NAVAL INSTRUCTION 9093.1C

From: Commander, Naval Sea Systems Command

Subj: COMBAT SYSTEM SHIP QUALIFICATION TRIALS FOR SURFACE SHIPS

Ref: (a) NAVSEAINST 9410.2, Naval Warfare Systems Certification Policy, 18 Jul 05
     (b) NAVSEAINST 5400.97B, Virtual SYSCOM Engineering and Technical Authority Policy, 3 Jan 05

Encl: (1) CSSQT Objectives, Definitions, Guidelines and Planning Process

1. Purpose. Provide policy and identify responsibilities for Combat System Ship Qualification Trials (CSSQT) for surface ships. This is a major revision to the previous instruction.

2. Cancellation. NAVSEAINST 9093.1B of 6 June 2002

3. Background. CSSQT provides the opportunity to verify and validate combat/weapon systems performance for new construction ships and for ships undergoing significant conversion/modernization availabilities. Data collection and analysis of combat/weapon systems and ship performance during CSSQT supports warfare area qualifications and certifications. In addition, the CSSQT period can be leveraged to conduct integrated Developmental and Operational Testing (DT/OT), tactics validation, and fleet training.

4. CSSQT Purpose. The purpose of CSSQT is to verify and validate that an individual ship's combat/weapon systems have been installed correctly and can be operated and maintained in a safe and effective manner. This is accomplished by assisting ship's force in achieving (1) a sustainable level of combat/weapon system operational readiness and (2) a maintainable level of material readiness. Enclosure (1) outlines the detailed objectives, provides scope and specific guidelines for the conduct of CSSQT, and describes the CSSQT planning, execution and reporting process.

5. Policy. CSSQTs will be scheduled for all surface combatants, aircraft carriers, and amphibious ships completing new construction or significant conversion/modernization availabilities. Designation of post availability ships for

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CSSQTs will be made by applicable Program Executive Offices (PEOs)/Program Managers (PMs) in coordination with the Type Commanders, CSSQT Certification Authority and Naval Sea Systems Command (SEA 62). These designations will be based on the extent of combat system changes made during the availability or the cumulative effect of combat/weapon systems changes since the last CSSQT. Determinations to conduct CSSQTs and their scope will be developed by a collaborative system engineering process described in enclosure (1). Following CSSQT, each applicable mission area will be qualified, as defined in enclosure (1), to be safe and effective based on combat/weapon system performance and observed crew proficiency. CSSQT does not directly certify combat/weapon systems, but CSSQT qualification results can be used to support Warfare System and Platform Certification Decisions in accordance with reference (a).

6. Responsibilities. Naval Sea Systems Command (NAVSEA), Chief of Naval Operations (OPNAV), PEOs/PMs, and the platform Type Commanders (TYCOMs) have responsibility for CSSQT scheduling, coordination, funding, conduct, reporting, and qualification of applicable mission areas. Specific responsibilities are as follows:

a. NAVSEA. NAVSEA has responsibility for establishing CSSQT guidance, coordinating CSSQTs with Fleet commands and PEOs/PMs, and monitoring the CSSQT program.

(1) SEA 62

(a) Serve as the Technical Process Owner for CSSQTs as defined in reference (b).

(b) Establish and coordinate overall policy with Commander, Fleet Forces Command (CFFC) and other commands as necessary.

(c) Monitor CSSQT efforts and conduct an annual review to ensure that CSSQTs are achieving desired objectives. SEA 62 will convene the review and seat a panel consisting of representatives from OPNAV, CFFC, PEOs/PMs, and the CSSQT Certification Authority. The review will solicit Fleet feedback to ensure the CSSQT program is addressing Fleet needs. It will also validate out-year CSSQT requirements in support of budget planning, Fleet Response Plan scheduling and the Naval Warfare System Certification Process.

