DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
WASHINGTON, D.C. 20362

IN REPLY REFER TO

NAVSEAINST 3560.1
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NAVSEA INSTRUCTION 3560.1

From: Commander, Naval Sea Systems Command

To: All Offices Reporting Directly to COMNAVSEA Distribution List

Subj: DELIVERY OF NAVAL EMBEDDED COMPUTER PROGRAMS

Ref: (a) NAVMATINST 3560.1 of 26 Jul 83; Delivery of Naval Embedded Computer Programs to User Activities

(b) TADSTAND E (Revision 1) MAT 08Y of 16 Mar 84; Software Development, Documentation, and Testing Policy for Navy Mission Critical Systems

(c) OPNAVINST 5239.1A of 3 Aug 82; Department of the Navy Data Processing Security Program

(d) NAVMATINST 5200.27A of 18 Apr 73; Transfer of Navy Tactical Digital System software responsibility, procedures for

(e) NAVSEAINST 5400.57 of 28 Jun 78; Technical responsibility and authority to perform engineering functions for combat subsystems and equipment

Encl: (1) Definitions

1. Purpose. Prescribe the procedures applicable to the delivery of naval embedded computer programs. Numerous directives have promulgated standards for the documentation, development, test and configuration management of naval embedded computer programs. Reference (a) specifically addresses the delivery of computer programs and sets forth policies and requirements for such deliveries. This instruction amplifies on that.

2. Definitions. See enclosure (1).

3. Applicability

a. All mission critical systems and non-mission critical systems that are integrated/interfaced to mission critical systems in production and in engineering under our cognizance which use embedded computer resources.

b. All ship-delivered computer programs including those delivered by others. Reference (a) designates NAVSEA as the cognizant systems command for delivery of embedded computer programs to surface ships or submarines.

c. All categories of embedded computer programs, including application, test and maintenance, trainer, and support, whether they are being delivered to the user for the first time or after a major upgrade. The documentation standards apply to all program deliveries.

d. Not applicable retroactively but documentation and delivery procedures for new programs or major upgrades to programs already delivered shall comply.

4. Policy

a. Delivery of shipboard embedded computer programs shall be coordinated through the appropriate ship class Combat System Engineer (CSE) as follows:

SHIP CLASS	DESIGNATED CSE
CG 47	PMS 400
DDG 51	PMS 400
New Construction FFG 7	PMS 399
Other Surface	SEA 61
SSBN 726	PMS 396
Other SSBN	SEA 63
SSN	PMS 409

b. The CSE shall determine the requirement for combat system level integration testing prior to shipboard delivery. The CSE is responsible for the planning, budgeting, and conduct of the test effort and may task participating subsystem managers to provide support. These tests, to the extent practicable, shall be conducted at a shore test facility prior to shipboard testing. See reference (b) for computer program quality acceptance testing standards for each new or upgraded program..

c. The initial delivery of a computer program to a ship class shall be by a qualified delivery team. The end user must be able to perform program checkout and program operation with the documentation that is provided with the program delivery.

d. The Director, Combat Systems Engineering Group (SEA 61) shall coordinate with the Naval Air Systems Command (NAVAIR) during the development and for the release of aircraft computer programs which interface with ship tactical data systems via data link or by other electrical means.

5. Action

a. The SHAPM/SLM shall:

(1) Determine the schedule for upgrades and availabilities and establish the schedule requirements for the delivery of computer programs to each ship under his cognizance.

(2) Concur with the configuration list of computer programs to be delivered to each ship under his cognizance.

b. The CSE shall:

(1) Develop a schedule for the delivery and determine the configuration of computer programs to meet the requirements established by the SHAPM/SLM and submit the delivery schedule and the configuration list to the SHAPM/SLM for concurrence. Identify the specific ship and schedule the initial program delivery in coordination with the appropriate Type Commander, Shipyard Commander, or Supervisor of Shipbuilding. Designate the delivery team identifying team members by name, organization, and team function.

(2) Ensure through this process that all integrated/interfaces computer programs are compatible and consolidate deliveries, when possible, to minimize impact to Fleet units. Subsystem managers, ISEAs, SSAs shall plan computer program updates, modifications, and testing to conform to the established schedules.

(3) Grant waivers, with SHAPM/SLM concurrence, when urgent requirements exist to deliver a computer program outside of the developed schedule.

(4) Establish liaison with the appropriate Naval Electronic Systems Command and Naval Air Systems Command subsystem managers and other NAVMAT program managers for the coordination of shipboard delivery of computer programs under their cognizance. Such deliveries shall conform to the requirements of this instruction.

(5) Coordinate with NAVAIR to schedule interoperability tests and concurrent delivery of shipboard and aircraft computer programs which interface with ship tactical data systems via data link or by other electrical means.

c. The Combat System Computer Program Configuration Management Agent (CSCPCMA) shall:

(1) Maintain and promulgate, for each ship of the class, a record containing as a minimum; the nomenclature of the effective programs, delivery letters and version description documents.

(2) Maintain a library of specifications and other applicable documentation provided by the ISEA which identify and define the configuration of each computer program.

d. SEA 61 shall:

(1) Establish and cochair a joint change review/ coordination board to consider changes affecting interfaces between ship and aircraft programs. SEA 61 will ensure that each office responsible for the development of shipboard computer programs that interface with aircraft computer programs will be represented on this board as required.

6. Procedures.

a. A delivery team shall properly demonstrate each embedded computer program in one ship of each class before it is delivered to other ships of the same class for operation.

b. Each delivery shall include an embedded computer program delivery package which shall contain, as a minimum, the following:

(1) A forwarding letter from the activity effecting the delivery declaring the readiness of the computer program for operational use or, in the event there are program user limitations, identifying the conditions and hardware configuration under which the program may be used. The forwarding letter shall also list the delivering activity's point of contact by name, code, telephone number, and address to permit user liaison.

