SPAWARINST 5238.1
SPAWAR 05
30 Mar 2001

SPAWAR INSTRUCTION 5238.1

From: Commander, Space and Naval Warfare Systems Command

Subj: COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (C4ISR) INTEROPERABILITY TEST PROCESS

Encl: (1) C4ISR Interoperability Test Process with Attachments A, B, C, and D.

1. Purpose. To establish the planning and management process for interoperability testing of command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) systems funded, developed, or procured by the Space and Naval Warfare Systems Command (SPAWAR); to invoke appropriate test policies and procedures within that process; and to assign roles and responsibilities for its implementation.

2. Background

a. Legacy C4ISR functionality is typically "stove-piped"; that is, it is provided by a single system or string of systems dedicated to a single mission and operating independently of systems performing other dedicated functions. If a network architecture is employed, it is a dedicated, single-use network. Modern C4ISR functionality encompasses an entwining of functional strings in a multiple-use network architecture that widely shares resources, increases efficiency, and reduces cost. Modern C4ISR systems must successfully interoperate through an expanded distribution and switching medium that interfaces secondary users and makes available secondary support services. Modern C4ISR systems must not only be interoperable with the systems in their primary functional string, but with a multiplicity of other functional strings as well. As a result, modern C4ISR interoperability testing must, in the case of most systems, be expanded to encompass wide-scale as well as local interoperability.

b. The modern C4ISR system discussed above describes the "SPAWAR Product"—a compilation of interoperating products developed by the various SPAWAR Program Managers (PMWs) across the claimancy. Delivery of this SPAWAR Product requires wide-scale interoperability testing with both internally and externally developed interfacing systems. Such testing requires, in turn, coordinated test planning and management to ensure the availability and readiness of all required participants. Enclosure (1) with attachments A, B, C, and D, establishes a claimancy-wide process to achieve that essential coordination.

3. Action. SPAWAR headquarters and its activities personnel shall utilize the guidance and shall comply with the policies and procedures set forth in enclosure (1) and attachments A, B, C and D.

/S/
K. D. SLAGHT
Rear Admiral, U.S. Navy

Distribution:
SPAWAR List 4
SNDL Part 1:
26F3 (COMOPTEVFOR)
SNDL Part 2:
A3 (CNO N091 Only)
FKA1G (COMNAVSEASYSCOM 05 Only)
A5 (JITC)
FF52 (NCTSI)

C4ISR Interoperability Test Process

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3. Definitions

a. "Interoperability" refers to the exchange of information or services among C4ISR systems (reference (a); see Attachment (1) for reference listing).

b. "Interoperability testing" seeks to verify complete and proper exchange of such information or services, or to document incomplete or improper exchange that degrades or downs one or more interoperating systems.

c. "Intraoperability testing" refers to such testing when conducted on interoperating elements below the full system level.

d. "Local interoperability" is concerned with the interoperation of a single functional string of interfacing systems (e.g., user terminal through distribution and switching medium to radio frequency (RF) distribution devices).

e. "Wide-scale interoperability" is concerned with the interoperability of one functional string of systems with all other functional strings with which it shares resources (e.g., user terminals executing different missions but sharing a non-dedicated, multiple-use network opening to a variety of RF portals).

f. "Network" refers to the distributed linking of devices internal to a given platform or operational land site and does not refer to the external linking of platforms or sites.

4. Applicability

a. This instruction is applicable to:

(1) The interoperability testing of SPAWAR C4ISR systems currently under development, systems that have completed their development cycle but have not been permanently installed on their candidate platforms, and installed systems undergoing alteration.

(2) Both the land-based testing of afloat and ashore systems and the shipboard testing of afloat systems.

(3) Both Fleet Modernization Program (FMP) and non-AEGIS Shipbuilding and Conversion, Navy (SCN) afloat systems. It is not applicable to AEGIS SCN systems, which shall continue to follow an AEGIS test process that already incorporates sufficient concern for wide-scale interoperability issues.

b. Waivers will be granted only by the Director, System Integration and Testing (SPAWAR 053), who will determine the applicability of this instruction's definitions and policies to specific intersystem configurations.

5. Interoperability Test Process. All C4ISR systems within the scope of this instruction will undergo interoperability testing by proceeding through one or more of the four test levels described below. (Attachment (2) is the process flowchart. Attachment (3) relates the process, where applicable, to the D-30 timeline established by reference (b).) This process is intended to ensure sufficiency in interoperability testing and to do so without redundancy. Nothing in the following paragraphs should be interpreted to restrict or preclude testing thought prudent by the cognizant SPAWAR Program Managers (PMWs) nor to duplicate previously accomplished testing of adequate scope.

a. Level I

(1) All C4ISR systems will enter the SPAWAR C4ISR interoperability test process by undergoing Level I testing. Level I is land-based intra/interoperability testing and occurs in two phases.

