OPNAV INSTRUCTION 3960.16B

From: Chief of Naval Operations

Subj: NAVY TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT, AUTOMATIC TEST SYSTEMS, AND METROLOGY AND CALIBRATION

Ref: (a) CJCSI 3170.01I
    (b) SECNAVINST 5000.2E
    (c) SECNAVINST 5400.15C
    (d) through (u) - refer to enclosure (1)

Encl: (1) Continuation of References

1. Purpose

   a. To set policy, establish procedures, and assign responsibilities for the execution of the Navy test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration program and supporting information resource management for the Chief of Naval Operations (CNO) to be used in the program objective memorandum planning, programming, budgeting, and execution phases.

   b. This instruction is being reissued with a new date, updated version, and signature authority to meet the CNO age requirement for Office of the Chief of Naval Operations (OPNAV) instructions. This instruction is a complete revision and should be reviewed in its entirety.

2. Cancellation. OPNAVINST 3960.16A.

3. Discussion. The complexity of weapons platforms, systems, and support systems, coupled with significant advances in technology, give importance to the Navy's test, monitoring, and diagnostic capability and the need for improved measurement assurance throughout all phases of the acquisition lifecycle. Optimal use of efficient test and diagnostic capabilities can reduce total ownership costs and improve readiness. Early life cycle development of measurement and calibration performance capability, based on fundamentals of reference (a), is required to deliver technologically sound, sustainable, and affordable diagnostic and measurement systems.

   a. Reference (b) defines CNO and Commandant of the Marine Corps responsibilities for readiness, planning, and programming to satisfy operational capability needs, and for providing
acquisition logistics assistance to Assistant Secretary of the Navy, Research, Development and Acquisition (ASN(RD&A)), as well as all of the specific additional responsibilities listed in reference (c).

b. Test, measurement, and diagnostic equipment and automatic test systems are used to monitor and test systems, equipment, devices, and the environmental conditions under which these systems and personnel operate. The accuracy of Navy and contractor test, measurement, and diagnostic equipment and automatic test systems used for quantitative and qualitative measurements is ensured through measurement traceability.

4. **Scope and Applicability**

a. This instruction applies to all components of the Navy, including Marine Corps aviation units, responsible for research, design, test, acquisition, operation, and logistics support of weapons platforms, weapon systems, and operational and support systems that include test, measurement, and diagnostic equipment, automatic test systems, and metrology and calibration equipment. The Navy test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration programs are applicable to all measurement areas of the physical sciences except radiation detection, indication, and computation devices; the Marine Corps test, measurement, and diagnostic equipment and metrology and calibration; and the automatic test equipment programs.

b. The Director of the Naval Nuclear Propulsion Program (CNO N00N), which is also known as the Naval Sea Systems Command (NAVSEA) Code 08 (Nuclear Propulsion), has responsibility for all matters pertaining to the maintenance, repair, and modification of naval nuclear propulsion plants and associated nuclear support facilities per sections 2406 and 2511 of Title 50, U.S. Code, and Executive Order 12344 of 1 February 1982. Nothing in this instruction supersedes or changes these responsibilities and authorities. Accordingly, NAVSEA Code 08 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. Where differences in requirements occur, those designated by NAVSEA Code 08 take precedence with NAVSEA Code 08 approved documents.

5. **Definitions**

a. **Test, Measurement, and Diagnostic Equipment.** Includes all devices used to measure, calibrate, gage, test, inspect, diagnose, or otherwise examine materials, supplies, and equipment to quantitatively or qualitatively determine compliance with specifications and tolerances, engineering drawings, technical orders, technical manuals, or use requirements and instructions.
b. **Calibration Standard.** A measuring instrument or artifact used as a reference to establish and maintain the accuracy of other measuring instruments or artifacts. Calibration standards may be used to calibrate other standards of lesser accuracy or to calibrate test and measurement equipment directly.

c. **Automatic Test Systems.** A fully-integrated, computer-controlled suite of electronic test equipment and instrumentation hardware, software, documentation, and ancillary items designed to verify at any level of maintenance the functionality of unit under test assemblies. An automatic test system combines the three elements in subparagraphs 5c(1) through 5c(3).

   (1) **Automatic Test Equipment.** An integrated assembly of stimulus, measurement, and switching components under computer-control that is capable of processing software routines designed specifically to test a particular unit under test or group of units under test. Automatic test equipment software includes operating system software, test executive software, and instrument control software.

   (2) **Test Program Set.** Interface hardware that connects the unit under test to the automatic test equipment plus test program software specific to the unit under test with required documentation. The test program set software directs all test functions including fault isolation and diagnostics, and can certify the condition of a unit under test. Test program set hardware consists of an interface device, cables, probes, holding fixtures, and peculiar support equipment or special purpose test equipment.

