DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
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IN REPLY REFER TO

OPNAVINST 4442.5
N412J
30 June 2000

OPNAV INSTRUCTION 4442.5

From: Chief of Naval Operations

Subj: READINESS BASED SPARING (RBS)

Ref: (a) DoD 5000.2-R of Mar 96 (NOTAL)
(b) SECNAVINST 5000.2B
(c) OPNAVINST 4423.4A
(d) OPNAVINST 3000.12
(e) OPNAVINST 5442.4M
(f) OPNAVINST 4441.12C
(g) CNO ltr Ser 412/394582 of 16 Mar 81 (NOTAL)
(h) CNO ltr 412E/7U394482 of 7 Jul 87 (NOTAL)
(i) CNO ltr 4400 Ser N412C/373-98 of 25 Jun 98 (NOTAL)
(j) DoD 4140.1-R of May 96 (NOTAL)

Encl: (1) Multi-Echelon Readiness Based Sparing Overview
(2) Readiness Based Sparing Implementation Sequence of Events

1. Purpose To establish sparing requirements determination policies and procedures to ensure life cycle supply support for weapon systems and other acquisition programs to achieve cost and operational readiness objectives specified by the Office of the Chief of Naval Operations (CNO).

2. Cancellation. OPNAVINST 4442.5 updates and supercedes NAVSUPINST 4442.14A.

3. Scope/Applicability.

a. This instruction describes the application of Readiness Based Sparing (RBS) methododology to ensure that readiness thresholds and objectives as specified by CNO are achieved at the least cost. Readiness thresholds are expressed as either Operational Availability (A_o) or Full Mission Capable (FMC) rates for RBS implementation. The term "RBS" applies to single echelon and single indenture systems and their multi-echelon (ME) and multi-indenture (MI) extensions. RBS applies to both traditional organic [Navy/Department of Defense (DoD)] and non-traditional Contractor Logistic Support (CLS) practices.

b. This RBS method is to be utilized for all new acquisition programs and equipment modification programs in Acquisition Categories (ACATs) I, II, or III, with the exception of nuclear and SSBN programs. It should be applied, as appropriate, to existing weapon systems and other new systems (i.e., ACAT IV) when it provides an optimal method for attaining the required readiness objective. RBS is to be applied to allowance package development, including CV and L-Class Aviation Coordinated Allowance Lists (AVCALs), Shore-Based Coordinated Allowance Lists (SHORCALs), Marine Aviation Logistics Support Packages (MALSPs), and Coordinated Shipboard Allowance Lists (COSALs).

c. New acquisition programs (ACATs I, II, & III) in the Engineering and Manufacturing Development phase or at the end of the Program Definition and Risk Reduction phase will apply the RBS process. This includes programs that require tailored Interim Supply Support (ISS) assistance to achieve full logistic support capability. The RBS assessment and sparing processes must be completed in time to allow for sufficient administrative and production lead-time before the Material Support Date (MSD). However, RBS is an ongoing process and should be revisited as necessary over the life of the weapon system or other acquisition program.

d. RBS will selectively apply to commercial best practices like Direct Vendor Delivery (DVD) or Time Definite Delivery (TDD) (i.e., use of premium transportation). RBS will also be applied, as appropriate, in the procurement and support of Commercial and Non Developmental Items (CaNDI) spares, subsystems, or systems, and in support of alternative approaches such as pre-positioned spares.

e. RBS is critical in the life cycle of any system requiring supply support and plays an important role in the provisioning for initial support as well as an equally important and ongoing role in subsequent replenishment support. Readiness and performance metrics, such as A_o and customer wait time, help indicate how well the system's integrated logistics support (ILS) is fulfilling its purpose during the Production & Fielding/Deployment and Operational Support phases. Over the system's life cycle, supply support effectiveness and its affect on A_o and customer wait time is, in large measure, dependent upon a robust RBS effort.

