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OPNAV INSTRUCTION 3960.16C

From: Chief of Naval Operations

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

Ref: (a) CJCSI 5123.01
(b) SECNAVINST 5000.2G
(c) SECNAVINST 5400.15D
(d) through (z) – refer to enclosure (1)

Encl: (1) Continuation of References
(2) Definitions

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 programs 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 3960.16B.

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)).

b. Reference (c) outlines specific additional responsibilities for program executive offices and direct report program managers and requires each to work with the systems commands (SYSCOMs) to ensure that technical authority processes are an integral part of their program execution and that acquisition and sustainment issues pertaining to supportability of their systems are coordinated and addressed throughout the entire life cycle. Direct report program manager, strategic systems program has the full responsibility, accountability and authority for a cradle to grave program management of the Navy's strategic weapon systems.

c. 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, development, 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. Marine Corps ground test, measurement and diagnostic equipment; metrology and calibration; and automatic test equipment programs are outside the scope of this instruction.

b. The Director of the Naval Nuclear Propulsion Program, which is also known as the Naval Sea Systems Command (NAVSEA) Nuclear Propulsion (Code 08), 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. NAVSEA Code 08 will be consulted in 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. Nothing in this instruction supersedes or changes these responsibilities and authorities.

5. Policy. 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 5a through 5ab.

- 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. 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.
- d. Participate in joint service initiatives in the areas of test, measurement and diagnostic equipment; automatic test systems; and metrology and calibration through the joint technical coordination group for calibration and measurement technology.
- e. 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 per reference (c). Product support, lifecycle management and sustainment planning is evaluated during the independent logistics assessment process per reference (d).
- f. 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 reference (f) to enable SYSCOMs to develop metrology and calibration support prior to initial operating capability.
- g. 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.
- h. Maximize the use of common support equipment or approved commercially available or non-developmental, standardized general purpose test equipment. Minimize the use of peculiar support equipment or special purpose test equipment, especially during the research, development, test and evaluation and acquisition phases.

- i. 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.
- j. 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.
- k. 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.
- l. Ensure that measurement traceability is established to support quantitative or qualitative measurements made throughout the acquisition process per references (c) and (e).
- m. Minimize hazardous material in test, measurement and diagnostic equipment; automatic test systems; and metrology and calibration per references (b) and (g).
- n. 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 operations demand, an end of period reliability less than 85 percent may be established but only after documenting the measurement decision risk and establishing a mitigation strategy. The end of period measurement reliability must in no case be reduced to less than 72 percent.
- o. 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. 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.

(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) 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 Navy test and monitoring systems executive director.

p. Calibrate and maintain test, measurement and diagnostic equipment used for quantitative or qualitative measurements per the approved procedures and intervals specified in reference (h) using approved calibration standards identified in reference (i).

q. Calibrate 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.

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

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

t. Calibrate Navy test, measurement and diagnostic equipment at Navy calibration laboratories. Where Navy calibration capability is not available, SYSCOMs and Director Strategic Systems Programs (DIRSSP) metrology and calibration program managers may authorize the use of non-Navy laboratories that meet the requirements of this instruction.

u. Use support agreements with other Services and agencies to optimize utilization of calibration facility infrastructure.

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

w. Promote efficiency by controlling capacity and capabilities of calibration facilities commensurate with the accuracies required. 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 5w(1) through 5w(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.

x. Maintain laboratory and field calibration activity facilities, per reference (l).

y. Execute a common Navy laboratory certification process to ensure established policies are met and Navy calibration laboratories and Navy primary standards laboratory operate in compliance with reference (m). All Navy calibration laboratories must be audited for certification at least once every 3 years to ensure compliance with reference (m).

z. Require calibration service providers and commercial service providers, who supply or calibrate Navy, or any test, measurement and diagnostic equipment used in the production, testing or maintenance of Navy systems and equipment must be certified to comply with reference (m) or be accredited to reference (n) or reference (o) by a third party accreditation body approved by the Navy test and monitoring systems executive director.

(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 (n) must be provided with the returned calibrated unit. The calibration certificate must confirm that the calibration was performed within the laboratory's accreditation scope.

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

ab. 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 administration and technical analysis of metrology and calibration programs.