(2) CSSQT Certification Authority. Naval Surface Warfare Center Port Hueneme Division (NAVSEA PH) will serve as the CSSQT Certification Authority as defined by reference (b). Specific responsibilities include:
(a) Qualify the applicable mission areas as safe and effective based on combat/weapon systems performance and observed crew proficiency assessed during CSSQT.

(b) Release CSSQT reports via naval message, in coordination with the applicable PEO/PM. The final CSSQT report shall qualify the applicable mission areas as safe and effective or identify requirements for additional testing, firings and/or training necessary to obtain qualification. The final report will detail all CSSQT activities; problems identified, and recommended corrective action.

(c) Ensure appropriate technical warrant holders participate in the CSSQT planning, execution and reporting process.

(d) Participate as a panel member in the annual CSSQT program review.

(e) Provide oversight of the Training Qualification Standards (TQS) Program including acting as Chair for TQS review boards for any Senior Representatives, Project Officers, and other applicable test team members.

(f) Approve ship specific CSSQT Test Plans.

(g) Advance and improve the CSSQT program through application of modeling and simulation (M&S) technologies and related test and evaluation tools that will lower CSSQT costs, increase test fidelity or broaden test result applicability.

(3) CSSQT Execution Agent. Responsible for the overall planning and execution of CSSQTs for surface ships. Specific responsibilities include:

(a) Coordinate long-range CSSQT schedules, as well as target, ordnance, services requests and test objectives with affiliated PEOs/PMs and SEA 62.

(b) Maintain the Training Qualification Standard (TQS) Program for key members of the CSSQT team.

(c) Assign a Project Officer (PO) and other CSSQT team members. Coordinate with other activities in identifying government and contractor personnel for the remaining CSSQT team assignments. The PO will establish liaison with the ship and conduct an onboard briefing well in advance of the CSSQT.
(d) Coordinate the CSSQT SOE with the participating ship, ISIC, and TYCOM. Identify crewmember and combat/weapon systems availability requirements for the conduct of each scheduled event.

(e) Participate in the development and approval process for event scenarios.

(f) Develop a CSSQT test plan and other required documents.

(g) Schedule, conduct and participate in test readiness reviews to ensure the participating ship, test range, and resources and services are available and ready to conduct CSSQT.

(h) Assign a senior representative, when directed, to be at the test site to supervise the execution of live ordnance firing events, and to coordinate with the affiliated PEOs/PMS in resolving emergent test execution issues.

(i) In coordination with the applicable PEO, develop initial, final and follow-up CSSQT reports to be released via naval message. The initial message establishes CSSQT scope and expectations and provides a status on all prerequisite requirements of the participating ship. The final report will detail all CSSQT activities; problems identified, and recommended corrective action. The final report shall qualify ship specific combat/weapon systems for applicable mission areas as safe and effective or identify requirements for additional testing, firings and/or training necessary to obtain qualification.

(j) Ensure Test Observation Reports (TORs) are submitted and tracked in accordance with enclosure (1).

(k) Ensure lessons-learned are captured and provided to the units and activities. Format the lessons-learned so they can be disseminated and used by teams conducting future CSSQTs.

b. PEOs/PMS

(1) Identify those surface combatants, aircraft carriers and amphibious ships that require CSSQTs, and coordinate their scheduling with Fleet commands.

(2) Coordinate budgeting and funding of the CSSQT program.

(3) Approve ship specific CSSQT Test Plans if applicable.
(4) In coordination with the NAVSEA Technical Process Owner, CSSQT Certification Authority and Technical Warrant Holders, utilize the CSSQT planning process described in enclosure (1) to determine the scope required to enable the combat/weapon systems to be assessed and qualified as safe and effective.

(5) Assign responsibility for CSSQT planning and execution to the CSSQT Execution Agent, jointly designated by the PEO and SEA 06, who will serve as the ship’s single Point of Contact (POC) during CSSQT.

(6) Provide guidance on CSSQT scope and expectations to the CSSQT Execution Agent.

(7) Ensure required resources (i.e., ordnance, targets and test services) are requested and available to support the approved test scenarios.

