



DEPARTMENT OF THE NAVY  
OFFICE OF THE CHIEF OF NAVAL OPERATIONS  
2000 NAVY PENTAGON  
WASHINGTON, D.C. 20350-2000

IN REPLY REFER TO

OPNAVINST 4700.7L  
N431  
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OPNAV INSTRUCTION 4700.7L

From: Chief of Naval Operations

Subj: MAINTENANCE POLICY FOR UNITED STATES NAVY SHIPS

Ref: (a) COMFLTFORCOMINST 4790.3B (NOTAL)  
(b) OPNAVNOTE 4700 Ser N43/9U158557 of 18 Aug 2009  
(c) OPNAVINST 4790.16A  
(d) NAVSEAINST 5400.97C  
(e) NAVSEAINST 4790.8B  
(f) NAVSEAINST C9210.30A (NOTAL)  
(g) NAVSEAINST 4790.27  
(h) NAVSEAINST N9210.4B (NOTAL)  
(i) NAVSEA 0989-058-8000 (NOTAL)  
(j) NAVSEA TM S0600-AA-PRO-010 Rev 7 (NOTAL)  
(k) OPNAVINST 4700.38B  
(l) SECNAVINST 5400.15C  
(m) 10 U.S.C. 2464  
(n) 10 U.S.C. 7310  
(o) OPNAVINST 3960.16A  
(p) 10 U.S.C. 2466  
(q) NAVSEAINST C9210.44B (NOTAL)  
(r) OPNAVINST 4700.8H

Encl: (1) Organizational-Level Maintenance  
(2) Intermediate-Level Maintenance  
(3) Depot-Level Maintenance  
(4) Maintenance Programs  
(5) Miniature/Micro-miniature (2M) Module Test and Repair (MTR)  
(6) Quality Maintenance  
(7) Acronyms  
(8) Definitions

1. Purpose

a. To set policy and establish responsibility for the maintenance of U.S. Navy ships per references (a) through (r).

b. To reflect organizational changes related to consolidation of fleet maintenance activities (FMAs), maintenance cycle changes as a result of implementation of the Fleet Response Plan (FRP) and reference (a), and minor procedural modifications.

c. To remove some detailed procedures that are an integral part of the maintenance and material management (3-M) system.

d. To combine the guidance contained in OPNAVINST 4900.79B, Intermediate Maintenance of Foreign Ships, allowing cancellation of that instruction.

2. Cancellation. OPNAVINST 4700.7K and OPNAVINST 4900.79B.

3. Scope

a. The Navy's program for maintaining the readiness of ships has two separate components: ship maintenance and ship modernization. While ship maintenance and modernization budgets are distinct, they are closely related in their planning and execution. This instruction addresses policy for the maintenance of Navy ships, with reference to modernization, as necessary.

(1) Navy ship maintenance policies and actions are designed to ensure crew and ship safety while achieving desired operational readiness levels at the lowest possible total ownership cost, consistent with public law and other directives.

(2) The ship modernization program is designed to increase ship system capability and or improve reliability and maintainability of existing systems while maintaining integrity of ship class configuration.

b. This instruction applies to all ships and craft of the United States Navy (active and reserve) and those commands responsible for ship and related equipment maintenance, with the following exceptions:

(1) Units assigned to the Military Sealift Command and the United States Special Operations Command.

(2) Units designated as service craft and boats.  
Governed by OPNAVINST 4780.6E.

(3) Ships and service craft assigned to the Inactive Fleet. Governed by OPNAVINST 4770.5G.

(4) Ships of the United States Coast Guard (USCG) are covered under this instruction during those times when the USCG operates as a service in the Navy.

(5) The Director, Strategic Systems Programs (DIRSSP) is responsible for providing material support acquisition and fleet support of ballistic missile and strategic weapon systems, including missiles, platforms, associated equipment, and installation and direction of necessary supporting facilities. Nothing in this instruction detracts in any way from those responsibilities. Accordingly, DIRSSP will be consulted in all matters pertaining to, or affecting, strategic systems.

(6) The Director of the Naval Nuclear Propulsion Program (CNO (N00N)), which is also known as the Naval Sea Systems Command (NAVSEASYS COM) Code 08 (NAVSEA 08), has responsibility for all matters pertaining to the maintenance, repair, and modification of naval nuclear propulsion plants and associated nuclear support facilities. Nothing in this instruction supersedes or changes these responsibilities and authorities. Accordingly, the Naval Nuclear Propulsion Directorate will be consulted in all matters pertaining to or affecting the maintenance, repair, or modification of naval nuclear propulsion plants or their associated nuclear support facilities.

c. This instruction provides policy for the accomplishment of maintenance of foreign ships.

d. Throughout this instruction, the term "ship" refers to all surface ships, aircraft carriers, submarines, and those craft specified in reference (b).

e. Organizational, intermediate, and depot levels of maintenance are described in enclosures (1) through (3), respectively.

#### 4. Policy

a. U.S. Navy ships will be maintained:

(1) In the highest practical level of material readiness to meet required operational availability (Ao) needs while minimizing total life cycle cost over the design life of the ship.

(2) In a safe material condition.

(3) Following shipboard habitability standards of OPNAVINST 9640.1A.

(4) To meet governing environmental standards.

(5) At the maintenance level that can best ensure proper accomplishment, taking into consideration applicable laws, urgency, priority, crew impact, capability, capacity, and total cost.

b. Maintenance procedures and schedules for Navy ships and related equipment are to be developed and performed per the condition-based maintenance (CBM) methodology defined in reference (c) whenever practical. The goal is to perform maintenance only when there is objective evidence of actual or predictable failure of a ship's installed systems or components, while ensuring operational readiness, safety, and equipment reliability in a cost effective manner. This will be determined per Commander, Naval Sea Systems Command (COMNAVSEASYSKOM)-approved reliability-centered maintenance (RCM) methodology by the command exercising technical authority per reference (d) for the system or component.

(1) The Navy ships' 3-M system is the Navy's primary management program for non-nuclear maintenance aboard all U.S. Navy ships per reference (e). Unless prior approval is granted by Chief of Naval Operations (CNO) Director, Fleet Readiness Division (OPNAV (N43)), other non-nuclear maintenance management programs may not be used.

(2) Nuclear reactor plant and support facilities preventive maintenance shall be administered by ship's force per reference (f).

(3) Preventive and other planned maintenance actions shall be:

(a) Detailed on maintenance requirements cards (MRCs) for organizational-level accomplishment, and as class maintenance plan (CMP) tasks for intermediate and depot-level accomplishment.

(b) Scheduled following the 3-M system planned maintenance system (PMS) scheduling application for organizational-level accomplishment and CMP scheduling applications for intermediate-level and depot-level accomplishment.

(c) Accomplished as scheduled.

(4) Corrective maintenance actions may be required to restore systems or equipment to full operation to bring operation within specified parameters or to ensure safe operation.

(a) The decision to perform corrective maintenance shall be based on actual equipment condition.

(b) Safety-related corrective maintenance is mandatory and shall be conducted at the earliest opportunity.

(c) The corrective maintenance action selected (i.e., repair, replacement, or alteration) shall be based on optimizing total ownership cost and reliability considerations. Execution shall be per applicable repair or installation standards or specific technical documentation.

c. The current ship's maintenance project (CSMP) shall be the primary repository of information concerning the current material condition of the ship and shall be maintained in a complete and current status at all times per reference (e).

d. A tailored maintenance program shall be developed and maintained for each ship class as detailed in enclosure (4). The program will, at a minimum, specify availability notional size, intervals and durations, required preventive and other planned maintenance actions and periodicities, and any special maintenance, maintenance support, or infrastructure requirements. The maintenance program for each ship class shall:

(1) Provide a general overview of the responsible program executive office's (PEO's), direct reporting program manager's (DRPM's), or ship program manager's (SPM's) maintenance program for the ship class.

(2) Include a CMP for each ship of the class that identifies all maintenance requirements developed with engineered periodicities using the RCM methodology defined in reference (g) and executed following CBM methodology defined in reference (c).

(3) Minimize the time ships spend in depot maintenance and total life cycle cost through the ship's design life by ensuring that maintenance requirements are an integral part of both the acquisition and the life cycle maintenance strategy for ships.

(4) Provide a selection of special support alternatives (e.g., rotatable pools, insurance item management, or dedicated

maintenance husbandry agents, such as port engineers or maintenance planning managers) whose use would be determined through the evaluation of technical and economic criteria.

(5) Ensure that ships are as self-sufficient in accomplishing maintenance as practical within the limits of specified maintenance requirements and within the limits of established Navy policy regarding crew workload and related integrated logistics support (ILS) elements, such as training, tools, and test equipment. The Navy should drive increasingly toward "one way of doing business" for ship maintenance, authorizing variances only where a compelling case is made and approved. Self-sufficiency shall not be interpreted as authorization or direction to independently develop and support class or ship-unique maintenance processes or information systems. Within the framework of this vision, maintenance programs shall utilize the following resources enhancing self-sufficiency:

(a) Reliable on-site or on-board technical decision making support programs, such as the Miniature/Micro-miniature (2M) Module Test and Repair (MTR) Program described in enclosure (5).

(b) Accurate technical information and data about system and equipment performance requirements, operating procedures, and maintenance and repair technical requirements and procedures. The key to this is the effectiveness of the ILS program and the manner in which that program is integrated into the larger Navy maintenance infrastructure.

(c) Effective processes and tools to minimize the labor hours required to: identify, locate, extract, and apply information and data required to perform work correctly the first time, and to accurately report work completion data.

(6) Include administration of non-nuclear maintenance using references (a) and (e), unless prior approval is granted by OPNAV (N43).

(7) Include administration of nuclear reactor plant and associated support facility preventive maintenance per reference (f).

e. FMAs are fleet assets to be utilized for accomplishment of maintenance and modernization that is beyond organizational-level capability or capacity. FMAs will screen maintenance

requests to determine when and where maintenance will be performed, based on availability of resources, to either intermediate-level or depot-level facilities. Intermediate-level maintenance is addressed further in enclosure (2) while depot-level maintenance is addressed further in enclosure (3). COMNAVSEASYSYSCOM is responsible for repairs and alterations on U.S. Navy ships. Shipboard repair and modernization work under NAVSEASYSYSCOM cognizance that is executed by the private sector shall be contracted under NAVSEASYSYSCOM Headquarters' contracting authority, exercised directly or through regional maintenance centers (RMCs). Contract administration and technical oversight will be provided by RMCs and supervisors of shipbuilding, conversion and repair (SUPSHIPS), NAVSEASYSYSCOM's principal on-site contracting activities and managers for efficient and effective work, resolution of technical issues, and assurance of delivery of work meeting Navy quality standards.

f. Navy commands responsible for ship and related equipment maintenance will promote, develop, and utilize existing and emerging technologies to increase maintenance efficiencies and quality assurance; promote shipboard safety and habitability; enhance environmental protection; and reduce costs. Maintenance of ship systems and equipment shall be:

(1) Performed by qualified personnel using correct procedures and material following technical requirements issued by the appropriate technical authority.

(2) Conducted based on an objective evidence of need, in a cost effective manner, to meet applicable specifications per quality assurance standards. Quality maintenance is discussed in enclosure (6).

g. Policy and direction issued by the fleet commanders (FLTCDRs), or their subordinate activities, shall comply with technical requirements. FLTCDRs and COMNAVSEASYSYSCOM shall establish procedures for addressing deviations to technical requirements. These procedures shall:

(1) Ensure that the activity, when finding itself unable to comply with the technical requirements, recommends to the appropriate technical authority a repair that the activity considers achievable and which will ensure that the needs of the fleet are satisfied.

(2) Differentiate between categories of repair and identify, by each category of repair, the appropriate technical authority that can authorize deviation from technical requirements.

(3) Ensure that work does not proceed until concurrence from appropriate technical authority is received.