4. Background

a. References (a) and (b) establish a general model and procedures for defense acquisition programs. These directives specify the acquisition programs be structured to ensure a logical progression through a series of phases designed to reduce risk, ensure affordability, and provide adequate information for decision-making. These directives also imply that readiness based thresholds and activities be established early in the acquisition cycle to ensure meeting operational requirements and reduced life cycle ownership costs. Reference (c) mandates RBS optimization models and techniques are applied to all new, non-nuclear, and non-strategic, ACATs I, II, or III programs.

b. Reference (d) establishes that readiness thresholds are to be stated as $A_o$thresholds or FMCrates, which serve as effectiveness measures for evaluating the adequacy of logistics support. FMC is the material condition of an aircraft that can perform all of its defined missions. Mission Capable (MC) is the material condition of an aircraft that can perform at least one and potentially all of its defined missions. Systems, subsystems and equipment that are essential to the performance of its mission area can be measured using A_o as the primary material readiness designator. A_o will be used throughout remainder of this instruction when referring to readiness effectiveness measures. Reference (d) defines A_o and describes a methodology for quantitatively approximating the value of A_o. This methodology provides a procedure for defining the level of supply support and reliability required to achieve a specified A_o. Linking FMC at the platform level, MC at the mission area level, and A_o at the system/subsystem/equipment level facilitates initial determination of efficient resource allocation across platforms and systems for meeting readiness objectives through a common measure of material readiness. The use of different terms for a common measure of readiness differentiates the indenture level at which the measure is being applied. Reference (e) provides policy guidance for material condition reporting of Navy and Marine Corps aircraft. It also establishes:

(1) A_o as the primary measure of operational availability / material readiness for Navy mission essential systems, subsystems, and equipment installed in platforms (ships and aircraft).

(2) Policy for application of A_o thresholds, calculations, analyses, and measurements.

(3) Definitions and equations that Program Managers (PMs) and developing agencies will use for calculating and reporting A_o to CNO.

(4) Sources of data for use in A_o calculations and monitoring.

c. Reference (f) establishes basic Navy policy governing the management of Navy-owned retail maintenance related inventories at Navy activities and Marine Corps aviation units, and specifies minimum supply system performance goals for operating forces. Improved supply support may be achieved by using the RBS methodology to support the readiness requirement identified by the CNO Program Sponsor. RBS methods should be supplemented by other analytical techniques, such as simulation modeling techniques capable of assessing RBS results using Fleet experience data. The Availability Centered Inventory Model (ACIM) and the Aviation Readiness Requirements Oriented to Weapons Replaceable Assemblies Model (ARROWS) are approved for use per references (g) and (h). These models are the Navy standard consumer-level RBS models and will be used for all approved systems. Per reference (i), all maritime allowances developed or modified after 30 September 1998 will be computed with Organizational Level Maintenance Assistance Modules (MAMs) considered as available spares.

d. Reference (j) states requirements for spare and repair parts are to be computed through a RBS requirements determination process for cost effective weapon system support provisioning. Where data availability and model capabilities permit, RBS models will directly compute both the range and depth for all echelons of supply. This ME capability should:

(1) Account for the hierarchical structure of supply and maintenance activities from the customer or consumer level, through the intermediate level of supply (when one exists), to the depot or wholesale level.

(2) Provide a more complete assessment of the supply support factors and interactions between the wholesale and the retail level of supply.

(3) Cover demand related pipeline and safety level requirements to achieve response time objectives [e.g., Customer Wait Time (CWT) and/or Mean Supply Response Time (MSRT)]. In order to avoid unnecessary procurement or repair actions, the same constraints for demand-based wholesale safety levels are to be applied to the safety level portion of an item's wholesale stock level.

e. Reference (i) specifies that where data availability and model capabilities permit, consumer level RBS computations will use a MI logic that:

(1) Where practical, links each item to its next higher assembly in the weapon system by modeling the impact of a lower level assembly (an item whose next higher assembly is another item or subassembly) on the availability of its next higher level assembly or assemblies.

