DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
1333 ISAAC HULL AVE SE
WASHINGTON NAVY YARD DC 20376-0001

IN REPLY TO

NAVSEAINST 4734.1B
Ser 04/185
08 SEP 2004

NAVSEA INSTRUCTION 4734.1B

From: Commander, Naval Sea Systems Command

Subj: NAVSEA TEST, MEASUREMENT AND DIAGNOSTIC EQUIPMENT (TMDE) AND CALIBRATION PROGRAMS

Ref:
(a) NAVSEA ST700-AM-PRO-010/TAMS, Test and Monitoring Systems Program Operations and Procedures Manual
(b) NAVSEA SE700-AA-MAN-100/RADIAC, RADIAC Policies and Procedures Manual
(c) NAVAIRINST 13640.1 Series, Naval Aviation Metrology and Calibration Program
(d) SECNAVINST 3960.6 Series, Department of the Navy Policy and Responsibility for Test, Measurement, Monitoring, Diagnostic Equipment and Systems, and Metrology and Calibration (METCAL) Programs
(e) OPNAVINST 4700.7 Series, Maintenance Policy for Naval Ships
(f) OPNAVINST 4720.2 Series, Fleet Modernization Program (FMP) Policy
(g) OPNAVINST 4790.4 Series, Ships' Maintenance and Material Management (3-M) Manual
(h) OPNAVINST 3960.16 Series, Navy Test and Monitoring Systems (TAMS)
(i) NAVSEAINST 5000.3 Series, Acquisition Program Review and Reporting
(j) NAVSEA ST000-AG-IDX-010, Test Measurement Diagnostics Equipment (TMDE) Index
(k) NAVSEAINST 5400.57 Series, Engineering Agent Assignment and Technical Authority
(l) NAVSEAINST 5400.61 Series, Headquarters Engineering and Technical Authority Policy
(m) NAVSEAINST 5400.97 Series, Technical Authority Principles and the Responsibility, Accountability and Authority of the NAVSEA Chief Engineer
(n) NAVSEANOTE 5400 Series, NAVSEA Warranted Technical Authorities
(o) NAVSEA OD 45845, Metrology Requirements List (METRL)
(p) NAVSEA 04-4734, Naval and Marine Corps Calibration Laboratory Audit/Certification Manual

(q) NAVSEA ST700-AM-GYD-010/METCAL, Metrology and Calibration Laboratory Requirements and Certification Guide
(r) ANSI/NCSL Z540-1 Calibration Laboratories and Measuring and Test Equipment - General Requirements
(s) ISO/IEC 17025, General Requirements for the Competence of Testing and Calibration Laboratories
(t) NAVSEA SL720-AA-MAN-010/020, Fleet Modernization Program (FMP) Management and Operations Manual
(u) Operating Agreement between the Commander, Naval Sea Systems Command and NAVSEA's Affiliated Program Executive Officers (PEOs) of April 1997
(v) SECNAVINST 5400.15 Series Department of the Navy Research, Development and Acquisition, and Associated Life Cycle Management Responsibilities
(w) Memorandum of Agreement between Commander, Fleet Forces Command (Serial number N43/036) and Commander, Naval Sea Systems Command (serial number 04/049) dated 29 April 2003
(x) MIL-STD-1839C, Standard Practice for Calibration and Measurement Requirements
(y) SECNAVINST 5000.2 Series Implementation of Mandatory Procedures for Major and Non-Major Defense Acquisition Programs and Major and Non-Major Information Technology Acquisition Programs
(z) Program Support Data (PSD) Automated Reporting and Tracking System (PARTS) User's Manual
(aa) NAVSUP P-485 Volumes 1 and 3 Naval Supply Procedures, Afloat and Ashore Supply
(bb) TT700-AA-CAL-010/TR-1, Technical Requirements for Calibration of Test and Monitoring Systems (TAMS)
(cc) NAVAIR 17-35TR-4 Requirements for Preparation of Instrument Calibration Procedures (ICPs)
(dd) NAVSEA ST700-AM-GYD-020/OICR, Oxygen Instrumentation Calibration Room (OICR) Requirements and Operations Guide
(ee) NAVAIR 17-35FR-06, Facility Requirements for Navy Calibration Laboratories
(ff) Memorandum of Agreement: Naval Air Systems Command (NAVAIRSYSCOM) and Naval Sea Systems Command (NAVSEASYSCOM) Consolidation of Metrology and Calibration Management Information Systems of 13 June 1997
(gg) MIL P24534A (Navy) of 7 May 1985, Planned Maintenance System: Development of Maintenance Requirements Cards

and Maintenance Index Page and Associated Documentation

(hh) COMFLTFORCOMINST 4790.3 Series, Joint Fleet Maintenance Manual (JFMM)

Encl: (1) List of Acronyms

1. **PURPOSE**. To issue policy and assign responsibilities for Metrology and Calibration (METCAL), Life Cycle Management of Test, Measurement and Diagnostic Equipment (TMDE), and Shipboard Instrumentation and Systems Calibration (SISCAL) including the Shipboard Gage Calibration Program (SGCP) functions under the cognizance of Naval Sea Systems Command (NAVSEASYSCOM, also referred to as NAVSEA). This instruction integrates NAVSEAINST 4734.1A, NAVSEAINST 9082.1A, and SISCAL program policy and responsibilities into one document. The guidance of this instruction is supplemented by processes and procedures described in reference (a). Chapters 1, 2, and 3 of this instruction describe the requirements for TMDE, METCAL and SISCAL including SGCP respectively and Table (1) provides a quick look page that highlights the program elements. This is a major revision and should be read in its entirety.

2. **CANCELLATION**

NAVSEAINST 4734.1A of 23 April 1993
NAVSEAINST 9082.1A of 3 March 1994

3. **SCOPE**

a. This instruction specifically applies to all NAVSEA headquarters and supporting field activities including: shipyards; warfare and logistics centers; Research, Development, Test and Evaluation (RDT&E) activities; Fleet units; Navy and Marine Corps air stations and other shore activities that establish requirements, acquire, field, use, calibrate, support or maintain NAVSEA cognizant General Purpose Electronic Test Equipment (GPETE), Calibration Standards (CAL STDs), Mechanical Test Instruments (MTI), Shipboard Installed Instrumentation, Automated Propulsion Control Systems, Special Purpose Electronic Test Equipment (SPETE), Data Acquisition and Control Systems, Virtual Test Equipment, Oxygen and Gas Standards, and Test Equipment Support and End Items.

b. The requirements of this instruction apply to TMDE, and shipboard installed instrumentation used for operation and maintenance of ships' nuclear propulsion systems under the

cognizance of NAVSEA 08 unless specifically superseded or supplemented by NAVSEA 08 approved documents. Where differences in requirements occur, those designated by NAVSEA 08 take precedence. NAVSEA 08 will advise NAVSEA 04 regarding suitability of models available to replace test equipment that has reached the end of its service life. Any changes to requirements of this instruction affecting the TMDE, calibration requirements and the installed instrumentation requirements for operation and maintenance of systems under the cognizance of NAVSEA 08 require NAVSEA 08 concurrence.

c. The requirements of this instruction exclude:

(1) Calibration activities and equipment under the technical cognizance of the Radiation Detection, Indication and Computation (RADIAC) Program. RADIAC equipment policy and procedures are contained in reference (b).

(2) TMDE requirements, systems, equipment, and installed instrumentation under the cognizance of the Strategic Systems Programs (SSP).

(3) Ships assigned to Military Sealift Command.

(4) Aeronautical support equipment and shipboard systems under the cognizance of the Naval Aviation Maintenance Program, reference (c).

4. **BACKGROUND**

a. General

(1) Reference (d) establishes policy and responsibility for incorporating testability and diagnostics capability into weapons platforms, weapons systems, surveillance, communications, navigational guidance, deception/protection systems, metrology systems, other operational systems and associated support systems. Reference (d) also establishes policy and responsibility for the selection, development, acquisition, standardization, application, and logistic support of TMDE, Automated Test Systems (ATS) and METCAL equipment and systems.

(2) References (e) through (g) provide policy and assign responsibilities for the maintenance and modernization of ships.

(3) This instruction combines pertinent TMDE and metrology functions contained in references (d), (h) and (i).