(4) Ensure that the responsible technical authority revises applicable technical requirements or documents a deviation from technical requirements to reflect resolution of the repair.

h. Depot maintenance activities perform maintenance and modernization work that is beyond intermediate-level capability or capacity. It is Navy policy to continue integration of organic shore intermediate maintenance and depot maintenance activities where there are opportunities for cost-effective organizational improvements. Intermediate-level maintenance is addressed in enclosure (2) and depot-level maintenance is addressed in enclosure (3).

i. Ship configuration shall be controlled through a formal change process that updates each Ship's Configuration and Logistics Support Information System (SCLSIS) process. The Configuration Data Manager's Database-Open Architecture (CDMD-OA) is the authoritative data source of SCLSIS data for all Navy ships and shore sites. Equipment and systems placed on Navy ships will be fully documented in the ship's configuration record by the command responsible for conducting the installation or change. This command is also responsible for ensuring that Government-contracted operating and maintenance training is conducted, and supply support (ILS) is fully in place at system initial operational capability. The ship's commanding officer (CO) shall ensure that the configuration is validated and recorded.

j. All changes to ship configuration shall be per specified requirements as approved by the appropriate technical authority. Navy engineering, acquisition, maintenance activities, fleets, and operational commands shall actively promote equipment standardization in the fleet. Equipment and components installed in Navy ships shall be standardized to the maximum extent practicable to minimize life cycle logistics support costs. This means that maintenance and modernization changes, as well as complex overhauls, refueling complex overhauls, and new construction changes should emphasize the use

of equipment and components already supported by the Federal Supply System to the maximum extent practicable, with due consideration to life cycle cost, reliability, and maintainability.

k. ILS resources required to implement the maintenance program of each new ship class shall be included in ship acquisition funding and are to be programmed and budgeted in sufficient time to ensure that support is in place no later than the end of the lead ship's post-shakedown availability (PSA). For systems being introduced for in-service ships, ILS resources shall be programmed and budgeted to ensure support is in place coincident with fleet introduction.

l. Repairs, maintenance, and modernization of the propulsion plants in nuclear-powered ships involve unique considerations for technical and quality control, ship safety, radiological controls for occupational health and safety, and information security. Accordingly:

(1) Reactor plant maintenance, repair, and modernization beyond the capability or capacity of the organizational level shall be assigned only to nuclear capable FMAs or private sector shipyards and performed following the requirements established by CNO (N00N), NAVSEA 08.

(2) Depot-level repair, maintenance, and modernization for steam plant systems, electric plant systems, and those auxiliary ship systems that support the reactor plant and associated reactor safety systems in nuclear-powered ships shall be assigned only to nuclear-capable shipyards and performed per requirements established by COMNAVSEASYS COM with NAVSEA 08 concurrence.

(3) Changes, repairs, and maintenance in the nuclear propulsion plants of nuclear-powered ships shall be in strict accordance with reference (h).

(4) Changes, repairs and maintenance in the nuclear support facilities of nuclear-capable tenders shall be in strict accordance with reference (i).

m. Dry dockings shall be planned and scheduled as promulgated by the annual issue of reference (b). Underwater ship husbandry (UWSH) inspection, maintenance, or repair actions shall be planned and accomplished per reference (j).

(1) In the event drydocking maintenance actions are required before the next scheduled docking, a review of current UWSH capabilities shall be undertaken by the responsible repair activity to determine if drydocking is necessary or if emergent drydock time can be reduced cost effectively by accomplishing repairs with qualified divers using approved procedures.

(2) Whenever feasible, UWSH maintenance actions should provide permanent repairs to avoid subsequent drydock rework costs. Where permanent repairs are not feasible, temporary repairs shall be accomplished, within technical (subparagraph 4g) and cost constraints, to support ship operations until the next regularly scheduled drydocking.

n. Depot maintenance, in support of deployed ships, may be performed within the theater of deployment when necessary per references (k) and (l). Depot maintenance performed overseas must be cost effective, must not adversely impact the U.S. industrial base (public or private) core logistics capabilities (reference (m)), and must comply with existing statutes. The following policies apply to maintenance performed overseas:

(1) U.S. or U.S. territory homeported ships. Per reference (n), only voyage repair (VR), as defined in volume III, paragraph 3.4 of reference (a), may be performed on U.S. or U.S. territory homeported ships by shipyards or ship repair facilities (SRFs) located outside of the United States or its territories. For the purposes of this prohibition, a shipyard is any facility that repairs naval vessels and is located outside the United States or its territories.

(2) Overseas homeported ships. Depot maintenance for ships being prepared for, or returning from, homeporting overseas will be scheduled to maximize the use of the industrial capacity of the United States. During the 15-month period preceding its planned reassignment to a homeport in the United States, or a territory of the United States, only depot availabilities less than 6 months in duration may be scheduled.

o. Ship availability assignment shall consider both the complexity of the required work and maintenance of public and private sector capability and capacity at levels commensurate with the Navy's current and future maintenance, modernization, and emergency ship repair requirements per references (g) and (o). To minimize negative impact on ship's force quality of service:

(1) CNO-scheduled private sector depot-level availabilities of 6 months duration or less shall normally be accomplished in the ship's homeport area. This supports the Navy's strategy to maximize the use of the multi-ship/multi-option contracting strategy and quality of service. Applicable Federal Acquisition Regulation (FAR) requirements apply.

(2) CNO availabilities solicited coast-wide, which may be awarded for out-of-homeport accomplishment, shall be planned and solicited to support contract award no less than 120 days prior to scheduled start.

(3) CNO availabilities solicited in an extended accomplishment area, which may be awarded for out-of-homeport accomplishment, shall be planned and solicited to support contract award no less than 60 days prior to scheduled start.

p. The Navy's ship maintenance and technical communities will, where practical, develop and maintain comprehensive material condition readiness metrics capable of providing an objective measure of material condition of ships to Office of the Chief of Naval Operations (OPNAV) and FLTCDRs. The metrics will be agreed upon by OPNAV, NAVSEASYSKOM, and FLTCDRs before implementation. The metrics will provide resource sponsors and maintenance managers the ability to utilize material condition information to support planning and execution of maintenance programs. The objectives of this effort are to ensure that approved maintenance plans are adequately implemented, to identify potential improvements to the maintenance plan, to provide a means of predicting the impact of various levels of maintenance funding on future ship material condition and readiness, and to ensure that ships are maintained in the highest achievable level of material readiness commensurate with supporting the ship's mission and availability for operations.

q. The Navy's ship maintenance and technical communities will collaborate with the Board of Inspection and Survey (INSURV) to develop and maintain fleet-wide standardized assessment procedures and criteria to determine the ship system and equipment material readiness metrics discussed in subparagraph 4p. OPNAV, COMNAVSEASYSKOM, FLTCDRs, and type commanders (TYCOMs) will use the results of these inspections for readiness assessment and for maintenance planning and budgeting purposes. INSURV will:

(1) Audit and validate reported material condition metrics; and

(2) Collaborate with COMNAVSEASYSKOM to develop common assessment procedures (CAPs).

r. Ship maintenance programs and technical issues that have the largest impact on fleet readiness and require senior Navy leadership attention for resolution will be managed and tracked to satisfactory completion by the Top Management Attention/Top Management Issues (TMA/TMI) Program which is defined in volume VI, chapter 32 of reference (a). NAVSEASYSKOM will coordinate the TMA/TMI Program for all systems commands (SYSKOMs) and program offices, with fleet maintenance personnel prioritization and participation.

s. Ship maintenance validation, screening, brokering, scheduling, planning and execution are to be accomplished using common processes across all enterprises, as applicable. Fleets and SYSKOMs will develop standard procedures to implement these processes. Changes to existing and future management information systems that provide metrics on maintenance costs for contractor, number of man-hours, and costs for organic maintenance shall facilitate timely retrieval of depot level cost data to support the annual public/private 50/50 workload distribution data call required by reference (p).

t. Messing and berthing during CNO-scheduled maintenance availabilities are significant quality of life issues. During maintenance availabilities in which the ship is declared uninhabitable, crew members not already receiving basic allowance for housing will be provided off-ship quarters per reference (k).

u. Maintenance of foreign vessels may be performed by FMAs if similar supplies and services are furnished on a like basis to naval vessels and military aircraft of the United States by the foreign country concerned. Maintenance of foreign vessels must be on a not-to-interfere and cost reimbursable basis and must be approved in each instance by OPNAV (N43) prior to the commencement of work.

v. Navy maintenance planning activities are to promote and support standard and reusable planning documents where possible.

## 5. Responsibilities

a. CNO. The CNO is responsible for maintaining the overall readiness of naval ships. This includes the responsibility for

planning and programming resources required for the acquisition, life cycle management, maintenance, and modernization of Navy ships.

(1) CNO (N00N) (NAVSEA 08) also serves as the Deputy Administrator for Naval Reactors, Department of Energy (DOE) National Nuclear Security Administration. CNO (N00N) has responsibility for and directs all aspects of all facilities and activities that comprise the Naval Nuclear Propulsion Program, a joint DOE and Department of the Navy organization. See subparagraph 3b(6).

(2) Deputy Chief of Naval Operations (Fleet Readiness and Logistics) (CNO (N4)) is the principal advisor to the CNO for the assessment of Navy readiness and logistic affairs. This includes the oversight and funding of ship maintenance. CNO (N4):

(a) Serves as the ship maintenance assessment and resource sponsor.

(b) Develops Navywide ship maintenance policy and goals in coordination with platform sponsors, FLTCDRs, and SYSCOMs.

(c) Coordinates preparation, integration, presentation, and defense of all ship maintenance requirements and resources through all phases of the Navy's planning, programming, budgeting, and execution system (PPBES) process.

(d) Coordinates and approves fleet depot-level availability schedules, working with FLTCDRs, SYSCOMs, their affiliated PEOs, warfare/provider enterprises, and resource sponsors.

(3) OPNAV (N43) is the CNO staff (OPNAV) point of contact for all ship maintenance and fleet readiness issues.

(a) Serves as CNO (N4) lead for the ship maintenance responsibilities listed above.

(b) Coordinates ship maintenance programs with other OPNAV resource sponsors (Deputy Chief of Naval Operations (Manpower, Personnel, Training, and Education) (CNO (N1)); Director, Strategic Mobility and Combat Logistics (OPNAV (N42)); Director, Expeditionary Warfare Division (OPNAV (N85)); Director, Surface Warfare Division (OPNAV (N86)); Director, Submarine

Warfare Division (OPNAV (N87)); and Director, Air Warfare Division (OPNAV (N88)), FLTCDRs, SYSCOMs, PEOs, warfare/provider enterprises, and DRPMs, as required.

(c) Reviews, approves, and monitors maintenance programs for all platforms, including Naval Reserve Force (NAVRESFOR) ships.

(d) Assesses ship maintenance requirements, identifies funding and other program deficiencies, and recommends resolutions to properly execute ship maintenance. Plans and programs the resources required to support the maintenance and modernization plans following the Navy PPBES guidance.

(e) With input from COMNAVSEASYSKOM, PEOs, FLTCDRs, and TYCOMs, documents in reference (b) the approved representative intervals, durations, maintenance cycles, and repair man-days for depot-level maintenance availabilities to be used for scheduling, programming, and budgeting purposes.

(f) Approves the location and dates of all CNO-scheduled depot maintenance availabilities. Reviews assigned work to ensure core logistics capabilities are maintained.

(g) Establishes ship material condition metrics discussed in subparagraph 4p. Plans and programs the resources required to develop and maintain these metrics.

(4) Ship's Resource Sponsors (OPNAV (N42), OPNAV (N85), OPNAV (N86), OPNAV (N87), and OPNAV (N88)) are the principal advisors to the CNO for the readiness and logistics resource requirements of their assigned assets. This includes the funding of ship modernization. OPNAV resource sponsors:

(a) Review and monitor maintenance programs for their respective platforms, including NAVRESFOR ships, to ensure both near- and long-term funding health.

(b) Plan and program the resources required to support modernization to resolve equipment obsolescence issues following the Navy PPBES guidance.

(c) Review all CNO scheduled depot availability changes for viability or funding impact and provide OPNAV (N43) with approval recommendations.

