Joint Interoperability Certification

What the Program Manager Should Know

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Would you say that a program manager whose system meets performance requirements, is on schedule, and within budget, is in good shape? If your answer is "yes," you might be wrong if the system isn't interoperable with its surrounding systems.

Sharing Information — "They Should Have Known"

Every time the wrong helicopter is shot down or the wrong target is bombed critics say, "They should have known." In some cases the critics are right. Some people did know, but the right information didn't get to the right people at the right time. That often happens when systems don't share information and interoperate efficiently and effectively across Service or Agency boundaries.

The Chairman, Joint Chiefs of Staff has directly attacked this problem with a joint interoperability certification process that applies to every Department of Defense Command, Control, Communications, Computers and Intelligence (C4I) system and Automated Information System (AIS).

Systems that integrate this process into their overall development and testing smooth the way into the field and provide the best support to their users. Programs that discover interoperability problems too late may suffer delays, cost overruns, or worst of all, contribute to deadly mistakes at critical times (Figure 1).

Program managers need to understand the process and use it to their advantage. To understand the process, a few basic questions need to be answered.

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What is interoperability?

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Simply put, interoperability is systems working effectively together. Joint Pub 1-02[1] uses a slightly more elaborate de-

finition: "The ability of systems to provide services to, and accept services from, other systems and to use the services exchanged to enable them to operate effectively together."

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What is interoperability certification?

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Interoperability certification is the process of ensuring that a system meets

FIGURE 1. **JITC — Ensuring Battle Ground Doesn't Become Testing Ground**

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the joint interoperability requirements of its users. It includes the collection of the data necessary to determine whether or not the system conforms to applicable interoperability standards and can effectively exchange all required information with all other required systems.

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Why certify for interoperability?

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Certification is the conclusion an independent source reaches that assures the warfighter that the Commander in Chief, Service, and Agency systems can interoperate in a joint team.

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Who certifies that a system is interoperable in a joint environment?

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The Joint Interoperability Test Command (within the Defense Information Systems Agency) has responsibility for certifying joint interoperability of all DoD systems.

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What systems need to be certified?

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All C4I systems and AIS that produce, use, or exchange information in any form and exchange information between Services, Agencies, or countries.

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When should systems be certified?

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All systems must be certified before they are fielded, usually before Milestone III or Initial Operating Capability. Fielded systems must be certified every three years or after a major modification. The system proponent should contact us early in the acquisition program to ensure that certification is timely and cost effective.

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What does certification involve?

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We follow the processes outlined in Chairman, Joint Chiefs of Staff Instruc-

tion (CJCSI) 6212.01A, *Compatibility, Interoperability, and Integration of Command, Control, Communications, and Computer Systems,* to perform our joint interoperability test and certification mission.[2] This document is currently being updated to mesh with recent changes to the requirements generation process and to ensure that interoperability certification is addressed during the acquisition of all C4I systems, regardless of acquisition category. Figure 2 depicts the four-step process we follow to implement joint certification.

Identification of All Joint Interoperability Requirements

We begin identifying requirements from traditional sources such as Mission Need Statements (MNS) and Operational Requirements Documents (ORD). But MNSs and ORDs are often outdated and incomplete. The requirements generation process has been strengthened with the publication of a revised CJCSI 3170.01A, *Requirements Generation System,* which serves to improve the identification of interoperability requirements.[3] This updated document mandates identification of interoperability Key Performance Parameters (KPP) for Capstone Requirements Documents and ORDs, and defines time-phased requirements in support of time-phased acquisitions.

To complete the requirements picture, we examine how the system will fit into the present and future joint operational networks and architectures by active participation in exercises and contingencies.