5. **DEFINITIONS**

a. TMDE is any system or device that is used to evaluate the operational condition of an end item or subsystem thereof, or to identify and/or isolate any actual or potential malfunction. TMDE includes diagnostics and prognostic equipment, permanently installed shipboard instrumentation, CAL STDs, semiautomatic and automatic test equipment (with issued software), and calibration test or measurement equipment. TMDE includes all devices used to measure, calibrate, gage, test, inspect, diagnose, or otherwise examine materials, supplies, and equipment to determine compliance with specifications, engineering drawings, technical orders, technical manuals, maintenance instructions, and/or serviceability standards. TMDE is centrally managed as required by reference (h) due to the large number of items in the Navy's inventory, initial outfitting costs, and significant life cycle support costs.

b. Automated Test Systems (ATS) includes Automatic Test Equipment (ATE) hardware and its operating software, Test Program Sets, which include the hardware, software and documentation required to interface with and test individual system component items, and associated software development environments. The term "ATS" also includes on-system automatic diagnostics and testing.

c. Metrology and Calibration (METCAL) are two independent yet inter-related entities with a common purpose; i.e., accurate parametric measurement. Metrology is the science of measurement for determination of conformance to technical requirements, including the development of standards and systems for absolute and relative measurements. Calibration is the comparison of a measurement system or device of unverified accuracy with a measurement system of known and greater accuracy to detect any deviation from required performance specifications of the unverified measurement system or device.

d. Shipboard Instrumentation and Systems Calibration (SISCAL) Program, which includes SGCP, is responsible for the calibration and maintenance support for permanently installed shipboard instrumentation and machinery control systems. The SISCAL process establishes shipboard installed instrumentation calibration requirements and assigns/develops required shipboard installed instrumentation calibration and related maintenance

support procedures. Shipboard installed instrumentation maintenance requirements (e.g., calibration/No Calibration Required (NCR) determination, maintenance level, intervals, etc.) are not based solely on the reliability of the instrument type; rather they are based upon operational considerations including the impact of application, function and the inherent component reliability. Calibration support for SISCAL is provided by SISCAL teams and the SGCP. SISCAL teams are established at regional maintenance centers to perform system calibration procedures onboard ship. SGCP is the establishment and maintenance of a Field Calibration Activity (FCA) aboard ship responsible for calibrating permanently installed pressure, temperature and torque instrumentation.

e. System Calibration is the concept and process that was established with the introduction of ship classes with Automated Machinery Control Systems. Since the physical parameters are simultaneously measured by instrumentation and monitored by control systems, a divergence in parameter "readings" exists due to system design. System calibration is the process where the instrumentation is calibrated while the control system is aligned to minimize this divergence.

f. Calibration support is defined as:

(1) For new construction ships: development of new calibration procedures, providing calibration interval analysis, associated Integrated Logistics Support (ILS) requirements, development of calibration documentation, development and procurement of calibration standards to fully support TMDE, ATS, METCAL and SISCAL.

(2) For modernization and alteration: development of new or revising existing calibration documentation, associated ILS requirements, updates to calibration intervals, calibration standards for new measurement requirements to fully support TMDE, ATS, METCAL, and SISCAL.

g. Non-Standard TMDE is defined as any TMDE not listed on the Test Measurement Diagnostics Equipment (TMDE) Index, reference (j).

6. POLICY

NAVSEA 04 shall manage technical authority and program oversight for NAVSEA TMDE, METCAL and SISCAL functions through the assigned Technical Warrant Holders for Reliability Centered

Maintenance, Metrology and Calibration in accordance with references (d, h, k, l, m, n).

Operation and maintenance of Navy systems require quantitative and qualitative measurement of parameters including: voltage, current, resistance, frequency, pressure, temperature, flow, optic, torque, weight, mass, and vibration to monitor systems and equipment operation, perform scheduled maintenance, or detect and isolate faults.

The accuracy of equipment used to conduct measurements must be validated. The accuracy of individual measurement results will be traceable through an unbroken chain of calibrations to accepted references (U.S. National Standards, Natural Physical Constants, Ratio Type Calibrations, Consensus Standards or National Standards of other countries which are correlated with U.S. National Standards as held or directed by National Institute of Standards and Technology (NIST)).

All TMDE that requires calibration shall be calibrated in accordance with the intervals and guidance contained in reference (o).

TMDE not authorized by NAVSEA 04RM shall not be used for or on any NAVSEA cognizant systems or equipment. This excludes TMDE used by RDT&E activities.

All NAVSEA cognizant Regional Calibration Centers (RCCs), depots, intermediate and organizational level maintenance and calibration activities that support NAVSEA cognizant equipment shall be certified in accordance with references (p) and/or (q). Commercial calibration activities, including Original Equipment Manufacturers (OEM), that calibrate NAVSEA TMDE will be certified or accredited by an accrediting body approved by NAVSEA 04 to be in compliance with references (p), (r) and/or (s), and the scope of accreditation must cover the appropriate measurement parameters and ranges of the calibrations performed. Naval Air Systems Command (NAVAIRSYSCOM, also referred to as NAVAIR) FCAs that support NAVSEA cognizant equipment shall be audited in accordance with reference (c). In the case that work can only be performed by a non-certified or non-accredited OEM, a waiver will be required from NAVSEA 04.

All Navy calibration laboratories, intermediate and organizational level maintenance activities, FCAs, and all other activities that support NAVSEA cognizant equipment, shall comply

with Department of Defense (DoD) Automated Test Systems (ATS) acquisition strategies in accordance with reference (h).

TMDE and Calibration requirements including METCAL Automated Information System (AIS) inputs for ship and equipment acquisition programs shall be identified, planned and implemented as shown in Figure (1).

TMDE and Calibration requirements during Modernization and alterations shall be identified, planned and implemented in accordance with reference (t).

For instrumentation that requires calibration, a calibration sticker will be affixed to document the calibration status in accordance with reference (q). All TMDE shall be labeled to indicate current calibration status, including "inactive" and NCR, in accordance with reference (q).

Local calibration procedures, when required will be funded by the command developing the local calibration procedures.

7. RESPONSIBILITIES

a. Deputy Commander for Fleet Logistics, Maintenance, and Industrial Operations Directorate (NAVSEA 04) will:

(1) Provide executive direction and program management for NAVSEA's METCAL, SISCAL and TMDE programs.

b. Program Executive Office (PEO), Ship Program Manager (SPM) and Program Manager (PM) will:

(1) Ensure that the requirements cited in this instruction apply to new construction ships and those ship systems and equipment for which the PEO/SPM/PM have life cycle support responsibilities in accordance with references (u) and (v) and the guidance provided in reference (h).

(2) In keeping with the Memorandum of Agreement reference (u), and the guidance provided in reference (h), PEOs/SPMs/PMs will liaison with NAVSEA 04 in order to determine all TMDE, METCAL and SISCAL requirements as early as possible in the acquisition process.

(3) Submit waiver requests for Non-Standard TMDE to NAVSEA 04.

(4) Fund for and provide all Integrated Logistics Support (ILS) requirements for Non-Standard TMDE including instrument calibration procedure development, calibration standard acquisition where required, training for calibration technicians and operators, technical manual development and support, allowance product listing, and repair parts as required.

c. Life Cycle Manager (LCM) will:

(1) Ensure that the requirements cited in this instruction apply to any equipment or system for which the LCM has life cycle support responsibilities.

(2) Ensure that funding requirements, during modernization and alteration process, are identified to PEOs/SPMs/PMs for calibration support for any equipment or system for which the LCM has life cycle support responsibilities.

d. Fleet Forces Command working with the Lead TYCOM will:

(1) Ensure Navy calibration personnel are trained in accordance with approved Metrology and Calibration Navy Training System Plans (NTSPs).

(2) Fund Regional Maintenance Centers (RMCs) to assist in conducting calibration audits and certifications of RCCs and Fleet calibration activities.

(3) Ensure deficiencies noted during certification of RCCs and Fleet calibration activities are corrected and reported to the certification authority in accordance with references (p) and/or (q).

(4) Ensure that budgeting and funding is provided for calibration of Fleet assets.

(5) Ensure that the data is updated in METCAL AIS.

e. All other non Fleet activities, including the performing laboratories, will:

(1) Provide calibration services on a reimbursable basis.

(2) Comply with the policies of this instruction.

(3) Implement and administer the NAVSEA TMDE program within their activities.

(4) Ensure that all custodians of TMDE and measurement standards within their activities are aware of and in compliance with this instruction. Specifically they shall:

(a) Ensure that all TMDE used for quantitative applications are calibrated prior to use, and that calibration labels are affixed to show their current calibration status in accordance with references (a), (o), and (q).