(a) Phase one testing is conducted on the interoperation of elements within a given system (also termed "intraoperability" or "stand-alone system" testing). An example would be testing the component and subsystem interfaces in a newly developed Data Terminal Set (DTS) for a Tactical Information Data Link (TADIL).

(b) Following successful completion of this intra-system phase, phase two testing is conducted on the interoperability of the full stand-alone system with other systems in its primary functional string (herein termed "local interoperability" testing). Continuing the TADIL example, local interoperability testing would test the functional string from antenna to radio to new DTS to crypto to the front-end processor of a Combat Direction System (CDS).

(c) For a megasystem (i.e., system of systems) that employs multiple functional strings, local interoperability testing will consist of separate evaluations of each functional string prior to the integrated testing of multiple strings at Levels II, IIA, and III.

(2) Level I testing will be coordinated, planned, and conducted by the appropriate PMWs. Intraoperability testing will always be administered by a single PMW. Local interoperability testing will be administered by a single PMW if all systems in the local functional string are within his/her cognizance. More usually, local interoperability will involve a primary system under test that is managed by one PMW and interfacing systems managed by other PMWs.

(3) All Level I test plans and schedules accompanying Change Requests (CRs) submitted to the SPAWAR Configuration Control Board (CCB) must be provided to SPAWAR 053 prior to the commencement of testing. All other Level I test plans and schedules are requested by SPAWAR 053 for information purposes only and not for review or approval. The information will be used to measure claimancy-wide test activity, deconflict resource demands, facilitate liaison with external activities as required, and similar purposes.

(4) For systems that are intended for Battle Force deployers and which must undergo the full SPAWAR C4ISR interoperability test process, Level I testing must be completed prior to D-18 (i.e., more than 18 months prior to Battle Group or Amphibious Ready Group deployment).

b. Transition to Level II/IIA

(1) When Level I testing is successfully completed, the cognizant PMW(s) will report completion of Level I intraoperability/local interoperability to SPAWAR 053, and will provide Functional Interface Diagrams (FIDs) or equivalent design information indicating the system's planned installation and operating environment. (FIDs are developed by SPAWAR 051.) For system alterations, the PMWs will also provide approved configuration changes so that SPAWAR 053 may assess the impact of these changes on integrated installations. (Paragraph 4 addresses the configuration change process.) In assessing system design and configuration information, SPAWAR 053 will be advised by the SPAWAR Integrated Test Team (SITT). The SITT will include Subject Matter Test Engineers (SMTEs) from the cognizant PMWs; full SITT composition is described in paragraph 5.

(2) Based on the Level I completion report and assessment of the system design/configuration information, SPAWAR 053 will approve the next step through the test process. The following options are available:

(a) Systems that will be installed ashore and operate in a single-function string (i.e., not resident on a multi-use network) will not require further interoperability testing. An example would be certain Special Intelligence (SI) circuits. Such systems will be issued a C4ISR System Interoperability Certification by SPAWAR 053 and permitted to exit the SPAWAR interoperability test process. (For systems which have not completed their developmental cycle and remain subject to formal Developmental and Operational Testing (DT/OT), permission to exit assumes that the Operational Test and Evaluation Force (OPTEVFOR) has participated in the Level I testing; see paragraph 6.)

(b) As specified in reference (c), all systems that interact with combat systems will normally be required to undergo Distributed Engineering Plant (DEP) testing (Level IIA). This applies to afloat systems intended for both SCN and FMP platforms. However, afloat systems that operate in a single-function string (such as the SI circuits described above) and do not interface with non-SPAWAR systems may omit Level II/IIA and proceed to shipboard interoperability testing at Level III. Such omission will require concurrence by SPAWAR 053 and the Naval Sea Systems Command (NAVSEA).

(c) Systems that will be installed ashore or afloat and operate in an architecture that interfaces multiple functional strings will proceed to wide-scale land-based interoperability testing at Level II and/or Level IIA.

1. Systems with interfaces to functional strings within the SPAWAR claimancy (principally other C4ISR functions) will proceed to Level II. This will be the case for most systems.

2. Systems with interfaces only to functional strings outside the SPAWAR claimancy will proceed to Level IIA. An example would be the Joint Tactical Information Distribution System (JTIDS), which is not currently resident on C4ISR networks but is part of a functional string that interfaces with NAVSEA CDSs and their functional strings.