(5) CNO (N1) shall provide trained, qualified military personnel to perform maintenance at all levels.

b. FLTCDRs

(1) The FLTCDRs are responsible for the material condition of their assigned ships per Navy regulations.

(2) Commander, United States Fleet Forces Command (COMUSFLTFORCOM) has primary responsibility for identifying, consolidating, and prioritizing fleet maintenance and modernization requirements in conjunction with Commander, Pacific Fleet (COMPACFLT) and the warfare enterprises with support from the lead technical authority, COMNAVSEASYSYSCOM, which establishes the technical requirements. COMUSFLTFORCOM will serve as the lead for collection and consolidation of resource requirements, and act as the single fleet voice and point of submission of resource requirements to CNO (N4).

(3) Additionally, the FLTCDRs shall:

(a) Identify and authorize required corrective maintenance and modernization actions using condition, cost, schedule, and mission trade-offs, as required.

(b) Approve those changes to CNO-scheduled depot maintenance availabilities authorized by the procedures outlined in enclosure (3).

(c) Implement standard maintenance policies and processes between the Atlantic and Pacific fleets per reference (a).

(d) Participate in the development and implementation of the maintenance program for each ship class.

(e) Promote self-sufficiency of fleet ships and activities.

(f) Provide feedback of resource expenditures and as-found material condition to the 3-M system. Resource expenditure feedback is required in detail sufficient for continuous improvement of depot-level planning, programming, and budgeting. As-found material condition feedback is required in detail sufficient to support refinement and validation of technical requirements, to perform engineering analysis and to schedule subsequent maintenance actions.

(g) Establish and manage procedures to approve and track the maintenance of foreign vessels as discussed in subparagraph 4u.

c. Fleet TYCOMs. Fleet TYCOMs are responsible to their FLTCDR for the material condition of their assigned ships. The TYCOMS shall:

(1) Ensure assigned ships are mission-ready to meet operational commander requirements.

(2) Manage emergent and scheduled maintenance, including the identification and prioritization of corrective maintenance actions and alterations on assigned ships.

(3) Advise FLTCDR, PEO, SPM, DRPM, and NAVSEASYSKOM on standardization of maintenance and modernization processes and products.

(4) Manage maintenance resources to meet FRP A requirements and expected ship service life.

d. COMNAVSEASYSKOM. COMNAVSEASYSKOM, as the lead SYSKOM for ships' in-service support, shall:

(1) Exercise engineering and technical authority per the policy set forth in reference (d).

(2) Oversee the core processes required to support in-service ships. Be the lead technical authority, along with the affiliated PEOs, in the development and management of maintenance programs for each ship class and to ensure that U.S. Navy ships are maintained in the highest possible state of material readiness and safety. COMNAVSEASYSKOM will ensure maintenance programs are updated as changes occur.

(3) Establish hull, mechanical, electrical (HM&E) and combat systems technical requirements and provide the technical support necessary to maintain the material condition of all ships.

(4) Oversee and manage standardization of maintenance and modernization processes, procedures, and products in support of the Navy's drive toward "one way of doing business" for ship maintenance. This includes ensuring the use of CBM, use of the standard NAVSEASYSKOM-approved RCM methodology specified in

reference (g) in the development and update of maintenance programs, approval of any RCM methodology variations proposed by PEOs, DRPMs, or SPMs, and coordinating efforts of the warfare enterprises to ensure efficient maintenance processes and share best practices.

(5) Establish standard policy and procedures to maintain configuration documentation on all U.S. Navy ships. Ensure coordination in configuration documentation with other SYSCOMs and PEOs for equipment and materiel under their cognizance.

(6) Ensure that naval supervising activities integrate all maintenance providers involved in the execution of CNO-scheduled availabilities to ensure that ship maintenance and modernization are performed within the scope of work authorized, employing prescribed technical and quality standards, specifications, and requirements in an efficient and cost effective manner.

(7) Furnish timely information on the prospective workloads of public and private shipyards to the respective FLTCDRs for their guidance, recommending changes to scheduled availabilities to balance workload and avoid excessive cost to the Navy.

(8) Issue and maintain current Navy drawings, job qualification requirements, technical manuals, repair standards, maintenance and test requirements, calibration procedures, and process controls as required for ship, system, and equipment operation, maintenance, and calibration.

(9) Assist and advise FLTCDRs and TYCOMs in CBM policy implementation.

(10) Develop RCM-based material condition diagnostic systems needed for more effective maintenance decision-making, and develop or integrate information systems required to support increased maintenance self-sufficiency of ships and other fleet activities.

(11) Manage and provide technical oversight for the Navy ships' 3-M system.

(12) Provide ship system direct fleet support (DFS) services as requested by the FLTCDRs. This support includes technical assistance, advice, instruction, and training of fleet personnel under the operational control of FLTCDRs. It also

includes readiness assessments, reviews, tests, and inspections to evaluate the effectiveness and material condition of ship equipment and systems.

(13) Identify, through close contact with the fleet and the other SYSCOMs, maintenance-training requirements. Work with the Commander, Naval Education and Training Command (NETC) to develop training courses and material as required.

(14) Support OPNAV and FLTCDRs in the development and maintenance of comprehensive material condition metrics capable of providing an objective measure of ship's true material condition as prescribed by OPNAV (N43) and resource sponsors. This includes responsibility to obtain an appropriate amount of as-found condition, completion, and cost data for the development of lessons learned.

(15) Develop, manage, and maintain a single program (TMA/TMI) with the fleets to track the resolution of critical fleet maintenance and technical issues that require attention of senior Navy leadership for resolution as discussed in subparagraph 4r.

(16) Analyze maintenance feedback to determine design and process improvements in order to refine maintenance requirements.

(17) Define and maintain shore industrial activity baseline capabilities and capacity. Ensure naval shipyard (NSY) capability meets national requirement per title 10, U.S. Code. This includes assessment of the health of the ship repair industrial base as it pertains to CNO availability execution performance and emergent mission requirements.

(18) Provide FLTCDRs and OPNAV analysis support in development and justification of PPBES Future Year Defense Plan for ship maintenance.

e. PEOs, DRPMs, and SPMs. PEOs, DRPMs and SPMs are responsible for all aspects of life cycle management of their assigned programs. Per reference (1), they will report to CNO through COMNAVSEASYSKOM for all matters pertaining to in-service support. They shall:

(1) Develop and maintain the CMP for assigned ship classes and ensure suitable support is provided to all

systems/equipments/components installed in/on those hulls until the last unit has been removed from service. This includes the development of the detailed CMP per reference (c).

(2) Ensure CMP requirements are executed during maintenance periods or properly reprogrammed. Implement a COMNAVSEASYSYSCOM process to evaluate life cycle impacts and authorize non-accomplishment of CMP requirements in conjunction with technical authorities.

(3) Issue and maintain current selected record data, ship drawings, and ship-class-specific technical manuals.

(4) Analyze in-service operational data and maintenance feedback through 3-M maintenance data, casualty reports (CASREPs), repair activity discrepancy reports, guarantee and warranty deficiencies, and other reporting sources to determine design and process improvements and to refine maintenance requirements.

f. Commander, Naval Air Systems Command (COMNAVAIRSYSCOM); Commander, Space and Naval Warfare Systems Command (COMSPAWARSYSCOM); and Commander, Marine Corps Systems Command. These commands shall coordinate with COMNAVSEASYSYSCOM in the performance of their assigned duties for the maintenance and modernization of ships and related equipment.

(1) Maintain their assigned systems and associated equipment in the highest state of material condition.

(2) Provide NSYs, SUPSHIPS, and FLTCDRs the technical support necessary to perform quality maintenance. This support is to be coordinated with COMNAVSEASYSYSCOM.

(3) Analyze maintenance feedback to determine design and process improvements in order to refine maintenance requirements.

(4) Provide DFS services as requested by FLTCDRs.

(5) Coordinate with COMNAVSEASYSYSCOM to provide, manage, and maintain configuration documentation for all U.S. Navy ships.

(6) Provide technical assistance to COMNAVSEASYSYSCOM in the development of comprehensive material condition metrics capable of providing an objective measure of ship's true material condition as discussed in subparagraph 4p.

(7) Coordinate those changes to CNO-scheduled depot maintenance availabilities authorized per enclosure (3).

g. Commander, Naval Supply Systems Command (COMNAVSUPSYSCOM). COMNAVSUPSYSCOM is responsible to provide and position material following approved planning data and a logistically supported maintenance concept to achieve operational readiness goals. COMNAVSUPSYSCOM will utilize configuration and technical information provided by the other SYSCOMs when determining material requirements. COMNAVSUPSYSCOM shall:

(1) Issue supply management policy and procedures as required to support material procurement and control.

(2) Determine supply allowances and requirements at all echelons of supply, which address readiness-based sparing policy.

(3) Provide a system and procedures to support spare parts accountability.

(4) Ensure standard stock materials are procured and available to support intermediate and depot maintenance availability schedules.

h. Chief of Naval Personnel (CHNAVPERS). CHNAVPERS is responsible for providing trained, qualified, military personnel as specified by current manpower authorization to perform organizational-level, intermediate-level, and depot-level maintenance.

i. NETC. NETC shall provide effective training in maintenance skills for military personnel and modify training programs to enhance quality maintenance. RCM, CBM, and quality maintenance concepts and methods shall be included in shipboard watch stander, equipment operator, maintainer, supervisor, planner, and engineering training programs.

j. Commander, Naval Reserve Force (COMNAVRESFOR). COMNAVRESFOR shall coordinate efforts with the FLTCDRs to optimize the productivity and contribution of the Selected Reserve to the fleet's maintenance requirements.

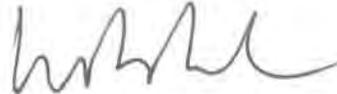
k. Ships' COs. The ship's CO is responsible for the proper self-assessment, preservation, repair, maintenance, and operation of the ship and for cost effective management of required

maintenance actions. Ship's CO will ensure proper inspections, readiness reporting and documentation of all maintenance and modernization.

6. Acronyms and Definitions. Acronyms used in this instruction are listed in enclosure (7), and applicable definitions are delineated in enclosure (8).

7. Records Management. Records created by this instruction, regardless of media and format, shall be managed per SECNAV Manual (M-)5210.1 of November 2007.

8. Reports Control. Reporting requirements contained within this instruction are exempt from reports control per SECNAV M-5214.1.



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ORGANIZATIONAL-LEVEL MAINTENANCE

1. Definition. Organizational-level maintenance is the lowest maintenance level and consists of all maintenance actions within the capability of ship's force. Organizational-level maintenance is the first defense against allowing small defects to become major operational and material problems. Within resource limitations, ships should strive to improve self-sufficiency and self-assessment capabilities. Self-assessment involves recognizing, identifying, and reporting equipment/systems' evident failure modes or symptoms of operation below standards or out-of-specification during zone inspection, PMS execution, or watch standing.

2. Policy

a. Maintenance will be performed at the maintenance level that can best ensure proper accomplishment, taking into consideration applicable laws, urgency, priority, crew impact, capability, capacity, and total cost. Accordingly, organizational-level maintenance may be assigned to higher maintenance levels.

b. Typical organizational-level maintenance actions include, but are not limited to, such items as:

(1) Facilities maintenance, such as cleaning and proper preservation.

(2) Routine systems and component planned maintenance, such as inspections, systems operability tests and diagnostics, lubrications, calibration, and cleaning.

(3) Corrective maintenance, such as HM&E and electronic troubleshooting down to the lowest replaceable unit level, 2M electronic repair, component change-out, and, in some cases, complete disassembly and repair in-place, in order to restore components to operation.

(4) Assistance to higher level maintenance activities.

(5) Verification and quality assurance of maintenance accomplished by other activities.

(6) Ensuring documentation of all deferred and completed maintenance actions, whether accomplished by ship's force or by other activities.