6. Responsibilities.

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

(1) Develop policy and monitor the test, measurement and diagnostic equipment; automatic test systems; and metrology and calibration programs. 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 (p), (q) and (r) 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) as the Navy test and monitoring systems executive director. The executive director serves as the single point of contact in the Navy for metrology and calibration programs.

(3) Monitor an OPNAV N83 approved and authorized test and monitoring system executive board, chaired by the Navy test and monitoring systems executive director.

(4) Support and serve as operations and maintenance; research, development, test and evaluation; and procurement requirements and resource sponsor for test, measurement and diagnostic equipment; automatic test systems; metrology and calibration; and associated information systems.

(5) Implement test, measurement and diagnostic equipment; automatic test systems; and metrology and calibration 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 seven gate process of reference (b).

b. Deputy Chief of Naval Operations, Warfare Systems (CNO N9) and Deputy Chief of Naval Operations for Fleet Readiness and Logistics (CNO N4) will support and serve as resource sponsor for test, measurement and diagnostic equipment; automatic test systems; and metrology and calibration operations and maintenance; research, development, test and evaluation; procurement; and associated automated information systems.

c. COMNAVAIRSYSCOM, COMNAVSEASYSYSCOM, Commander, Naval Information Warfare Systems Command (COMNAVWARSYSCOM) and DIRSSP will:

(1) Implement and execute engineering, technical authority and certification authority policy for metrology within cognizant technical domains per reference (c).

(2) Provide senior representatives to the test and monitoring systems executive board.

(3) Provide technical and administrative support to the test and monitoring systems executive board.

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

(5) 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.

(6) 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(t) 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 Navy test and monitoring systems executive director.

(7) Prior to implementation of an end of period measurement reliability below 85 percent ensure a justification for the lesser end of period measurement reliability is documented on the basis of measurement decision risk and submit to the metrology and calibration technical advisor for review then approval by the SYSCOM metrology and calibration program manager in coordination with cognizant Program Executive Officer (PEO), Program Manager Office (PMA), Direct Reporting Program Manager.

(8) Ensure the risk level for measurement processes are documented to include the probability of false acceptance and probability of false rejection.

(9) Minimize hazardous material in the test, measurement and diagnostic equipment; automatic test systems; and metrology and calibration programs per references (b) and (g).

(10) Coordinate requests for establishment and disestablishment of calibration laboratories and activities with the Navy test and monitoring systems executive director. Authorize use of non-Navy laboratories meeting the requirements of this instruction.

(11) Establish calibration laboratory and field calibration activity operational process review procedures and manage cognizant calibration laboratories and field calibration activities. Provide technical direction and manage the execution of joint naval audit and certification program within the SYSCOMs to ensure cognizant calibration facilities are in compliance with reference (m).

(12) Budget and fund for procurement of calibration standards and required integrated product support, to include calibration standard support equipment recommendation data, calibration procedures, calibration intervals. Coordinate 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 with program executive offices, program managers and direct reporting program managers.

(13) Budget and fund for initial outfitting of general purpose electronic test equipment for aviation and non-aviation activities and execute all general purpose electronic test equipment requirements and procurements through the COMNAVSEASYS COM test, measurement and diagnostic equipment program. Submit all Navy general purpose electronic test equipment acquisition requirements to COMNAVSEASYS COM for review against test, measurement and diagnostic equipment index.

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

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

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

(17) Participate in joint technical coordination group projects as required.

(18) 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 COMNAV AIRSYS COM PMA-260.

(19) Implement and enforce policy and processes for their metrology and calibration programs, in coordination with the Navy test and monitoring systems executive director where cross-SYSCOMs policies and process are involved.

(20) 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.

d. COMNAVAIRSYSCOM will:

(1) Serve as both the Navy's lead for automatic test systems (COMNAVAIRSYSCOM PMA260) and as the Navy's representative to the DoD Automatic Test System (ATS) Management Board (AMB) executive directorate functions (COMNAVAIRSYSCOM PMA260).

(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 (u).

(3) Coordinate the review and routing of all Navy waivers, reference (v), for the use of automatic test systems other than the Consolidated Automated Support System family of testers through COMNAVAIRSYSCOM PMA260.