3. Systems with both types of interfaces will proceed first to Level II and then to Level IIA.

c. Level II

(1) Systems entering Level II will undergo wide-scale land-based interoperability testing in an environment that permits full integration with other C4ISR systems. Typically, this level of integration is achieved by use of the SPAWAR System Integration Environment (SIE), a distributed test bed of networked and interactive resources which can replicate the multiple functional C4ISR strings of a given platform or operational land site. The SIE is dispersed among SPAWAR facilities in Charleston, Chesapeake, and San Diego and is managed by SPAWAR 053. SIE test policies and procedures are described in reference (d).

(2) Various Land-Based Test Facilities (LBTFs) may suffice for systems not requiring the fully integrated environment of the SIE, or may serve to supplement SIE testing. For example, certain SCN afloat systems will be able to use designated Turnkey Integration Facilities (TIFs) to physically replicate an integrated C4ISR environment. In TIFs, C4ISR systems are installed and tested in the same functional and spatial configuration as planned for shipboard installation. The use of TIFs retains for the government the flexibility to install new technology after platform contract award by specifying design parametric envelopes (heating, cooling, ventilation, power, etc.) in the platform drawings rather than identifying specific systems.

(3) Level II testing is coordinated by SPAWAR 053 and is planned and conducted by the SITT. Prior to the commencement of testing, SITT personnel will brief the Level II test plan to SPAWAR 053 at a SPAWAR Test Readiness Review (STRR). At the conclusion of testing, the SITT will develop appropriate reports, including inputs to Capabilities and Limitations (CAPS/LIMS) documentation for deploying Battle Forces, and will brief test results to SPAWAR 053.

(4) For systems intended for FMP ships that have been identified for a deploying Battle Force, Level II testing must be conducted between D-18 and D-13. For systems intended for SCN ships, Level II testing will be conducted as appropriate within the SCN window.

d. Level IIA

(1) Systems entering Level IIA will undergo wide-scale land-based interoperability testing in an environment that permits full integration with non-C4ISR systems. Typically, this level of integration is achieved by use of the Navy DEP or Joint Distributed Engineering Plant (JDEP). The DEP provides a distributed test bed that permits SPAWAR C4ISR systems to be linked to key NAVSEA facilities housing various NAVSEA systems, simulations, and tactical programs. Typically, the Navy Center for Tactical System Interoperability (NCTSI) will also participate in the DEP testing of TADILs. The JDEP adds joint-service systems and the Joint Interoperability Test Command (JITC) to this test environment. The SIE network serves as the Navy's C4ISR node to the DEP/JDEP. (For systems not requiring Level II SIE testing (e.g., JTIDS), the SIE network merely provides connectivity to the DEP/JDEP.) Reference (e) contains a discussion of DEP capabilities.

(2) For some systems, less complex LBTFs may suffice or provide supplemental capability (as was noted for Level II). For example, the Combat Direction System Development and Evaluation Site (CDES) permits interoperability testing of the TADIL-to-CDS interface by remoting all required CDS functionality. Similarly, the Land-Based Submarine Radio Room (LBSRR) permits submarine C4ISR systems to be interfaced with NUWC combat system assets not available in the DEP. The use of such LBTFs in lieu of DEP testing will require NAVSEA concurrence.

(3) Level IIA is also appropriate for interoperability testing with other Department of the Navy (DON), Department of Defense (DOD), or other government agencies. The test bed will be integrated from a combination of the other-agency assets and SIE, DEP/JDEP, and/or LBTF resources on a case-by-case basis.

(4) Level IIA testing is coordinated with non-SPAWAR claimancy organizations by SPAWAR 053. The testing is planned and conducted by the SITT in concert with appropriate test teams from the non-SPAWAR agencies. Prior to the commencement of testing, SITT personnel will brief the Level IIA test plan to SPAWAR 053 at an STRR. At the conclusion of testing, the SITT will develop appropriate reports, including inputs to CAPS/LIMS documentation, and will brief test results to SPAWAR 053.

(5) For systems intended for FMP ships that have been identified for a deploying Battle Force, Level IIA testing must be conducted between D-12 and D-10. For systems intended for SCN ships, Level IIA testing will be conducted as appropriate within the SCN window.

e. Transition to Level III

(1) When wide-scale land-based interoperability testing is completed at either Level II or IIA, the cognizant PMWs will provide updated installation and operating

environment information and approved configuration changes, as required. Based on assessment of this information and the Level II/IIA results, SPAWAR 053 will approve the next step for the system through the C4ISR interoperability test process. (As noted for Level II, the SITT will advise SPAWAR 053 in making technical assessments.) Given successful Level II/IIA testing, the following options are available:

(a) Ashore systems will not require further interoperability testing. Such systems will be issued a C4ISR System Interoperability Certification by SPAWAR 053 and permitted to exit the SPAWAR interoperability test process. (For ashore systems that are subject to formal DT/OT, permission to exit assumes that OPTEVFOR has participated in the Level II/IIA testing; see paragraph 6.)