(2) For each program being delivered, at least two copies of the computer program medium (tape, cassette, etc.) properly classified and labeled.

(3) A list of patches, if any, remaining in the program.

(4) A computer program version description document which provides data about the new or upgraded program, such as capabilities added or deleted, and impacts on support programs or documentation provided in the delivery.

(5) All supporting integrated logistic support: crew briefing material, operator manual change pages, updated MRC cards as required, training material, program checkout procedures, and instructions for the disposition of superseded material.

c. The delivering activity shall forward copies of the delivery letter and the program version description document to the SHAPM/SLM, the CSE, each subsystem manager, ISEA, SSA, and the designated CSCPCMA upon completion of the delivery.

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DEFINITIONS

a. Application Software. Computer software/firmware and associated data that implement the operational capabilities of tactical digital systems. Examples include target tracking, navigation, and avionics programs.

b. Delivery. The process of transferring control of copies of embedded computer programs to the end user, while the control and maintenance of the master program remain with the ISEA. Prior to delivery, the delivering activity shall ensure the certification and accreditation requirements of reference (c) are met.

c. Embedded Computer. A digital computer or processor that is an integral component, from design, procurement, and operations point of view, of any tactical digital system. This definition includes microcomputer, microprocessor, etc.

d. Embedded Computer Resource. The totality of operational and support software/firmware; embedded computers; data storage and display devices; interface standards; programming languages; support facilities ashore; training facilities; training support personnel; and personnel whose primary specialized educational experience and/or training is directed toward operation and maintenance of embedded computers. Specifically included are programmable calculators (PROCALS) that are electrically interfaced to tactical digital systems.

e. Major Upgrade. For a given system, the redesign or substantial addition of hardware, the re-writing of more than half the software, the re-design of the software architecture, or the substantial addition of new software functions. If an operational evaluation, operational functional checkout, or equivalent is required, the system is considered major.

f. Mission Critical Systems. Those systems which are required for the conduct of the military mission of the Department of Defense. This definition includes systems related to:

(1) Intelligence activities.

(2) Cryptologic activities related to National security.

(3) Command and control of military forces.

(4) A weapon or weapon system.

(5) The direct fulfillment of military or intelligence missions but not routine administrative or business applications.

This definition includes Tactical Digital Systems.

g. Qualified Delivery Team. A group of personnel who understand the design of the weapon system, the computer programs, the equipment-computer program interfaces, the changes which are included in the program revision and who are capable of demonstrating the satisfactory operation of the program while embedded in the end user's equipment.

h. Software Support Activity (SSA). The organization designated under reference (d) to maintain and support the embedded computer program(s) during the operational support phase of the life cycle. Per reference (e), the appropriate In-Service Engineering Agent (ISEA) will be the designated SSA within NAVSEA.

i. Standard. A designation assigned by the Chief of Naval Material to selected Embedded Computer Resources (ECR) that are approved for service use or otherwise authorized for use. The minimum criteria for designating selected ECR as standard are assignment to a designated configuration control board, assignment to a designated development or maintenance activity for life cycle support, and in-service use in at least one tactical digital system.

j. Support Software. The computer software/firmware and associated data that are the means by which software/firmware for tactical digital systems is developed, tested, executed, and maintained. Such software includes:

(1) Requirements and specification analyzers.

(2) Text editors, compilers, interpreters, assemblers, linkage editors, builders, loaders, utilities, and operating systems.

(3) Test case generators, symbolic execution analyzers, and other debugging programs.

(4) Stimulation and simulation programs.

(5) Data extraction, insertion, and reduction programs.

(6) Programs used for data base management, management control, configuration control, and documentation generation and control.

Trainer and, test and maintenance software are not considered support software in this definition.

k. Tactical Digital System. Those tactical weapons, communication, command and control, and intelligence systems and subsystems that employ digital computers and directly

support military operation in the following mission areas:

(1) Anti-Air Warfare

(2) Antisubmarine Warfare

(3) Antisurface Warfare

(4) Strike Warfare

(5) Amphibious Warfare

(6) Mine Warfare

(7) Special Warfare

(8) Mobility (MOB 1 through MOB 11)

(9) Command and Control and Communications

(10) Intelligence

(11) Electronic Warfare

(12) Noncombat Operations (NCO 2-6, NCO 9, NCO 18, and NCO 20)

The surface ship, submarine, and aircraft systems and subsystems included in this definition are:

Combat Direction Systems (including data processing, display, and data links)

Missile Fire Control

Gun Fire Control

Underwater Battery Fire Control

Underwater Fire Control

Weapon Delivery (including bombs, torpedoes, and depth charges)

Electronic Warfare (including signal processing, identification, and prediction)

Sensor (including beam forming, and signal processing of radar video, beacon video, laser, infrared, and television signals)

Sonar (including beam forming, acoustic signal processing, identification, and prediction)

Communications (including automated message processing and distribution, frequency prediction, and hardware resources management)

Sonobuoy (including deployment, operation, acoustic signal processing, identification, and prediction)

Navigation

Intelligence (including collection, processing, and evaluation of information)

l. Test and Maintenance Software. Software provided as tools to assist in the fault diagnosis and isolation, operational readiness verification, and system alignment checkout of the system or its components. This software may be used to check out and certify the equipment and total system at installation, re-installation or after maintenance. Test and Maintenance software is also used periodically in accordance with prescribed procedures to maintain the system throughout its operational life.

m. Trainer Software. Software used to train users, operators, and maintenance personnel in the operation and maintenance of the system.