(4) Maximize, at proper and suitable scope, weapons systems' testing compatibility for automated test from factory original equipment manufacturer (OEM) to field and between Government and industry. Provide the ability to capitalize similar OEM weapons systems' testing capabilities at Government or commercial Intermediate and Depot maintenance levels or both to maximize ATS, test program investment(s) for re-use across all maintenance levels.

(5) Maintain Navy automatic test system policy in reference (w) (COMNAVAIRSYSCOM PMA260).

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

(7) Manage the Navy primary standards lab.

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

(9) Provide functional requirements and calibration inventory and production data for the Navy metrology and calibration central database to COMNAVSEASYSYSCOM and OPNAV N4.

e. COMNAVSEASYSYSCOM will:

(1) Serve as the Navy test and monitoring systems executive director.

(2) Serve as the Navy wide 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. Budget and fund for replacement of general purpose electronic test equipment that is either beyond economical repair or obsolete.

(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 (s) and (x).

(5) Provide functional requirement and calibration inventory and production data for the Navy metrology and calibration central database to COMNAVAIRSYSCOM and OPNAV N4.

(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.

f. Commander, Naval Supply Systems Command (COMNAVSUPSYSCOM) will:

(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 (t) 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 Navy test and monitoring systems executive director.

g. DIRSSP will:

(1) Coordinate with COMNAVSEASYSYSCOM to maintain assigned systems and associated equipment in the highest state of material condition for the Navy's strategic weapon systems. 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

the ballistic missile submarines, associated strategic weapons systems and DIRSSP cognizant activities, per reference (q).

(2) Budget and fund for test, measurement and diagnostic equipment calibration and repair of the ballistic missile submarines, associated strategic weapons systems and DIRSSP cognizant activities.

h. U.S. Fleet Forces Command (USFLTCOM) and Commander, U.S. Pacific Fleet (COMPACFLT) will:

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

(2) Budget and fund for the calibration and repair of their test, measurement and diagnostic equipment, with the exceptions listed in subparagraphs 6g(2)(a) and 6g(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 test, measurement and diagnostic equipment calibration and repair of ballistic missile submarines, associated strategic weapons systems and DIRSSP cognizant activities.

(3) Verify and maintain 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.

(4) Inventory test, measurement and diagnostic equipment and report the inventory to the Navy configuration databases.

(5) Redistribute excess test, measurement and diagnostic equipment.

(6) Coordinate a periodic review of organizational and intermediate maintenance level 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.

(7) Manage organizational and intermediate maintenance level 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.

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

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

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

i. Chief, Bureau of Medicine and Surgery (BUMED) will:

(1) Establish and maintain test, measurement and diagnostic equipment allowances.

(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, COMNAVSEASYSKOM.

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

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

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

j. Program Executive Officers, Program Managers, Direct Reporting Program Managers will:

(1) In conjunction with supporting SYSCOMs or DIRSSP, establish the test, measurement and diagnostic equipment; automatic test systems; and metrology and calibration requirements per references (c) and (e) for their systems. Execute life cycle management and

sustainment to ensure measurement technology is planned, available, suitable and effective to support test, measurement and calibration requirements of all phases of an acquisition per reference (c).

(2) Identify Navy test and monitoring systems requirements early. Plan, budget and fund to support SECNAV policy for program integration of life cycle support and systems engineering requirements starting at the program inception phase per references (b) and (c). The metrology and calibration requirements are documented in reference (e).

(3) Coordinate with the Navy metrology and calibration technical advisor and SYSCOM metrology and calibration program manager when new or improved measurement technology is required by an acquisition program. Develop product support per reference (c).

(4) 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 test and monitoring systems executive director.

(5) 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 SYSCOM metrology and calibration program manager for review.

(6) Minimize hazardous material in the test, measurement and diagnostic equipment; automatic test systems; and metrology and calibration programs per references (b) and (g).

(7) Fund for procurement of test, measurement and diagnostic equipment; automatic test systems; metrology and calibration; and the required integrated product support elements per references (b) and (c). Coordinate with the appropriate SYSCOMs or DIRSSP with respect to the selection, procurement and integrated product support of Navy test and monitoring systems. Fund research and development, procurement and integrated product support of peculiar support equipment and special purpose test equipment.

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

k. Commanding Officer, Naval Surface Warfare Center, Corona Division will:

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

(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 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) Review justification for reduced end of period measurement reliability and provide to SYSCOM metrology and calibration program manager for approval.