3. Responsibilities. The ship's CO is responsible for the proper self-assessment, preservation, repair, maintenance, and operation of the ship, and for cost effective management of required maintenance actions. The ship's CO shall:

a. Ensure ship's force accomplishment of organizational-level maintenance actions.

b. Ensure that quality maintenance is performed by other activities by providing assistance and oversight, as necessary, to ensure that published quality assurance standards are adhered to per reference (a).

c. Ensure documentation of all maintenance actions per reference (e), whether accomplished by ship's force or by other activities.

d. Ensure the CSMP is maintained in a complete and up-to-date status.

INTERMEDIATE-LEVEL MAINTENANCE

1. Definitions

a. Intermediate-Level Maintenance. Maintenance that requires skills, facilities, or capacities normally beyond those of the organizational level but does not necessarily require depot-level skills, facilities, or capacities. Intermediate-level maintenance is performed by FMA or private shipyards as assigned by the FLTCDR.

b. Non-CNO Availability. When not assigned operational commitments, ships may be made available to the maintenance activities above for the accomplishment of maintenance and alterations. These availability periods may be scheduled or emergent, and may be further categorized based on scope, location, and type. During these non-CNO availabilities, the ship may be rendered incapable of fully performing its assigned mission and tasks due to the nature of the repair work. Non-CNO availabilities are assigned by the FLTCDR or his or her authorized representative.

2. Mission

a. FMA. FMAs are assigned the following missions:

(1) Screen ship maintenance requests to determine when and where maintenance will be performed, based on availability of resources.

(2) Perform, direct, and monitor the accomplishment of assigned emergent organizational-level, intermediate-level, and depot-level repairs.

(3) When military personnel are assigned:

(a) Provide in-rate training and experience for enlisted ratings that repair and maintain shipboard systems. This training and experience will be focused on acquisition of journeyman skills and those skills required by the activity to perform its mission. Military personnel should also be provided training and experience opportunities that develop skills useful in afloat assignments.

(b) Provide a mobilization option for wartime maintenance and battle damage repair.

(c) Provide billets co-located with NAVRESFOR ships to support Naval Reserve full time support sea/shore rotation and retention. Provide in-rate training and experience for assigned Selected Reserve units.

b. Submarine Tenders. In addition to the above missions, tenders, because of their mobility, also:

(1) Provide capability for repair of battle damage and other emergent repairs to forward-deployed naval forces (FDFNs).

(2) Provide redeployment capability between theaters to complement the movement of operating forces.

### 3. Policy

a. In keeping with the policy of performing maintenance at the echelon level that can best ensure proper accomplishment, taking into consideration applicable laws, urgency, priority, crew impact, capability, capacity, and total cost, FMAs should be utilized to the maximum extent practicable. All FMAs are authorized, within the limits of capability and capacity, to perform work that is classified as organizational-level, but is not feasible or practicable for ship's force to accomplish because of time or personnel constraints. Navy policy, as stated in subparagraph 4h of this instruction, for organic shore maintenance activities that historically have performed intermediate-level ship maintenance, is to integrate them with organic depot activities in a cost-effective manner under the RMC construct.

b. Work that is within FMA capability, but in excess of local FMA capacity, may be assigned to the private sector industrial base or to an appropriate depot activity.

c. To increase Ao, continuous maintenance availability (CMAV) for surface forces ships may be assigned concurrent with CNO-scheduled depot availabilities. In these instances, a formal agreement between the FMA and the cognizant NYS, or SUPSHIP, specifying responsibilities should be obtained.

d. Authorized work includes, but is not limited to the following:

(1) Preventive maintenance.

(2) Corrective maintenance.

(3) Tests and inspections.

(4) Provision of services such as electrical power, water, gas, and air replenishment, and tool issue.

(5) Installation of alterations.

(6) Work on electronic circuit boards, components, modules, subassemblies, and other equipment coded for intermediate-level repair.

(7) Calibration and repair services for electrical and electronic test and monitoring equipment; pressure, vacuum, and temperature measuring devices; and mechanical measuring instruments.

(8) Technical assistance to ship's force in diagnosing system or equipment problems and assistance in repairs, as necessary.

(9) Assistance in the emergency repair and manufacture of unavailable replacement parts or assemblies.

e. Work on equipment held in storage as rotational assets (e.g., missiles, torpedoes) shall be accountable to the item's life cycle manager and not to the activity storing or testing the equipment.

f. FMAs shall use Navy standard maintenance information technology systems for identification, assignment, and tracking of work items, schedules, and resources.

g. FMAs may perform work on foreign ships if authorized by OPNAV (N43). Foreign ship repair work that would either interfere with future planned work or would restrict an afloat FMA from meeting its readiness requirement for getting underway shall not be undertaken.

#### 4. Responsibilities

##### a. CNO

(1) OPNAV (N43) shall establish general policy and guidance concerning accomplishment of intermediate-level maintenance.

(2) CNO ships' resource sponsors (OPNAV (N42), OPNAV (N85), OPNAV (N86), OPNAV (N87), OPNAV (N88)) will establish the number of afloat and ashore RMCs/FMAs required in support of fleet needs.

b. FLTCDRs. FLTCDRs shall:

(1) Plan and schedule non-CNO availabilities.

(2) Determine FMA manpower, contracting, and funding requirements for the preparation of budgets and act as the budget submitting office for FMAs.

(3) Manage FMA resources allocated for intermediate-level maintenance.

c. COMNAVSEASYSCOM. COMNAVSEASYS COM shall:

(1) As lead technical authority, provide technical direction and support to FMAs.

(2) With FLTCDR assistance, define and maintain FMA baseline capability descriptions. As a minimum, the baseline will describe, by FMA type, work center functions, billets, industrial plant equipment, and maintenance responsibilities.

(3) Manage and operate the NSYs and RMCs performing intermediate-level maintenance.

d. COMNAVRESFOR. COMNAVRESFOR shall coordinate efforts with the FLTCDRs to optimize the productivity and contribution of the Selected Reserve to the fleet's maintenance requirements.

DEPOT-LEVEL MAINTENANCE

1. Definition. Maintenance that requires skills, facilities, or capacities normally beyond those of the organizational level and intermediate level and is performed by NSYs, private shipyards, original equipment representatives/authorized agents, or NAVSEASYS COM designated overhaul point (DOP). Depot availabilities are defined in reference (b).

2. Policy

a. Every ship completing a CNO-scheduled depot availability shall be capable of carrying out its mission with a reasonable expectation of maintaining a satisfactory condition of readiness until the next CNO-scheduled depot availability.

b. CMAs for surface forces ships are used between CNO-scheduled availabilities to accomplish planned depot work that can be executed outside of a CNO availability.

c. Maintenance and repair work essential for safe and reliable nuclear propulsion plant operations and submarine submerged operations will not be deferred from one depot-level maintenance period to the next.

d. CNO-scheduled depot availabilities shall be scheduled per reference (b) guidelines.

e. Adherence to the reference (b) notional schedule is essential to minimize degradation of a ship's material condition and to ensure orderly workload planning at depot-level maintenance activities. In the event it becomes necessary to revise planned availability schedules, the procedures outlined in subparagraph 3c shall be followed.

f. Maintenance cycles shall commence on the first day of the month after completion of PSA, or as indicated in the CMP or in reference (b) for that ship class.

g. The majority of NSY and RMC work falls within the forth (CNO-scheduled depot maintenance availabilities) of the following 10 prioritized items listed below. To ensure flexible yet consistent application of prioritization decisions across the Navy under the forth item, work shall be accomplished following the continued use of the Fleet Maintenance Board of Directors (FMBOD) and local board of directors governance processes to provide NSYs and RMCs with necessary prioritization guidance such

as: ships necessary to meet minimum combatant commanders requirements; ships completing or nearing completion of an availability; shorter availabilities already in execution in order of duration; and longer availabilities already in execution in order of duration. The following priorities are listed in descending order:

- (1) Emergent and refit work associated with fleet ballistic missile submarine strategic assets.
- (2) VPs on deployed or deploying units.
- (3) Work on ships being prepared for deployment.
- (4) CNO-scheduled depot maintenance availabilities.
- (5) Modernization and restricted/technical availabilities.
- (6) Other U.S. Navy ship availabilities, except for inactivation or disposal.
- (7) Refurbishment of repairables.
- (8) Work on other U.S. Government ships.
- (9) Inactivation and disposal availabilities.
- (10) Work on foreign ships.

h. Repairs, maintenance, and modernization of the propulsion plants in nuclear-powered ships involve unique considerations for technical and quality control, ship safety, radiological controls for occupational health and safety, and information security. Accordingly:

(1) Reactor plant maintenance, repair, and modernization beyond the capability or capacity of the organizational level shall be assigned only to nuclear capable FMAs or private sector shipyards and performed following the requirements established by CNO (N00N), NAVSEA 08.

(2) Depot-level repair, maintenance, and modernization for steam plant systems, electric plant systems, and those auxiliary ship systems that support reactor plant and associated

reactor safety systems in nuclear-powered ships shall be assigned only to nuclear-capable shipyards and performed per requirements established by COMNAVSEASYS COM with NAVSEA 08 concurrence.

(3) Changes, repairs, and maintenance in the nuclear propulsion plants of nuclear-powered ships shall be in strict accordance with reference (h).

(4) Changes, repairs, and maintenance in the nuclear support facilities of nuclear-capable tenders shall be in strict accordance with reference (i)

i. Depot availabilities of tenders with nuclear support facilities may be assigned to non-nuclear capable shipyards, provided the requirements of reference (q) are met.

j. Availabilities awarded in the private sector shall be accomplished in such a manner to ensure quality performance, promote vigorous and healthy competition, support the nation's industrial base, include quality of life considerations for ship's force and provide full support for the flexibility and surge tenets of the FRP.

k. Since condition-directed repair renders full definition of all work prior to the start of the availability impractical, availability contracts must have the flexibility to add and delete work during availability execution without placing the Government at a negotiating disadvantage.

### 3. Procedures

#### a. Availability assignment and scheduling.

(1) OPNAV (N43) will coordinate among OPNAV staff, warfare enterprises, fleets, PEOs, DRPMs, and COMNAVSEASYS COM, as required, to ensure the effective assignment and scheduling of all CNO-scheduled depot availabilities. Consideration of shipyard capabilities (e.g., workload/skills mix) should be included in the coordination process.

(2) OPNAV Director, Warfare Integration Division (OPNAV (N8F)) will determine the fiscal year that activation and inactivation availabilities are to be scheduled.

b. CNO-scheduled depot maintenance availabilities. Ships shall generally undergo CNO-scheduled depot maintenance availabilities at the intervals and durations set forth in reference (b).

(1) Maintenance Cycle

(a) Allowable deviations from submarine maintenance cycles are specified in reference (b).

(b) Allowable deviations from surface ship and aircraft carrier maintenance cycles are specified in reference (b).

(c) For deviations that exceed reference (b) guidelines, fleet shall provide COMNAVSEASYS COM an assessment of the ship's material condition. COMNAVSEASYS COM shall provide fleet impact of proposed deviations. Reasons for these deviations, along with any impact identified, shall be included on the fleet's schedule change request.

(2) Durations. Reference (b) availability durations are to be used as nominal durations in long range planning. To support PPBES, nominal durations shall be updated annually for availabilities occurring during the first 2 years of the PPBES cycle based on known deviations from the notional package. When the scope of the work package is defined, the accomplishing activity will evaluate the work package, assess its capacity and capability to perform the work in the allotted time, and recommend adjustments to availability durations.

c. Schedule changes. Changes to CNO-scheduled availabilities may become necessary for operational, port workloading, or other reasons. Such changes shall be held to a minimum in order to maintain ship maintenance and modernization program integrity. If schedules require revision, the following procedures shall be followed:

(1) TYCOMs are authorized to initiate record changes to approved CNO availabilities, and FLTCDRs are authorized to approve changes provided they:

(a) Do not change accomplishing activity or fiscal year of execution.

(b) Do not constitute a major workload adjustment.

(c) Do not extend the availability duration by greater than 35 days from the currently approved duration.

(d) Do not deviate from the maintenance cycle beyond the allowable deviations specified in reference (b).

(e) Are coordinated with COMNAVSEASYSKOM, the PEO or DRPM, and the accomplishing activity, and reported to OPNAV (N43) and the cognizant operational forces resource sponsor.