(b) Afloat systems will proceed to shipboard interoperability testing at Level III.

f. Level III. All afloat C4ISR systems are required to undergo shipboard interoperability testing before completion of their development cycle, as part of their permanent installation procedure, and as part of any required significant alteration procedure.

(1) For systems being installed on non-AEGIS SCN platforms:

(a) Interoperability testing will be accomplished as part of the Stage 5, Intersystem Tests, of the Total Ship Test Program (TSTP) procedures and will be conducted as an end-to-end checkout. For appropriate systems, interoperability testing will also be conducted as part of TSTP Stage 6, Special Tests, and Stage 7, Sea Trials. The TSTP procedures are described in references (f) and (g) and were adopted for SPAWAR use in reference (h).

(b) The interoperability portion of the TSTP testing will be coordinated by SPAWAR 053 and will be conducted by the SITT using NAVSEA procedures approved by the cognizant PMWs. SITT personnel will brief the Level III SCN test plan to SPAWAR 053 at an STRR prior to the commencement of testing.

(c) For systems installed aboard SCN ships that have been identified for a deploying Battle Force, TSTP testing must be completed (and the Obligated Work Limiting Date (OWLD) must occur) prior to the Battle Force's Target Configuration Date (TCD) at D-6.

(2) For systems being installed on FMP platforms or undergoing ship alteration:

(a) Interoperability testing will be conducted as part of the post-installation/alteration Shipboard Operational Verification Test (SOVT) procedures.

Although not yet formally adopted for SPAWAR testing on FMP platforms, the use of TSTP Stage 5, 6, and/or 7 procedures (approved by the cognizant PMWs) for the technical testing portion of the SOVT is encouraged. An end-to-end checkout should always be conducted, even if TSTP procedures are not employed. When multiple installs are accomplished, the end-to-end checkouts will be combined into an Integrated C4ISR Validation.

(b) The Integrated C4ISR Validation and/or the interoperability portion of individual SOVTs will be coordinated by SPAWAR 053 and SPAWAR 04F. SPAWAR 04F and the SPAWAR System Centers (SSCs) will develop test procedures and conduct testing.

(c) For systems installed aboard FMP ships that have been identified for a deploying Battle Force, SOVTs must be completed, signed, and reported before TCD at D-6.

(3) For systems under development and being temporarily installed on a test platform:

(a) Interoperability testing will be coordinated by the cognizant PMW and SPAWAR 04F. Coordination will include liaison with SPAWAR 053, the test ship, its Immediate Superiors in Command (ISIC), OPTEVFOR, and, as appropriate, the PMWs of interfacing SPAWAR systems, NAVSEA, and other affected DON or non-DON agencies.

(b) The cognizant PMW will plan and conduct the testing using procedures developed with input from the PMWs of interfacing SPAWAR systems, NAVSEA, and other participating agencies as appropriate.

(4) When Level III testing is completed:

(a) SPAWAR 053 will be briefed on the results for SCN systems by SITT personnel and on the results for FMP systems by SPAWAR 04F personnel. SPAWAR 053 will release results to the appropriate TSTP and SOVT report recipients, and SPAWAR 04F will develop CAPS/LIMS inputs. Given successful Level III testing, the SCN and FMP systems will be issued C4ISR System Interoperability Certifications by SPAWAR 053 and permitted to exit the SPAWAR interoperability test process. For systems installed on Battle Force deployers, this certification will constitute readiness for fleet evaluation in Battle Group System Integration Tests (BGSITs). The C4ISR System Interoperability Certification will be provided to the BGSIT Readiness Review at D-6.

1. The BGSIT is a C4ISR/combat system integration validation event sponsored by the Commanders in Chief of the Atlantic and Pacific Fleets. It is designed

to assist operational commanders and system program offices in identifying and resolving tactical, technical, and procedural integration and interoperability issues.

2. Preparation for, participation in, and response to BGSITs will be coordinated by SPAWAR 04F and 053. BGSITs are conducted at D-5.

(b) In the case of the results from Level III testing of systems that remain in development, the cognizant PMW shall include SPAWAR 053 in the DT report distribution.