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

(6) Represent the Navy on the joint technical coordination group for calibration and measurement technology as required by the Navy test and monitoring systems executive director.

(7) Develop and maintain Navy calibration facility requirements, reference (l), for laboratories. Navy test and monitoring systems executive board representatives for COMNAVAIRSYSCOM, COMNAVSEASYSYSCOM and DIRSSP will review and approve changes to the document prior to release.

(8) Maintain the metrology requirements list, reference (h) and the Navy calibration equipment list, reference (i).

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

(10) 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.

(11) Establish and adjust calibration intervals for all DON test, measurement and diagnostic equipment per references (y) and (z), except for.

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

(b) Higher technical authority as designated by SYSCOMs program manager.

(12) Approve specifications for calibration labels and tags. Update and maintain references (j).

(13) Execute the Navy's metrology and calibration research and development program as directed by the Navy test and monitoring systems executive director.

(14) Provide technical support for metrology and calibration training to SYSCOMs and appropriate curriculum development authorities.

(15) Coordinate with COMNAVAIRSYSCOM to identify new test, measurement and diagnostic equipment measurement requirements necessitating Navy primary standards laboratory support to enable proper planning of Navy primary standards laboratory measurement capabilities per reference (z).

(16) Provide technical support for the joint naval audit and certification program.

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

I. Navy Test and Monitoring Systems Executive Director will:

(1) Establish and charter an OPNAV N83 approved and authorized test and monitoring system executive board. The executive director serves as the single point of contact in the Navy for general administration and coordination of Navy metrology and calibration programs and outreach to other departments and government agencies.

(2) Administer process for rotating assignment of chairperson for the test and monitoring system executive board no less than once every 3 years between COMNAVAIRSYSCOM, COMNAVSEASYSYSCOM, COMSPAWARCOM and DIRSSP.

(3) Serve as requirements and resource sponsor for the test and monitoring system executive board resources.

(4) Provide management oversight and coordination of common test, measurement and diagnostic equipment; automatic test systems; metrology and calibration functions to optimize Navy efficiency and effectiveness. Balance enterprise benefits with SYSCOM requirements while ensuring rapid responsiveness to fleet demand signals.

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

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

(7) Develop and submit central funding requirements aligned with assigned duties per established DON policies in coordination with the test and monitoring systems executive board.

(8) Serve as Navy office of primary responsibility to the joint technical coordination group on matters pertaining to Navy metrology and calibration. Provide the Navy representative to the joint technical coordination group for calibration and measurement technology.

(9) Manage the Navy test and monitoring systems research and development program and designate the program manager.

(10) Provide oversight and advocacy for the advancement of the Navy state-of-the-art in test and monitoring systems to keep pace with measurement requirement advancements in weapons and test equipment technology in coordination with SYSCOM metrology and calibration program manager.

(11) Develop, promote and implement a Navy test and monitoring systems strategic plan with SYSCOMs for OPNAV N83 approval on an annual basis. Submit a written report on the status of the Navy test and monitoring systems program to OPNAV N83 annually.

(12) Promote metrology infrastructure optimization. Approve requests for establishment and disestablishment of calibration laboratories and activities. Coordinate with SYSCOMs on laboratory capability for efficiency and effectiveness through modernization, equipment renewal and research and development.

(13) Maintain the Navy metrology and calibration central database with cognizant SYSCOMs.

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

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

m. Test and Monitoring Systems Executive Board will:

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

(2) Consist of senior representatives from COMNAVVAIRSYSCOM; COMNAVSEASYSYSCOM; COMNAVWARSYSYSCOM; DIRSSP; USFLTFORCOM;

COMPACFLT; Headquarters, Marine Corps (HQMC). Include senior representatives from other commands as needed to participate on the Navy test and monitoring systems executive board and in joint service initiatives.

(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) Provide central funding requirements aligned with assigned duties to the Navy test and monitoring systems executive director per established DON policies.

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

(6) Evaluate requirements and set priorities for shared program resources and recommend appropriate SYSCOMs funding.

(7) 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 (m).

n. Commands and SYSCOMs Managing or Using Navy Test, Measurements and Diagnostic Equipment, Automatic Test Systems and Metrology and Calibration will:

(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, COMNAVSEASYSYSCOM, COMNAVWARSYSCOM, 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.