   (3) **Test Environment.** The test environment includes a description of the automatic test systems architecture; programming and test specification languages; compiler; and development tools and provisions for capturing and using unit under test design requirements and test strategy information in the generation and maintenance of test program set software.

d. **Metrology.** The science related to all theoretical and practical aspects of measurement, including development of standards, systems, and methods for absolute and relative measurements.

e. **Calibration.** The comparison of a measurement system or device of unverified accuracy with a measurement system of known and greater accuracy to detect deviation of the unverified measurement system from required performance specifications (of the unverified measurement system or device) and to quantify all measured values to applicable units of the international system of units.

f. **Calibration Service Providers.** Commercial calibration activities and other government agencies that provide calibration services to the Navy and Marine Corps as a major line of business.
g. **Commercial Service Providers.** Suppliers of Navy test, measurement, and diagnostic equipment, including original equipment manufacturers, who may calibrate their own products but are not engaged in calibration as a major line of business, and other commercial laboratories that provide low volume, model specific, or unique parameter calibration services.

h. **Measurement Traceability.** The property of a measurement result that can be related to a national or international measurement standard through a documented, unbroken chain of calibrations, each with a stated measurement uncertainty. Individual measurement results must be traced through an unbroken chain of calibrations to accepted references, such as: U.S. national standards, the U.S. Naval Observatory, ratio and consensus standards, natural physical constants, or the national standards of other countries correlated with U.S. national standards as held or directed by National Institute of Standards and Technology and Department of Defense (DoD) approved sources.

i. **The End of Period Measurement Reliability.** The probability that all the applicable measurement quantities of a test, measurement, and diagnostic equipment are within tolerance at the end of the calibration interval assigned to the given test, measurement, and diagnostic equipment.

j. **Calibration Interval.** The periodicity between calibrations that is assigned to achieve Navy end of period measurement reliability objectives for test, measurement, and diagnostic equipment.

k. **The Probability of False Acceptance.** The probability that a test used to verify that a measurement quantity is within specified tolerances results in an incorrect acceptance decision.

l. **The Probability of False Rejection.** The probability that a test used to verify that a measurement quantity is within specified tolerances results in an incorrect rejection decision.

m. **The Test Uncertainty Ratio.** The ratio of the difference between the upper and lower tolerance limits for a measurement quantity subject to calibration, to the difference between the upper and lower 95 percent uncertainty limits for the measurement process used for calibration.

n. **The Test Accuracy Ratio.** The ratio of the difference between the accuracy tolerance for a measurement quantity subject to calibration, to the accuracy tolerance of the calibration standard used for calibration.

o. **Measurement Decision Risk.** The probability that an incorrect decision will result from a measurement.

p. **Quantitative Measurement.** A measurement that can be expressed as numeric value associated with a unit of measurement.
q. **Qualitative Measurement.** A measurement that expresses a quality or condition of an observation based on the value of a quantitative measurement. The underlying quantitative measurement may or may not be visible to the user of the qualitative measurement such as would be the case with a measurement parameter represented by an indicator light which illuminates at a threshold value.

r. **Metrology Data Systems.** An integrated database environment that hosts all Navy metrology data, including applications, engineering software tools, and data publication mechanisms.

6. **Policy.** CNO policy is to provide the organizational, intermediate, and depot maintenance levels with diagnostic capabilities to detect, isolate, and correct faults, and to ensure all test, measurement, and diagnostic equipment used for quantitative measurements is maintained and calibrated. Maintenance and calibration must be performed at the maintenance echelon that can best ensure proper accomplishment, taking into consideration applicable laws, urgency, priority, crew impact, capability, capacity, and total ownership cost. CNO policy requirements for Navy and Marine Corps are per subparagraphs 6a through 6ac.

   a. Carry out the policies of references (a) through (c).

   b. Centrally manage policies and processes required for the test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration programs.

   c. Ensure all test, measurement, and diagnostic equipment used for quantitative or qualitative measurements is maintained and calibrated.

   d. Implement a common Navy laboratory certification process using reference (d). All Navy calibration laboratories must be audited for certification at least once every 3 years to ensure compliance with reference (d).

   e. Participate in joint service initiatives of the joint logistics commanders in the areas of test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration through the joint technical coordinating group for calibration and measurement technology.

   f. Use inter-Service support agreements with other Services and agencies to optimize utilization of calibration facilities.

   g. Maintain a research and development program for test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration to address current measurement traceability needs and measurement requirements for emerging technologies.
h. Ensure measurement technology is planned, available, suitable, and effective to support test, measurement, and calibration requirements of all phases of an acquisition. New or improved measurement technology required by an acquisition program will be developed concurrently with reference (c).

i. Invoke reference (e) in all applicable prime systems and equipment development and procurement contracts to ensure metrology and calibration requirements are identified as part of the integrated product support process. These requirements must be identified early in the research, design, and acquisition of all weapon systems and test, measurement, and diagnostic equipment to assure that measurements and related test and calibration decision risks are commensurate with the needs of each phase of an acquisition program per reference (b), and allowing systems commands (SYSCOM) to develop metrology and calibration support prior to initial operating capability.