(2) Uses an item indenture structure to trade off between items at the first level of indenture (i.e., items whose next higher assembly is the weapon system) and items at lower levels of indenture needed to repair those items. In this way the impact of each item on each level of indenture, and ultimately on the weapon system itself, is portrayed and their procurement or repair requirements computed accordingly.

(3) Links the field level repairable or consumable item allowance computation to their next higher assemblies and ultimately to the availability of the weapon system.

f. References (a), (b), and (i) state that material managers, together with other acquisition and logistics managers, shall evaluate supply support approaches (i.e., organic or contractor) and requirements determination methods (i.e., demand-based or RBS) to select the cost effective supply support concept. Contractor support and servicing capabilities shall be used to the maximum extent possible when cost effective. Explicit candidates for contractor support are items that require substantial initial investment or the probability of design obsolescence is high. The DoD movement towards logistics outsourcing and the adoption of commercial best practices (e.g., DVD, TDD) and procurement of CaNDI provides the opportunity to expand RBS capabilities to minimize cost and/or improve readiness. RBS can be used to assess alternative

material management approaches, optimize inventory levels, evaluate cost considerations, gauge potential savings, and quantify incentives. The primary objective, while maintaining desired readiness levels, is to reduce total ownership cost for new/modified systems by expanding the application of the RBS process to identify and assess innovative maintenance and supply support strategies..

5. Policy

a. Supply support will be designed to achieve and sustain the A_o objectives specified by CNO while working in accord with all the other Integrated Logistics Support (ILS) elements. The designated PM or Hardware Systems Command (HSC) is responsible for assisting the CNO sponsor in establishing thresholds, including preparing preliminary A_o analyses based upon experience with similar weapon systems. An analysis of support alternatives, tailored to the needs of program, is to be conducted and considered at appropriate milestone decisions. This evaluation of cost versus A_o trade-offs, various forms of logistic support, life cycle costs, and operational risks is used to assess the weapon system A_o threshold and modify, if required, the Operational Requirements Document (ORD).

b. Consumer level (e.g., onboard repair parts and interim spares) and wholesale level spares will be computed using approved RBS models to achieve readiness thresholds at least cost. CNO (N41) approval is needed to implement RBS allowances for existing weapon systems or new acquisitions other than those mentioned above. Waiver requests to N41 must be accompanied by Commander, Naval Supply Systems Command (COMNAVSUPSYSCOM) comments and analysis that demonstrates a specific alternative is required to achieve the A_o threshold.

c. RBS will include Maritime Organizational Level MAMs in computing consumer level spares. This computation will identify consumer and wholesale costs as well as MAMs and operating space item (OSI) availability in supporting the sparing strategy.

d. RBS is the preferred sparing method for evaluating non-traditional CLS practices (e.g., DVD and TDD). The evaluation will optimize the process to achieve readiness thresholds at least cost. CLS practices will be evaluated in terms of their affect on CWT and/or A_o.

e. Demand-based methods may be used in provisioning when data is inadequate for RBS modeling or the application of RBS approaches is not cost-effective. As for choosing RBS methods, activities desiring a non-RBS method for spares requirements determination will forward these requests to CNO (N412) for approval via COMNAVSUPSYSCOM (Code 4B2).

f. Only CNO-approved allowance computation models are authorized for sparing computation and analysis. Approved retail models include ACIM-TIGER, ARROWS, Fleet Logistic Support Improvement Program (FLSIP), and Retail Inventory Model for Aviation (RIMAIR). The Computation and Research Evaluation System (CARES)

model is used to determine wholesale levels. These models are all contained in the COMNAVSUPSYSCOM RBS Workstation. Commander, Naval Inventory Control Point (NAVICP 041) will coordinate use of the wholesale (CARES) and consumer level models in support ME and MI sparing approaches. All requests for modifications to existing sparing models will be forwarded to COMNAVSUPSYSCOM (4B2) for approval. Requests for the development of new or use of commercially available RBS models, or application of other than those approved above, are to be forwarded to CNO (N41) via COMNAVSUPSYSCOM (4B2) with sufficient details on the operational scenarios that can not be supported by currently approved models.