(2) Changes, other than those authorized above, shall be approved by OPNAV (N43).

(3) Issuance of changes to the CNO depot maintenance schedule and requests for changes will normally be accomplished by naval message. Messages shall be addressed to OPNAV (N43), the cognizant operational forces resource sponsor (OPNAV (N42), OPNAV (N85), OPNAV (N86), OPNAV (N87), or OPNAV (N88)), and CNO (N00N) for nuclear-powered ships and tenders with nuclear support facilities, with an information copy to the cognizant COMNAVSEASYSKOM codes, PEO, DRPM, SPM, planning yard, SUPSHIP, RMC, or NSY, and other interested activities.

(4) Activities executing CNO-scheduled depot availabilities that will extend beyond the current approved completion date must formally propose a new completion date in sufficient time to obtain approval of the request prior to the expiration of the currently approved completion date.

d. Solicitation of private sector availabilities. Private sector availabilities will be solicited, competed, and awarded using the FAR and the Defense Federal Acquisition Regulation Supplement (DFARS).

#### 4. Responsibilities

##### a. CNO

(1) CNO operational forces resource sponsors (OPNAV (N42), OPNAV (N85), OPNAV (N86), OPNAV (N87), and OPNAV (N88)) shall:

(a) Approve maintenance program master plans for their respective platforms, including NAVRESFOR ships, listed in reference (b).

(b) Monitor maintenance program master plan compliance.

(c) Review all CNO-scheduled depot availability change requests with OPNAV (N43) prior to approval.

(2) OPNAV (N43) shall:

(a) Document, in reference (b), the notional depot availability durations, intervals, and repair man-days approved by the operational forces resource sponsors for each ship class.

(b) Control schedules for CNO-scheduled availabilities per paragraph 3 of this enclosure.

(c) Coordinate all CNO-scheduled depot maintenance availability schedule change requests with the cognizant operational forces resource sponsors, COMNAVSEASYSKOM, the cognizant PEOs or DRPMs, and, for nuclear-powered ships or ships with nuclear support facilities, CNO (N00N).

b. FLTCDRs FLTCRDs shall:

(1) Maintain the depot maintenance intervals and cycles, issued in reference (b), to the maximum extent practical within operational requirements.

(2) Plan for and monitor availability execution to achieve a balance of cost and schedule for the scope of work authorized. Ensure that any growth in the scope of work authorized is necessary to reasonably assure safe, reliable operation of the ship during the subsequent operating cycle.

(3) Inform the Deputy Chief of Naval Personnel (PERS-4) of any significant changes that would affect ship manning requirements during an extended depot availability.

(4) Ensure that any required testing of systems or equipment installed or repaired during the availability is conducted prior to availability completion.

(5) Coordinate with the PEO, DRPM, or SPM, as applicable, in the accomplishment of depot availability planning.

(6) Plan for and provide berthing, messing, offices, classrooms, equipment stowage space, and ship's force repair shop space per reference (k), when shipboard facilities are expected

to become unusable or uninhabitable. This pertains to all private shipyard availabilities and all public shipyard availabilities when the public shipyard is unable to provide adequate facilities.

(7) Assign and schedule non-CNO availabilities. This may be delegated to subordinate commands for accomplishment.

(8) Ensure completion data for availabilities conducted by SRFs is forwarded to COMNAVSEASYSKOM for analysis and refinement of maintenance requirements.

(9) Execute approval authority for changes to CNO-scheduled availabilities authorized in paragraph 3.

c. COMNAVSEASYSKOM. As the lead technical authority, COMNAVSEASYSKOM shall:

(1) Establish NSY and RMC operating policies.

(2) Furnish timely information on the prospective workloads of public and private shipyards to the respective FLTCDRs for their guidance, recommending changes to scheduled availabilities to balance workload, and avoid excessive cost to Navy.

(3) Establish performance standards for the accomplishment of maintenance, modernization, and all other ship work scheduled for accomplishment by depot-level maintenance activities.

(4) Ensure that NSYs, SUPSHIPS, and RMCs execute ship repair and modernization within the scope of work authorized, employing prescribed technical methods, specifications, and quality assurance requirements in the most cost effective manner.

(5) Establish and implement minimum requirements for qualification and certification of docking officers and observers for floating drydocks, graving docks, and marine railways.

(6) Ensure that management information systems used for the collection and analysis of post-availability completion and as-found condition data are compatible with the 3-M system, and report this information to the 3-M database.

(7) Conduct system and equipment engineering analysis to eliminate or refine maintenance periodicities.

(8) Assist PEOs or DRPMS and FLTCDRs or TYCOMs in coordinating private-sector, CNO-scheduled, depot availability assignment and contracting within established FAR and DFARS guidelines.

(9) Develop and implement process to continuously review ship CMPs to incorporate lessons learned, refine the balance between confidence and risk, and identify areas where technological development can be brought to bear to reduce cost/increase Ao.

d. PEOs, DRPMS, and SPMs. PEOs, DRPMS, and SPMs shall:

(1) Issue availability planning milestones that maximize the probability of successful execution and are in compliance with the milestones outlined in reference (a).

(2) Conduct a post-availability evaluation and review with the fleet or TYCOM within 60 days of a CNO-scheduled availability completion.

(3) Analyze post-availability completion data and refine maintenance requirements data for FLTCDR and OPNAV (N43, N85, N86, N87, and N88) use.

(4) Ensure system and equipment engineering analysis is conducted to refine maintenance periodicities.

(5) Coordinate with the FLTCDRs or TYCOMs all private-sector, CNO-scheduled, depot availability assignment and contracting within established FAR and DFARS guidelines.

(6) Conduct a combined alteration and repair verification conference with the fleet prior to a CNO-scheduled availability start per enterprise milestones.

(7) Provide OPNAV (N43) with concurrence/non-concurrence input regarding change requests to CNO-scheduled availabilities addressed in paragraph 3.

MAINTENANCE PROGRAMS

1. Maintenance Program Definition

a. The goal of Navy ship maintenance is to maintain the highest practical level of material readiness and safety to meet required Ao needs while minimizing total life cycle cost over the expected life of the ship. The maintenance program established for a class of ships identifies all maintenance requirements developed with engineered periodicities using the RCM methodology and executed following CBM in order to maintain or restore ship material condition at the level needed to achieve the required degree of readiness and to achieve expected service life.

b. Maintenance program elements include personnel, material, facilities (public and private), programs, and procedures. The overall goal is successful determination of maintenance requirements and authorization of applicable and effective maintenance actions in a near continuous flow of maintenance candidates to the most appropriate level and maintenance activity for accomplishment. Timed to best support validation, screening, brokering, scheduling, planning, and executing maintenance has migrated from a centralized, time-based, batch process to a decentralized, condition-based, nearly continuous process. Maintenance will be performed at the maintenance level that can best ensure proper accomplishment, taking into consideration applicable laws, safety, urgency, priority, crew impact, capability, capacity, and total cost.

c. The Navy ship is a unique entity in that responsibility for both the operation and maintenance of the ship rests with the ship itself. Other Navy organizations exist to support that entity.

d. The fundamental CNO-approved approach places the emphasis on ensuring a reasonable probability that the ship is ready for prompt and sustained combat operations at sea on a continuing basis, i.e., appropriate material condition. The basis for the information needed to properly support the CO is principally the 3-M system's PMS, which provides MRCs for organizational-level planned maintenance actions, and CMP, which provides intermediate-level and depot-level planned maintenance action tasks. MRCs and CMP tasks are developed by cognizant technical authority, using RCM. CMP tasks shall include or refer to fully detailed procedures for accomplishment of intermediate-level and depot-level maintenance actions, such as MRCs or other task-

standard documents. Performance of these organizational-level MRCs and intermediate-level and depot-level CMP tasks provides:

(1) Assurance that systems are operating within technical specifications.

(2) Assurance that necessary maintenance actions (e.g., lubrication, greasing, and adjustments) are performed.

(3) Technical information that indicates system condition and can be used as the basis for determining required corrective maintenance.

(4) Technical information to be used by the technical community as the basis for determining process or technical changes.

(5) Technical information to be used as the basis for sustaining material certification.

(6) Maintenance actions that are used to obtain objective evidence of equipment performance or condition trends that are considered preventive maintenance.

## 2. Policy

a. Each ship class, including unique single-ship classes, shall have a CNO-approved maintenance program.

(1) Preventive maintenance actions identified in a maintenance program for a ship class shall be developed using approved RCM techniques per reference (g). MRCs, for organizational-level preventive maintenance, and CMP tasks, for intermediate-level and depot-level planned maintenance, shall be the reference documents for accomplishing these actions.

(2) Corrective maintenance determination shall be based on CBM requirements, i.e., on objective evidence of need.

(a) Condition-directed repairs should be based on current evidence of degradation below system performance requirements. This includes material condition trend predictions of future degradation below system performance requirements prior to the next scheduled availability.

(b) Where CBM diagnostics, inspections, or tests are unavailable or impractical to determine actual equipment

condition or trends, time-directed repairs shall be based on engineering analysis such as assessment of the as-found material condition of components or systems when they are disassembled for maintenance or age-reliability analysis, including age exploration.

(3) Maintenance actions shall be authorized to be performed by the maintenance level that can best ensure proper accomplishment, taking into consideration applicable laws, urgency, priority, crew impact, capability, capacity, and total cost.

(4) Effective use of specialized husbandry agents for maintenance determination, authorization, and management is encouraged where such use provides a clear value added.

(a) Husbandry agents, such as port engineers or maintenance planning managers, shall meet qualifications established for performing specific functions of the maintenance program. For example, port engineers are expected to be highly qualified, licensed marine engineers with both an engineering degree and prior sailing and port engineer experience, or equivalent U.S. Navy ship repair experience.

(b) Husbandry agents normally shall be assigned responsibility for no more than two ships and shall be involved in the determination, planning, authorization, and execution of all intermediate-level and depot-level maintenance actions.

(c) When performing duties in the areas of work determination, authorization, and execution, husbandry agents are responsible to the fleet.

b. The process for developing the maintenance program for new ship classes shall:

(1) Satisfy the requirements outlined in subparagraph 4d of this instruction, including development of a detailed CMP per reference (c).

(2) Apply both technical and cost criteria to maintenance decisions, providing due consideration to ship design and crew composition.

(3) Accommodate differences in intermediate-level and depot-level industrial capability and capacity.

(4) Take into account the policy that maintenance will be performed at the maintenance level that can best ensure proper accomplishment, taking into consideration applicable laws, urgency, priority, crew impact, capability, capacity, and total cost.

(5) Ensure that pre-depot availability tests and inspections required for maximum work identification are developed. MRCs and CMP tasks shall be the reference documents for accomplishing these tests and inspections.

c. Maintenance programs for in-service ship classes should be reviewed for conformance with the guidelines of above subparagraph 2b and modified in areas where it can be determined that the expected results would be cost effective.

d. A CNO-approved, tailored maintenance program shall be developed for each ship class. The maintenance program master plan shall describe the basic parameters of the maintenance program for that ship class. This includes:

(1) Establishing minimum organizational-level repair capabilities needed to satisfy operational requirements and established self-sufficiency objectives.

(2) Establishing the intermediate-level and depot-level requirements (e.g., number, type, duration, interval between, and man-day size of availabilities).

(3) Identifying the maintenance approach used for critical systems and equipment.

(4) Identifying all required support features, including facilities requirements, specific turnaround programs, insurance material programs, special diagnostic systems, husbandry agents (e.g., port engineers or maintenance managers), qualification, and maintenance management requirements.

(5) Developing a plan of action and milestones for implementing and improving maintenance support requirements.

e. A COMNAVSEASYS COM-approved CMP shall be developed for each ship class in conformance with reference (c). The CMP is the principal document for scheduling and executing the tailored maintenance program for a ship class. The CMP for a ship class shall describe all preventive and planned maintenance actions and maintenance support requirements. This includes:

(1) Identifying all organizational-level, intermediate-level, and depot-level maintenance actions, engineered periodicities, and the maintenance level expected to accomplish each.