j. Develop calibration procedures, calibration standard, calibration intervals, support equipment recommendation data or equivalent, and calibration and measurement requirements summary data during the acquisition of weapons platforms, weapon systems, operational systems, and support systems.

k. Minimize the use of peculiar support equipment or special purpose test equipment and maximize the use of common support equipment or approved commercially available or non-developmental, standardized general purpose test equipment.

l. Comply with DoD automatic test systems policy to minimize the life cycle cost of providing automatic test systems for weapon systems support at DoD field, depot, and manufacturing operations, and to promote joint service automatic test systems interoperability by using approved DoD automatic test systems families as the preferred choice to satisfy automatic test systems requirements.

m. Satisfy Navy and Marine Corps factory, depot, and field automatic testing requirements with the consolidated automated support system family of testers, the Navy's approved DoD automatic test systems family. New design automatic test equipment must not be acquired if the requirement can be satisfied by the consolidated automatic support system family of testers. Exceptions to the use of the consolidated automatic support system family of testers require a waiver approved by ASN(RD&A). Requests for waivers must be routed to ASN(RD&A) via the Commander, Naval Air Systems Command (COMNAVAIRSYSCOM) Aviation Support Equipment Program Manager, Air (PMA-260). Waiver requests must document why the consolidated automatic support system family of testers cannot satisfy the weapon system’s automatic testing requirements and include a life cycle cost analysis to address automatic test equipment and its associated test program set development, production, and fielding costs as well as all logistics support costs to sustain the automatic test equipment and its test program sets over the life cycle.
n. Ensure maximum diagnostic compatibility is provided for automatic testing performed from factory to field and between government and industry. The same capabilities should be provided at the intermediate and depot government or commercial maintenance levels that are used to perform factory diagnostics to reduce “cannot duplicate” failure conditions and to allow for the re-use of test programs across all maintenance levels.

o. Ensure that measurement traceability is established to support quantitative or qualitative measurements made throughout the acquisition process per references (c) and (e).

p. Establish an end of period measurement reliability goal for test, measurement, and diagnostic equipment equal to, or greater than, 85 percent. The end of period measurement reliability must be assessed regularly and documented for each test, measurement, and diagnostic equipment model. If end of period measurement reliability of at least 85 percent cannot be achieved, prior to implementation of a reduced end of period measurement reliability, a documented justification for the lesser end of period measurement reliability based on analysis of the measurement decision risk must be provided to the Navy metrology and calibration technical advisor, if necessary, for resolution and approval by the cognizant SYSCOMs metrology and calibration program manager, where applicable, or executive director for Navy metrology and calibration and presented to the cognizant program executive officer or direct reporting program manager for acceptance of the enhanced risk per reference (c). The end of period measurement reliability must in no case be reduced to less than 72 percent.

q. Ensure all measurement processes utilizing test, measurement, and diagnostic equipment are capable of limiting the risk of wrong measurement decisions at each level in the traceability chain for any supported measurement parameter. The risk level for measurement processes must be documented to include the probability of false acceptance and probability of false rejection. Probability of false acceptance must be limited to 2 percent or less. Probability of false rejection impact on total cost and readiness must be considered and must not exceed 15 percent. The aforementioned documentation must be submitted to the Navy metrology and calibration technical advisor if necessary and Navy metrology and calibration executive director for review.

(1) Measurement processes with a documented minimum test uncertainty ratio of 4:1 or greater for each measurement parameter will be deemed to meet this requirement. A test accuracy ratio may be used instead of test uncertainty ratio if approved by SYSCOMs metrology and calibration program manager.

(2) If a probability of false acceptance of 2 percent or less and a probability of false rejection of 15 percent or less cannot be achieved, the test, measurement, and diagnostic equipment design or specifying activity must provide, prior to implementation, a documented justification or mitigation strategy for the deviation to the SYSCOMs and if necessary Navy metrology and calibration technical advisor for resolution and approval by the cognizant
SYSCOMs metrology and calibration program manager, where applicable, or executive director for Navy metrology and calibration and presented to the cognizant program executive officer or direct reporting program manager for acceptance of the enhanced risk per reference (c).

(3) Measurement processes implemented prior to the release of this instruction are exempt from this requirement. However, the use of measurement decision risk as described in this instruction will be applied to these processes at the discretion of the cognizant SYSCOMs metrology and calibration program manager, where applicable, or executive director for Navy metrology and calibration.

r. Ensure that all Navy organic calibration laboratories are included in reference (f) and are uniquely identified.

s. Promote efficiency by controlling capabilities of calibration facilities commensurate with the accuracies required for the assigned workload. Maintain a calibration laboratory and activity hierarchy within the Navy that will ensure traceability to national or international standards and include as a minimum the items contained in subparagraphs 6s(1) through 6s(4).