6. Configuration Management (CM) Process. Paralleling the interoperability test process is the SPAWAR CM process. The CM process ensures that system design integrity is maintained through system maturity as well as the various installation and operating environment changes that accompany movement through the interoperability test levels. The SPAWAR CM process employs configuration control tools and procedures that support the adjudication and management of proposed changes to each system baseline. The process is managed by the SPAWAR CCB, chaired by SPAWAR 051. The SPAWAR CCB evaluates system configuration Change Requests for technical, budgetary, and schedule issues, and makes recommendations to SPAWAR 05 regarding their disposition. Approved changes are assessed by SPAWAR 053 and the SITT to determine the appropriate level of testing required to verify the interoperability of the changed configuration.

7. Roles and Responsibilities. Following are the roles and responsibilities of the organizations, panels, and forums to which this instruction is applicable.

a. SPAWAR 051

(1) Participates in the SITT.

(2) Provides system requirements analysis and architecture/design information in the form of FIDs or equivalent shore-installation data.

(3) Maintains system CM and chairs the SPAWAR CCB.

b. SPAWAR 052

(1) Participates in the SITT and SPAWAR CCB.

(2) Responsible for budget formulation.

c. SPAWAR 053

(1) Acts as primary test engineer for C4ISR interoperability testing.

(2) Determines and prioritizes which C4ISR systems must undergo interoperability testing, and grants interoperability testing waivers as necessary.

(3) Negotiates and establishes any agreements required for successful completion of C4ISR interoperability testing.

(4) Chairs the SITT and participates in the SPAWAR CCB.

(5) Participates (as a non-voting member) in test management bodies established by megasystem projects.

(6) Approves SITT recommendations for required levels of interoperability testing beyond Level I.

(7) Coordinates Level II testing within SPAWAR and Level IIA testing with non-SPAWAR agencies, and approves Level II and IIA test plans.

(8) Serves as the managing authority for all SIE resources, facilities, and manpower.

(9) Develops the SCN platform testing schedule and manages the SCN testing funds provided by SPAWAR 054.

(10) Coordinates Level III testing aboard SCN platforms.

(11) In conjunction with SPAWAR 04F:

(a) Supports Level III testing aboard FMP platforms.

(b) Coordinates SPAWAR involvement in BGSITs.

(12) Approves the release of Level II, IIA, and III test results and Level II/IIA CAPS/LIMS inputs to appropriate recipients.

(13) Issues C4ISR System Interoperability Certifications for ashore and afloat systems successfully exiting this test process.

(14) Maintains liaison with cognizant PMWs during shipboard interoperability testing of systems that have not completed their development cycle.

(15) Interfaces with other external agencies such as OPTEVFOR, NTCSI, N091, and organizations responsible for security certification, as required. (This neither modifies, negates, nor eliminates existing security requirements.)

(16) Formulates developmental test and evaluation policies and instructions for SPAWAR 00 approval, including Capstone Test and Evaluation Master Plans and related requirements.

d. SPAWAR 054

(1) Participates in the SITT and SPAWAR CCB.

(2) Acts as the managing authority for SCN tasking.

(3) Provides resources for Level III testing aboard SCN platforms.

e. SPAWAR 04F

(1) Serves as afloat C4ISR Test Coordinator for FMP installations.

(2) Participates in the SITT and SPAWAR CCB.

(3) Provides resources for Level III testing aboard FMP platforms.

(4) In conjunction with SPAWAR 053, schedules and coordinates Level III testing aboard FMP platforms.

(5) Plans and conducts Level III testing aboard FMP platforms with SSC test teams.

(6) Briefs Level III FMP results to SPAWAR 053.

(7) Develops appropriate reports, including inputs to CAPS/LIMS documentation for deploying Battle Forces.

(8) In conjunction with SPAWAR 053, coordinates SPAWAR involvement in BGSITs.

f. SITT

(1) The SITT is a team chaired by SPAWAR 053 and comprised of representatives from the following codes and organizations:

(a) SMTEs from each PMW.

(b) Test Directors designated by megasystem projects.

(c) SPAWAR 051.

(d) SPAWAR 052.

(e) SPAWAR 054 (appropriate Platform Manager for SCN installations).

(f) SPAWAR 04F (for FMP installations).

(g) OPTEVFOR (for systems undergoing DT/OT).

(h) NCTSI.

(i) JITC (when joint-service interoperability is an issue).

(2) The SITT's responsibilities include:

(a) Plan and coordinate testing efforts through working-level teams comprised of system SMTEs and lab technicians.

(b) Meet to support SPAWAR 053 decisions concerning the entry and exit of systems from Levels II, IIA, and III. In addition:

1. Meet as required to support D-30 decision points for systems deploying on Battle Force ships, with additional meetings to be considered as the complexity of programs require. Hold meetings concurrently with D-30 decision forums when practicable.

