each deliverable item of software are known. 2.8 For commercial-off-the-shelf/non-development items, form/fit and function information has been required/provided for refresh/insertion.	
	Activity	
3. Configuration Control - establishes and maintains a systematic change management process.	3.1 Configuration control processes and procedures are established including change initiation, evaluation and disposition. 3.2 A change control board is established. Membership includes logistics representation. 3.3 Configuration control requirements are flowed to subcontractors. 3.4 Audits have been conducted to verify the functional, allocated and/or baseline configuration.	
(continued on next page)	***Activity***	

Configuration Management - *Continued*

Program Activity	Metrics	Rating
4. Configuration Status Accounting - provides configuration information to support all program/project activities.	4.1 The configuration status accounting information is maintained in a CM database that may include such information as the as-designed, as-built, as-delivered, or as-modified configuration of the product as well as of any replaceable component within the product. 4.2 Traceability of requirements from the top-level documentation through all subordinate levels has been documented. 4.3 The results of configuration audits, including the status and final disposition of identified discrepancies and action items have been recorded. 4.4 The status of proposed engineering changes from initiation to final approval and contractual implementation have been recorded and reported.	
	Activity	
	Element	

Technical Data

Program Activity	Metrics	Rating
1. Continuous Acquisition Life Cycle Support – requires transitioning from paper-intensive defense system acquisition and support processes to automated and integrated digital processes for the support of defense systems and equipment. *(continued on next page)*	1.1 Logistics technical data for new systems, and applicable logistics technical data from legacy systems, which interface with new systems, should be acquired, converted, and/or developed in digital electronic form to perform life cycle support using digital operations. 1.2 Electronic data interchange, on-line access and automation issues have been addressed separately using documents such as MIL-STD-1840.	
	Activity	

Access the N4 website for the latest DoN policy on acquisition and conversion of logistics technical data to digital form. The Navy Contracting for Technical Data Handbook provides guidance on contracting for technical data to support the Integrated Digital Data Environment.

Technical Data – *Continued*

Program Activity	Metrics	Rating
2. Technical Data Package - provides a technical description of an item adequate for supporting an acquisition strategy, production, engineering and logistics support. The description defines the required design configuration and procedures to ensure adequacy of item performance.	2.1 A technical data management plan including change control processes have been developed and validated. 2.2 A determination has been made regarding ownership of technical data package rights. 2.3 The technical data package is consistent with maintenance planning and provides a sufficient level of detail for reprocurement, upgrade, maintenance and repair of hardware. The technical data package normally includes: – Specifications, engineering drawings and special instructions. – Coordination, interchangeabilty, form, fit and function information. – Safety requirements. – Preservation and packaging requirements. – Test requirements data and quality provisions. – Preventative Maintenance System/ Maintenance Requirements Card. – Environmental stress screening requirements.	
	Activity	
3. Technical Manuals - provide instructions for the installation, operation, maintenance, training and support of a system or equipment.	3.1 Contents are validated on production configured system or equipment by fleet personnel. 3.2 Technical manuals include: – Required readability/comprehension levels. – Operational and maintenance instructions. – Parts lists and breakdowns. – Related technical information or procedures exclusive of administrative procedures. 3.3 Commercial-off-the-shelf manuals have been evaluated using MIL-HDBK-1221. 3.4 The contents of the technical manuals have been integrated into the Interactive Electronic Technical Manual (IETM) considering the following: – Phased development schedule in parallel with the system development, including validation and transition to the Navy. – Operator and maintainer training are embedded and job performance aids included. – Legacy data converted and incorporated. – Software used to create, manage and update the IETM documented and provided to the Navy. – The established IETM level is achievable and within the schedule.	
	Activity	
	Element	