(1) Navy primary standards laboratory to maintain and disseminate the most accurate units of measurement within the Navy, and provide support to lower echelon calibration laboratories.

(2) Navy calibration laboratories including depot laboratories and regional calibration centers to calibrate and repair calibration standards and test, measurement, and diagnostic equipment from lower echelon calibration laboratories and fleet and shore activities. Navy calibration laboratories must obtain services from Navy primary standards laboratory for assets beyond their capability.

(3) Intermediate laboratories and aviation field calibration activities calibrate and repair calibration standards and test, measurement, and diagnostic equipment within their capability from lower echelon calibration activities and fleet and shore activities. These laboratories must obtain services from Navy primary standards laboratory or Navy calibration laboratories for assets beyond their capability.

(4) Organizational laboratories and non-aviation field calibration activities calibrate test equipment from fleet and shore activities within the capability of their approved phase package and obtain services from Navy primary standards laboratory, Navy calibration laboratories, or intermediate laboratories as required.

t. Maintain laboratory and field calibration activity facilities, per reference (g).
u. Calibrate Navy test, measurement, and diagnostic equipment at Navy calibration laboratories. Where Navy calibration capability is not available, SYSCOMs metrology and calibration program managers may authorize the use of non-Navy laboratories that meet the requirements of this instruction.

v. Require calibration service providers and commercial service providers, who supply or calibrate Navy test, measurement, and diagnostic equipment, to be certified to comply with reference (d) or be accredited to reference (h) or reference (i) by a third party accreditation body approved by the executive director for Navy metrology and calibration.

(1) The laboratory's scope of competency must include the parameters required to execute the calibration at appropriate ranges and tolerances.

(2) A calibration certificate meeting the requirements of reference (h) must be provided with the returned calibrated unit. The calibration certificate must confirm that the calibration was performed within the laboratory’s accreditation scope.

w. Develop and maintain information technology in coordination with Navy information technology enterprise initiatives to support recording and reporting of calibration servicing and inventory data for metrology and calibration program administration and technical analysis.

x. Calibrate test, measurement, and diagnostic equipment per the approved procedures and intervals specified in reference (j) using approved calibration standards identified in reference (k).

y. Use approved labels and tags per reference (l) to identify the calibration status of the equipment.

z. Allow Navy calibration laboratories to calibrate test, measurement, and diagnostic equipment belonging to Navy contractors on an actual cost basis when capability and adequate capacity is available.

aa. Maintain a metrology and calibration training program for personnel performing calibration and repair of test, measurement, and diagnostic equipment.

ab. Minimize hazardous material in the test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration program.

ac. Require calibration of built-in-test, built-in-test equipment, and embedded sensors where the quantitative measurement(s) being made is (are) critical to personnel safety, reliability of prime system operation, or diagnostics being conducted for maintenance purposes.
7. Actions and Responsibilities

a. Deputy Chief of Naval Operations, Integration of Capabilities and Resources (CNO N8)

(1) Develop policy and implement and monitor the test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration program. All OPNAV directives pertaining to test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration must be submitted to OPNAV, Director, Fleet Readiness Division (OPNAV N83), for review. References (m) through (o) must be reviewed for impact on test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration policy.

(2) Designate Commander, Naval Sea Systems Command (COMNAVSEASYSCOM), Industrial Operations Directorate (NAVSEA Code 04) as the Navy test and monitoring systems executive director for Navy metrology and calibration test and monitoring system executive director.

(3) Establish and charter an OPNAV N83 approved and authorized test and monitoring system executive board, chaired by the executive director. The chairperson serves as the single point of contact in the Navy for the metrology and calibration program.

(4) Support and serve as requirements and resource sponsor for:

(a) test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration for systems and activities under their management and associated automated information systems; and

(b) Navy research and development and procurement of automatic test equipment – Deputy Chief of Naval Operations, Warfare Systems (CNO N9), and metrology and calibration OPNAV N83 lead.

(5) Implement test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration requirements into integration of capabilities and resourcing processes. Ensure that the calibration joint capability area is addressed during the Department of the Navy (DON) requirements and acquisition, two-pass with six gate process of reference (b).

b. COMNAVAIRSYS COM; COMNAVSEASYSCOM; Commander, Space and Naval Warfare Systems Command (COMSPAWARCOM); and Director, Strategic Systems Programs (DIRSSP)

(1) Provide senior representatives to the test and monitoring system executive board.
(2) Provide technical and administrative support to the test and monitoring system executive board.

(3) Establish, procure, and maintain test, measurement, and diagnostic equipment allowances required to support assigned missions are in reference (p).

(4) Provide guidance to acquisition managers regarding compliance with test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration acquisition, selection, and lifecycle support requirements.

(5) Coordinate requests for establishment and disestablishment of calibration laboratories and activities with the executive director for Navy metrology and calibration.

(6) Authorize use of non-Navy laboratories meeting the requirements of this instruction.