6. Procedures

a. The RBS process acknowledges that every acquisition program is different. In conjunction with the PM and Milestone Decision Authority (MDA), each program should be structured to ensure a logical progression through a series of phases designed to reduce risk, ensure affordability, and provide adequate information for decision-making. Accredited modeling (e.g., CARES, ACIM, ARROWS) and simulation (e.g., TIGER) are applied, as appropriate, throughout the system life cycle in support of the various acquisition activities to include requirements definition and logistic support. Support analyses determine resource requirements for the program's initial planning, execution, and life cycle support. Recommendations for fleet introduction and deployment are based on adequate support resources to meet and sustain support performance thresholds.

b. Major Acquisitions The PM for major new acquisitions (ACAT I, II, or III), other than nuclear-power and SSBN programs, is to conduct an RBS analysis with the assistance of an RBS team that includes engineering and supply representatives from COMNAVSUPSYSCOM and NAVICP, plus an In-Service Engineering Agent (ISEA) or Fleet Support Team (FST) representative. A sample RBS process overview is illustrated and provided in enclosure (1). The sequence of events and responsibilities related to RBS implementation for programs, systems, and equipment is provided in enclosure (2). A RBS analysis consists of the following:

(1) Conduct a readiness assessment to generate reliability, maintainability, and availability (RM&A) indices. Using simulation or analytical models (e.g., TIGER), identify readiness drivers and/or establish preliminary A_o thresholds. A readiness driver is a part that contributes to the unavailability of a system or equipment. A root cause analysis should be conducted on readiness drivers to identify potential changes to existing ILS elements to resolve the problems.

(2) Estimate the technological life cycle of the component or end-item based on comparable industry trends. Evaluate trade-offs between technological life, reliability, methods of logistic support, and impacts on system life cycle costs.

(3) Determine a tentative sparing strategy using the approved RBS models and demand based models. Tentative sparing strategy includes the type of logistic support

and the process for introducing this support to include interim support. This strategy must address the following considerations: single indenture sparing versus MI sparing; single echelon sparing versus ME sparing; and contractor logistics support versus organic logistics support. The sparing strategy should be developed using the baseline level or repair option defined for the system. Analysis should be conducted to assess the spares implications of supporting the system during the interim support period and, if applicable, after attaining intermediate level of repair capability. The final strategy should encompass combinations of these support alternatives (e.g., MI, ME, and organic support) that best achieve program objectives. CLS (including DVD and TDD) should be given comparable consideration in choosing a sparing strategy.

(4) Determine and validate RBS wholesale and consumer spares computation results to decide if the weapon system and platform mission readiness thresholds can be achieved within associated cost estimates. If MAMs are authorized by the HSC, the assets are to be included in the RBS spares computation for their contribution to A_o. The logistics planner should also consider environmental factors (e.g., space, weight, transportation) that would impact a user, site, or platform.

(5) When required, direct contractors to compute readiness based consumer interim support spares requirements for each site ashore and afloat using ARROWS, ACIM/TIGER, or if approved, another RBS-model. Identify and resolve readiness or funding constraints that prevent achievement of readiness goals. Advise CNO (N41 and N8) when it is anticipated that readiness goals will not be achieved. The contractor will summarize results, identify items as new or established, and provide an Interim Support Item List (ISIL). Require the contractor to prepare and implement a transition plan from interim to Navy or contractor support.

(6) Forward the RBS sparing strategy to COMNAVSUPSYSCOM (4B2) as part of Milestone II and III information.

(7) The PM will coordinate with COMNAVSUPSYSCOM (4B2) and ensure the required actions to implement and support the optimized consumer allowance and supporting wholesale levels are taken.