(b) Ensure that all TMDE are scheduled and submitted for calibration as they are recalled, or when the calibration label is nearing expiration.

(c) Schedule and submit TMDE for calibration or repair if accuracy or operation is suspect.

(5) Ensure that budgeting and funding is provided for the calibration and repair of assets within their activities and certification of calibration laboratories under their cognizance.

(6) Implement and administer the METCAL program within their activities.

f. Navy's Deputy Executive Agent for METCAL:

NAVSEA 04RME has been designated to fulfill this position and the responsibilities of the office include:

(1) Chair the Test and Monitoring Systems (TAMS) Executive Board (EB).

(2) Serve as Navy Metrology/Calibration Office of primary responsibility to the Joint Logistics Commander (JLC). Provide representation to the Joint Logistics Commanders Joint Technical Coordinating Group for Calibration and Measurement Technology (JTCG-CMT). Participate with other Navy, DoD components and Federal agencies in achieving maximum calibration activity efficiency and utilization.

(3) Manage the Navy Metrology Research and Development program. Conduct research on the latest advances in metrology, investigate applications for existing and new prime systems and

equipment, and explore future requirements for calibration standards and calibration procedures.

(4) Coordinate with Navy, DoD, and non-DoD government activities, including NIST, to advance the state-of-the-art in Metrology and Calibration to keep pace with advances in weapons systems and test equipment technology.

(5) Ensure that measurement results and values of standardization are traceable to NIST.

(6) Coordinate Navy requirements for NIST calibration services.

(7) Establish and monitor centrally managed policies and processes to optimize economy and efficiency of the Navy Calibration Program.

(8) Oversee the METCAL Shared Funding Process that supports tasks jointly funded by all SYSCOMs.

(9) Be assigned Additional Duty to Fleet Forces Command (N43) to promote a single Navy-wide METCAL program with the goals of consolidating processes, standardizing TMDE, and reducing infrastructure and cost. Other duties assigned in accordance with reference (w).

g. Technical Warrant Holder for TMDE, METCAL and SISCAL

The Deputy Commander for Ship Design, Integration and Engineering (SEA 05) is the NAVSEA's technical authority for platform and ship systems including areas common to both surface ships and submarines. Within this capacity, SEA 05 designates the Technical Warrant Holder responsible for the execution of TMDE/METCAL/SISCAL technical authority in accordance with reference (n).

Technical Warrant Holders make authoritative decisions on technical matters, engineering practices, and processes related to the design, development, construction, testing, repair, operation, in-service support and/or disposal of platforms, systems or tools within the scope of this instruction.

Technical Warrant Holders ensure that sound technical decisions are made in a manner that complies with higher tier requirements, meets the needs of the responsible programmatic authority, and addresses risks, alternatives and trade-offs as appropriate.

A. W. LENGERICH
Vice Commander

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SNDL	21A	Fleet Commanders
	22A	Fleet Commanders
	23	Force Commanders
	24	Type Commanders
	A1J1L	PEO IWS
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	A1J1N	PEO SUB
	A1J1P	PEO SHIPS
	A1J1Q	PEO CARRIERS
	C84	COMNAVSEASYSCOM Shore Based Detachments (less C84J)
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	FKP	COMNAVSEASYSCOM Shore Activities (less FKP68 & FKP24)

NAVSEA Special List Y2

Copy to:

SNDL	26A	Amphibious Group
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	26E	Amphibious Unit
	26F	Operational Test and Evaluation Force
	26G	FBM Operational Test Support Unit
	26H	Naval Coastal Warfare Group
	26J	Afloat Training Group and Detachment
	26K	Undersea Surveillance
	26L	Priority Material Office and Detachment
	26S	Harbor Defense Commands
	26T	Regional Support Group and Organization
	26U	Regional Maintenance Centers
	26W	Cargo Handling Group and Battalions
	26Z	Shore Intermediate Maintenance Activity and Detachment/Naval Reserve Maintenance Facility
	26CC	Fleet Coordinating Group

26DD	Mobile Diving and Salvage Unit and Detachment and Consolidated Divers Unit
26GG	Explosive Ordnance Disposal Mobile Unit and Group
26JJ	Fleet Area Control and Surveillance Activity
26MM	Fleet Integrated Logistics Overhaul Activity and Team
26QQ	Special Warfare Group, Unit, and Detachment
26RR	Fleet Imaging Command, Center, Facility, and Detachment
26SS	Mobile Mine Assembly Group and Unit
26VV	Submarine Force Shipyard Representative
26WW	Deep Submergence Unit
26YY	Fleet Ocean Surveillance Information Center and Facility
26HHH	Fleet Information Warfare Center and Detachment
26KKK	Tactical Training Group
26LLL	Tactics and Equipment Development Activity
26PPP	Mobile Training Team
28	Squadron, Division, and Group Commanders - Ships
29	Warships
30	Mine Warfare Ships
31	Amphibious Warfare Ships
32	Auxiliary Ships
36	Service Craft
39	Construction Battalions, Brigades, Regiments, and Detachments
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CHAPTER ONE: TMDE

1. SCOPE

For TMDE this instruction does not apply to areas listed under paragraph 3. (c) of the scope section in the main part of this instruction.

2. BACKGROUND

a. Reference (d) establishes Department of Navy (DoN) policy and responsibility for the TMDE Program and assigns Commander, Naval Sea Systems Command (COMNAVSEASYSCOM) to serve the Chief of Naval Operations (CNO) as Lead Systems Command for TMDE.

b. TMDE is any system or device that is used to evaluate the operational condition of an end item or subsystem thereof or to identify and/or isolate any actual or potential malfunction. TMDE includes diagnostics and prognostic equipment, permanently installed shipboard instrumentation, CAL STDs, semiautomatic and automatic test equipment (with issued software), and calibration test or measurement equipment. TMDE includes all devices used to measure, calibrate, gage, test, inspect, diagnose, or otherwise examine materials, supplies, and equipment to determine compliance with specifications, engineering drawings, technical orders, technical manuals, maintenance instructions, and/or serviceability standards. TMDE is centrally managed as required by reference (h) due to the large number of items in the Navy's inventory, initial outfitting costs, and significant life cycle support costs.

3. POLICY

a. Policy and guidance for acquisition, and life cycle support of TMDE will be centrally established by NAVSEA.

b. The TMDE Program Manager, NAVSEA 04 is responsible for the planning, development, selection and acquisition for all TMDE to include outfitting, obsolescence replenishment, standardization and modernization. This will be an integral part of the system and equipment acquisition and logistic planning process. This excludes TMDE used by RDT&E activities.

c. Life cycle logistics support for fielded TMDE including: technical and operations manuals, Instrument Calibration Procedures (ICPs), Calibration and Measurement Requirements

Summary (CMRS) data, Calibration Support Plans, training guides, Calibration Standards, and other TMDE support items will be planned for and procured concurrent with TMDE acquisition. TMDE will not be fielded before all integrated logistics support is in place and has been approved for service use by NAVSEA 04.

(1) This requirement does not apply to RDT&E activities purchasing special or unique test equipment in support of nonrecurring project requirements. LCM logistic support requirements still apply for those items that have multipurpose and/or recurring usage. RDT&E activities are responsible for all costs related to calibration or other logistic support required for special or unique test equipment they procure. Should the special or unique test equipment or system be transferred to Fleet use, the Equipment/System PM is responsible for all maintenance, logistic, acquisition and calibration support prior to introduction of the equipment into the Fleet. Total Asset Visibility (TAV) requirements apply for all TMDE.

d. Naval Surface Warfare Center, Indian Head Division - Seal Beach California Detachment is the Engineering Agent (EA) for the NAVSEA TMDE acquisition Program with duties and responsibilities as designated in writing by the appropriate NAVSEA Technical Warrant Holder.

e. Maximum use will be made of standard general purpose TMDE at all levels of maintenance. Wherever possible TMDE requirements will be satisfied by preferred equipment selected from the TMDE Index, reference (j). Models of equipment that perform similar measurement functions will be standardized to reduce the number of variants at ship and shore facilities and to reduce Total Ownership Cost.

f. Program/acquisition managers in accordance with references (x) and (y) will provide measurement requirements that are in support of prime systems to the TMDE EA via CMRS data submitted.

g. TMDE requirements will be based on expressed measurement needs of PEOs, SPMs, PMs, Type Commanders (TYCOMs) Technical Representatives, EAs, Training Activities, RCCs, and supported shore activities.