(8) Participate as a panel member in the annual CSSQT program review.

(9) Schedule, conduct and participate in test readiness reviews to ensure the participating ship, test range, and resources and services are available and ready to conduct CSSQT.

c. Fleet Commands. Coordinate scheduling of Fleet air, surface and sub-surface assets, and provide ship steaming days and OPTAR funds to conduct CSSQT. CFPC will participate as a panel member in the annual CSSQT review.

(1) **Type Commanders**

(a) Approve the coordinated CSSQT Schedule.

(b) Ensure that all prerequisite post-availability maintenance and testing are accomplished prior to CSSQT.

(c) Ensure that ship’s schedule allows for proper conduct of inport and at-sea phases of CSSQT. Scheduling should optimize resources and quality of life during Fleet Response Training Plan (FRTP).

(d) Identify alterations (equipment installs) requiring at-sea testing that can be accomplished concurrently with CSSQT.

(e) Coordinate Fleet training schedules to optimize sharing of assets.
(f) Ensure adequate ship steaming days and OPTAR funds are available to conduct CSSQT.

(2) Immediate Superior in Command (ISIC)

(a) Ensure ship's schedule allows for completion of required CSSQT events and accomplishment of CSSQT objectives.

(b) Monitor ship's progress throughout CSSQT and provide assistance as required.

(3) Participating Ships

(a) Develop a detailed Schedule of Events (SOE) with the CSSQT Execution Agent, and submit the schedule to the TYCOM via the ship's ISIC for approval.

(b) Ensure required combat/weapon systems and sufficient formally trained crewmembers are available to support the SOE, and maintain close liaison throughout the entire CSSQT to make any required adjustments to the SOE.

(c) Participate in various test readiness reviews during the planning and conduct of CSSQT.

d. Other Shore Engineering and Fleet Support Commands. Assist the applicable PEO/PM, TYCOM, CSSQT Certification Authority and CSSQT Execution Agent during the formulation of CSSQT requirements, plans and procedures, and provide technical support as required.

7. Action

a. NAVSEA, affiliated PEOs/PMs, CSSQT Execution Agent, and CSSQT Certification Authority will ensure CSSQTs are scheduled and conducted in accordance with policies and qualification processes as specified in this instruction. Enclosure (1) is considered a living document and will be updated as required.

b. In coordination with applicable PEOs/PMs, the CSSQT Certification Authority will submit final CSSQT reports and qualify applicable mission areas as safe and effective unless otherwise noted.

c. All CSSQT implementing directives issued by subordinate and supporting activities will adhere to this instruction and its enclosure.
8. Reports

   a. Ensure CSSQT final reports are coordinated in accordance with the provisions of this instruction and released to CFFC within 90 days following the completion of CSSQT.

   b. The CSSQT annual review will be announced in advance to ensure visibility and input from Fleet, PEOs/PMs and Navy Activities. The CSSQT annual review reports will provide status of the CSSQT program and will be published by SEA 62 within 30 days of the annual review.

   [Signature]

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1. **Objectives.** The objectives of CSSQT are to verify and validate that an individual ship's combat/weapon systems have been installed correctly and can be operated and maintained in a safe and effective manner. This is accomplished by a combination of Planned Maintenance System (PMS) actions and inport or at-sea combat/weapon systems engineering exercises. These exercises employ the combat/weapon systems and ship's force in realistic test environments (live or simulated) and provide a demonstration of the selected sub-systems' maintenance readiness and operational readiness. Measures of Effectiveness (MOEs) in assessing overall readiness include: System Documentation Adequacy, Logistics Support Adequacy, Maintenance Adequacy, Operational Adequacy, and other areas deemed as required by the Type Commander, PEO or appropriate Program Manager. Figure (1) maps the goals, objectives, readiness requirements and readiness actions required to conduct a safe and effective CSSQT. A secondary objective is to provide the opportunity to leverage the CSSQT period for the conduct of integrated Developmental and Operational Testing (DT/OT), tactics validation, and fleet training.