(8) Provide applicable RBS system files (e.g., mission, configuration, and parts files) to COMNAVSUPSYSCOM (4B2) for inclusion in the RBS central repository.

c. Existing Systems & Other Acquisitions For existing systems and new acquisitions (other than non-nuclear, non-SSBN programs in ACATs I, II, or III), the following actions apply:

(1) For existing systems, PMs should routinely monitor A_o performance and, where needed, conduct root cause analysis. This analysis will support major events such as new acquisitions, major modifications and upgrades; Engineering Change Proposals (ECPs); Logistic Engineering Change Proposals (LECPs); and CLS. For new and established systems, RBS can be used to conduct sensitivity and trade-off

analyses necessary to establish goals or evaluate reengineered business processes. Thus, RBS is the preferred method for goal setting or evaluation of CWT-oriented sparing strategies and inventory management initiatives like MI, ME, DVD, or TDD.

(2) RBS should be considered to replace demand based sparing if it is projected to significantly improve A_o (greater than 5 percentage points) or if it is needed to achieve the CNO-specified A_o objective or cost objectives. For systems currently supported through RBS, application of enhanced RBS methods (MI, ME, CLS variations) should be considered when total inventory cost can be reduced while achieving the same or improved readiness.

(3) After the RBS process has been used to develop the required data, the PM should convene a RBS working group meeting to present the analyses and supporting documentation for review and comment. The PM will chair this meeting that should include: CNO Program Sponsor and sparing policy (N412) representatives; HSC supply manager; ISEA technical agent; COMNAVSUPSYSCOM RBS models coordinator (4B2) and spares budget (013) representative; and a NAVICP program support representative. PMs can also use the RBS Working Group to present the RBS evaluation results.

(4) A formal request for approval to apply the RBS process is to be forwarded to CNO (N41) with a copy to COMNAVSUPSYSCOM (4B2) and the CNO Program Sponsor. The request should include supporting documentation.

(5) COMNAVSUPSYSCOM will provide comments and recommendations to the CNO Program Sponsor, and address the impact of cost increases on the Navy Working Capital Fund budget.

(6) Once approved by CNO (N41), the requestor is to coordinate with COMNAVSUPSYSCOM (4B2) subsequent actions required to implement the RBS sparing strategy.

(7) Provide applicable RBS system files (e.g., mission, configuration, and parts files) to COMNAVSUPSYSCOM (4B2) for inclusion in the RBS central repository.

d. Life Cycle Monitoring. Systems spared under RBS should be tracked and monitored annually on achieved A_o performance relative to design performance. When performance is below expectations, an assessment of the components (reliability, maintainability, and supportability) is to be conducted to identify the readiness detractors. Logistics support performance, measured by Average Customer Wait Time (ACWT), is to be reviewed to ensure the optimized times are achieved as required to maintain readiness. Similarly, non-supply adjustments such as redesign, additional training, or maintenance modifications should be considered during monitoring. When achieved A_o differs significantly from the readiness threshold (i.e., 5 percentage points over/under the threshold) and the initial assessment reveals no major supply or non-supply solutions, complete re-optimization is warranted.

7. Responsibilities

a. HSCs and Program Executive Office (PEO) PMs are responsible for:

(1) Initiating RBS evaluations for new, non-nuclear, non-SSBN acquisition programs in ACATs I, II, or III, and presenting the results at the established Milestone reviews.

(2) Recommending to CNO (N41), through the Baseline Assessment Memorandum (BAM) process, existing systems or other new acquisitions that may require RBS evaluation to achieve readiness objectives.

(3) Planning, budgeting and acquiring approved levels of support in coordination with COMNAVSUPSYSCOM at established Milestones. NAVICP is the supply agent for the PM.

(4) Provide applicable RBS system files (e.g., mission, configuration, and parts files) to COMNAVSUPSYSCOM (4B2) for inclusion in the RBS central repository.