h. Waivers are required before fielding special purpose and non-standard TMDE in the Fleet and at other NAVSEA supported activities. Waivers will be granted by NAVSEA 04, if existing standard TMDE cannot fully satisfy the requirements. TMDE not

authorized by NAVSEA 04RM shall not be used for or on any NAVSEA cognizant systems or equipment. This excludes TMDE used by RDT&E activities.

i. Requirements for general purpose TMDE will be documented on Program Support Data (PSD) Sheets and recorded in the PSD Automated Reporting and Tracking System (PARTS) in accordance with reference (z).

j. For all initial outfitting requirements, delivery of TMDE will be concurrent with the initial operating capability of the associated prime system and equipment.

k. End users will replace lost or damaged TMDE using Operating Target (OPTAR) funds in accordance with references (h) and (aa).

l. Any TMDE requiring calibration is not authorized for use unless it has a current calibration sticker.

m. NAVSEA 04 will expedite replacement of obsolete and obsolescent TMDE as funded by Chief of Naval Operations (OPNAV) Resource Sponsors. Obsolescent TMDE will be scheduled for replacement in an orderly manner. Replacement will be based on Fleet input, calibration intervals, failure rate, repair costs, measurement requirements, parts availability, utilization criticality, and availability of newer more cost effective replacement models consistent with available funding. TMDE designated as obsolete will be purged from the Navy's inventory.

n. Allowances will be established by NAVSEA 04 and documented for all authorized holders of NAVSEA-cognizant TMDE including CAL STDs in accordance with reference (a). Allowances will be based on measurement applications, frequency of use, maintenance periodicity, location of supported system and equipment, reliability and maintainability characteristics, and operational considerations of the TMDE.

o. TMDE, except permanently installed shipboard instrumentation addressed in the SISCAL chapter of this instruction, required for production and maintenance of NAVSEA cognizant equipment or systems shall be calibrated in accordance with the requirements of references (o) and (bb) and in compliance with reference (p).

(1) All equipment delivered is to have a valid calibration label showing the equipment has a minimum of 75% of its designated interval remaining at time of turnover.

(2) All TMDE will be included in the METCAL AIS.

p. All TMDE for prime systems scheduled for Navy ships will be recorded in the NAVSEA 04 approved configuration database Configuration Data Managers Database - Open Architecture (CDMD-OA) in accordance with reference (g).

q. TMDE training curricula will be reviewed for organizational, intermediate and depot levels of maintenance.

r. Optimum use will be made of DoD-wide TMDE programs.

4. **RESPONSIBILITIES**

a. Deputy Commander for Fleet Logistics, Maintenance, and Industrial Operations Directorate (NAVSEA 04) will:

(1) Provide representation for Joint Service TMDE initiatives. Provide Navy liaison with other government agencies and industry groups in the areas of TMDE and testing technology. Participate in the Department of Defense Consolidated Electronic Test Equipment Listing (DODCEL) Executive Committee as the Navy TMDE representative.

(2) Provide program management for Navy TMDE equipment and systems under NAVSEA cognizance to:

(a) Develop, implement, coordinate and disseminate policy and procedures for life cycle management of TMDE. Provide Command liaison on TMDE policy with CNO and other SYSCOMs. Review all standards, specifications, instructions, and directives impacting NAVSEA TMDE programs.

(b) Plan, program, budget, and execute required NAVSEA cognizant TMDE, related logistics, and other necessary engineering support for Fleet, shore activities, and training activities. Determine and consolidate, by fiscal year, TMDE requirements to support the Fleet Modernization Program (FMP) and orderly replacement.

[1] Coordinate input from system and equipment PEOs, SPMs, and PMs for planning, programming, budgeting, and

funding initial outfitting requirements for GPETE as well as the modernization and standardization of existing Fleet assets.

[2] Coordinate planning, programming, budgeting and funding for the procurement of METCAL and SISCAL calibration standards, test equipment, and associated ILS.

[3] Program for the orderly replacement of obsolete and obsolescent TMDE, coordinating requisite funding requirements with cognizant OPNAV sponsors and replacement priorities with Fleet Commanders, TYCOMs and NAVSEA TMDE claimants.

(c) Ensure that TMDE is identified, validated, acquired, and delivered with required allowance documentation, calibration procedures, calibration intervals, and operations/maintenance manuals to support prime equipment and systems afloat and ashore, including delivery of calibration standards to calibration activities concurrent with TMDE acquisition.

(d) Develop and maintain TMDE allowances and allowance documentation (i.e., Ships/Shore Portable Electrical/Electronic Test Equipment Requirements List (SPETERL), Shipboard Mechanical Test Instrument Allowance List (SMTIAL), and Test Equipment List (TEL) for activities not in receipt of a SPETERL) for ships, supported shore activities, and training activities, including allowancing of calibration standards and test equipment for SISCAL Teams and SGCP FCAs.

(e) Review ship system measurement requirements and grant waivers to PEOs, SPMs, and PMs if standard general purpose TMDE models cannot fully satisfy requirements.

(f) Provide direction to the TMDE EA for, processing of engineering data obtained from PEOs, prime system contractors and prime system ISEAs in accordance with reference (a).

(g) Annually facilitate the review of integrated life cycle support and ensure that outfitting for new construction ships general purpose TMDE is consistent with equipment identified in the TMDE Index, reference (j) or approved by NAVSEA 04.

(h) Conduct periodic TMDE reviews to ensure the adequacy of TMDE and related logistic requirements for each ship class throughout its life cycle.

(i) Incorporate TMDE items held in storage for future use into a NAVSEA-approved TAV Program.

(j) Explore new technology and standardize GPETE models with multi-functional, multi-range equipment with emphasis on reducing life cycle cost.

(k) Evaluate GPETE reliability by utilizing data from associated information systems e.g., single Navy METCAL AIS and Maintenance and Material Management (3M) repair data. Resolve unsatisfactory material reports on new, repaired, restored, and overhauled TMDE that is delivered in an unsatisfactory condition. Conduct and report Product Quality Deficiency Report (PQDR) analyses.

(l) Provide assistance in resolving rejected Supply Support Requests. Revise provisioning and Allowance Parts List (APL) files to correspond to existing repair capability; update files to reflect support and parts or assemblies being replaced with alternates. Act as final approval authority for recommended "Buy Lists".

(m) Coordinate criteria for determining TMDE Sub-Category (SCAT) code assignments and associated priority code designations with TYCOMs and NAVSEA TMDE claimants. Assign SCAT and priority code designations.

(n) Assure training and related logistics requirements are in place at Navy maintenance activities responsible for maintaining NAVSEA-cognizant TMDE.

(o) Administer the Minor Repair and Calibration Program in support of designated Naval Education and Training Command (NETC) training courses and assist in the development of TMDE allowances and outfitting for cognizant training activities.

(p) Review all TMDE Allowance Change Requests (ACRs) and Board of Inspection and Survey (INSURV) trial cards that cite TMDE problems and provide timely feedback to resolve all issues.

(q) Ensure that TMDE changes made as a result of equipment installations by an Alteration and Installation Team (AIT) are reported to the appropriate Configuration Data Manager (CDM) for input to appropriate databases.

b. Program Executive Office (PEO), Ship Program Manager (SPM), and Program Manager (PM) will:

(1) Require shipbuilding and conversion contractors to submit measurement requirements as CMRS data to the EA for TMDE in accordance with reference (x) and (y).

(2) Refer TMDE ACRs and Board of INSURV trial cards that cite TMDE problems to NAVSEA 04 for review.

(3) For new construction, in coordination with NAVSEA 04, budget Ships Construction Navy (SCN) funds for the procurement of TMDE to fill requirements reflected on the SPETERL and SMTIAL. Ensure that new construction general purpose TMDE requisitions are dropped in sufficient time to support ships' delivery. Plan, program, and budget in coordination with NAVSEA 04 for all initial; calibration requirements analysis, calibration standards, calibration procedures, calibration documentation, calibration interval analysis, associated ILS requirements, research and development (R&D), and engineering necessary to establish measurement traceability.

(4) Provide NAVSEA 04 with overhaul or availability letters and information relative to all alterations and equipment installation deferrals no later than 6 months before start of overhaul or availability to allow reprogramming for required general purpose TMDE.