Environmental, Safety and Occupational Health

Program Activity	Metrics	Rating
1. Environmental Regulations – The National Environmental Policy Act (NEPA) is the basic charter for protection of the environment. It establishes policy, sets goals and provides means for carrying out environmental policy.	1.1 A plan of action and milestones is developed to identify significant program events to ensure NEPA or EO 12114 compliance. These may include: – Conducting tests utilizing test ranges. – Contracting for production. – Planning basing or home porting locations. – Planning new facilities to support the system. 1.2 NEPA decisions results in one or more of the following: – Categorical Exclusion (CATEX). – Finding of No Significant Impact (FONSI) based upon an environmental assessment. – Record of Decision (ROD) based upon an Environmental Impact Statement (EIS). 1.3 Specific impact assessments should include: – Clean Water Act. – NPDES Permits, Marine Mammal Protection Act. – Clean Air Act. – Air permits. – National Emissions Standards for Hazardous Air Pollutants (NESHAPS). – National Ambient Air Quality Standards (NAAQS). – Resource Conservation and Recovery Act. – Endangered Species Act.	
	Activity	
2. Safety and Health - program identifies and evaluates system safety and health hazards, defines risk levels and manages the probability and severity of all hazards associated with development, use and disposal of the system. *(continued on next page)*	2.1 Noise abatement is compliant with all Federal and state standards. 2.2 Material toxicity is compliant with all Federal and state standards. 2.3 Personnel protective equipment is compliant with all Federal and state standards.	
	Activity	

The latest requirements, information, and tools are available on the DCNO (N45) web site (See Part VII).

Environmental, Safety, and Occupational Health *- Continued*

Program Activity	Metrics	Rating
3. Hazardous Material Management Program - ensures that appropriate consideration is given to eliminating and reducing the use of hazardous materials.	3.1 Hazardous materials prohibited in the weapon system design due to operation, maintenance and disposal costs associated with the use of such materials have been identified. 3.2 Hazardous materials whose use cannot be avoided have been documented and communicated to the user and support installations. This includes an inventory of materials incorporated into the weapon system during production and those materials required for maintenance. 3.3 The program has a plan for tracking, storing, handling and disposing of hazardous materials. 3.4 Hazardous material findings and determinations are incorporated into the training program as applicable.	
	Activity	
4. Pollution Prevention Program – minimizes environmental impacts and the life-cycle costs associated with environmental compliance.	4.1 The pollution prevention program should identify impacts of the system on the environment, wastes released to the environment and associated source reduction opportunities. 4.2 The program has a plan to recycle or dispose of system replaceable and disposable components, such as metals, plastics, electronic components, oils, coolants and refrigerants during system life and end of service life.	
	Activity	
	Element	

Facilities

Program Activity	Metrics	Rating
1. Facility Requirements - identify the facility/shore infrastructure support requirements associated with the system being acquired. The shore activity/Naval Region designated to support the system, installation major claimants, the Naval Facilities Engineering Command (NAVFAC) and the system manufacturer participate in this process.	1.1 The types of facilities required to support and sustain the new or modified system have been identified, such as: – Berthing space for ships (including utilities, dredging, special deck structural requirements for crane loads, fendering systems, etc.). – Parking aprons, hangar space for aircraft, etc. – Support facilities, supply warehouses, transit sheds, maintenance facilities, dry dock capability, training facilities (both classrooms and trainers for operational training and maintenance training), etc. – Transient support requirements when the system requires some level of support at continental US and outside continental US activities that are not regular homeports/support sites. 1.2 Basic Facilities Requirements (BFR) have been developed in accordance with the NAVFAC P-72 (Department of Navy Facility Category Codes), NAVFAC P-80 (Facilities Planning Criteria for Navy and Marine Corps Facilities) and other appropriate documents (e.g., MIL-HDBKs), using the system's logistics support requirements. 1.3 The facilities support requirements are usually documented in the Acquisition Logistics Support Plan, Logistics Requirements and Funding Summary and/or the Program's Facilities Management Plan or its equivalent.	
	Activity	
2. Evaluation of Existing Facilities/ Capabilities – is conducted by the program manager and the fleet to ensure that existing facilities can adequately support the system being acquired. Where existing facilities are substandard or inadequate, analysis and development of a plan of action is required to address the deficiency in order to ensure adequate support is in place upon fleet introduction of the system. The shore activity/Naval Region designated to support the *(continued on next page)*	2.1 System support and basic facilities requirements are provided to the Naval activities/regions expected to support operations, maintenance, training and other logistical support related to the system. This is done on a periodic (e.g., annual) basis as the system is being designed and constructed so that the receiving support activities may factor support requirements into their facility planning efforts at the earliest possible time. One mechanism for accomplishing this may be a Facilities Planning/Criteria Letter issued by the program manager. 2.2 Existing assets at each impacted shore activity have been evaluated (e.g., site survey) to determine if they	

OPNAVINST 11000.16 and NAVFACINST 11010.45 provide policy and guidance for the development of the Navy's regional planning initiative. The Navy's facilities planning process is formalized in the Shore Facilities Planning System, which is used to develop the facilities plan.