![Figure 1](image_url)

Safe and Effective: Safety is the condition or practice of preventing or avoiding death, injury, or damage or loss of equipment or property. In the context of Safe and Effective combat/weapon systems qualification, it represents the level to which risks of injury or damage (hazards) to personnel and equipment have been reduced to an acceptable level.
System Effectiveness has been defined as the probability of a system completing its mission. A cogent treatment of this subject states that system effectiveness (E) at any given moment is the result of the following three factors:

- The system capability to perform the mission (Pc);
- The availability of systems when needed (Ao); and,
- Trained personnel available to operate the system (Pp)

All three factors are necessary for mission success.

a. **Primary Objectives**

(1) Demonstrate the capability of ship's force to operate and maintain ship systems and equipment and employ them individually and collectively in a safe and effective manner.

(2) Verify and validate combat/weapon system performance in selected mission areas through actual demonstration and operational performance testing.

(3) Provide supplemental instruction and familiarization to ship's force in the maintenance and operation of the installed systems and equipment. In addition, provide instruction and familiarization in the use of all combat/weapon systems level documentation as applicable (e.g., Combat System Technical Operations Manual (CSTOM), Combat System Alignment Manual (CSAM), Combat Systems Operational Sequencing System (CSOSS), Combat Systems Accuracy Trials (CSAT), Overall Combat System Operability Test (OCSOT) and Capabilities and Limitations Document). Also provide supplemental combat/weapon systems training to assure crew readiness necessary to accomplish technical objectives.

b. **Secondary Objectives**

(1) Identify and document system and equipment deficiencies and provide feedback to the technical community.

(2) Identify and document system documentation, logistics and test equipment deficiencies and provide feedback to the logistics community.

(3) Identify deficiencies in training that would adversely impact the ship's ability to maintain a stable level of combat readiness.

(4) Provide the opportunity to leverage the CSSQT period for the conduct of integrated DT/OT, tactics validation, and fleet training.
2. **CSSQT Scope**

   a. **Combat System Ship Qualification Trials (CSSQT).** CSSQT verifies and validates mission critical elements of surface ship combat/weapon systems. The combat/weapon system is defined as a functional grouping of all the shipboard equipment, computer programs, personnel and documentation, plus other critical systems that are designed to detect, track, identify, communicate, process, evaluate, and execute the engagement of enemy forces, either actively or passively. It is the warfare fighting capability of the ship. Readiness for CSSQT is achieved by providing supplemental instruction on correct operational and maintenance actions, performing exercises to demonstrate system performance, material readiness, operator/maintainer proficiency and logistics adequacy and sustainability. The following warfare areas, as applicable, shall be included in CSSQT for new construction ships or ships undergoing significant conversion/modernization:

   - Air Defense Warfare (ADW)
   - Strike Warfare (STW)
   - Surface Warfare (SUW)
   - Undersea Warfare (USW)
   - Expeditionary Warfare (EXW)
   - Electronic Warfare (EW)

   The following systems, which support multiple warfare areas and are critical to its success, are also typically within CSSQT scope:

   - Command, Control, Communications, Computers and Intelligence Systems (C4I)
   - Combat System Support Elements (Power, Dry Air, Coolant System)
   - IC/Navigation Systems
   - Underway/Vertical Replenishment Systems (UNREP/VERTREP) (Missiles and Ammunition only)
   - Ordnance Handling and Movement
   - Signal Intelligence
   - Offboard Vehicle Launch, Handling and Recovery Systems

   The CSSQT effort progresses from the maintenance by ship's force within the framework of the Planned Maintenance System (PMS) to the operation of individual systems through more complex inter-system maintenance and operations. CSSQT culminates in a final demonstration of combat/weapon systems operability through simulated and, if required, live firing exercises. The CSSQT shall, if required, include auditing logistics support (Logistics
Special Assistance Team - LOGSAT), publication accuracy (Publications Special Assistance Team - PUBSAT) and test equipment adequacy (Test Equipment Special Assistance Team - TESAT) for combat/weapon systems.