(5) For new systems and equipment or prime system modifications:

(a) Provide NAVSEA 04 with the CMRS data to support each new prime system or equipment not previously listed in the TMDE Index no later than 90 days after award of contract for the first ship installation.

(6) Ensure that installed TMDE meets appropriate specifications and is selected in order to maximize standardization.

(7) Provide life cycle management of SPETE, including maintenance, supply support, recall, and calibration

requirements. Plan, program, and budget for SPETE including development of calibration and measurement requirements data, standardization analysis, and calibration requirements support.

(8) Ensure commercial calibration activities are certified or accredited by an activity approved by NAVSEA 04 to be in compliance with references (p), (r), and/or (s), and the scope of accreditation must cover the appropriate measurement parameters and ranges of the calibration performed.

(9) Obtain a waiver from NAVSEA 04 before procurement, development or fielding of non standard GPETE, SPETE, calibration standards, or other TMDE.

(10) Ensure new and revised maintenance documentation and training material cite applicable TMDE derived from the TMDE Index in accordance with reference (j).

(11) Ensure any change to deployed hardware or software is analyzed to determine the impact on TMDE for each level of maintenance before being implemented and that testing capability changes are implemented concurrently with prime system changes.

c. Fleet Forces Command working with the Lead TYCOM will:

(1) Ensure TMDE models are labeled in accordance with references (a), (o), and (q) and denote calibration status.

(2) Ensure RCCs and Fleet calibration activities maintain Calibration Standards and records documenting calibration traceability to NIST or intrinsic standards of measurement.

(3) Ensure all TMDE and shipboard installed instrumentation is included in the Navy METCAL AIS.

(4) Use the Navy TAV Program to report unassigned assets for potential procurement offset and redistribution. Report all calibration standards at RCCs as a tool to assist in workload management.

(5) Ensure that budgeting and funding is provided for calibration of fleet assets.

(6) Ensure that TYCOMs provide NAVSEA 04 with the CMRS data for TYCOM procured alterations and installations.

d. All other non Fleet activities, including the performing laboratories, will:

(1) Provide calibration services on a reimbursable basis.

(2) Comply with the policies of this instruction.

(3) Implement and administer the NAVSEA TMDE program within their activities.

(4) Ensure that all custodians of TMDE and measurement standards within their activities are aware of and in compliance with this instruction. Specifically they shall:

(a) Ensure that all TMDE used are calibrated prior to use, and that calibration labels are affixed to show their current calibration status in accordance with references (a), (o), and (q).

(b) Ensure that all TMDE are scheduled and submitted for calibration as they are recalled or when the calibration label is nearing expiration.

(c) Schedule and submit TMDE for calibration or repair if accuracy or operation is suspect.

(5) Ensure that budgeting and funding is provided for the calibration and repair of assets within their activities and certification of calibration laboratories under their cognizance.

CHAPTER TWO: METCAL

1. SCOPE

The NAVSEA METCAL Program includes all Navy METCAL activities not otherwise covered by the Naval Air Systems Command (NAVAIR), the Director, Strategic Systems Programs (DIRSSP) or the Marine Corps Systems Command (MARCORSYSCOM).

However, the requirements of this chapter do not apply to areas listed under paragraph 3.(c) of the scope section in the main part of this instruction, and;

a. Installed instrumentation whose calibration requirements and support are being addressed by SISCAL.

2. BACKGROUND

Reference (d) establishes DoN policy and responsibility for the METCAL Program and assigns COMNAVSEASYSCOM to serve the CNO as Lead Systems Command for Navy Metrology, Calibration and TMDE. Reference (h) directs NAVSEA to execute responsibilities as the Lead Systems Command for Navy METCAL functions and to execute specific responsibilities for the NAVSEA METCAL program.

3. POLICY

a. Policy and guidance for NAVSEA METCAL, acquisition, and life cycle support will be centrally established by NAVSEA.

b. Naval Surface Warfare Center, Corona Division, Corona, California is the EA for calibration standards and the NAVSEA METCAL Program with duties and responsibilities as designated in writing by the appropriate NAVSEA Technical Warrant Holder.

c. All ICPs will be developed in accordance with reference (cc). All Local Calibration Procedures (LCPs) will be developed in accordance with references (a) and (cc) and be submitted to the NAVSEA METCAL EA for approval.

d. Optimum use will be made of DoD-wide metrology and calibration programs.

e. Program managers and acquisition managers will submit measurement requirements as CMRS data in support of prime systems to the METCAL EA in accordance with references (x) and (y).

f. TMDE used to support NAVSEA cognizant equipment and systems that requires calibration is not authorized for use if it is not calibrated. All TMDE that requires calibration shall be calibrated in accordance with the intervals and guidance contained in reference (o).

g. In order to use a non-certified or non-accredited OEM for calibration support, a waiver must be obtained from NAVSEA 04 by the cognizant calibration laboratory. The laboratory requesting the waiver will identify the model number and the manufacturer of the unsupported equipment along with the owner or custodial activity. The request for waiver will include the name, address, telephone number and point of contact for the non-certified or non-accredited OEM and the customer or equipment custodian.

4. RESPONSIBILITIES

a. Deputy Commander for Fleet Logistics, Maintenance, and Industrial Operations Directorate (NAVSEA 04) will:

(1) Execute responsibilities for METCAL as directed in reference (h).

(2) Provide direction for management of the NAVSEA programs supporting METCAL functions.

(3) Assure training and related logistics requirements are in place at Navy maintenance activities responsible for maintaining NAVSEA-cognizant TMDE.

(4) Establish policy, provide technical guidance for, and manage NAVSEA METCAL Program and tasks assigned to cognizant metrology and calibration activities.

(5) Serve as the scientific, engineering and technical Program Authority for NAVSEA METCAL Program via the designated Technical Warrant Holder.

(6) Provide approval for service use designation and ensure all required calibration logistic support elements that support prime systems or equipment are in place prior to fielding.

(7) Plan, program, budget and execute METCAL engineering support functions including:

(a) Instrument calibration procedures for life cycle support of equipment procured through the NAVSEA TMDE acquisition manager.

(b) Resolution of calibration problem reports

(c) Approval and control of local calibration procedures

(d) Development of METCAL qualification training material

(e) Metrology Requirements (METREQ), METRL and Central Data Base Facility (CDBF) databases

(f) Portable TMDE interval analysis

(g) Specifications for calibration standards at NAVSEA-cognizant METCAL calibration activities

(h) Input to Navy METCAL AIS interface and business practices, and

(i) Quality assurance of NAVSEA cognizant calibration activities.

(8) Provide direction to the METCAL EA for Calibration Standards, including processing of CMRS data obtained from PEOs, prime system contractors, and prime systems ISEAs, approving ICPs, and authorizing local calibration procedures in accordance with reference (a).

(9) Oversee the implementation of the Measurement Assurance Programs (MAPs) for NAVSEA-cognizant RCCs and depots to maintain measurement quality.

(10) Manage the Oxygen Instrument Calibration Room (OICR) Calibration Program in accordance with reference (dd).

(11) Manage the NAVSEA METCAL Calibration Laboratory Certification Program in accordance with references (p), (q), (dd) and (ee).

(12) Participate with other Systems Commands in the METCAL Shared Funding process. Review and approve shared metrology requirements. Ensure funding is available to support NAVSEA's shared responsibilities.

(13) Ensure NAVSEA participation in the development and maintenance of a single Navy METCAL AIS. Ensure NAVSEA representation on the METCAL AIS Configuration Control Board in accordance with reference (ff).

(14) Support and provide input to reference documents (a) through (hh).

(15) Provide NAVSEA 04 representation to the TAMS EB and its Standing Committees, including METCAL subject matter experts to support TAMS EB taskings as assigned.

(16) Meet semi-annually with Fleet, TYCOM and PEO representatives to review program status.

b. Program Executive Office (PEO), Ship Program Manager (SPM), Program Managers (PM) will:

(1) For new systems and equipment or prime system modifications:

(a) Provide funding to cognizant EAs for the following support:

[1] Procure the calibration standards, calibration documentation and test equipment to support unique equipment installations.

[2] Development of new and/or revise and update existing calibration procedures, related calibration documentation, calibration intervals, calibration standards and ILS associated requirements affected by any alteration installation.

c. Fleet Forces Command working with the Lead TYCOM will:

(1) Identify METCAL deficiencies and requirements to the METCAL Program Office.

(2) Ensure that budgeting and funding is provided for calibration of fleet assets.