Facilities – *Continued*

Program Activity	Metrics	Rating
system, installation major claimants and NAVFAC should be included in this process to ensure the most cost effective and timely means of support is being planned and implemented to support fleet introduction of the system.	can be used to satisfy the BFRs associated with the new or modified system. If they are not suitable, the rationale is documented and analysis of viable support alternatives is done to develop a solution for providing adequate facilities to support delivery of the system. Alternatives to be considered include: – Outsourcing (contractor operates Government-owned facilities or their own). – Privatizing (Government buys services and relinquishes all interest including real estate and personal property). – Leasing. – Repair/renovation/conversion of existing assets to satisfy requirements. – New construction to provide required capability. 2.3 If repair/support facilities cannot be completed in time to meet mission requirements and satisfy the BFR, a designated source of repair/support or work around has been identified and received fleet concurrence.	
	Activity	
3. New Construction - previously one of the primary means of satisfying facility deficiencies, is now considered one of several options. However, new construction is frequently required to support a new or modified weapon.	3.1 The program has assessed (e.g., site surveys and trade studies) all means of satisfying a facility requirement prior to selecting the use of Military Construction (MILCON). 3.2 For construction or alterations less than $500,000, the program office has identified funding to support the construction, and contract award is in process. 3.3 For projects in excess of $500,000 (classified as MILCON), Congressional authorization and funding has been approved. 3.4 Estimates of facility requirements and associated costs have been refined and detailed project documentation and cost estimates have been developed. 3.5 Funding for MILCON and other construction projects is available in the budget. 3.6 Construction on MILCON projects has been initiated and is on track to support introduction of the new or modified system to the fleet.	
	Activity	
	Element	

The Facilities Management Plan for an acquisition program is the means for managing facilities initiatives and formally documenting the facilities support concept, facilities requirements, existing support capabilities, and development concept for support of new or modified systems.

Computer Life Cycle Support

Program Activity	Metrics	Rating
1. Computer Resources Life cycle Management Plan - identifies the facilities, hardware, software and support tools, documentation and personnel required to operate and support computer systems.	1.1 A computer and software security plan has been developed. 1.2 Requirements for system firmware and software documentation have been identified and procured. 1.3 A software configuration management plan has been developed or is included as part of the configuration management plan (see "Configuration Management" to assess applicable software configuration management requirements). 1.4 A software support activity has been designated/established. 1.5 Software maturity can and has been measured. 1.6 Software testing requirements have been identified/completed. 1.7 A software safety plan/program has been established. 1.8 A software development plan has been generated and reflects program milestones. 1.9 Required software data rights have been obtained. 1.10 Measures of effectiveness have been established for software.	
	Activity	
	Element	

NAVSO P-3686, Chapter 7, provides key software measures for tracking software progress and risk (See Part VII).

Part IV
Assessing Logistics Risk

To assess logistics risk, evaluate program compliance with each metric in Part III. Using experience and practical knowledge, assign a numerical value of (1) for little or no program compliance with the completed metric or progress to completing the metric, (3) for minimum compliance, (5) for significant compliance and N/A if that metric is not applicable at the time of the assessment. By totaling these values and dividing by the number of metrics (excluding ones marked N/A), a rating is derived for each program activity. The value in using this approach is the ability to identify weaknesses and track progress by comparing the degree of risk from one assessment to the next. Using the following Rating Calculations and Rating vs. Risk Conversion Tables, logistics risk can be quantified.