(7) Establish calibration laboratory and field calibration activity operational process review procedures and manage cognizant calibration laboratories and field calibration activities. Ensure cognizant calibration facilities are in compliance with reference (d).

(8) Budget and fund for procurement of calibration standards and required integrated product support, to include calibration procedures, calibration intervals, support equipment recommendation data or equivalent, and calibration and measurement requirements summary data during the acquisition of weapons platforms, weapon systems, operational systems, and support systems.

(9) Review test, measurement, and diagnostic equipment excesses and re-distribute test, measurement, and diagnostic equipment to fill deficiencies prior to initiating additional procurement.

(10) Develop and maintain adequate training programs for personnel.

(11) Provide test, measurement, and diagnostic equipment inventory and calibration data to the Navy metrology and calibration central database on a semi-annual basis.

(12) Participate in joint logistics commanders’ projects as required.

(13) Submit all Navy general purpose electronic test equipment acquisition requirements to COMNAVSEASYSCOM for review against test, measurement, and diagnostic equipment index.

(14) Submit waivers for the use of any automatic test systems other than the consolidated automatic support system family of testers to ASN(RD&A) via COMNAVAIRSYSCOM PMA-260.
(15) Implement and enforce policy and processes for their metrology and calibration programs, in coordination with the Navy metrology and calibration executive director where cross-SYSCOMs policies and process are involved.

(16) Conduct engineering review and approval of measurement decision risk variance from this instruction.

(17) Coordinate with the Navy metrology and calibration executive director to obtain requirements and resources during the program objective memorandum cycle for the centrally funded functions.

c. COMNAVAIRSYSCOM

(1) Serve as both the Navy's lead for automatic test systems (COMNAVAIRSYSCOM PMA-260) and as the DoD automatic test systems executive directorate (COMNAVAIRSYSCOM PMA-260).

(2) Serve as Navy program manager for the metrology automated system for uniform recall and reporting metrology automated information system for Navy use and update reference (q).

(3) Coordinate the review and approval of all Navy waivers for the use of automatic test systems other than the consolidated automatic support system family of testers through COMNAVAIRSYSCOM PMA-260.

(4) Budget and fund for initial outfitting of general purpose electronic test equipment for aviation activities and execute all general purpose electronic test equipment requirements and procurements through the COMNAVSEASYSCOM test, measurement, and diagnostic equipment program.

(5) Budget and fund for the calibration of aviation test, measurement, and diagnostic equipment beyond the capability of the fleet.

(6) Manage the Navy primary standards lab.

(7) Manage and update as required the support equipment resources management information system program.

(8) Provide functional requirement for the Navy metrology and calibration central database to COMNAVSEASYSCOM and OPNAV N83.
d. **COMNAVSEASYSCOM**

1. Serve as the executive director for Navy metrology and calibration.

2. Serve as the Navywide acquisition manager for general purpose electronic test equipment to standardize general purpose electronic test equipment across both aviation and non-aviation fleet activities and to identify suitable replacements for general purpose electronic test equipment determined to be obsolescent. Ensure appropriate integrated logistics support and calibration support is established for new general purpose electronic test equipment items. Coordinate, prioritize, and execute planned general purpose electronic test equipment requirements for procurement. Procure general purpose electronic test equipment for the fleet modernization programs with funding to be provided by the cognizant program executive officer or ship program manager.

3. Manage the ships and shore portable electrical and electronic test equipment requirements list.

4. Serve as Navy program manager for the metrology benchtop calibration management system automated information system for Navy use and update references (p) and (r).

5. Provide functional requirement for the Navy metrology and calibration central database to COMNAVAIRSYSCOM and OPNAV N83.

6. Charter the test and monitoring system executive board and ensure central funding requirements aligned with assigned duties are developed and submitted per established DON policies.

e. **Commander, Naval Supply Systems Command**

1. Procure test, measurement, and diagnostic equipment in support of SYSCOMs and DIRSSP requirements.

2. Procure or develop required supply support for test, measurement, and diagnostic equipment as specified by the SYSCOMs or DIRSSP.

3. Include test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration subject matter experts on independent logistics assessments teams to review the implementation of all calibration and test equipment requirements associated with the execution of reference (s) requirements. Metrology and calibration independent logistics assessments findings and observations must not be modified without concurrence from the appropriate SYSCOMs metrology and calibration program manager, where appropriate, or the executive director for Navy metrology and calibration.
f. **DIRSSP**

(1) Establish, implement, and maintain a support and test equipment control system to ensure the availability and support of test, measurement, and diagnostic equipment used onboard *Ohio* class submarines and DIRSSP cognizant activities, per reference (m).

(2) Provide a senior representative to the test and monitoring system executive board.

(3) Budget and fund for *Ohio* class submarines test, measurement, and diagnostic equipment calibration and repair.

g. **U.S. Fleet Forces Command (USFLTFORCOM) and Commander, U.S. Pacific Fleet (COMPACFLT)**

(1) Provide a senior representative to the test and monitoring system executive board (USFLTFORCOM and COMPACFLT).