(3) Ensure that personnel assigned to RMC and Fleet calibration laboratories are trained to perform required functions in accordance with reference (h).

(4) Ensure that RMC and Fleet calibration laboratories are certified.

d. All other Non-Fleet Activities will:

(1) Comply with the policies of this instruction.

(2) Implement and administer the METCAL program within their activities.

(3) Ensure budgeting and funding is provided for calibration of assets within their activities and certification of calibration laboratories under their cognizance.

CHAPTER THREE: SISCAL

1. SCOPE

a. SISCAL is applicable to:

(1) All ships of the United States Navy, active and reserve. The term "ship" in this instruction refers to all surface ships, Landing Craft Air Cushion (LCAC), aircraft carriers, and submarines.

(2) Calibration performed by SGCP FCAs, SISCAL teams and Aviation Intermediate Maintenance Department (AIMD) FCAs on installed instrumentation.

(3) Systems/equipment at Naval shore activities that replicate shipboard installations.

b. This chapter does not apply to areas listed under paragraph 3. (c) of the scope section in the main part of this instruction, and;

(1) TMDE whose calibration requirements and support are being addressed under the METCAL program.

2. BACKGROUND

a. Reliability and man-hour issues associated with the removal and reinstallation of shipboard installed instrumentation and the introduction of automated propulsion control systems necessitated that a new calibration methodology be implemented. The SISCAL process was developed to address the uniqueness of shipboard operational requirements and is shown in Figure (2). Shipboard installed instrumentation maintenance requirements are not based solely on the reliability of the instrument type; rather they are based upon operational considerations including the impact of application, function and inherent component reliability. The SISCAL Criticality Analysis Diagram (CAD) and logic diagrams based on the principles of Reliability Centered Maintenance (RCM) shall be used to determine the need to calibrate or perform other maintenance actions, identify the appropriate maintenance activity level, assign or develop an appropriate calibration procedure, and determine an appropriate maintenance interval in accordance with

references (e) and (gg). These installed instrumentation calibration support parameters are consolidated and documented in a ship-specific Calibration Requirements List (CRL).

b. The SISCAL program determines shipboard installed instrumentation calibration requirements and establishes required shipboard installed instrumentation calibration and other maintenance support processes. SISCAL processes satisfy the requirements of references (d), (e), and (h) as they apply to shipboard installed instrumentation. As a result, the SISCAL Program assures shipboard installed instrumentation used to monitor critical system and equipment parameters are accurate and calibrated.

3. **POLICY**

a. NAVSEA 04 shall execute technical authority and program oversight for NAVSEA SISCAL functions via the designated Technical Warrant Holder.

(1) SISCAL applies to permanently installed shipboard instrumentation and machinery control systems. SISCAL will be centrally managed by NAVSEA 04RM.

(2) All applicable activities shall implement and execute the NAVSEA SISCAL policies as defined in this instruction.

(3) Naval Surface Warfare Center, Carderock Division, Ship Systems Engineering Station (NSWCCD-SSES) is the EA for the NAVSEA SISCAL Program with duties and responsibilities as designated in writing by the appropriate NAVSEA Technical Warrant Holder. NSWCCD-SSES shall establish the requirements for calibration (or other related maintenance actions) for permanently installed shipboard instrumentation, develop a CRL for each ship using the Criticality Analysis logic based on the principles of RCM in accordance with reference (gg) (MIL P24534A) and assign/develop appropriate calibration or maintenance procedures, as necessary. CRLs for new construction ships will be funded by the appropriate PEO per paragraph 4.b.(2)(a) of this chapter. CRLs for New Construction platforms will be completed by Initial Operational Capability date + 90 days.

(4) The CRL is the source document for installed instrumentation and identifies calibration requirements, calibration intervals and calibration procedures for a ship's installed instrumentation. The CRL also documents installed

instrument configuration and the activity responsible for calibration or other maintenance tasks. The CRL supersedes calibration guidance provided by the Metrology Requirements List (METRL), reference (o) for permanently installed shipboard instrumentation. Ships without CRLs will develop Critical Instrument Lists (CILs) in accordance with reference (hh).

(5) The SISCAL EA shall determine and develop the appropriate calibration requirement and documentation for permanently installed shipboard instrumentation. This shall include identification/development of an approved maintenance or calibration procedure, determination of an appropriate maintenance or calibration interval, and assignment of a maintenance activity for performing the calibration.

(a) Approved calibration procedures can be Maintenance Requirement Cards (MRCs), System Calibration Procedures (SCPs), or ICPs. However, calibration procedures, regardless of format, are to provide essential instructions and information that enable calibration personnel to determine whether the instrument being calibrated is operating within prescribed tolerances or performance criteria and will:

[1] Establish and maintain uniformity of calibration test methodology and agreement of calibration results among Navy calibration activities.

[2] Provide detailed instructions concerning calibration equipment setup and connections, required measurement standards and ancillary equipment, test instrument connections, control adjustments, tolerance values and test criteria, performance of various tests, and interpretation of results.

(b) The SISCAL EA shall develop the required calibration procedures for all permanently installed shipboard instrumentation requiring calibration. The SISCAL EA, in coordination with the Technical Warrant Holder for Calibration, shall approve all calibration procedures for in-place calibration of shipboard installed instrumentation and automated machinery control systems. Approval of a calibration procedure is contingent upon shipboard validation.

(c) The assignment of installed instrumentation calibration intervals is based upon the impact of the instrument's operating environment, functionality, and reliability. Calibration intervals will be continually analyzed

using RCM principles and all available reliability/maintainability information including, but not limited to, 3M, METCAL AIS and equipment/system manufacturer's data.

(d) Assignment of a maintenance level to perform a calibration is based upon the skill level and training associated with the applicable calibration procedure. Calibration of shipboard installed instrumentation will be performed in-place or on-site whenever possible. The maintenance levels documented in the CRL are:

[1] SGCP FCAs that are assigned responsibility for instruments to be calibrated using procedures as directed in the applicable CRL.

[2] AIMDs onboard applicable aircraft capable ships now perform calibrations previously performed by the SGCP FCA. For shipboard installed instrumentation in applicable aircraft capable ships, approved calibration procedures can be MRCs or ICPs per CRL.

[3] SISCAL teams from designated Fleet Maintenance Activities (FMAs) assigned responsibility for performing System Calibration Procedures. SISCAL teams are authorized to perform Planned Maintenance System (PMS) calibration per Maintenance Index Page (MIP) series 9802.

[4] Calibration laboratories are assigned responsibility for performing calibration procedures of shipboard installed instrumentation if the calibration cannot be performed by the FCA, AIMD, or SISCAL teams from designated FMAs.

(e) In accordance with reference (o), installed instrumentation not requiring system calibration or alignment are maintained in accordance with PMS MIPs and MRCs.

(6) Personnel calibrating installed instrumentation shall possess an appropriate calibration technician Navy Enlisted Classification (NEC), Shipboard Gage Calibration Program training certificate or be an AIMD trained calibration technician to ensure they have the knowledge necessary to safely perform the approved calibration procedure using calibration standards. Personnel performing planned maintenance actions on installed instrumentation shall be trained technicians to ensure that they have the knowledge necessary to safely perform the

approved maintenance procedures and to operate the associated test equipment. If the required personnel are not available, submit a work request to the applicable Regional Maintenance Center to perform the required calibration. Training for the SGCP FCAs shall be provided by the activities authorized by the NAVSEA calibration Technical Warrant Holder.

(7) The Technical Warrant Holder for Calibration will designate the activities responsible for providing training and certification for the SISCAL Teams.

(8) A SISCAL calibration test equipment and calibration standards allowance list shall be established for each SISCAL Team. The test equipment identified in an approved calibration procedure shall be used to perform the procedure. Substitution from the preferred calibration test equipment shall be in accordance with the SISCAL EA's approved SCAT code. Each SISCAL Team and SGCP FCA's test equipment and calibration standards requirements shall be identified in the applicable SPETERL.

(9) Technical Manual Deficiency Evaluation Reports (TMDERs) shall be processed in accordance with guidance contained in the SISCAL CRL Computer Disk - Read Only Memory (CD-ROM) and reference (hh).

4. RESPONSIBILITIES

a. Deputy Commander for Fleet Logistics, Maintenance, and Industrial Operations Directorate (NAVSEA 04) will:

(1) Explore new technology and standardize GPETE models with multi-functional, multi-range equipment applicable to SISCAL requirements with emphasis on reducing life cycle cost.