Rating Calculations

To Calculate	**Do the Following**
Metric Ratings	Assign a number **(1, 3, or 5)** indicating program compliance
Program Activity Ratings	Sum the **Metric Ratings** ڊ **by # of metrics*** in each Programmatic Activity *do not count metrics marked N/A
Logistics Element Rating	Sum of **Program Activity Ratings** ڊ The **number of Program Activities**.
Overall Logistics Program Rating	Sum of **Logistics Element Ratings** ڊ **Number of Logistics Elements**

Rating vs. Risk Conversion Table

Rating Values	**Risk Assessment**
1.0 to 2.2	**High (Red)**
2.3 to 3.7	**Moderate (Yellow)**
3.8 to 5.0	**Low (Green)**

Illustrative Risk Assessment and Roll-Up

Support Equipment

Program Activity	Metrics	Rating
1. Maintenance Plan - documents the support equipment (SE) concept as a result of analyses such as the level of repair analysis, organic repair/contractor support and the sparing concept.	1.1 Establishes the diagnostics concept.	**5**
	1.2 Identifies test and fault isolation capabilities desired of automatic, semi-automatic and manual test equipment at all maintenance levels, expressed in terms of realistic and affordable probabilities and confidence levels.	**1**
	1.3 Identifies the SE associated with the most economical level of repair (usually defined in the level of repair analysis) unless over-ridden because of non-economic factors.	**5**
	1.4 Identifies manpower, training and maintenance task requirements.	**3**
	1.5 Identifies required technical documentation to support the SE.	**1**
	1.6 Identifies the level of maintenance at which the various SE is required (e.g., organizational, intermediate and depot level maintenance).	**3**
	1.7 Types and quantity of SE for each location has been established.	**N/A**
	1.8 SE calibration requirements are specified.	**3**
	1.9 Support Equipment Requirements Document is submitted by the contractor to justify SE requirements and initiate follow-on support activities.	**N/A**
	***Activity* (21/7)**	**3.0** 
2. Design - should implement the same practices and procedures used in the design of the weapon system. Sound design practices of SE ensures that reliable, maintainable, low risk, supportable and mature designs are released.	2.1 Includes documentation of the test/diagnostics requirements.	**1**
	2.2 Includes test measurement and diagnostic equipment calibration requirements and associated technical parameters.	**3**
	2.3 Includes test fixtures and/or interfaces to connect the system to the test equipment.	**1**
	2.4 Includes procedures to perform the required diagnostics.	**5**
	2.5 Includes maintenance tasks supported by the SE.	**3**
	2.6 The environmental and physical constraints, such as size, weight, power, temperatures, interfaces, etc., have been factored into SE design.	**1**
	2.7 Analyses to identify the optimum mix of automatic and manual fault detection and isolation equipment at each applicable maintenance level has been conducted.	**1**
	***Activity* (15/7)**	**2.1** 

Support Equipment- *continued*

Program Activity	Metrics	Rating
3. Test Validation/Verification Plan – validate that the SE will perform to the weapon systems interface and performance requirements.	3.1 Contains physical/functional characteristics of the unit being tested. 3.2 Contains interface requirements. 3.3 Contains detailed test information. 3.4 Contains assembly drawings. 3.5 Contains test flow charts and diagrams. 3.6 Contains calibration and measurement requirements and equipment.	**3** **5** **1** **N/A** **3** **5**
	***Activity* (17/5)**	**3.4** △
4. Provisioning Requirements - need to be addressed to assure that SE can be supported by the supply system and can be reprocured as necessary (also see supply support provisioning requirements).	4.1 Provisioning documentation identifies tools and test equipment by task function and maintenance level. 4.2 Category codes (e.g., source, maintenance and recoverability codes) are identified for SE. 4.3 Provisioning documentation includes: – Manufacturers part numbers. – Nomenclatures. – Descriptions. – Estimated prices. – Recommended SE quantities.	**3** **5** **3**
	***Activity* (11/3)**	**3.7** △
	***Element* (3.0 + 2.1 + 3.4 + 3.7)/ 4**	**3.1** △