User Requirements Confirmation

Once identified, we develop a joint interoperability requirements matrix and confirm it with the appropriate operational command or Agency. This joint interoperability requirements matrix is

then coordinated with the program office. We will test to the user requirements with the understanding that any discrepancies between the user and contractual requirements may require resolution at higher level.
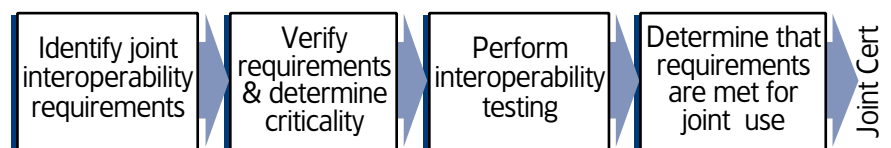
Interoperability Data Collection

We then gather joint interoperability data from appropriate test events and sources as agreed with the system proponent. While each C4I system or AIS presents unique challenges, we can divide interoperability assessments into two basic categories: information transport and information processing.

The interoperability issue with information transport is the complete, accurate, and timely transfer of information from one system to another. The objective of this assessment is to determine the ability of the system to send and receive information in its intended operational environment.

As an example, we assess tactical communications equipment in terms of supporting a notional Joint Task Force (JTF). While the Services acquire tactical communications equipment with Service requirements, our focus is determining the degree that this equipment interoperates within the overall communication requirements of the JTF, i.e., the capability of the system to transfer data, voice, imagery, and the system management functions required for JTF operations.

Interoperability assessment of information processing requires more than bits, bytes, and protocol testing. We assess the system end-to-end to determine how one system interacts with other systems in order to determine if they can exchange information and services in a joint environment. The objective of this testing is to assess the ability of the system to process and present information

FIGURE 2. **Joint Certification Process**

Identify joint interoperability requirements ▸ Verify requirements & determine criticality ▸ Perform interoperability testing ▸ Determine that requirements are met for joint use ▸ Joint Cert

to and from other systems in the joint architecture.

Determination of the Status of Interoperability

All relevant data are used to determine the level of interoperability of a system and all its interfaces. The determination is published in a letter of certification sent to the program office. Copies are also sent to the Joint Staff; Director, Operational Test and Evaluation (DOT&E); and appropriate Service.

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How do you get and keep your system certified?

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- Contact us as early in system development as possible.
- Coordinate all testing with us, so joint interoperability can be integrated into the test program schedule.
- Consult us on changes in requirements or capabilities in order to keep certification status current.

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What will JITC do to help get your system certified?

A

When a program manager contacts us early in the acquisition program, we will:

- Assist in identifying joint interoperability requirements during the concept/design phase of the program.
- Ensure that interoperability is built into the system from the start.
- Plan for the most efficient use of resources.
- Assist the program manager in identifying solutions to interoperability problems necessary to get the system certified.

We also have a range of tools available for system assessments. We have laboratories and networks for testing virtually all types of C4I systems and AISs, and have extensive recent experience in the following areas:

- Defense Information System Network (DISN)

While the Services acquire tactical communications equipment with Service requirements, our focus is determining the degree that this equipment interoperates within the overall communication requirements of the JTF.

- Defense Message System (DMS)
- Defense Red Switch Network (DRSN)
- Electronic Commerce/Electronic Data Interchange (EC/EDI)
- Global Command and Control System (GCCS)
- High Frequency Radio
- Joint Tactical Data Link (JTDL)
- National Imagery Transmission Format Standard (NITFS)
- Asynchronous Transfer Mode (ATM)
- Security Management Infrastructure (Public Key Infrastructure [PKI] and Electronic Key Management System [EKMS])
- Strategic and Tactical Switching and Communications
- Ultra High Frequency (UHF) Demand Assigned Multiple Access (DAMA)
- Year 2000.

We also have a variety of specialized interoperability analysis tools, including interPRO, INTELpro, and the Joint Operational C4I Assessment Team (JOCAT).

INTERPRO

InterPRO is an Internet-based joint interoperability analysis support tool developed to support Joint Theater Air and Ballistic Missile Defense systems users. It identifies interoperability deficiencies and supports connectivity, Information Exchange Requirement (IER), and detailed interoperability analyses. The interoperability deficiencies identified in interPRO are also linked to the JITC's Trouble Report database, where detailed information about the actual problems is documented.

