

Navy study makes recommendations

PANEL: DEFENSE SOFTWARE PROBLEMS PUT INFO DOMINANCE 'AT RISK'

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To control the cost of high-tech warships, tactical fighters and other military systems and protect the Pentagon's "information dominance," defense officials must revamp the way they acquire software, a new naval study concludes.

The Naval Research Advisory Committee reviewed software-intensive systems in the Navy and the Army, as well as joint Pentagon initiatives and other efforts, but focused its recommendations on what the sea service can do to address its problems developing such systems.

New platforms such as the Zumwalt-class DD(X) destroyer and the F-35 Lightning II Joint Strike Fighter are increasingly dependent on millions of lines of software code, but the Navy needs "visionary action and structural innovation" to deal with that reality, according to a briefing the panel presented last month to Navy acquisition executive Delores Etter.

"Information dominance" -- considered essential to the Defense Department's mission -- is "at risk," the briefing states. The Pentagon has a history of ignoring good recommendations about military software, the panel notes.

The Navy has problems specifying, developing, acquiring, testing, maintaining and researching software systems, the study says. For instance, the Navy has inadequate system engineering to properly define software requirements. The department also lacks experienced software acquisition professionals. The productivity of programmers varies enormously, the study finds. Attempts to address testing, security and interoperability are often too late. The panel also finds the Navy is not investing enough money in software research.

In a recent session with reporters, Vice Adm. Lewis Crenshaw, the head of the Navy's capabilities and resources directorate, noted he was "really surprised" to learn the extent to which software and integration work can drive up the cost of ships such as DD(X).

"It's no longer steel and labor that drives a lot of the costs of these ships," he said. "It's the software, it's the integration piece with all of the weapon systems that are driving the costs."

In an interview with *Inside the Navy*, Etter said she believes software issues are very important.

One of the panel's major recommendations calls for putting someone in charge of establishing acquisition educational standards; promoting basic process improvements; and increasing awareness of software problems, technology and opportunities. Etter has already taken steps to address these recommendations about leadership (see related article).

In a May 15 memo, Etter directed Navy and Marine Corps officials to consolidate various efforts to improve the acquisition of software products. The development, acquisition and delivery of software is essential to the Navy's ability to successfully conduct its business and perform its missions, the memo says. She has created a steering group and five related teams that will tackle various challenges. Etter has also directed acquisition officials to take courses on acquiring software. Further, she is pressing contractors to ensure they have adequate software process improvement programs.

Under the heading of acquisition matters, the Naval Research Advisory Committee recommends creating a software specialty within the Navy. The sea service should develop "real incentives to share specifications, interfaces, models and software," the briefing says. The Navy also needs to apply emerging software engineering tools to appropriate problems. The committee also wants the Navy to deploy system engineering methods that allow software specification, implementation and testing to evolve together.

In addition, the Navy needs a focused science and technology effort that would leverage existing software engineering, research and practices according to the panel. For instance, the panel calls for developing software tools for evolutionary systems engineering; practices for automated daily build, test and evaluation; domain-specific model languages; technology for dealing with old systems; and the means to exploit lessons gleaned from within the Navy and the government at large.

The briefing outlines a three-step plan for the Navy. First, the panel recommends creating "rapid evolution software engineering teams" (RESET) to promote the use of system engineering tools, policies and practices. There would be 10 to 20 people on each team. These groups would identify open systems needs and ensure compliance. The teams would also recommend contract incentives.

The briefing says the Navy could implement this step by embedding these expert teams at the offices of defense contractors working on programs such as the CG(X) cruiser, the Broad Area Maritime Surveillance unmanned drone, the Aegis combat system upgrade and the Littoral Combat Ship.

The second step would be the creation of a naval software system center with 50 full-time employees. This organization would institutionalize and staff the RESET teams. The center would also build models, maximize Navy commonality, manage and staff

independent expert reviews, recommend incentives and acquisition policy and manage innovation, the briefing states.

Ultimately, however, officials should build on the first two steps to develop a “cross-cutting, horizontally integrated, possibly joint activity that ensures information dominance,” the panel writes. However, the briefing predicts it would be difficult to obtain human resources for this third step. There would be other challenges too: cultural resistance, budget priorities, industry resistance, contracting difficulties and sustaining the organization in the coming years. -- *Christopher J. Castelli*