Example

Illustrative Overall Logistics Risk Assessment

Logistics Element	Rating	Risk
Funding	3.3	Moderate
Design Interface	2.8	Moderate
Support Equipment	3.1	Moderate
Supply Support	4.6	Low
Manpower and Personnel	2.0	High
Training	5	Low
Packaging, Handling, Storage and Transportation	4.1	Low
Configuration Management	1.7	High
Technical Data	1.5	High
Environmental, Safety and Occupational Health	1.2	High
Facilities	2.9	Moderate
Computer Life Cycle Support	4.8	Low
Overall Logistics Program Rating	**37/12 = 3.1**	**Moderate ***

* In determining the ***Overall Logistics Program Rating***, the numerical value and the criticality of specific logistics elements, corrective actions and schedules must be considered. In addition, the numerical rollup provides a good summary for tracking and reporting the relative health of the program on a periodic basis.

Part V
Logistics Contractual Considerations

Please refer to ASN(RD&A)ABM Publication NAVSO P-3689, "Contracting For The Rest Of Us," for additional information on Navy contracting requirements (See Part VII).

All metrics discussed in Part III should be traceable to contract requirements, if they are not Government responsibilities. The following are additional considerations to be included in the contract.

The contract should…

- Specify customer/vendor conferences to foster integrated product teams and educate all parties on what is expected.
- Specify the specific design analyses to be performed.
- Require failures to be summarized and categorized (part type, cause, location, supplier, etc.).
- Require that manufacturing screening be performed.
- Require commercial-off-the-shelf/non development item reliability be identified.
- Specify requirements for obsolescence and technology refresh programs.
- Use long term contracting vehicles to support direct vendor programs.
- State whether to permit utilization of commercial specifications and standards for asset replenishment or repair, or performance standards vice "build to print."
- Require a time delivery requirement for all shipments to the Navy from contractors.
- Require core transportation carriers to provide near real time shipment tracking services and support customer access to their shipment tracking system.
- Specify vendor managed inventory whenever justified to reduce inventory costs and delivery times.
- Acquire limited rights, as a minimum, for proprietary and copyrighted data to allow reproduction and distribution of the data for government purposes.
- Specify requirements for the contractor to develop and provide a technical data package of hazardous materials incorporated into the weapon system design and/or required for maintenance.
- Specify a design goal of minimizing both the variety and volume of materials required for maintenance support of the weapon system.
- Specify the criteria for evaluation of the offeror's Environmental Safety and Occupational Health integration and design constraints imposed upon the contractor to minimize long-term costs of environmental compliance
- Specify the facilities support concept (e.g., existing Naval facilities will be utilized for support) and specify that the contractor perform analyses to verify compliance with that concept.
- Require the contractor to provide product characteristics (e.g., length, width/beam, depth/height) and support requirements on a periodic basis as design/construction progresses rather than as a one time deliverable.

Part VI
Watch Out Fors

This following provides selected lessons learned expressed as "Watch Out Fors" that can become traps if not avoided while following the guidelines contained in Part III, "Metrics for Assessing Logistics Program Activities."

Watch out for…

Supportability Analysis

- Conducting supportability analysis after critical design review. Supportability analysis performed after the fact merely documents design shortcomings, as opposed to supportability influencing the design.
- The failure to define the maintenance concept by preliminary design review, which leads to equipment redesign and/or delays in development of technical documentation, personnel training, or special test equipment. Failure to accommodate support needs in the detail design results in program cost growth.
- Total ownership cost analysis not updated when factors that effect support changes occur.