(2) Budget and fund for the calibration and repair of their test, measurement, and diagnostic equipment, including calibration standards, with the exceptions listed in subparagraphs 7g(2)(a) and 7g(2)(b).

(a) COMNAVAIRSYSCOM must fund for calibration of fleet aviation test, measurement, and diagnostic equipment individual material readiness list equipment, and calibration and repair of calibration standards beyond the calibration capability of the fleet.

(b) DIRSSP will fund for *Ohio* class submarines test, measurement, and diagnostic equipment calibration and repair.

(3) Budget and fund for replacement of general purpose electronic test equipment that is either beyond economical repair or obsolete.

(4) Verify test, measurement, and diagnostic equipment allowances and submit change requests to the test, measurement, and diagnostic equipment program manager for the appropriate SYSCOMs or DIRSSP.

(5) Inventory test, measurement, and diagnostic equipment and report the inventory to the Navy configuration databases (i.e., the ship configuration and logistics support information system for non-aviation activities, and support equipment resources management information system for aviation activities).

(6) Redistribute excess test, measurement, and diagnostic equipment as follows: aviation activities; COMPACFLT activities; and *Ohio* class submarine activities must follow the
guidance of their respective SYSCOMs. COMNAVAIRSYSCOM activities will coordinate with their type command’s consolidated test, measurement, and diagnostic equipment readiness assessment program manager.

(7) Coordinate a periodic review of their laboratories and ensure the laboratories comply with the policies of this instruction and the applicable SYSCOMs instruction. Fund certification audits of non-aviation afloat and ashore field calibration activities and shore laboratories.

(8) Manage calibration laboratories and ensure adherence to standards under the policy of this instruction and technical guidance provided by the appropriate SYSCOMs. Provide properly trained personnel to authorize calibration activities for test, measurement, and diagnostic equipment repair and calibration.

(9) Use existing Navy calibration laboratories resources to the maximum extent possible. Submit all requests for non-Navy calibration support, and proposals for establishment or major changes to Navy calibration laboratories and field calibration activities to the appropriate SYSCOMs metrology and calibration program manager via the chain of command.

(10) Calibrate test, measurement, and diagnostic equipment per the procedures and calibration intervals specified in reference (j).

(11) Obtain calibration services from Navy metrology and calibration authorized laboratories.

(12) Use the approved CNO automated information system to report metrology and calibration transaction and recall data.

h. Chief, Bureau of Medicine and Surgery

(1) Establish, procure, and maintain test, measurement, and diagnostic equipment allowances required to support assigned missions.

(2) Budget and fund for test, measurement, and diagnostic equipment including calibration standards and associated integrated product support required supporting assigned missions. Procure common test equipment through the Navy general purpose electronic test equipment acquisition manager, COMNAVSEASYSCOM.

(3) Use existing Navy calibration laboratory resources to the maximum extent possible. Submit all requests for non-Navy calibration support and proposals for establishment or major changes to Navy calibration laboratories to the appropriate SYSCOMs metrology and calibration program manager via the chain of command.
(4) Calibrate test, measurement, and diagnostic equipment per the procedures and calibration intervals specified in reference (j).

(5) Obtain calibration services from Navy metrology and calibration authorized laboratories.

(6) Utilize CNO approved Navy database systems to maintain test, measurement, and diagnostic equipment inventory and metrology and calibration transactions.

(7) Perform test, measurement, and diagnostic equipment inventories and report the inventory to the Navy configuration database.

i. **Program Executive Officers, Program Managers, Direct Reporting Program Managers**

   (1) Plan, budget, and support the CNO policy for programmatic integration of the metrology and calibration program starting at the material solution analysis phase of the acquisition process, early-on integration into the integrated product team for systems engineering reference (c), and for periodic review of the calibration and measurement requirements summary report reference (e).

   (2) In conjunction with supporting SYSCOMs or DIRSSP, establish the test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration requirements for their systems.

   (3) Minimize the use of peculiar support equipment or special purpose test equipment and maximize the use of approved commercially available and non-developmental, standardized general purpose test equipment. If requirements cannot be met by general purpose test equipment, submit both calibration and measurement requirements summary and waiver request for peculiar support equipment and special purpose support equipment to the cognizant SYSCOMs, DIRSSP manager, or Navy metrology and calibration executive director.

      (a) Fund research and development, procurement, and integrated product support of peculiar support equipment and special purpose test equipment.

      (b) Coordinate research and development requirements with the Navy metrology and calibration research and development program manager and measurement science department, naval surface warfare center, corona division.

   (4) Fund for procurement of test, measurement, and diagnostic equipment; automatic test systems; metrology and calibration; and other integrated product support elements per references (b) and (c). Coordinate with and follow the procedures of the appropriate SYSCOMs or DIRSSP with respect to the selection, procurement, and integrated product support of test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration.
(5) Obtain calibration services from Navy metrology and calibration authorized laboratories.

j. Commanding Officer, Naval Surface Warfare Center, Corona Division

(1) Serve as scientific and technical advisor for the Navy metrology and calibration program.

