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Consolidated Afloat Networks and Enterprise Services (CANES)

Manpower, Personnel, and Training Implications

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Summary

This study broadly assessed the manpower, personnel, and training implications associated with the introduction of the Consolidated Afloat Networks and Enterprise Services (CANES) to U.S. Navy ships. CANES will provide a common computing network and common operating system for command, control, communications, computers, and intelligence (C4I) systems onboard Navy ships, which could reduce the requirement for manpower and alter the demand for training. This environment will differ considerably from the traditional environment, which included stovepiped networks with unique hardware and software systems. The Navy effort to consolidate hardware and operating software and to introduce service-oriented architectures is consistent with the practices of private-sector organizations and information technology providers.

This RAND effort focused on particular Information Technology (IT) and Electronics Technician (ET) Navy Enlisted Classifications (NECs) associated with a subset of CANES systems, networks, and applications, including the Integrated Shipboard Network System (ISNS), the Sensitive Compartmented Information (SCI) Network, the Combined Enterprise Regional Information Exchange System–Maritime (CENTRIXS-M), the Global Command and Control System–Maritime (GCCS-M), and the Navy Tactical Command Support System (NTCSS). Given this selection from the list of CANES early adopters, this work focused primarily on the IT NECs specific to these systems. The analysis included two ship classes: carriers (CVNs) and destroyers (DDGs).

This report provides a review of current Navy manpower, personnel, and training practices; the implications of the conversion to CANES; and resulting recommendations.

Current Navy Practices

Manpower

This document describes the calculations used to develop the manpower requirements for IT and ET personnel. We determined IT requirements with a manpower equation that includes multiple inputs, such as Condition I (CI) watches, Condition III

(CIII) watches, the ship standard workweek, preventive maintenance, corrective maintenance, facilities maintenance, own unit support, and others.[1] Our analysis indicates that while IT manpower requirements on destroyers are determined by CI and CIII watches, CIII watches drive the IT manpower requirements on carriers. This is because the hours available for work beyond the watchstanding requirement exceed the hours needed for maintenance and other activities. Thus, despite technological improvements that would otherwise suggest reduced manpower requirements, no reduction of requirements is likely without a reduction in the watches. ET requirements are determined with a different requirements model: ET requirements are designated such that there is ET coverage for each type of equipment onboard.

Further, previous significant technology changes have had only very limited effects on manpower requirements. This observation underscores our conclusion that to affect manpower requirements, one must reduce watches, change organization, shift to another model for determining requirements, or eliminate equipment, in the case of ETs.

Manning

There are many manning or personnel issues pertaining to ITs onboard ships, but few of the issues are specific to CANES. For example, even if the requirements are exactly right, the ship's authorizations may reduce the manning on a ship. Another of the manning problems we discuss is that ships are detailed by aggregate NEC, without consideration for the number of people or whether the individual with that NEC will be available to the department in which the NEC is needed. Other problems mentioned reflect the traditional practices onboard ships that make junior IT personnel unavailable to their own departments for a significant portion of their initial assignment.

Training

There were several perceived deficiencies in IT training relayed to us from shipboard personnel, community managers, detailers, and training personnel. The first is the timing of the IT NEC training: Most ITs are assigned to their first unit without an NEC and have never actually touched the systems they will work with. This is in contrast to ETs, who primarily attend C school prior to their first assignment. Another issue is that the training software and hardware sometimes vary from the assignment destinations of the trainees. Shipboard personnel also note the difficulty of sending

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[1]   CI is Battle Readiness, during which "[a]ll personnel are continuously alert" and "[a]ll possible operational systems are manned and operating. No maintenance is expected except that routinely associated with watchstanding and urgent repairs. Maximum expected crew endurance at Condition I is 24 continuous hours" (McGovern, 2005). CIII is Wartime Cruising Readiness, during which "[o]perational systems are manned and operating. . . . Accomplishment of all normal underway maintenance, support, and administrative functions is expected. Opportunity for eight hours of rest provided per man per day. Maximum expected crew endurance at Condition III is 60 continuous days" (McGovern, 2005).

personnel to training, for reasons such as pay grade prerequisites that exclude high-potential junior personnel, the NEC prerequisites that may leach their department of necessary skill capabilities, or other manning shortages. Still another aspect of training mentioned was the concern that training completion and award of the NEC do not necessarily reflect system expertise. This is sometimes a perceived issue of personnel completing sufficient training to pass the course but not enough to apply their knowledge to the challenging shipboard environment. This latter concern also reflected more senior personnel, whose training is not recent and whose system expertise has eroded.