7. Records Management.

a. Records created as a result of this instruction, regardless of format or media, must be maintained and dispositioned per the records disposition schedules located on the DON Assistant for Administration, Directives and Records Management Division portal page at

<https://portal.secnav.navy.mil/orgs/DUSNM/DONAA/DRM/Records-and-Information-Management/Approved%20Record%20Schedules/Forms/AllItems.aspx>.

b. For questions concerning the management of records related to this instruction or the records disposition schedules, please contact the local records manager or the OPNAV Records Management Program (DNS-16).

8. Review and Effective Date. Per OPNAVINST 5215.17A, OPNAV N83 will review this instruction annually around the anniversary of its issuance date to ensure applicability, currency and consistency with Federal, Department of Defense, SECNAV and Navy policy and statutory authority using OPNAV 5215/40 Review of Instruction. This instruction will be in effect for 10 years, unless revised or cancelled in the interim, and will be reissued by the 10-year anniversary date if it is still required, unless it meets one of the exceptions in OPNAVINST 5215.17A, paragraph 9. Otherwise, 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.



J. P. ECKARDT
Director, Fleet Readiness

Releasability and distribution:

This instruction is cleared for public release and is available electronically only via Department of the Navy Issuances website: <https://www.secnav.navy.mil/doni/opnav.aspx>.

CONTINUATION OF REFERENCES

- d. NAVSOP-3692 Department of the Navy Guide for Conducting Independent Logistics Assessments, Sep 2006
- e. MIL STD-1839D, DoD Standard Practice – Calibration and Measurement Requirements, 12 May 2010
- f. Defense Acquisition Guidebook, www.dau.edu/tools/t/Defense-Acquisition-Guidebook
- g. MIL PRF 28800G Performance Specification Test Equipment for Use With Electrical and Electronic Equipment, 17 Nov 2021
- h. NAVAIR 17-35MTL-1, NAVSEA OD 45845, USMC TI-4733-15/13 Metrology Requirements List (METRL)
- i. NAVAIR 17-35NCE-1, NAVSEA OD 48939, USMC TI-4733-45/16, Navy Calibration Equipment List, 10 Apr 2016
- j. NAVAIR 17-35TR-08 Technical Requirements for Calibration Labels and Tags, 1 Mar 2013
- k. NAVAIR 17-35 NCA-1, NAVSEA ST700-AA-LST-010/NCA, Navy Calibration Activity List (NCA)
- l. NAVAIR 17-35FR-06, Facility Requirements for Navy and Marine Corps Calibration Laboratories, 1 Sep 2022
- m. NAVAIR 17-35QAC-01C, NAVSEA 04-4734C, USMC TI-4733-35/23C, Navy and Marine Corps Calibration Laboratory Audit/Certification Manual, 22 Mar 2021
- n. ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories (3rd Edition), Nov 2017
- o. ANSI/NCSL Z540.3 Requirements for the Calibration of Measuring and Test Equipment, 3 Aug 2006
- p. OPNAVINST 4700.7M
- q. OPNAVINST 4000.57H
- r. OPNAVINST 4790.2J
- s. NAVSEA ST100-AG-IDX-010 Test, Measurement Diagnostics Equipment Index
- t. SECNAVINST 4105.1D
- u. OP 43P6B, Metrology Automated System for Uniform Recall and Reporting User's Manual, Sep 1992
- v. NAVAIR Form 13630/1 Consolidated Automated Support System Waiver Request
- w. NAVAIRINST 13630.5A Optimizing Weapon System Support Using Automatic Test Systems
- x. S0750-AC-MAN-010 METBENCH, Calibration Management System; Volume 1, User's Manual, 9 Sep 2016
- y. NAVAIR 17-35TR-05 Technical Requirements for Calibration Interval Establishment for Test and Monitoring Systems, 1 Mar 2021
- z. NAVAIR 17-35TR-06, Technical Requirements for Technical Review of Calibration Intervals, 1 Jan 1996

DEFINITIONS

1. 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 c(1) through c(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 its required performance specifications and to quantify all measured values to applicable units of the international system of units.

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- 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 comparison and 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.

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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.