2. Meet to support appropriate milestones for non-Battle Force systems.

(c) Recommend to SPAWAR 053 the required levels of interoperability testing (beyond Level I) by:

1. Reviewing FIDs and equivalent installation and operational environment information.

2. Reviewing approved configuration changes to assess their impact on integrated installations.

(d) Develop test plans based on a prioritized list of systems and resource constraints.

(e) Brief test plans to SPAWAR 053 at STRRs.

(f) Conduct all Level II and IIA testing and the Level III testing aboard SCN platforms.

(g) Brief test results to SPAWAR 053.

(h) Develop appropriate reports, including inputs to CAPS/LIMS documentation for deploying Battle Forces.

g. STRR

(1) The STRR is a review convened by SPAWAR 053 when notified by the SITT that the test planning process is sufficiently mature to assess readiness to conduct testing. STRRs will be held prior to commencement of Level II and Level IIA testing and Level III testing aboard SCN platforms. The purpose of the STRR is to assess readiness to conduct testing based on documentation review and to determine when personnel, test facilities, equipment, or other resources may be authorized to begin testing. The SITT will present the:

(a) Requirements changes.

(b) Design changes.

(c) Software/hardware test plans and procedures.

(d) Test limitations as defined by risk analysis tools.

(e) Software/hardware problems, other issues, and proposed solutions.

(f) Test schedules.

(g) Documentation updates.

(h) Recommended post-STRR action.

(2) At the STRR meeting, SPAWAR 053 will give final approval to commence Level II, IIA, or III testing and commit SPAWAR resources to the tests.

h. PMWs

(1) Serve as controlling authority for all Level I resources, facilities, and manpower.

(2) Coordinate, plan, and conduct Level I testing.

(3) Provide Level I test plans and schedules to SPAWAR 053 (see par. 3a(3)).

(4) Report completion of Level I testing to SPAWAR 053.

(5) Provide SPAWAR 053 with requirements analysis, architecture/design information, FIDs or equivalent shore-installation information, and approved configuration changes prior to commencement of Level II/IIA and III testing.

(6) Provide resources for Level II/IIA testing.

(7) Provide, maintain technical responsibility for, and approve appropriate TSTP procedures for Level III testing aboard SCN and FMP platforms.

(8) Coordinate, plan, and conduct Level III testing of systems that have not completed their development cycle, keeping SPAWAR 053 informed.

(9) Include SPAWAR 053 on distribution for results of Level III testing of systems that have not completed their development cycle.

(10) Provide integrated logistic support during Level II/IIA and III testing, including manuals, training, spare parts, Maintenance Requirement Cards, and Maintenance Assist Modules.

(11) Resolve deficiencies identified at all levels of testing as appropriate.

(12) Provide SMTEs for the SITT.

(13) Provide other test observers/participants as appropriate for Level II, IIA, and III testing.

i. SSCs

(1) Provide SMTEs to the SITT as directed by the cognizant PMW.

(2) Support PMWs at all levels of testing and develop test procedures as required.

(3) Plan and conduct Level III testing aboard FMP platforms, in conjunction with SPAWAR 04F.

(4) Provide results to SPAWAR 04F for briefing to SPAWAR 053.

8. Relationship of SPAWAR C4ISR Interoperability Test Process to Formal DT/OT. For systems that have not completed their developmental cycle and remain subject to formal DT and OT, each level of testing discussed above may be used as a phase of DT and (with OPTEVFOR participation) a phase of OT interoperability testing. In the case of such systems, test plans for all levels should always be provided to OPTEVFOR and their participation invited. As shown below, the precise correspondence between test level and DT/OT phase will vary depending on the planned installation environment (ashore or afloat) and the planned operating environment (single-function string or multifunction network). Although COMOPTEVFOR remains the final judge of the applicability of any interoperability testing to OT requirements, the following guidelines will be generally useful. (See reference (i) for a discussion of the role of DT and OT in the acquisition process.)

a. Ashore Systems in a Single-Function String

(1) Level I testing should suffice for all required DT and OT interoperability testing with the exception of the system Technical Evaluation (TECHEVAL) and Operational Evaluation (OPEVAL). For TECHEVAL/OPEVAL, the interoperability testing will likely be conducted at an operational land site.

b. Afloat Systems in a Single-Function String

(1) Level I testing should suffice for DT-I/OT-I and early DT-II/OT-II interoperability testing.

(2) Level III testing will be required for later DT-II/OT-II testing (including TECHEVAL/OPEVAL) as well as for DT-III/OT-III (follow-on technical and operational testing).

c. Ashore Systems Operating in a Multifunction Network

(1) Level I testing should suffice for DT-I/OT-I and early DT-II/OT-II interoperability testing.