(2) Support the Navy's acquisition, research and development, test and evaluation to ensure the calibration requirements are identified and measurement capability and calibration standards are properly planned, implemented, and supported.

(3) Provide centralized management and coordination to advance the state-of-the-art in metrology and calibration to keep pace with advancements in weapons and test equipment technology and measurement requirements as tasked by the appropriate SYSCOMs or program office.

(4) Develop and evaluate calibration standards specifications and standards as tasked by SYSCOMs and program offices.

(5) Represent the Navy on the joint logistics commanders joint technical coordinating group for calibration and measurement technology as required by the Navy test and monitoring system executive board chairperson.

(6) Develop and maintain Navy calibration facility requirements, reference (g), for laboratories. COMNAVAIRSYSCOM, COMNAVSEASYSCOM, and DIRSSP must approve the documents prior to release.

(7) Maintain the metrology requirements list, reference (j), and the Navy calibration equipment list, reference (k).

(8) Assign and maintain Navy laboratory codes as approved by SYSCOMs metrology and calibration program managers and maintain reference (f).

(9) Maintain approved calibration procedures and metrology and calibration documentation for use at all Navy laboratories and field calibration activities except for Navy primary standards laboratory primary measurement systems.

(10) Establish and adjust calibration intervals for all DON test, measurement, and diagnostic equipment per references (t) and (u), except for:
(a) specific shipboard installed instrumentation assigned to Naval Surface Warfare Center, Philadelphia, by the COMNAVSEASYSCOM metrology and calibration program manager;

(b) Navy primary standards laboratory primary measurement systems; and

(c) higher technical authority as designated by SYSCOMs program manager.

(11) Approve specifications for calibration labels and tags. Update and maintain references (l) and (u).

(12) Execute the Navy's metrology and calibration research and development program as directed by the metrology and calibration research and development program manager.

(13) Coordinate the technical content of metrology and calibration training with appropriate curriculum development authorities to ensure the needs of the Navy metrology and calibration program are met.

(14) Identify to Navy primary standards laboratory all test, measurement, and diagnostic equipment measurement requirements necessitating Navy primary standards laboratory support to enable proper planning of Navy primary standards laboratory primary measurement capabilities per reference (u).

(15) Manage the joint naval audit and certification program.

(16) Review calibration and measurement requirements summary data and documentation as tasked by SYSCOMs and program offices.

(17) Execute technical authority delegated from COMNAVSEASYSCOM metrology and calibration technical warrant holder.

k. NAVSEA Code 04

(1) Establish and charter an OPNAV N83 approved and authorized test and monitoring system executive board, chaired by the executive director. The chairperson serves as the single point of contact in the Navy for the metrology and calibration program.

(2) Delegate the system commands to chair the test and monitoring system executive board which must rotate every 3 years between COMNAVAIRSYSCOM, COMNAVSEASYSCOM, COMSPAWARCOM, and DIRSSP. Serve as requirements and resource sponsor for the test and monitoring system executive board resources.
(3) Provide technical, management oversight and coordination of common test, measurement, and diagnostic equipment; automatic test systems; metrology and calibration functions within the Navy metrology; and calibration program including Marine Corps aviation units, and may invite senior representatives from other commands as desired and participate in joint service initiatives.

(4) Provide advocacy to resource sponsors for test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration programs through the cognizant SYSCOMs.

(5) Maintain a registry of Navy approved calibration laboratory accreditation bodies and non-Navy calibration laboratory certified to reference (d).

(6) Ensure central funding requirements aligned with assigned duties are developed and submitted per established DON policies.

(7) Chair the test and monitoring system executive board, balancing enterprise benefits with program component requirements, and ensuring rapid responsiveness to fleet demand signals.

(8) Serve as Navy office of primary responsibility to the joint logistics commanders on matters pertaining to Navy metrology and calibration.

(9) Provide the Navy representative to the joint logistics commanders’ joint technical coordinating group for calibration and measurement technology.

(10) Provide oversight and advocacy to the Navy metrology and calibration research and development program.

(11) Submit a written report on the status of the Navy test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration program to OPNAV N83 semi-annually.

(12) Approve requests for establishment and disestablishment of calibration laboratories and activities.

(13) Promote metrology infrastructure optimization, including laboratory modernization, equipment renewal, and research and development elements.

(14) Develop, promote, and implement a Navy metrology and calibration strategic plan with SYSCOMs for OPNAV N83 approval on an annual basis.
(15) Maintain the Navy metrology and calibration central database with cognizant SYSCOMs.

(16) Provide oversight and advocacy for the joint naval audit and certification program.