(2) Establish policy, provide technical guidance for, and manage the NAVSEA SISCAL Program.

(3) Serve as the scientific, engineering and technical Program Authority for NAVSEA SISCAL Program via the designated Technical Warrant Holder.

(4) Provide approval for service use designation and ensure all required calibration logistic support elements that support prime systems or equipment are in place prior to fielding.

(5) Plan, program, budget and execute SISCAL engineering support functions, core products and services including:

(a) SISCAL Team audit plans and SISCAL Team audits

(b) SISCAL Team Report monitoring

(c) Calibration standards and test equipment evaluation, selection, specification and allowancing for SGCP FCAs and SISCAL Teams

(d) SISCAL test equipment SCAT code and APL development

(e) SISCAL Team and SGCP training curricula and qualification criteria

(f) Input to Navy METCAL AIS interface and business practices

(g) Installed instrumentation calibration interval analysis

(h) Resolution of Fleet emergent issues and other assigned actions

(i) Maintenance of SGCP MIP 9802

(j) SISCAL program management

(k) System Calibration Procedures, and

(l) Calibration Requirements Lists.

(6) Establish and execute plans of action for the SISCAL Program based upon funding and priorities coordinated with PEOs, SPMs, PMs, LCMs, Fleets, and TYCOMs.

(7) Provide PEOs, SPMs, PMs, and LCMs with SISCAL funding requirements for planning, programming and budgeting for assigned SISCAL functions. Meet quarterly with PEO/SPM/PM representatives for each ship class to review program status, tasking and funding.

(8) Provide direction to the SISCAL EA.

(9) Provide NAVSEA 04 representation to the TAMS EB and its Standing Committees for any SISCAL subject matter experts to support TAMS EB taskings as assigned.

b. The SISCAL EA will:

(1) Develop and maintain the CRLs.

(2) Develop and maintain the SISCAL calibration procedures IAW reference (o).

(3) Provide Technical and Logistics requirements to SISCAL Teams and SGCP FCAs.

(4) Provide responses to Fleet feedback and correspondence.

(5) Conduct SISCAL Team technical meetings.

(6) Interface with Navy METCAL AIS.

(7) Manage the NAVSEA SISCAL Team Certification Program and certify SISCAL Teams.

(8) Develop the training requirements and maintain a training plan for SISCAL Teams.

c. Program Executive Office (PEO), Ship Program Manager (SPM), and Program Manager (PM) will:

(1) For new systems and equipment or prime system modifications:

(a) Inform SISCAL EA of any equipment installations or alterations that have impact on installed instrumentation and machinery control systems.

(b) Implement the NAVSEA SISCAL requirements as defined in this instruction for calibration support of shipboard installed instrumentation.

(2) Provide funding to cognizant EA for the following SISCAL support:

(a) Development of CRLs for new construction platforms. CRLs for New Construction platforms will be completed by Initial Operational Capability date + 90 days.

(b) Development of required calibration procedures as identified in the CRL and associated ILS.

(c) Procurement of calibration test equipment to support unique equipment installations.

(d) Development of new and/or update of existing calibration documentation, procedures, and intervals for permanently installed shipboard instrumentation and machinery control systems affected by alterations.

d. Fleet Forces Command working with the Lead TYCOM will:

(1) Ensure that personnel assigned to SISCAL Teams and SGCP FCAs are trained to perform required functions in accordance with reference (h).

(2) Ensure that SISCAL Teams and SGCP FCAs are certified.

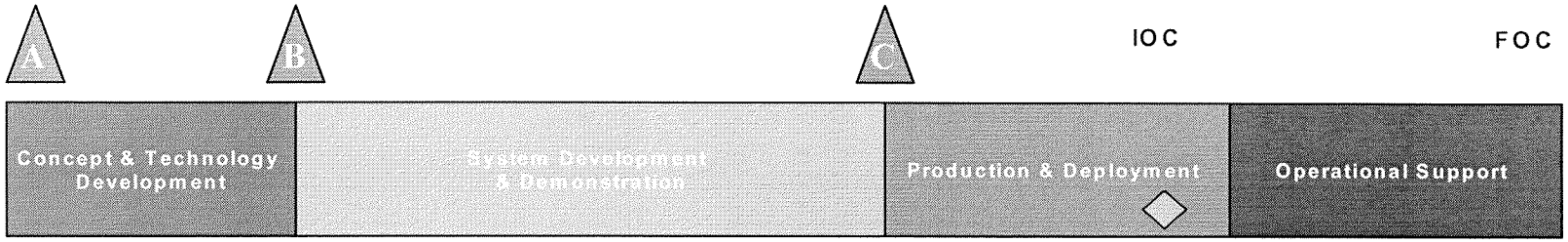
(3) Ensure that budgeting and funding is provided for calibration of installed instrumentation and machinery control systems.

NAVSEA METCAL/TMDE/SISCAL Programs Quick Look Page 08 SEP 2004

	METCAL	TMDE	SISCAL
Program Manager	SEA 04RM3	SEA 04RM3	SEA 04RM3
Technical Warrant Holder	SEA 04RME	SEA 04RME	SEA 04RM and 04RME
Program Sponsor(s)	OPNAV N43 (O&MN)	OPNAV N43 (O&MN) N75, N76, N77, N78, N91, N96, N6, N43 (OPN) SCN for New Ship Acquisition	OPNAV N43 (O&MN)
Engineering Agent	NSWC Corona	NSWC Indian Head, Seal Beach Det / Det Earle	NSWCCD-SSES Philadelphia
Governing Instructions	SECNAV 3960.6 OPNAV 3960.16 OPNAV 4700.7H NAVSEA 4734.1B	SECNAV 3960.6 OPNAV 3960.16 NAVSEA ST700-AM-PRO-010/TAMS NAVSEA 4734.1B	OPNAV 3960.16 OPNAV 4700.7H NAVSEA 4734.1B
Primary Stakeholders	Regional Cal Centers Depot Cal Centers Intermediate Cal Labs Field Calibration Activities (FCAs) CFFC / TYCOMs Applicable PEOs/SPMs/PMs	Afloat / Ashore units requiring TMDE Calibration Activities CFFC / TYCOMs Applicable PEOs/SPMs/PMs	SGCP FCAs SISCAL Teams Ships CFFC / TYCOMs Applicable PEOs/SPMs/PMs
Program Requirements	-Resolve Calibration Problem Reports -Conduct TMDE Interval Analysis -Develop & Maintain Instrument Calibration Procedures -Develop & Distribute METPRO -Conduct Metrology Engineering Analysis -Oversee Calibration Training -Manage OICR Calibration Program -Manage METCAL Calibration Laboratory Certification Program	-Identify TMDE Requirements -Manage Acquisition, Life Cycle, Standardization & Modernization -Develop TMDE Allowances & Asset Visibility -Grant Waivers for SPETE & non-standard TMDE -Manage SCAT Assignment -Maintain TMDE Index, SPETERL - Procure initial TMDE and calibration standards for new construction platforms in coordination with PEOs/SPMs/PMs.	-Determine calibration and maintenance requirements for shipboard installed instrumentation -Develop & Maintain CRLs for each Ship -Develop and maintain calibration and maintenance procedures for Shipboard Installed Instrumentation including SCPs and PMS -Oversee the Shipboard Gage Calibration Program -Establish SISCAL Team Training, Audit Procedures & Certification Requirements

Table 1

TEST EQPT, CAL STDS, INSTRUMENTATION & CONTROL SYSTEMS CALIBRATION



- Metrology Guidance/ Consideration
- International/ National Measurement Technology Assessment
- Instrumentation and Systems Design for Maintenance

- Requirements Analyses
- ILSMT
- LSA
- Logistics Document Reviews
- CMRS Guidance
- Metrology R&D
- Evaluation Criteria
- Installed Instrumentation Suite Baseline/ Template Development

- Verify Contractor Traceability
- Technology Validation
- CMRS Development
- CSP Development
- Temp Inputs
- Installed Instrumentation and Systems Maintenance Requirements Analyses

- SERD
- CMRS Review, Approval
- Calibration Support Plan Approval
- Cal Standard Design, Develop, Procurement
- Evaluation Criteria
- Cal Procedure Development, Approval (Contractor, DoD)
- Tech, Mgt, Pol. Docs
- Facility (Incl Environ) Requirements
- Training Requirements
- Manpower, Workload Requirements
- Interval Analyses