Design Interface

- Use of new technologies without conducting trade-studies to identify supportability risks.
- Design Reference Mission Profiles that are simply extracted from MIL-HDBK 810, "Environmental Engineering Considerations And Laboratory Tests," 1 Nov 2000.
- Emphasis on testing to assess compliance to reliability, maintainability and availability requirements rather than for growth and verification.
- Failure analysis required only when repetitive failures occur.
- Exclusion of test equipment, government furnished equipment and commercial-off-the-shelf/non-development item failures from failure reporting and corrective action system.
- Designs using part technologies whose remaining life cycle will not support production and postproduction uses.
- In-service use of design limit qualification test units and other units that are stressed to a level resulting in inadequate remaining life.
- Commercial-off-the-shelf/non-development item design that is incompatible with mission needs and program life-cycle maintenance philosophy.
- Testability design that results in special purpose test equipment.
- Circuit card assemblies and modules with test points that aren't accessible.
- Limitations to built-in-test coverage/effectiveness caused by:
  - Non-detectable parts (mechanical parts, redundant connector pins, decoupling capacitors, one-shot devices, etc.).
  - Power filtering circuits.
  - Use of special test equipment (e.g., signal generators) to simulate operational input circuit conditions.
  - Interface and/or compatibility problems between some equipment designs (e.g., digital vs. analog).
  - Inadequate time to perform built-in-test localization/diagnosis.
- Complex integrated circuits/ chips without self-test capabilities.
- A design that does not reflect the ability to:

  - Initialize the operating characteristics of a system by external means (e.g., disable an internal clock).
  - Control internal functions of a system with external stimuli (e.g., break up feedback loops).
  - Selectively access a system's internal partition and parts based on maintenance needs.
- System reviews that are primarily programmatic in nature instead of technical.
- System review schedules that are based on planned milestone dates.
- System reviews not formally documented and reported to management.
- System reviews held by teams without adequate technical knowledge or representation of manufacturing, product assurance, supportability, etc.

Support Equipment

- Product delivery before built in test/fault isolation system is fully developed. This typically results in unplanned support equipment upgrades to enable proper support of the fielded product.
- Utilizing support equipment that cannot be calibrated in remote field locations.
- Maximizing rather than optimizing the use of built-in-test equipment in the product design. Maximizing built-in-test equipment may not be cost effective or necessary to meet support requirements when considering other automatic and general purpose test equipments.
- Support equipment selected and designed prior to a stable system design.
- Intermediate and depot maintenance being initialized during support equipment design instability.
- Standard maintenance busses not used to test equipment at all maintenance levels.

Supply Support

- Spares requirements determined without using reliability or failure/usage data.
- Spares/consumables requirements determined without considering secondary failures or collateral repairs.
- Lack of a shelf life item management program.
- No interim support plan for systems, subsystems, assemblies and subassemblies with unstable designs.

Training

- Designing and implementing training courses that do not utilize product engineers and subject matter experts.
- Creation of video-based training directly from classroom training. These videos are usually of poor quality and are not effective in holding the student's attention.
- Development of training methods and devices before a confirmed baseline design has been established.
- Development of instructor and student course material before the technical manuals have been developed.
- Not validating training material with its associated equipment.

Packaging, Handling, Storage, and Transportation

- Use of unqualified containers.
- Design of special handling equipment without researching those available on the using platforms.

Configuration Management

- Engineering change proposals that do not consider logistics impact.
- High rate of design changes, engineering change proposals, waivers and deviations continuing after critical design review and into production.

Technical Data

- Design changes after technical manuals have been completed.
- Technical manual development schedule not coordinated with test plans, production schedules and deployment schedules to ensure the availability of hardware, software and equipment to support the verification effort.

Environmental, Safety and Occupational Health

- Lack of a system to identify and manage processing of hazardous material and waste at the inventory control points, maintenance facilities, storage activities and shipboard.

Facilities

- Not identifying facilities support requirements early enough or more than once during acquisition. If military construction is required, there is a 5-7 year lead-time required for identification of the requirement to support planning, programming, design and execution of a construction project.
- Not having a process in place to address facilities and adapt to unforeseen changes due to reliance on programmatic guidance.
- Not integrating facilities with the other logistics elements (maintenance, training, supply support, etc.) to ensure all potential facilities impacts are assessed and addressed in a logical and efficient manner.
- Not keeping abreast of changes to Navy mission and shore infrastructure support. Once a development concept for support of the system has been developed, continued coordination with fleet activities and installation major claimants regarding facilities support must occur. Closures, realignments and other shifts in Naval missions and operations at a designated support location can affect the best plans and may require adjustments at any time to ensure required support is in place to support the program.
- Planning to stand-up more than one support site at one time. Establishing multiple support sites at the same time does not allow the Navy to allocate resources efficiently and effectively nor apply critical lessons learned/successes, based upon experience, to subsequent support sites.