(2) Identifying those maintenance actions designated by the cognizant technical authority as mandatory or that RCM analysis has shown to be valid time-directed maintenance.

(3) Identifying those maintenance actions associated with assessing equipment condition, including pre-availability diagnostics, tests, and inspections performed by ship's force or by other maintenance support organizations.

(4) Providing details regarding the level of effort or involvement of each maintenance support organization and program designated in the maintenance program master plan.

f. MRCs may be incorporated or referenced in the CMP for each ship class.

g. MRC and CMP task periodicities shall be modified based on the results of RCM-validation of maintenance experience. These periodicities are to be used as a scheduling tool for accomplishment of the maintenance action.

h. MRC and CMP task actions shall include diagnostics, tests, inspections, and selected acceptance criteria to determine the need for condition-directed maintenance.

i. The CMP is the core of the logistics program developed for each ship class. The translation of these plans into maintenance actions requires the development and maintenance of MRCs and CMP tasks for the assessment of equipment condition, determination of maintenance requirements, and execution of maintenance actions.

j. A thorough knowledge and assessment of actual equipment condition in relation to its minimally acceptable condition is the basis for maintenance decisions. Equipment condition is a broad term that of necessity includes static parameters, such as size, shape, and the extent of material degradation observed from prior maintenance on similar or the same components, and dynamic parameters, such as speed, temperature, pressure, and electrical characteristics. Ship's force is required to know the condition of its ship and equipment.

k. The complexities of shipboard systems and equipment have necessarily led to the development of other supporting organizations, programs, requirements documentation, and information systems to augment the original MRC and CMP task process. These support organizations, programs, requirements documentation, and information systems should be continually reviewed for effectiveness and integrated, consolidated, or standardized, as practicable; and modified, as appropriate, to maximize fleet self-sufficiency.

l. Intermediate-level and depot-level repair work determination shall be based on:

(1) CSMP records of deferred and completed maintenance.

(2) Objective evidence of degradation or failure determined by results of MRCs or CMP tasks conducted by ship's force or support programs.

(3) Material condition trend predictions of future failure.

(4) Time-directed maintenance, which is based on age reliability analysis, appropriate distribution of failures, and availability of an applicable maintenance action.

m. Depot-level availability repair work authorization shall be based on assessment of the relative risk of non-accomplishment to personnel safety and ship mission readiness. Authorization of repair work items shall be prioritized in descending order of risk to personnel safety and mission readiness. Relative risk is the product of the probability of failure before the next scheduled availability and a measure of the severity of failure.

n. Reactor plant maintenance, repair, and modernization in nuclear-powered warships shall be programmed following requirements and policies established by CNO (N00N), NAVSEA 08.

o. Maintenance and repair work essential for safe and reliable nuclear propulsion plant operations and submarine submerged operations shall not be deferred from one depot-level maintenance period to the next.

### 3. Repair Procedures and Support

a. Repair Determination. FLTCDRs, acting through their TYCOMs or other designated subordinates, shall determine the repair actions required to maintain or restore equipment to its intended condition based on technical requirements defined by the cognizant technical and programmatic authority. This determination shall use RCM principles. Repair determination assistance is available through various programs, organizations, and information systems within the fleet and SYSCOMs.

b. Repair Authorization. FLTCDRs, acting through their TYCOMs or other designated subordinates, shall authorize required maintenance actions based on safety considerations, on cost, schedule, and mission trade-offs, as required within technical and programmatic authority. The choice of required maintenance actions to be authorized shall be based on evaluation of risk to personnel safety and ship mission readiness imposed as a result of those maintenance requirements deferred. Acceptance of risk is unavoidable; proper management of risk is essential.

c. Repair Execution. Repairs shall be executed following technical requirements and, in keeping with the policy that maintenance will be performed at the maintenance level, that can best ensure proper accomplishment, taking into consideration applicable laws, urgency, priority, crew impact, capability, capacity, and total cost. If funding constraints exist, priority must be placed on providing ships that can safely and reliably perform their missions.

d. Reactor plant maintenance, repair, and modernization shall be performed following requirements established by NAVSEA 08.

### 4. Responsibilities

a. CNO. The CNO operational forces resource sponsors (OPNAV (N42), OPNAV (N85), OPNAV (N86), OPNAV (N87), and OPNAV (N88)) shall:

(1) Approve all tailored maintenance program(s) and any modifications to these plans for their respective platforms.

(2) Plan and program the resources required to fully support their tailored maintenance program(s), including resources for organizational-level, intermediate-level, and depot-level maintenance.

(3) Monitor tailored maintenance program compliance.

b. FLTCDRs. The FLTCDRs shall:

(1) Participate with PEOs, DRPMs, and SPMs in the development of the maintenance program for each ship class.

(2) Execute each program in strict accordance with this instruction and specific guidance provided in the ships' CMP.

(3) Manage risks inherent in making maintenance decisions, recognizing that prudent risk is acceptable and no maintenance decision is risk free.

(4) Assist the PEO, DRPM, or SPM in determining husbandry agent qualifications and maintenance management requirements.

c. COMNAVSEASYSCOM. as the lead technical authority, COMNAVSEASYSCOM shall:

(1) Oversee the RCM development and continuous improvement of ship, system, and equipment maintenance programs per reference (g).

(2) Develop, review, and validate maintenance requirements. Develop, issue, and maintain organizational-level MRCs and intermediate-level and depot-level CMP tasks.

(3) Assist PEOs and DRPMs in developing tailored maintenance program(s) and CMPs.

(4) Review and approve CMPs, including those developed by PEOs and DRPMs, ensuring that they satisfy the requirements of this instruction and reference (c), are technically correct, and are best suited to individual ship classes.

(5) Recommend changes to existing maintenance programs and CMPs that: support Navy's continued drive toward integration, standardization, and fleet self-sufficiency; are based on RCM experience; and are cost effective.

(6) Ensure effective support of maintenance determination, planning, and execution by field activities, and continuously improve maintenance procedures and technology.

d. PEOs, DRPMs, and SPMs. PEOs, DRPMs, and SPMs shall:

(1) Develop a tailored maintenance program for CNO approval that is best suited to an individual ship class, that supports fleet mission and material readiness needs, and is cost effective.

(2) Develop for COMNAVSEASYS COM approval, issue, and maintain CMPs based on approved tailored maintenance program(s) and the requirements of this instruction. The CMP shall be issued by delivery of the first ship of the class. Ensure CMP requirements are executed during maintenance periods or properly reprogrammed. Implement COMNAVSEASYS COM processes to evaluate life cycle impacts and authorize non-accomplishment of CMP requirements in conjunction with technical authorities.

(3) Ensure adequate logistics support for their maintenance programs.

e. CNO (N00N) (NAVSEA 08). CNO (N00N) is responsible for establishing nuclear-powered warship reactor plant maintenance, repair, and modernization requirements and policies.

MINIATURE/MICRO-MINIATURE (2M) MODULE TEST AND REPAIR (MTR)

1. Definition

a. Miniature Electronic Repair. Miniature electronic repair is defined as the repair of single-sided and double-sided circuit card assemblies (CCA) and electronic modules (EMs). It includes the removal and installation of discrete and multi-leaded components, removal and application of conformal coatings, wiring and soldering of various terminals or connectors, and replacement of damaged conductors and board laminate. Some miniature repairs require the use of a stereomicroscope. Miniature repair also covers electrostatic discharge (ESD) familiarization and handling procedures to minimize ESD risk to CCA/EMs.

b. Micro-miniature Electronic Repair. Micro-miniature electronic repair is a more technically demanding level of repair than miniature and requires additional training and specialized tools, materials and repair equipment. It includes repair of CCA/EMs with high-density component packaging, multilayer conductor and laminate, edge lighted panel, welded lead and surface mount technology repair. Micro-miniature electronic repair includes repairs to modules and small "daughter" boards, which are too complex or dense for miniature electronic repair, repairs to flexible printed circuit boards and printed circuit cables; removal and installation of special connectors, eyelets, and terminals; electroplating, micro-soldering, repairs to ceramic and composite CCA/EMs and complete rebuilding of damaged electronic circuitry.

2. Limitations. The 2M MTR Program excludes internal repairs to micro-electronic components, but their removal or replacement is acceptable. Other exclusions include internal repairs to critically sensitive components, such as miniature radio frequency balanced mixers or repairs that may require special alignment, special disassembly/assembly, calibration and test equipment and other repair tools, materials, and equipment not available to the maintenance activity. Shipboard and selected shore activities 2M repairs are to be performed by certified technicians per policy and procedures in reference (a).

3. Discussion

a. Navy shipboard and shore-based systems with removable, high cost CCA/EMs are characterized by increased packaging complexity, multi-layer construction, and the extensive use of micro-miniature devices and subminiature components. The

increased use of such sophisticated CCA/EMs in Navy systems and equipments and the limited amount of shipboard spare CCA/EMs and maintenance assist modules calls for expanded fleet electronic repair and diagnostics capabilities at all maintenance levels. These capabilities must include properly trained and certified personnel, effective and affordable 2M repair equipment and test equipment, selected diagnostics, and repair procedures and CCA/EM repair parts.

b. The 2M MTR Program provides the 2M repair equipment and associated accessories, tools, materials, MTR test equipment, and ILS, including Navy training plans, curriculum material, and training aids for the 2M MTR courses. The program also provides a Navy 2M MTR certification plan, a standard 2M maintenance practices manual, and test and repair procedures for the repair of specific CCA/EMs. The program also develops and maintains piece part allowances for ship classes, FMAs, ashore and other designated shore activities that support the fleet.

c. The MTR test equipment supplements the 2M electronics repair capabilities and provides the fleet and authorized shore activities with portable, cost effective manually operated test equipment, semi-automatic controller aided test systems (AN/USM-646, AN/USM-674, AN/USM-676), associated operating software, MTR test procedures (i.e., Gold Disks and Pinpoint test routines), test accessories, and MTR test equipment ILS. The program also develops MTR test procedure candidate lists periodically from COMNAVSUPSYSCOM and Defense Logistics Agency CCA/EM requisition data in order to facilitate the selection and development of MTR test procedures that will provide the most return on investment and have the highest probability to improve system/equipment readiness.

4. Policy. There are two principal categories of 2M repair: normal repair and emergency repair. All 2M repair actions, regardless of category, must be performed by certified technicians utilizing certified facilities. The source, maintenance, and recoverability (SM&R) code identifies the maintenance levels that may remove, repair, replace, or condemn a CCA/EM. 2M MTR-certified technicians will screen and attempt to repair all CCA/EMs within their training and capability, regardless of the SM&R code. This includes depot level repairable (DLR) and consumable CCA/EMs.

a. Normal repair is the application of a progressive repair concept consisting of sequential attempts to repair an item following the established organizational-level, intermediate-

level, and depot-level repair hierarchy. If a ship has certified 2M MTR technicians and facilities, organizational-level test or repair is normally attempted prior to obtaining a replacement item from the supply system. If ship's force is unable to repair the item, when feasible, it is shipped to an FMA for further inspection. If the repair is within the capability of the FMA's 2M MTR trained personnel and facility, the FMA will verify the condition of the CCA/EM and conduct intermediate-level repairs, if possible. If the FMA is unable to repair the item, and it is designated as a DLR, it is shipped to the depot facility for further inspection and repairs.

b. Emergency repair is a repair deemed to normally be beyond a command's authorized 2M repair capability that has been authorized by a ship's or shore activity's CO because of operational necessity. Even if this repair is considered adequate, the item will be designated for higher-level repair and shipped to the appropriate repair activity when operations permit. The FMA or other appropriate repair activity will complete actions as indicated in subparagraph 4a.

c. The condition of a CCA/EM or other system and equipment lowest replaceable unit with electronic circuitry must be verified at a 2M MTR station before discard. Ships should send items that are coded for organizational-level discard (consumables) to an FMA for possible repair when feasible.

d. Technicians who repair CCA/EMs and subassemblies must receive formal training and certification in miniature or micro-miniature repair.

e. Ships, FMAs, and other designated shore activities performing 2M electronic repair must meet the technical criteria established by COMNAVSEASYSKOM.