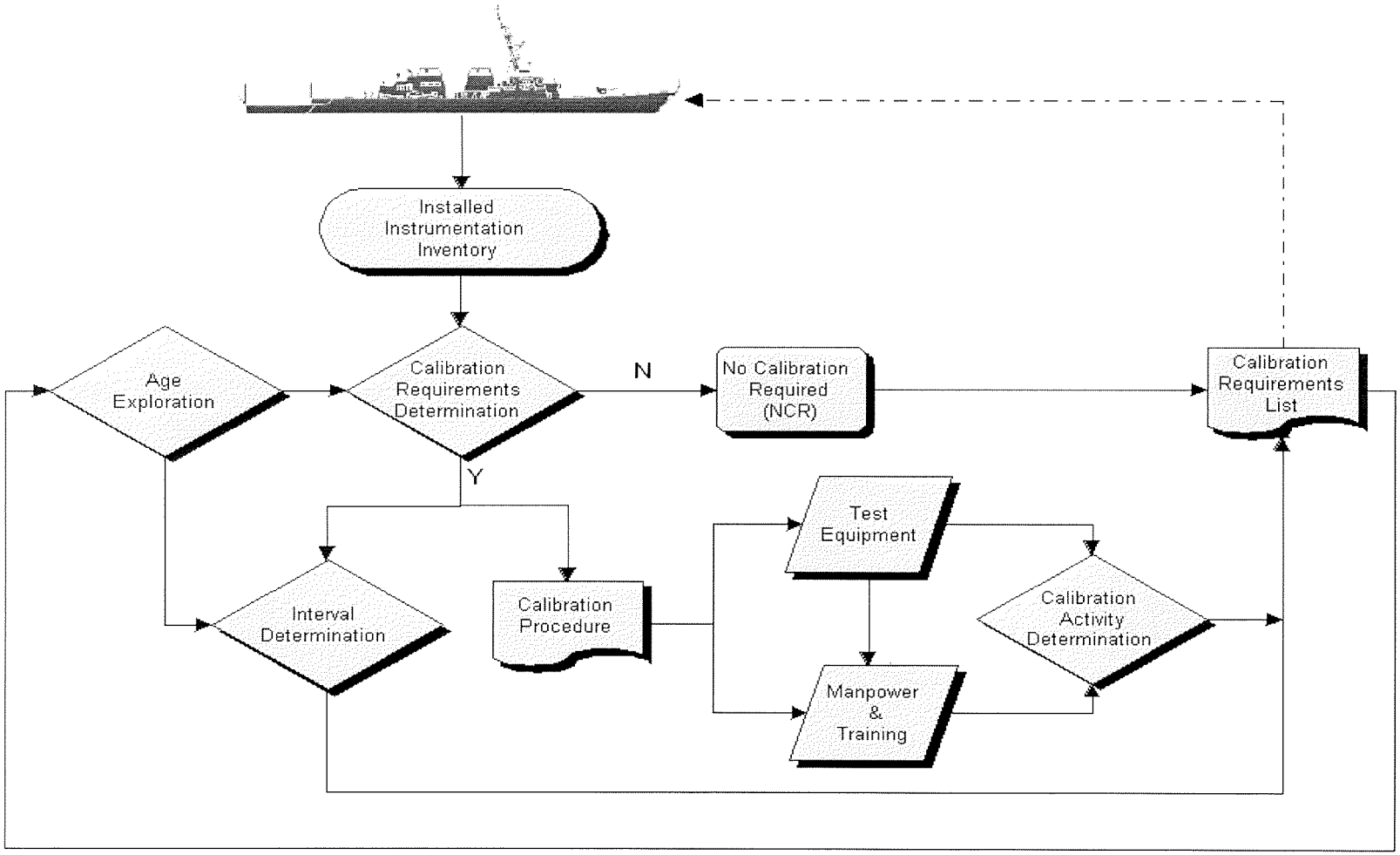
- Contractor's Calibration System Evaluation (Follow-on)
- Calibration Std ILS
- Deploy Calibration Support
- Establish Cal Support Level
- Installed Instrumentation Sight Validation
- Calibration RCM Analyses
- CRL Development

- Test Eqpt & Cal Stds Calibration
- Installed Instrumentation Calibration (SGCP)
- System Calibration (SISCAL)
- Feedback Responses
- Technical/Engrg/ Training Assists
- Joint Service Support
- Modification/Rqmt Planning

- Calibration Reliability Analyses
- METCAL AIS Process Control

Figure (1)
Calibration Requirements Determination for Acquisition Programs

SISCAL PROCESS



(Figure 2)

Table 1

LIST OF ACRONYMS

3M	Maintenance and Material Management
ACR	Allowance Change Requests
AIMD	Aviation Intermediate Maintenance Department
AIS	Automated Information System
AIT	Alteration and Installation Team
APL	Allowance Parts Lists
ATE	Automatic Test Equipment
ATS	Automated Test Systems
CAD	Criticality Analysis Diagram
CAL STDs	Calibration Standards
CDBF	Central DataBase Facility
CD-ROM	Compact Disk - Read Only Memory
CDM	Configuration Data Manager
CNO	Chief of Naval Operations
COMNAVSEASYSCOM	Commander, Naval Sea Systems Command
CMRS	Calibration and Measurement Requirements Summary
CRL	Calibration Requirements List
DIRSSP	Director, Strategic Systems Program
DoD	Department of Defense
DODCEL	Department of Defense Consolidated Electronic Test Equipment Listing
DoN	Department of the Navy
EA	Engineering Agent
EB	Executive Board
FBM	Fleet Ballistic Missile
FCA	Field Calibration Activity
FMA	Fleet Maintenance Activity
FMP	Fleet Modernization Program
GPETE	General Purpose Electronic Test Equipment
ICP	Instrument Calibration Procedure
ILS	Integrated Logistics Support
INSURV	Board of Inspection and Survey
ISEA	In-Service Engineering Agent
JFMM	Joint Fleet Maintenance Manual
JLC	Joint Logistics Commanders
JTCG-CMT	Joint Logistics Commanders Joint Technical Coordinating Group for Calibration and Measurement Technology
LCAC	Landing Craft Air Cushion
LCM	Life Cycle Manager
MAPs	Measurement Assurance Programs
MARCORSYSCOM	Marine Corps Systems Command
METCAL	Metrology and Calibration

METCAL AIS	Metrology and Calibration Automated Information System
METRL	Metrology Requirements List
METREQ	Metrology Requirements
MIP	Maintenance Index Page
MRC	Maintenance Requirement Card
MTI	Mechanical Test Instrument
NAVAIR	Naval Air Systems Command
NAVSEA	Naval Sea Systems Command
NCR	No Calibration Required
NEC	Navy Enlisted Classification
NETC	Navy Education and Training Command
NIST	National Institute of Standards and Technology
NSWC	Naval Surface Warfare Center
NTSP	Navy Training System Plan
OEM	Original Equipment Manufacturer
OICR	Oxygen Instrument Calibration Room
OPNAV	Office of Chief of Naval Operations
OPTAR	Operating Target
PARTS	PSD Automated Reporting and Tracking System
PEO	Program Executive Office
PM	Program Manager
PMS	Planned Maintenance System
POM	Program Objective Memorandum
PQDR	Product Quality Deficiency Report
PSD	Program Support Data
R&D	Research and Development
RADIAC	Radiation Detection, Indication and Computation
RCC	Regional Calibration Center
RCM	Reliability Centered Maintenance
ROH	Regular Overhaul
RDT&E	Research, Development, Test and Evaluation
SCAT Code	Sub-Category Code
SCLSIS	Ship Configuration and Logistics Support Information System
SCN	Shipbuilding and Conversion, Navy
SCP	System Calibration Procedure
SGCP	Shipboard Gage Calibration Program
SISCAL	Shipboard Instrumentation and Systems Calibration
SMTIAL	Shipboard/Shore Mechanical Test Instruments Allowance Lists
SM&R	Source, Maintainability and Recoverability
SPETE	Special Purpose Electronic Test Equipment

SPETERL	Ship/Shore Portable Electrical/Electronic Test Equipment Requirements List
SPM	Ship Program Manager
SSP	Strategic Systems Programs
SSR	Ship Selected Record
TAMS	Test and Monitoring Systems
TAV	Total Asset Visibility
TEL	Test Equipment List
TMDE	Test, Measurement, and Diagnostic Equipment
TMDER	Technical Manual Deficiency Evaluation Report
TYCOMs	Type Commanders