Computer Life Cycle Support

- Contractor requirement for separate software licenses for each unit being fielded, including operation, support and test sites.
- Warranty provisions that do not specify the inclusion of software.
- Support of non-standard software.

Part VII
Resources

This part provides a listing of selected resources available for assistance with acquisition logistics planning and implementation.

The Office of the Assistant Secretary of the Navy (Research, Development and Acquisition) Acquisition and Business Management ASN(RD&A)ABM is the Navy Acquisition Office Responsible for logistics acquisition policy and guidance. The Office of the Deputy Chief of Naval Operations for Logistics (DCNO) (N4) is assigned by ASN(RD&A) the responsibility to validate and oversee the Integrated Logistics Support process and ensuring that the process results in fully supported systems at Initial Operational Capability. The following tools are available on the ASN(RD&A)ABM website or other Navy/DoD sites. Live link information is provided with each tool. For questions, guidance, policy or the latest information, contact your SYSCOM/PEO logistics coordinator, or visit the ABM or DCNO (N4) websites at:

http://www.abm.rda.hq.navy.mil

http://www.hq.N4.navy.mil

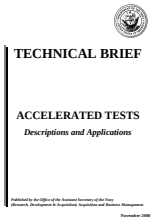
Navy Acquisition Reform Office - was established to enable the acquisition community to improve its support of the warfighter. The Navy Acquisition Reform Office has tools available on-line to support Navy activities, as well as the Outreach, Communication and Education Program that brings subject matter experts directly to the requesting Navy activities. The Navy Acquisition Reform Office can be accessed at: http://www.acq-ref.navy.mil

The Naval Facilities Engineering Command (NAVFAC) - manages the planning, design and construction of shore facilities for U.S. Navy activities around the world. They provide the Navy's forces with the needed shore-based operating, support and training bases. NAVFAC personnel are available to provide guidance and support for Navy facility logistics issues and can be accessed at: http://www.navfac.navy.mil

Naval Surface Warfare Center (NSWC), Corona Division, Quality Assessment Directorate - provides technical and logistics support to Navy and DoD Program offices in conducting independent logistics assessments. The Quality Assessment Directorate of NSWC Corona Division can be accessed at: http://www.corona.navy.mil

Logistics Assessment Handbook - provides guidance and formats to facilitate an assessment of the adequacy of integrated logistics support planning, management, resources and execution in support of research and development, production, fleet introduction and life-cycle support of new or modified systems (i.e. weapons platforms, systems, subsystems or equipment). Access this tool at: http://www.hq.N4.navy.mil

NAVSO P-3686 "Top Eleven Ways to Manage Technical Risk" - offers a single source of concise explanations and clear descriptions of steps to establish and implement core technical risk management functions. It contains baseline information, explanations and best practices that contribute to a well-founded technical risk management program. Access this tool at: http://www.abm.rda.hq.navy.mil



ASN(RD&A)ABM Technical Briefs – are periodically issued to share technical and logistics information to continuously improve acquisition practices. These technical briefs are joint efforts between senior technical experts in the Navy and industry. Two current briefs effecting acquisition logistics are "Accelerated Tests" and "Built-In-Test." Access these briefs at: http://www.abm.rda.hq.navy.mil

Government-Industry Data Exchange Program (GIDEP) - is a cooperative activity between government and industry participants seeking to reduce or eliminate expenditures of resources by making maximum use of existing information. The program provides a media to exchange technical information essential during research, design, development, production and operational phases of the life cycle of systems, facilities and equipment. GIDEP is the DoD's centralized database for Diminishing Manufacturing Sources and Material Shortages. Access GIDEP at: http://www.gidep.corona.navy.mil

Turbo Streamliner - is a repository of acquisition definitions, principles, best practices, lessons learned, references, sample contractual language and related websites. This tool is organized by acquisition functional areas and associated request for proposal elements. The purpose of Turbo Streamliner is to assist the acquisition community in applying Acquisition Reform principles, concepts and techniques to acquiring and sustaining DoN warfighting capabilities for new requirements and reprocurements. Access this tool at: http://www.abm.rda.hq.navy.mil