INTELPRO

INTELpro is similar to the interPRO; however, it is designed to support intelligence systems users.

JOCAT

JOCAT is a worldwide deployable team consisting of equipment and personnel with the capability and expertise to provide on-site interoperability analysis and support during field exercises and real-world contingencies. The JOCAT monitors the Joint Data Network (JDN); selected voice networks; Tactical Information Broadcast Service (TIBS); Tactical Receive Equipment and Related Applications (TRAP) Data Dissemination System (TDDS) network; Joint Planning Network (JPN); and exercise Distributed Interactive Simulation (DIS) networks.

Further, it provides automated methods to identify items of interest and interoperability anomalies for immediate analysis. JOCAT's automated methods process the data collected at various interfaces to provide valuable and timely feedback.

Nonparticipation in the Certification Process

Our nation's forces deploy and execute their assigned missions as members of Joint Task Forces. Operational networks clearly reflect this joint force composition and carry with them the requirement to exchange information across Service boundaries. The Service-sponsored process through which systems have been procured, and the rapid acquisition of readily available and low-cost C4I technologies, have posed challenges to ensuring that all systems are capable of operating when placed in a joint environment. C4I capabilities have been fielded that enhance the capabilities of the specific user but may degrade

overall system performance when viewed from an integrated joint perspective.

The program managers or sponsors of these noncertified C4I system procurements did not participate in the joint certification process. Updates to the requirements generation and interoperability certification process instructions noted earlier, coupled with the emerging role of the Commander in Chief, U.S. Atlantic Command as the Chairman's advocate for interoperability, will establish a means to overcome these challenges and better enforce the requirement for C4I systems to participate in the joint certification process.

Assurance of Interoperability For Nation's Warfighters

JITC, as the sole joint certifier of these systems, will continue to play an active role in the interoperability requirement and testing certification process. The ultimate beneficiaries will be the warfighters who will be provided with higher levels of assurance that the systems procured for their use will interoperate.

Editor's Note: Two documents are available at **http://jitc.fhu.disa.mil/testing.htm** that provide additional insight into the joint certification process: *JITC Interoperability Assessment* contains the overall concept of interoperability and the significance of joint interoperability; *JITC Certification Process* provides a description of the JITC certification process model used throughout a system's life cycle. To obtain more information about the joint interoperability certification process, please contact 1-800-LET-JITC or visit the JITC Web site at **http://jitc.fhu.disa.mil** on the Internet.

R E F E R E N C E S

1. Joint Publication (JP) 1-02, *DoD Dictionary of Military and Associated Terms,* March 23, 1994.
2. Chairman, Joint Chiefs of Staff Instruction (CJCSI) 6212.01A, *Compatibility, Interoperability, and Integration of Command, Control, Communications, and Computer Systems,* June 30, 1995.
3. CJCSI 3170.01A, *Requirements Generation System,* August 10, 1999.

Inside DSMC

Chad Steven Campbell has been selected as the Western Regional Center Operations Officer. A graduate of the Marine Corps Noncommissioned Officers Course, Campbell joins the Western Region staff after serving a four-year tour with the U.S. Marine Corps as a basic rifleman and scout team leader. His most recent assignment was at the Marine Corps Air Ground Combat Center, Twentynine Palms, Calif., where he served as the administrative manager for the battalion chaplain with collateral duties as an assistant to the battalion executive officer.

New DSMC Guidebook Available!

A new text on *Systems Engineering Fundamentals* (October 1999) is now available. Topics include the systems engineering process; system analysis and control; and planning for, organizing, and managing systems. The guide provides a basic, conceptual-level description of systems engineering management as it relates to the development and life cycle management of a system, including basic concepts, problem solving, tools to balance the process, and issues integral to the systems engineering management effort. The text supplements course material at DSMC and is the first guidance issued on the topic of systems engineering since publication of the *Systems Engineering Management Guide* (1990).

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