Manpower, Personnel, and Training Implications for the CANES Program

Implications from the Literature

The literature indicates that manpower reductions from technological innovations are more likely if organizational and technological centralization exists. Moreover, IT insertions can facilitate structural and work redesign that leads to downsizing and increased productivity. For CANES, the implications from the literature are straightforward. Stakeholders, of which there are many in the Navy technology and manpower, personnel, and training enterprises, have a say in structural and work redesign. Neither organization nor technology decisionmaking is solely the province of the PEO and program managers. However, one should assume that technology insertions such as CANES should facilitate watchstanding changes and greater productivity; a smaller but more experienced IT workforce; fewer and less complex tasks; better training and tracking of NEC use and reuse; and the same fill but better fit of personnel to billets.

Manpower Implications for CANES

If we assume that IT manpower requirements continue to be determined by a watchstanding model, our analysis suggests that at least one CI watch could be eliminated from a destroyer. This reduction would equate to 6 percent of the IT manpower on a DDG. We also estimate that CIII watches on carriers could be reduced, for possible savings of 6 to 12 percent of IT manpower. Further, our analysis suggests that the ET 1678 NEC will likely not be needed for CANES, although this may not reduce the number of ET requirements, given that ET personnel tend to have more than one NEC and that the other may still be required.

Watchstanding is not the only basis for calculating manpower needs. An alternative model is a maintenance model in which IT workload is tied to own unit support and planned preventive and corrective maintenance. Another model is an engineering model in which unmanned spaces exist and equipment is centrally monitored via consoles and "rovers" are sent to the spaces as needed. Finally, a more experienced

and better-trained IT workforce could lead to reduced requirements from improved productivity.

Manning Implications for CANES

Our analysis suggests several manning implications for CANES. First, the current detailing process of assigning personnel by aggregate NEC limits the effective use of CANES IT personnel; we recommend a more individualized assignment process for these more technical personnel. Our analysis also suggests that the traditional shipboard practice of using junior personnel away from their NEC for the initial year of their sea tour is a barrier to the effective use of IT personnel, especially if IT personnel were to receive additional training before their assignment. Additionally, converting the entire IT community to an initial six-year enlistment and providing C school before the initial assignment would be beneficial to CANES because of the resulting productivity gains. Longer initial enlistments may also result in long-term cost savings from assessing and training fewer IT personnel.

Training Implications for CANES

The Department of Defense (DoD) has issued DoD Directive 8570.01, which requires IT personnel, among others, to become certified in Information Assurance. This requirement will have positive implications for CANES, as it will ensure certain technical capabilities of those IT personnel working on CANES systems. Other training implications discussed in this report include plans to increase the length of IT A school, in part to accommodate the certification requirement; resequencing the IT NEC training; and moving C school to the beginning of the IT career. Although current Navy plans are to provide initial C school to only a minority portion of ITs, our analysis suggests the benefit of providing initial C school to all ITs, which would result in a considerable increase in the number of trained ITs assigned to units.

Recommendations

The first recommendation is specific to manpower, personnel, and training in the CANES environment. The next six affect all ITs and thus have significant implications for CANES. The last one affects many Navy ratings and is not a new suggestion.

- The PEO C4I should work with the Navy Manpower Analysis Center (NAVMAC) and with organizational stakeholders (e.g., the type commanders [TYCOMs]) to either reduce watches for ITs or move to a different model for addressing manpower requirements. Ideally, the manpower model selected would permit the Navy to capitalize on technology advances, such as those resulting in improved

reliability and the opportunity for virtual administration, that would otherwise suggest a reduction in manpower.

- Proceed as planned with longer A school to provide Level One IA certification to IT personnel. However, also institute a two-week remedial program for those personnel who are not initially successful with certification.
- Add critical training elements from the 1678 NEC to IT network training to facilitate the absorption of the 1678 requirement among ITs.
- Consider greater use of the detailing strategy used on the Littoral Combat Ship (LCS). In other words, assign IT personnel as individuals to fill specific positions, and ensure that they receive appropriate training en route.
- Enlist all IT personnel with a six-year enlistment contract and send all ITs to C school following A school, in order to dramatically increase the number of trained ITs associated with CANES.
- Explore whether the early C school can reduce the length of system-specific NEC training. Additionally, if early C school is not instituted for all ITs, still consider resequencing NEC training such that network training is prerequisite for system-specific training.
- Consider whether the productivity gains from early C school should result in greater effectiveness or in manpower savings.
- Consider whether the traditional use of junior personnel onboard ships remains appropriate and effective, especially for highly trained technical personnel.