(2) Level II/IIA testing will be required for later DT-II/OT-II interoperability testing and for follow-on testing (DT-III/OT-III). For the system TECHEVAL/ OPEVAL, the interoperability testing will be conducted at an operational land site.

d. Afloat Systems Operating in a Multifunction Network

(1) Level I testing should suffice for DT-I/OT-I interoperability testing.

(2) Level II/IIA testing will be required for early DT-II/OT-II.

(3) Level III testing will be required for later DT-II/OT-II (including TECHEVAL/OPEVAL) and for follow-on testing (DT-III/OT-III).

References

(a) Joint Chiefs of Staff Joint Publication 1-02 of 23 March 1994 (as amended through 10 January 2000), Department of Defense Dictionary of Military and Associated Terms

(b) CLF/CPFINST 4720.3A of 27 April 2000, Management of Afloat Combat Systems and C4I Installations and Improvements

(c) NAVSEA Warfare Systems Guidance and Policy Paper 98-03, Battle Force Interoperability (BFI) Certification Process

(d) SPAWAR Systems Integration Environment Master Test Plan of 2 April 1999

(e) NAVSEA DEP-001-P-TI-BGIT of 14 June 1999, Distributed Engineering Plant (DEP) Battle Group Interoperability Test (BGIT) Instruction

(f) NAVSEA S9095-AD-TRQ-010/TSTP of 3 March 1995, Total Ship Test Program Manual

(g) DOD-STD-2106 (NAVY) of 30 July 1989, Military Standard: Development of Shipboard Industrial Test Procedures

(h) SPAWAR 053/054 Memorandum of 10 November 1999, SPAWAR Claimancy Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) Test & Verification Roles and Responsibilities for non-AEGIS Shipbuilding and Conversion, Navy (SCN) Funded Programs

(i) DoD Directive 5000.2-R of 15 March 1996, Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs

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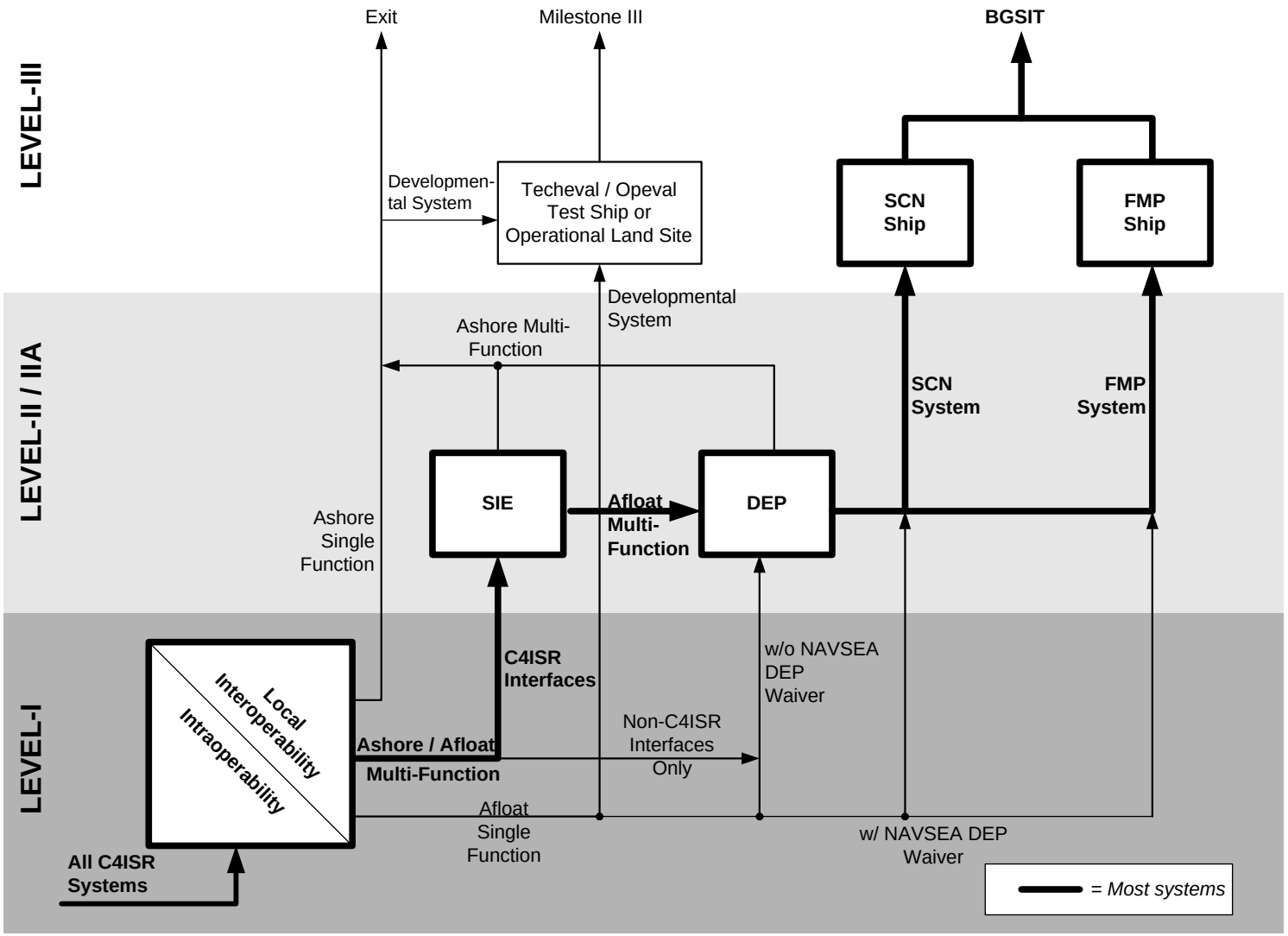