(17) Approve third party accreditation bodies that are authorized to accredit calibration service provider and commercial service provider laboratories to the requirements of reference (h) or reference (i), as appropriate.

(18) Comply with the policies of this instruction.

1. **Test and Monitoring System Executive Board**

   (1) Function as executive steering committee and board of directors for the test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration program.

   (2) Consist of senior representatives from COMNAVAIRSYSCOM; COMNAVSEASYSCOM; COMSPAWARCOM; DIRSSP; USFLTFORCOM; COMPACFLT; Headquarters, Marine Corps (HQMC).

   (3) Provide corporate overview and guidance for the Navy test, measurement, and diagnostic equipment; automatic test systems; and metrology and calibration programs including policy, procedures, processes, instructions, standards, and guidance for procurement, operations, and maintenance within OPNAV N83 policy guidelines.

   (4) Establish and task standing committees and working groups to review functional areas for process improvements and to improve quality or reduce cost of operation.

   (5) Review proposals for shared program resources and recommend appropriate SYSCOMs funding.

   (6) Provide technical direction and manage the execution of joint naval audit and certification program to ensure established policies are met and Navy calibration laboratories and Navy primary standards laboratory operate in compliance with reference (d).

m. **Commands and SYSCOMs Managing or Using Navy Test, Measurement, and Diagnostic Equipment, Automatic Test Systems, and Metrology and Calibration**

   (1) Issue implementing instructions as required.

   (2) Submit waivers for non-consolidated automatic support system family of testers to ASN(RD&A) via COMNAVAIRSYSCOM and waivers for remaining test, measurement, and
diagnostic equipment policy requirements to COMNAVAIRSYSCom, COMNAVSEASYSCOM, COMSPAWARCOM, DIRSSP, and HQMC, as appropriate.

(3) Obtain calibration services from Navy metrology and calibration authorized laboratories and field calibration activities.

(4) Comply with the policies of this instruction.

8. Records Management. Records created as a result of this instruction, regardless of media and format, must be managed per Secretary of the Navy Manual 5210.1 of January 2012.

9. Review and Effective Date. Per OPNAVINST 5215.17A, CNO N8 will review this instruction annually on the anniversary of its issuance date to ensure applicability, currency, and consistency with Federal, DoD, Secretary of the Navy, and Navy policy and statutory authority using OPNAV 5215/40. This instruction will be in effect for 5 years, unless revised or cancelled in the interim, and will be reissued by the 5-year anniversary date if it is still required, unless it meets one of the exceptions in OPNAVINST 5215.17A, paragraph 9. If the instruction is no longer required, it will be processed for cancellation as soon as the need for cancellation is known following the guidance in OPNAV Manual 5215.1 of May 2016.

Releasability and distribution:
This instruction is cleared for public release and is available electronically only via Department of the Navy Issuances Web site, http://donidocumentservices.dla.mil/
CONTINUATION OF REFERENCES

(d) NAVAIR 17-35QAC-01B, NAVSEA 04-4734B, USMC TI-4733-35/23B, Navy and Marine Corps Calibration Laboratory Audit/Certification Manual, 1 Dec 2006*
(e) MIL STD-1839D, DoD Standard Practice – Calibration and Measurement Requirements, 12 May 2010
(f) NAVAIR 17-35 NCA-l, NAVSEA ST700-AA-LST-010/NCA, Navy Calibration Activity List (NCA) (updated monthly or more frequently as necessary)*
(g) NAVAIR 17-35FR-06, Facility Requirements for Navy and Marine Corps Calibration Laboratories, 1 Jun 2003*
(i) ANSI/NCSL Z540.3 Requirements for the Calibration of Measuring and Test Equipment, 3 Aug 2006
(j) NAVAIR 17-35MTL-l, NAVSEA OD 45845, USMC TI-4733-15/13 Metrology Requirements List (METRL) (updated monthly or more frequently as necessary)*
(k) NAVAIR 17-35NCE-l, NAVSEA OD 48939, USMC TI-4733-45/16, Navy Calibration Equipment List, 10 April 2016*
(l) NAVAIR 17-35TR-05 / OD 58483 Technical Requirements for Calibration Interval Establishment for Test and Monitoring System, 31 May 1992*
(m) OPNAVINST 4700.7L
(n) OPNAVINST 4000.57G
(o) OPNAVINST 4790.2J
(p) NAVSEA ST100-AG-IDX-010 Test, Measurement Diagnostics Equipment Index (updated monthly or more frequently as necessary)*
(r) S0750-AC-MAN-010 METBENCH, Calibration Management System; Volume 1, User’s Manual, 9 Sep 2016*
(s) SECNAVINST 4105.1C
(t) OD 58483/NAVAIR 17-35TR-05 Technical Requirements for Calibration Interval Establishment for Test and Monitoring System, 31 May 1992*
(u) NAVAIR 17-35TR-06, Technical Requirements for Technical Review of Calibration Intervals, 1 Jan 1996*

(*) Indicated reference is under review.