b. **CSSQT Firing Exercises.** The intent of CSSQT live firing exercises is to demonstrate the complete detect-to-engage weapon firing sequence. This enables the collection of engineering data for assessment of end-to-end performance of combat/weapon system(s), and provides the opportunity for ship's force to demonstrate their ability to safely and effectively operate the system(s). Requirements for and scope of all live fire events shall be determined as part of the CSSQT planning process.

c. **Duration.** The duration of CSSQT is dependent upon:

- The complexity of the individual system or combat/weapon systems
- The proficiency of ship's force
- Work accomplished during the availability
- The amount of additional testing required for DT/OT requirements, tactics validation and Fleet training.

3. **Guidelines**

a. **General Conduct.** Initial pre-CSSQT visits will be conducted to gain an early assessment of the material readiness and operational status of the combat/weapon systems and crew, and to ensure all ship prerequisite requirements are addressed. This may include visiting the shipyard to identify any incomplete work or testing, and identifying outstanding TORs. These visits must be conducted as early as possible to ensure that any corrective action can be taken before commencement of CSSQT. The CSSQT Execution Agent will document and release all findings as part of the initial CSSQT report.

Initial phases of CSSQT are devoted to determining the basic operational condition of the equipment and the proficiency of the ship's personnel through accomplishment of applicable PMS tests. Performance of PMS provides training for ship’s force in both preventive and corrective maintenance. After successful and stable combat/weapon systems performance has been established, scenarios are introduced to allow for combat/weapon systems operation and, if applicable, operation in multi-threat environments. Live tracking exercises will assess the performance of the systems and allow the maintenance personnel to observe the effect of their maintenance actions. The final phase of the CSSQT shall consist of live or simulated firings, as
required, on selected systems to serve as final verification of the safe and effective use of the combat system.

b. **CSSQT Team.** A team of experienced, Training Qualification Standards (TQS) qualified engineers and technicians will be assembled to provide maintenance and technical operations instruction to shipboard personnel. Composition of the team is based on the events scheduled during CSSQT.

c. **Formal Instruction.** Formal instruction is conducted to enable ship's force to operate and maintain their combat/weapon systems and to ultimately support the successful conclusion of CSSQT. The instruction consists of structured discussions on capabilities, limitations, modes of operation, information flow and combat/weapon systems level documentation, followed by extensive hands-on watch team training in combat/weapon systems operations during the at-sea phases.

d. **Qualification.** Proper ship system(s) performance and crew proficiency are the criteria used for qualifying the applicable mission areas. This is accomplished by ship's force demonstrating their capability to maintain and operate the equipment or systems through simulated and live firings, as required.

e. **Scenario Guidance.** CSSQT scenarios provide a challenging operational environment to verify crew proficiency and combat/weapon systems performance in all applicable warfare areas tested through a coordinated series of exercises. Scenarios consist of single and multi-target engagements representing current and projected threats in both clear and Electronic Attack (EA) environments.

f. **Test Plan.** The test plan will provide an overall description of all events that are to be conducted during the CSSQT. Tests will be based on approved Test Objectives developed from engineering-based requirements. Test Plans will be approved by the CSSQT Certification Authority and other agencies as applicable. The approved Test Plan will be provided not less than one month prior to CSSQT commencement.

g. **Ship Preparation.** Ships that have been designated will achieve the following prerequisites prior to CSSQT commencement:

   (1) Following the industrial period, the ship has successfully completed the required TYCOM post-availability assessment and has been recommended for continuation of follow-on evolutions.
(2) Ensure that all prerequisite post-availability maintenance and testing are accomplished.

(3) Sufficient formally trained personnel are onboard to adequately maintain and operate the equipment and systems.

(4) Supporting test equipment for all systems is available, operable, calibrated and distributed to the appropriate work centers for use.