C4ISR Interoperability Test Process Flowchart

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Simplified D-30 Timeline for C4ISR System Battle Force Installation

The following highlights key months and events in the timeline for C4ISR system installation or upgrade in deploying Battle Force ships. It does not apply to developmental systems or approved systems intended for non-deployers or SCN ships. Level II, IIA, and III testing of systems intended for SCN ships will be conducted at appropriate times within the SCN window. For a given SCN ship, the SCN window must close (OWLD occur) prior to the TCD of the Battle Force for which that SCN ship has been identified. Acronyms used below are defined in Attachment (4).

Month	Event
Prior to D-18	FLTCINC promulgates Battle Force composition message (D-30)
	SYSCOMs identify Proposed Baseline Configuration (D-29)
	NAVSEA 53 establishes Initial Baseline Configuration (D-28)
	FLTCINC approves Final Baseline Configuration (D-24)
	SPAWAR Level I test window (PMW must report completion of Level I testing to SPAWAR 053 prior to D-18)
D-18 to D-13	SPAWAR Level II test window (testing conducted in SIE or equivalent)
D-12 to D-10	SPAWAR Level IIA test window (testing conducted in NAVSEA DEP, JDEP, or equivalent)
D-9 to D-7	SPAWAR Level III test window (SOVT must be completed, signed, and reported prior to D-6)
D-6	TCD
	SPAWAR 053 issues C4ISR System Interoperability Certification
	FLTCINC conducts BGSIT Readiness Review
D-5	Battle Force conducts BGSIT
D-2	NAVSEA 053 issues Battle Force Interoperability Certification
D	Battle Force deployment

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List of Acronyms

BGIT	Battle Group Interoperability Test
BGSIT	Battle Group System Interoperability Test
C4ISR	Command Control Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CAPS/LIMS	Capabilities and Limitations
CCB	Configuration Control Board
CDES	Combat Direction System Development and Evaluation Site
CDS	Combat Direction System
CM	Configuration Management
CR	Change Request
DEP	Distributed Engineering Plant
DOD	Department of Defense
DON	Department of the Navy
DT	Developmental Testing
DTS	Data Terminal Set
FID	Functional Interface Diagram
FLTCINC	Commander in Chief Pacific Fleet or Commander in Chief Atlantic Fleet
FMP	Fleet Modernization Program
ISIC	Immediate Superior in Command
JDEP	Joint Distributed Engineering Plant
JITC	Joint Interoperability Test Command
JTIDS	Joint Tactical Information Distribution System
LBSRR	Land-Based Submarine Radio Room
LBTF	Land-Based Test Facility
NAVSEA	Naval Sea Systems Command
NCTSI	Naval Center for Tactical System Interoperability
OPTEVFOR	Operational Test and Evaluation Force
OT	Operational Testing
OWLD	Obligated Work Limiting Date
PMW	SPAWAR Program Manager
RF	Radio Frequency
SCN	Shipbuilding and Conversion, Navy
SI	Special Intelligence
SIE	Systems Integration Environment
SITT	SPAWAR Integrated Test Team
SMTE	Subject Matter Test Engineer
SOVT	Shipboard Operational Verification Test
SPAWAR	Space and Naval Warfare Systems Command
SSC	SPAWAR Systems Center
STRR	SPAWAR Test Readiness Review
SYSCOM	Systems Command
TADIL	Tactical Data Information Link

TCD	Target Configuration Date
TIF	Turnkey Integration Facility
TSTP	Total Ship Test Program