



“The Penultimate C4ISR Challenge: Reducing Military Manpower and Total Operating Costs”

Track 1: C2 Concepts, Theory, & Policy

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“My long term goal is to eliminate the need for jobs and not just keep moving the work around from one part of the workforce to another. In the long run, I am anxious to invest in the technology in order to take the work out. We have a tendency to look at what it takes to get a program out the door. We don’t think too much about what the life cycle cost is. It’s “Can I build it?” I would like us all to be mindful of what it costs to operate whatever we are building for whatever its life is going to be because I have to pay that bill every single year. That is why I am so excited about the reduced manning potential of the DD(X). That process needs to apply in lots of areas.”

Admiral Michael Mullen
Chairman of the Joint Chiefs of Staff (then CNO)
Government Executive
May 2006



Outline

- ▼ The Total Ownership Cost Imperative
 - ▼ The DDG-1000 as a Best-Practices Example
 - ▼ Lab-Based Initiatives
 - ▼ Future Imperatives
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The Total Ownership Cost Imperative

“There’s no question that crew sizes have got to come down. We, frankly, are not aggressive enough in employing the technologies that allow us to take people off ships. It’s largely a cultural thing we’ve got to break through...and we can do it, I’m confident. In the past, we’ve had some initiatives underway but they had a hard time taking through. In my tenure I intend to be a little more on the bold side.”

“CNO: Reducing Crew Sizes a Top Priority”
Navy Times March 27, 2008



The Total Ownership Cost Imperative

- ▼ CNA Study: *Inside the Black Box*
 - ▼ Navy Enterprise HSI MOU
 - ▼ GAO Criticism of Navy ship acquisition programs
 - ▼ DDG-51 Study
 - ▼ DDG-1000 Example
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The DDG-1000 as a Best-Practices Example

“Implementation of the Navy’s HSI approach in the acquisition program for the DDG-1000 destroyer is a best practice example with HSI effectively enabling improved reliability, maintainability, and safety in design while significantly reducing manpower levels. HSI as the combination of engineering disciplines to define the role of the human vice automation was able to identify requirements associated with the human roles. Through application of HSI’s emphasis on improving human reliability and reducing human errors, innovative design approaches for equipment, software, procedures, information, environment, communications, and organizations could be shown to satisfy operational requirements.”

“The Art of Successfully Applying Human Systems Integration”
Naval Engineers Journal, Vol. 120, No. 1, 2008



The DDG-1000 as a Best-Practices Example

- ▼ First major program to have a step-function decrease in crew size
 - ▼ NAVSEA Human Systems Integration Directorate (SEA 05H) directly involved from the outset
 - ▼ Manpower KPP (Key Performance Parameters) integrated into early design decisions
 - ▼ KSA (Knowledge, Skills, and Abilities) for 18,000 specific tasks evaluated
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“The largest single component of life-cycle cost for a naval ship is acquiring, training, assigning, and supporting manpower for ship operations, maintenance, and support. The primary benefits of optimized crewing are the significant reduction in ownership costs and improved total system performance.”

“Optimized Crewing for Surface Ships”

Patricia Hamburger, Robert Bost and Jennifer McKneely

www.manningaffordability.com

“The crew size of 148 was not pulled out of thin air. This has been from the ground up. Every minute of every sailor in every billet has been accounted for in either workload or in some sort of automation that takes that workload away. It’s not magic. Usability testing done with the technologies and engineering design models (EDMs) have validated the crew size of 148. All of that has been modeled, and tested, through each software release with actual sailors and other personnel, in what the Navy calls software usability testing.”

“DDG-1000: Bigger Ship, Smaller Crew”

Defense Daily April 8, 2008

Quoting DDG-1000 Program Manager

Captain Jim Syring

Lab-Based Initiatives

“We will win – or lose – the next series of wars in our nation’s laboratories.”

Admiral James Stavridis
EUCOM Commander
“Deconstructing War”
U.S. Naval Institute Proceedings
December 2005



Lab-Based Initiatives

- ▼ Multi-Modal Watch Station
 - ▼ LCS USV Operations
 - ▼ Mast Clamp Current Probe Antenna
 - ▼ Ship's Signal Exploitation Equipment
 - ▼ CANES (Consolidated Afloat N&E Services)
 - ▼ JIATF South Command Center
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Examples of Manning Reduction Efforts

Improved human computer interfaces and
decision management systems

▼ Multi-Modal Watchstation

- Demonstrates the application of advanced HCI and how it reduces human workload, task processing time, errors, and training.

▼ Littoral Combat Ship (LCS) Unmanned Surface Vehicle (USV) Operations

- Development of improved HCI and attention management systems to allow one operator the ability to control more than one USV.



Examples of Manning Reduction Efforts

Automation

- ▼ **Mast Clamp Current Probe HF Receive Antenna (MCCP)**
 - Developed to reduce maintenance on existing HF whip antennas. MCCP has essentially no maintenance while providing comparable performance.
- ▼ **Ship's Signal Exploitation Equipment (SSEE)**
 - Efforts reduced manning from 3-5 operators and 2 maintainers for the COBLU program in the late 1990s, to 0-3 operators and 1 maintainer for the SSEE INCR F (IOC 2010).
- ▼ **Consolidated Afloat Networks and Enterprise Services (CANES)**
 - SPAWAR Institute conducted a workload analysis on CANES early adopters and generated a workload estimate for the Information Assurance Technician (IAT) Level II billet. Over all platforms that will acquire CANES, workload requirement decreases from over 10 million to a little over 2 million man hours.



Joint Operations Command Center of the Future

Slight manning increase due to
undermanned positions

- ▼ Enhanced performance for the Joint Interagency Task Force (JIATF) South in counter narcotics mission
- ▼ Focused on ensuring right mix of watch standers and optimizing their proximity with workflow analysis
- ▼ Maximizing team performance requires:
 - Manning and role optimization
 - Physical layout
 - Information management
 - KM around the Command's business process

Future Imperatives

“When asked what single event was most helpful in developing the theory of relativity, Albert Einstein is reported to have answered, ‘Figuring out how to think about the problem.’”

*Men, Women, Messages and Media:
Understanding Human Communication*



Future Imperatives

- ▼ Manpower costs continue to grow at a faster rate than all other Navy accounts
 - ▼ Most recently: NLUS SAS Symposium, three maritime service chiefs
 - ▼ DDG-1000 program has set the bar high for future TOC/manpower reduction efforts
 - ▼ NAVEA – as well as other Navy “Enterprises” focused on this issue
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“Technologies that reduce overall expenses are worth the up-front investment – things like open architecture, modularity, and minimal manning technologies.”

Admiral Gary Roughead
Chief of Naval Operations
Remarks at the 2009
Surface Navy Symposium

Questions