(5) All support systems are operable and capable of supporting the applicable system and equipment during CSSQT. Support systems include, but are not limited to chilled water, cooling systems, dry air, air conditioning and electrical power.

4. CSSQT Planning Process. The CSSQT planning process establishes a close-loop system engineering approach that provides for long range and near term planning, execution, reporting and feedback. This approach verifies combat/weapon system performance, demonstrates compliance with design requirements, validates improved capabilities or correction of deficiencies, and provides a mechanism to influence future combat/weapon system design. The process applies a structured standardized engineering approach to the CSSQT and T&E processes for all ship classes. The process includes the following major activities:

- CSSQT Long Term Planning And Scope Determination
- CSSQT Annual Review
- CSSQT Detailed Planning
- CSSQT Execution
- CSSQT Performance Reporting

a. CSSQT Long Term Planning and Scope Determination. The objectives of this activity include:

(1) Define the planned CSSQT scope and system engineering test requirements, and determine requirements for simulated or live firing events.

(2) Develop test objectives and assign to CSSQTs.

(3) Provide early identification of test resources required to support CSSQT events including, range services, participating units (aircrafts, ships, Land-Based Test Sites), ordnance and target requirements.

A hierarchal approach is used to identify test requirements from element/system level capabilities to platform/ship class and
inter-platform/ship capabilities. Test requirements are derived
from various working groups and T&E Integrated Product Teams
(IPTs) as well as from Fleet activities to address doctrine
evaluation. These working groups will be responsible for initial
identification and documentation of CSSQT TOs derived from core
CSSQT requirements, TEMPS, and critical experiments. TOs will
provide measures of performance, data collection requirements,
identify resource requirements, and where Modeling and Simulation
(M&S) is required as a prerequisite.

b. CSSQT Annual Review. SEA 62 will convene an annual
review to ensure the CSSQT program is addressing fleet needs.
The review panel will consist of representatives from OPNAV,
CFFC, PEO IWS, and the CSSQT Certification Authority. In
addition to the panel, participants will include the PEOs/PMs,
CSSQT Execution Agent, NAVSEA Warfare Centers, test ranges and
associated range resource activities, and fleet Type Commanders.
The review meeting will validate the scope of planned CSSQTs and
address CSSQT Execution Agent recommendations and/or concerns.
Representatives from the applicable ship classes will address
unique combat system test requirements that could leverage from
testing planned for CSSQTs, such as demonstrating
interoperability requirements and sharing T&E resources. All
known relevant technical, programmatic, financial, and scheduling
issues requiring NAVSEA, OPNAV, CFFC or PEO support will be
discussed. Open technical issues remaining from previous CSSQTs
or Fleet firings should be presented along with CSSQT performance
metrics. Additionally, lessons-learned from previous CSSQTs or
Fleet firings will be reviewed as well as results from DT and OT
events.

c. CSSQT Detailed Planning. The objectives of this activity
include:

(1) Validate the planned CSSQT scope and system
engineering test requirements.

(2) Develop scenarios, and identify data collection
requirements.

(3) Ensure that adequate modeling and simulation of
planned scenarios has been conducted to define expected outcome
and mitigate risks associated with complex at-sea test events.

(4) Develop a test plan for the execution of scenarios
and coordination and conduct of CSSQT.

(5) Develop a plan for the management and analysis of
combat/weapon system performance data that fully assesses system
performance.
d. **CSSQT Execution.** Ship specific CSSQTs will be conducted in accordance with a test plan, which is coordinated and briefed to ship’s force prior to CSSQT execution. TORs will document any issues and/or discrepancies pertaining to combat system engineering and subsystem integration (computer programs and equipment); human systems integration; and Combat System-supportability.

e. **CSSQT Performance Reporting.** System performance issues identified through CSSQT testing are reviewed and adjudicated through a weapon system performance assessment process and addressed through system design/development processes. Results will be provided at the annual CSSQT review.