## 5. Responsibilities

a. CNO. OPNAV (N43) is the program and resource sponsor for the 2M MTR Program. As such, OPNAV (N43) is responsible for properly funding the program and providing policy and guidance, as required.

b. FLTCDRs. FLTCDRs shall:

(1) Per 2M MTR policy and responsibilities in reference (a), operationally administer and promote optimum use of the 2M

MTR Program at the organizational level and intermediate level and ensure that 2M repairs are conducted at the lowest feasible maintenance level.

(2) Assist the 2M MTR in-service engineering agents (ISEAs) in initial fleet evaluations of new 2M MTR equipment and associated software. Identify outfitting requirements and priorities and assist 2M MTR ISEAs in the delivery of 2M MTR equipment to authorized 2M MTR facilities. Assist 2M MTR ISEAs to obtain reusable 2M MTR equipment and 2M repair piece parts from decommissioned ships and disestablished shore commands.

(3) Inspect and certify 2M repair facilities and technicians following established COMNAVSEASYSKOM certification procedures.

(4) Ensure that 2M repair and MTR test equipment training is scheduled and provided to personnel as required to continuously maintain 2M MTR station certification requirements and minimize gaps in 2M MTR capability and capacity caused by technicians' sea shore rotation, end of enlistment, or other change of duty assignments.

(5) Designate ships and shore activities as Gold Disk developer commands. Assist the MTR test equipment ISEA in the selection of high priority Gold Disk test procedure candidates. Assist the MTR test equipment ISEA to obtain access to CCA/EMs for test procedure development when CCA/EM assets are not available from other sources.

(6) Ensure that all 2M MTR maintenance actions are documented in the Module Test and Repair Tracking System (MTRTS) and aggregate reports provided each quarter per direction in reference (a).

c. COMNAVSEASYSKOM. COMNAVSEASYSKOM shall provide technical direction and implement the 2M MTR Program. COMNAVSEASYSKOM shall also:

(1) Provide overall 2M MTR Program management and establish procedures for orderly program direction.

(2) Provide nominations for the monthly CNO Gold Disk Developers Award and the associated letter of commendation and coordinate the associated military cash award for each awardee.

(3) Acquire and, in conjunction with the fleet, conduct initial evaluations and deploy 2M MTR equipment and ILS, including semi-automatic and manual test equipment to support CCA/EM test/diagnostics and repair.

(4) Coordinate the selection, development, and distribution of CCA/EM test and repair procedures.

(5) Establish standard 2M repair practices, 2M MTR personnel, and facility certification procedures to support repair of shipboard equipment that contains electronic circuitry.

(6) Develop, maintain, and acquire consolidated piece part allowances for each ship class and shore commands authorized 2M MTR capabilities.

d. PEOs, SPMs, and System and Equipment Acquisition Managers. PEOs, SPMs, and system and equipment acquisition managers shall comply with test and diagnostics policy in reference (o) and to the maximum extent feasible incorporate utilization of organizational-level and intermediate-level 2M MTR capabilities into ILS planning and into system and ship class maintenance and training plans.

(1) Coordinate with the 2M MTR Program and determine the need to have test and repair analyses done by 2M MTR Program ISEAs on systems and equipment with CCA/EMs or other electronic circuitry. Ensure that level of repair analyses done for new or modified systems do not include costs to outfit and train existing organizational-level and intermediate-level 2M MTR facilities and personnel.

(2) When economically and technically feasible, fund for test/diagnostics and repair procedures that will utilize fleet 2M MTR capabilities and coordinate with FLTCDRs and the 2M MTR program manager to determine any required additional organizational-level and intermediate-level 2M MTR capabilities and capacity.

(3) Ensure that effective depot planning is conducted on new systems/equipment and that the progressive repair concept is applied to all CCA/EMs that can be supported with fleet organizational-level and intermediate-level 2M MTR capabilities.

e. NETC. NETC, in coordination with COMNAVSEASYS COM and the FLTCDRs, shall provide training facilities, curricula, and instructors for the 2M MTR Program.

f. COMNAVSUPSYSCOM. COMNAVSUPSYSCOM shall support the use of fleet organizational-level and intermediate-level 2M MTR capabilities by ensuring that COMNAVSUPSYCOM instructions, guidance, procedures, and training are consistent with OPNAV and fleet 2M MTR policy.

(1) Direct the distribution of stock for rotatable CCA/EM pools as requested by the FLTCDRs.

(2) Assist the 2M MTR Program in selecting CCA/EMs candidates for test procedure development.

(3) Assist the 2M MTR ISEAs in the development and revisions to 2M piece part allowance parts lists for ship classes and shore activities that are authorized 2M MTR capabilities.

QUALITY MAINTENANCE

1. Background. Performing maintenance following published technical and quality assurance requirements is a longstanding policy. Quality assurance requirements carry equal weight with the technical requirements in the overall objective of quality maintenance. The technical complexity of present day ships reinforces the need for strict compliance with administrative and technical direction to ensure conformance to technical requirements during maintenance. Seemingly trivial or minor deviations from requirements have resulted in the loss of life and degradation of ships' readiness.

2. Policy

a. The Navy ship maintenance function shall have a quality management system in place. That is:

(1) Maintenance management processes shall be documented.

(2) The maintenance processes shall be consistently and expertly executed.

(3) Maintenance process documentation and execution shall be audited both internally and externally.

(4) CMPs and processes shall be continuously improved.

b. Quality maintenance requires the proper execution of responsibilities by each individual involved in the planning, logistics support, and execution of the maintenance process. Workers and planners will be provided adequate tools, guidance, training, resources, and time to perform quality maintenance. Failure to consistently accomplish first time quality maintenance should be viewed as a weakness or breakdown in the process. Reasons for failure should be identified and the process examined for modification, as appropriate.

c. Maintenance of ship systems and equipment shall be performed by qualified personnel using correct procedures and material following the technical requirements promulgated by the appropriate technical authority. Policy and direction issued by the FLTCDRs, COMNAVSEASYSKOM, or their subordinate activities shall comply with such technical requirements. FLTCDRs and COMNAVSEASYSKOM shall ensure procedures addressing deviations to technical requirements are established. These procedures shall:

(1) Ensure that the activity, when finding itself unable to comply with technical requirements, recommends to the appropriate technical authority a repair which the activity considers achievable and which will ensure the needs of the fleet are satisfied.

(2) Differentiate between categories of repair and identify, by each category of repair, the appropriate technical authority that can authorize deviation from technical requirements.

(3) Ensure work does not proceed until concurrence from appropriate technical authority is received.

(4) Ensure cognizant technical authority revises applicable technical requirements, or documents a deviation from technical requirements, to reflect resolution of the repair.

d. Compliance with quality maintenance requirements will be validated by independent oversight in the form of audits and inspections.

### 3. Responsibilities

a. FLTCDRs. The FLTCDRs are responsible for safe and effective maintenance of their assigned ships. They shall:

(1) Ensure their TYCOMs or other designated subordinate commands utilize approved processes for maintenance.

(2) Ensure all organizational-level and intermediate-level maintenance is accomplished per the cognizant SYSCOM technical specifications and requirements. When this requirement cannot be satisfied, action shall be taken as outlined in subparagraph 2b.

(3) Maintain positive control over the maintenance practices of subordinate commands to ensure compliance with the standard Navywide maintenance policy.

(4) Provide guidance to facilitate the development of joint policy instructions and notes, addressing the following as a minimum:

(a) Administrative requirements.

(b) Organizational-level and intermediate-level maintenance activity quality assurance organization and execution requirements.

(c) Responsibilities of organizational-level and intermediate-level activity personnel relating to the definition and oversight of maintenance performed by depot activities.

(d) Situational responsibility and accountability guidance.

(5) Assign quality assurance responsibilities.

(6) Advise NETC and provide guidance to fleet training centers concerning new training requirements identified as a result of work-procedure development, changes in current maintenance performance, and evaluations of maintenance quality problems.

(7) Ensure that SRFs comply with technical and quality requirements promulgated by COMNAVSEASYSKOM.

b. COMNAVSEASYSKOM. As the lead SYSKOM and technical authority for the life cycle management of ships, COMNAVSEASYSKOM shall:

(1) Develop the technical requirements necessary for performing quality maintenance. This includes issuing and maintaining such technical documentation as current selected record data and Navy equipment drawings, technical manuals, calibration and repair standards, test requirements, and plans, as required.

(2) Identify those systems, portions of systems, or components that, due to their essentiality, complexity, cleanliness or material requirements, must have additional process controls to ensure that technical requirements are met.

(3) Develop and manage special programs to implement additional process controls for those systems and components identified as requiring such.

(4) Provide necessary technical support and oversight of NSYs, SUPSHIPS, and RMCs.

(5) Provide technical support to FLTCDRs to ensure quality objectives are met.

(6) Ensure all depot-level maintenance is accomplished following cognizant SYSCOM technical requirements and specifications. When this requirement cannot be satisfied, action should be taken as outlined in subparagraph 2b.

(7) Issue quality assurance policy for NSYs, SRFs, and RMCs for depot-level maintenance.

(8) Assist and advise FLTCDRs to ensure that guidance provided in such areas as work-procedure preparation, material requirements and control, work control, testing, and certification instructions are technically correct and consistent with Navy quality objectives.

(9) Advise NETC of new training requirements identified with new procedures, systems, or troubleshooting techniques.

(10) Provide COMNAVSUPSYSCOM with the following:

(a) Sufficient, accurate, and up-to-date technical information to ensure consistent procurement and control of material that fulfills all technical requirements.

(b) Assistance in the evaluation of discrepancies reported through the Quality Deficiency Report Program.

(c) Assistance in determining whether or not the severity of a reported problem warrants purging of supply system stocks. If purging is required, details of the inspection characteristics and methods should be provided, including the scope of the action to be taken.

c. COMNAVAIRSYSCOM and COMSPAWARSYSCOM. COMNAVAIRSYSCOM and COMSPAWARSYSCOM shall:

(1) Coordinate with COMNAVSEASYSYSCOM in the development of technical requirements essential to performing quality maintenance. This includes promulgating and maintaining such technical documentation as current selected record drawings and Navy equipment component drawings, technical manuals, calibration and repair standards, test requirements, and plans, as required.

(2) Identify to COMNAVSEASYSYSCOM those systems, portions of systems, or components that, due to their essentiality,

complexity, cleanliness or material requirements must have additional process controls to ensure that technical requirements are met.

(3) Assist COMNAVSEASYSKOM in the development of the additional process controls required to ensure that proper maintenance actions or repairs are performed.

(4) Provide COMNAVSEASYSKOM and FLTCDRs necessary technical support to ensure that quality objectives are met.

(5) Assist or advise FLTCDRs to ensure that guidance provided in such areas as work-procedure preparation, material requirements, work control, testing, and certification instructions are technically correct and consistent with Navy quality objectives.

(6) Advise NETC of training requirements identified with work procedures, systems, and troubleshooting techniques.

(7) Provide COMNAVSUPSYSCOM with the technical information and assistance outlined in subparagraph 3b(10).

d. COMNAVSUPSYSCOM. COMNAVSUPSYSCOM is responsible for procurement of material per technical specifications provided by the hardware SYSCOMs. COMNAVSUPSYSCOM shall:

(1) Control material designated by hardware SYSCOMs for special programs such as level I and submarine safety following cognizant SYSCOM procedures.

(2) Provide or support material control training for those supply personnel who receive, handle, and issue material for designated special programs.

(3) Take action to ensure rapid correction of quality deficiencies as they are identified, utilizing guidance received from the cognizant SYSCOM.

e. NETC. NETC is responsible for providing effective training in maintenance skills for military personnel. NETC shall:

(1) Emphasize quality maintenance principles in all leadership, management, and maintenance courses.

(2) Develop new quality oriented leadership, management, and maintenance courses as required by FLTCDRs and SYSCOMs.