(5) Life cycle monitoring of weapons system performance, with annual reassessments as required, to ensure readiness objectives are attained.

b. COMNAVSUPSYSCOM is responsible for:

(1) Providing guidance and recommendations concerning the use of RBS and other supply support methods required to achieve A_o objectives.

(2) Implementing and maintaining enhanced supply support methods (e.g., RBS, ME-RBS, MI-RBS, DVD, etc.).

(3) Maintaining and providing RBS models and supporting documentation.

(4) When required, convene the RBS Working Group, consisting of representatives from COMNAVSUPSYSCOM, NAVICP, and the appropriate HSC, to review an RBS model submitted for approval. After the Group assesses the model, it will make an approve/disapprove recommendation to CNO (N41), who will make the final decision.

(5) Maintain a central repository for approved RBS-system files.

c. NAVICP is responsible for:

(1) Advising the PM and RBS team on supply support matters.

(2) Developing and implementing ME RBS optimized consumer allowances and supporting wholesale levels.

(3) Conducting RBS analyses as needed in support of special initiatives such as DVD and TDD.

(4) Provide applicable RBS system files (e.g., mission, configuration, and parts files) to COMNAVSUPSYSCOM (4B2) for inclusion in the RBS central repository.

8. Action. All HSCs, with input from the MDAs and PMs, will issue detailed procedures to implement this policy and provide one copy each to CNO (N41) and COMNAVSUPSYSCOM (4B2).

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By direction

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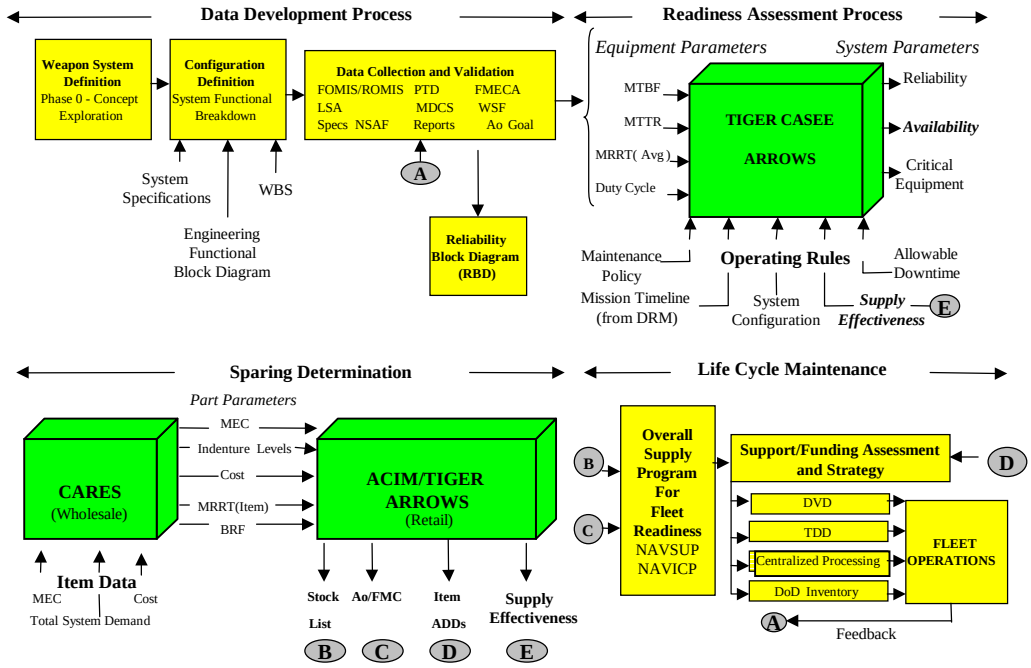
Multi-Echelon Readiness Based Sparing Process Overview



READINESS BASED SPARING IMPLEMENTATION SEQUENCE OF EVENTS