(3) Ensure that appropriate shipboard quality assurance fundamentals are included in rate advancement examinations.

f. INSURV. INSURV is responsible for identifying and reporting ship material conditions that substantially reduce a ship's fitness for naval service, and its ability to perform its primary and secondary missions and to reach its expected service life. INSURV shall:

(1) Audit and validate reported material condition metrics.

(2) Collaborate with COMNAVSEASYSKOM to develop CAPs.

ACRONYMS

2M	miniature/micro-miniature
3-M	maintenance and material management
Ao	operational availability
CBM	condition-based maintenance
CAP	common assessment procedure
CASREP	casualty reports
CCA	circuit card assemblies
CDMD-OA	Configuration Data Manager's Database-Open Architecture
CHNAVPERS	Chief of Naval Personnel
CIA	carrier incremental availability
CMAV	continuous maintenance availability
CMP	class maintenance plan
CNO	Chief of Naval Operations
CO	commanding officer
COMNAVAIRSYSCOM	Commander, Naval Air Systems Command
COMNAVRESFOR	Commander, Naval Reserve Force
COMNAVSEASYSYSCOM	Commander, Naval Sea Systems Command
COMNAVSUPSYSCOM	Commander, Naval Supply Systems Command
COMPACFLT	Commander, Pacific Fleet
COMSPAWARSYSCOM	Commander, Space and Naval Warfare Systems Command
COMUSFLTFORCOM	Commander, United States Fleet Forces Command
CSMP	current ship's maintenance project

DFARS	Defense Federal Acquisition Regulation Supplement
DFS	direct fleet support
DIRSSP	Director, Strategic Systems Programs
DLR	depot-level repairable
DOE	Department of Energy
DOP	designated overhaul point
DRPM	direct reporting program manager
EM	electronic modules
ESD	electrostatic discharge
FAR	Federal Acquisition Regulation
FDNF	forward-deployed naval force
FMA	fleet maintenance activity
FMBOD	Fleet Maintenance Board of Directors
FLTCDR	fleet commander
FRP	Fleet Response Plan
HM&E	hull, mechanical, electrical
ICMP	integrated class maintenance plan
ILS	integrated logistics support
INSURV	Board of Inspection and Survey
ISEA	in-service engineering agent
MRC	maintenance requirements cards
MTR	module test and repair
NAVSEASYS COM	Naval Sea Systems Command

NETC	Naval Education and Training Command
NAVRESFOR	Naval Reserve Force
NSY	naval shipyard
OPNAV	Office of the Chief of Naval Operations
PEO	program executive office
PMS	planned maintenance system
PPBES	planning, programming, budgeting, and execution system
PSA	post-shakedown availability
RCM	reliability-centered maintenance
RMC	regional maintenance center
SCLISIS	Ship's Configuration and Logistics Support Information System
SM&R	source, maintenance, and recoverability
SPM	ship program manager
SRF	ship repair facility
SUPSHIP	supervisor of shipbuilding, conversion, and repair
SYSCOM	systems command
TMA/TMI	top management attention/top management issues
TYCOM	type commander
USCG	United States Coast Guard
UWSH	underwater ship husbandry
VR	voyage repair

LIST OF DEFINITIONS

1. Carrier Incremental Availability (CIA). A CNO availability for continuous accomplishment of depot maintenance and selected modernization on aircraft carriers. Each carrier operational cycle contains two CIAs.

2. Class Maintenance Plan (CMP). The principal document for executing the approved maintenance program for all ships in a class. The CMP describes all preventive maintenance actions and maintenance support requirements, including material condition assessment requirements, approved modernization, and shipyard routines. The CMP may also include standard repairs required based on commonly expected assessment results.

3. Condition-Based Maintenance (CBM). Maintenance based on objective evidence of actual or predictable failure of ship's installed systems or components.

4. Condition-Directed Preventive Maintenance. A periodic diagnostic test or inspection that compares the existing material condition or performance of an item with established standards and takes further action accordingly. The purpose of condition-directed tasks is to discover a potential failure that can be corrected before actual failure occurs. The fact that such condition-directed tasks are scheduled does not make them time-directed tasks.

5. Continuous Maintenance. A process that involves the near continuous flow of work candidates to the most appropriate maintenance level and maintenance activity for accomplishment.

Continuous Maintenance Availability (CMAV). CMAV is a scheduled availability for surface forces ships normally 2 to 6 weeks in duration and normally scheduled once per non-deployed quarter during a period when the ship is in port.

6. Core Depot Maintenance. The capability maintained within organic Defense depots to meet readiness and sustainability requirements of the weapons systems that support the Joint Chiefs of Staff contingency scenario. Core depot maintenance capabilities will comprise only the minimum facilities, equipment, and skilled personnel necessary to ensure a ready and controlled source of required technical competence. [Reference (m)].

7. Corrective Maintenance. Maintenance actions performed as a result of failure in order to return or restore equipment to acceptable performance levels.

8. Depot-Level Maintenance. Maintenance that requires skills, facilities, or capacities normally beyond those of the organizational and intermediate levels and is performed by select FMAs, private shipyards, original equipment representatives/ authorized agents, or NAVSEASYS COM DOP.

9. Emergent Maintenance. Maintenance conducted with little or no notice to restore a failed mission essential system or component to service. This maintenance is normally related to C-3/4 CASREPs which are defined in Navy Tactics Techniques and Procedures 1-03.3 (Rev. A).

10. Engineered Periodicity. The recommended periodicity for accomplishment of a maintenance action based upon an engineering analysis of all relevant technical maintenance history information, including material condition and performance feedback data.

11. Fleet Maintenance Activity (FMA). FMAs include tenders and shore-based maintenance activities, such as naval submarine support facilities, TRIDENT refit facilities, ship repair facility, naval shipyards and intermediate maintenance facilities, and RMCs. Within the limits of each FMA's personnel and facilities, they perform those maintenance functions on HM&E and combat equipments and systems that are beyond the organizational capability or capacity of a ship.

12. Fleet Maintenance Board of Directors (FMBOD). The principal membership of the FMBOD includes COMUSFLTFORCOM Fleet Maintenance Officer (N43), COMPACFLT Fleet Maintenance Officer (N43), NAVSEA Logistics, Maintenance and Industrial Operations Directorate (NAVSEA (04)), and OPNAV (N43).

13. Integrated Class Maintenance Plan (ICMP). ICMP is a central repository maintained by NAVSEASYS COM that identifies planned organizational-level, intermediate-level, and depot-level maintenance and maintenance support tasks for all surface ships. NAVSEASYS COM manual TL790-AE-PRO-010 (ICMP Procedures Manual) of 7 January 2008 includes specific ICMP and CMP information.

14. Integrated Logistics Support (ILS). ILS consists of various support elements that are required for effective operation, maintenance, and sustainability of systems and equipment.

Traditional ILS elements include design interface; maintenance planning; support equipment; technical data; manpower, personnel and training; packaging, handling, storage and transportation; configuration management; computer resources; and supply support. Proper ILS planning ensures that required ILS elements are resourced and available to effectively support the system or equipment initial operational dates and throughout its life cycle.

15. Intermediate-Level Maintenance. Repair work that exceeds organizational-level capability or capacity but does not require execution by an NSY, private shipyard original equipment representative/authorized agent, or NAVSEASYSKOM DOP.

16. In-Service Support. Management and technical support provided between delivery to operational forces and final disposal. This includes maintenance, systems engineering, technical support, configuration management, test and evaluation, and all aspects of ILS.

17. Life Cycle Management. Management responsibility for a program that encompasses the acquisition program, in service support, and final disposal.

18. Maintenance Program. A maintenance program identifies, by ship class, maintenance actions required to sustain ship safety and required material condition at levels commensurate with expected ship operational tempo through its expected life. The maintenance program is developed by the PEO and COMNAVSEASYSKOM for OPNAV approval. It specifies key elements such as depot-level availability intervals and durations, frequency of CMAVs, and any special maintenance, maintenance support, or infrastructure requirements.

19. Miniature-Microminiature (2M) Module Test and Repair (MTR). The 2M MTR Program provides the repair equipment, tools, documentation, and training for the repair of printed circuit boards and electronic/electrical assemblies.

20. Module Test and Repair (MTR). The MTR Program includes test equipment, training, documentation, and Gold/Silver Disk test procedures to support component level troubleshooting of printed circuit boards and electronic/electrical assemblies.

21. Navy Afloat Maintenance Training Strategy. A program for training Sailors to obtain journeyman mechanic Navy enlisted classification codes.

22. Naval Supervising Activity. Single naval activity [e.g., NSY, RMC, and SRF] charged with the responsibility for oversight of work being accomplished on U.S. Navy ships during any type of availability.

23. Organizational Maintenance. The lowest maintenance level; consists of all maintenance actions within the capability of ship's force.

24. Overseas Maintenance Facilities. Facilities capable of performing maintenance for ships that are deployed or are in a forward-deployed naval force (FDNF) status. Maintenance performed at these facilities must conform with section 7310 of title 10, United States Code, restrictions on the overhaul, repair, etc. of vessels in foreign shipyards.

25. Planned Maintenance System (PMS). PMS is a standardized method for planning, scheduling, and accomplishing preventive maintenance by ship's force. The maintenance procedures used in PMS are the minimum required to maintain equipment and systems in a fully operational condition within specifications. PMS maintenance procedures are developed per RCM concepts and principles. PMS is a major subsystem under the 3-M system.

26. Post-Shakedown Availability (PSA). An availability assigned to newly built, activated, or converted ships upon completion of post-delivery shakedown. Reference (r) provides guidance on the procedures, scheduling, and durations of these availabilities.

27. Preventive Maintenance. Maintenance actions intended to prevent or discover functional failures.

28. Regional Maintenance Center (RMC)

a. RMCs are ship maintenance activities and detachments located in various major fleet concentration areas. RMCs were established to more effectively plan and execute maintenance, modernization, and technical support work in their respective regions. RMCs core support areas are as follows:

(1) In-service engineering and technical support to operational surface ships, carriers and submarines;

(2) Provide waterfront contracts management and oversight of private sector depot-level maintenance and modernization;

(3) Provide project management of surface ships maintenance availabilities; and

(4) Provide oversight of private sector quality assurance program.

b. The Navy's RMCs are located in San Diego, CA; Mayport, FL; Puget Sound/Everett, WA; Pearl Harbor, HI; Yokosuka and Sasebo, Japan; Norfolk, VA; Naples, Italy; and Manama, Bahrain.

c. RMC strategy was implemented to centralize all fleet maintenance, modernization, and technical support activities within a single regional command in the various fleet concentration areas.

29. Reliability-Centered Maintenance (RCM). A method that identifies applicable and effective maintenance tasks needed to maintain safety and the inherent reliability of systems or equipment at minimum cost

30. Scheduled Maintenance Requirements. Those inspection/repair actions essential to keeping the system/equipment in a state of operational readiness commensurate with its design. These actions include inspections, failure finding tasks, and servicing or lubrication tasks that are scheduled on some recurring basis related to equipment age, such as operating time. Scheduled maintenance is identified, depending on ship type, in the CMP, ICMP, and PMS.

31. Time-Directed Maintenance. A task performed at some interval to renew life based on statistical analysis of population wear out regardless of actual condition. This interval may be based on calendar time or the number of recurring events (rounds fired, cycles, starts, stops, etc.). Examples include critical hose replacement or component change out on a calendar basis and battery shelf life replacement. Time-directed tasks are only authorized when RCM analysis shows there is no applicable and effective condition-directed task.

32. Top Management Attention/Top Management Issues (TMA/TMI). The TMA/TMI process is the Navy's priority corrective action process for COMUSFLTFORCOM, FLTCDRs, TYCOMs, SYSCOMs, and OPNAV. Volume VI, chapter 32 of reference (a) explains TMA/TMI applicability, scope, and responsibilities.

33. Voyage Repair (VR) Availability. A maintenance period solely for the accomplishment of corrective maintenance of

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mission- or safety-essential items necessary for a ship to deploy or to continue on its deployment. Repairs accomplished during a VR availability are frequently referred to as VPs.