

A FUTURE NAVAL CAPABILITY

Knowledge Superiority & Assurance

The Knowledge Superiority and Assurance Future Naval Capability lies at the heart of network-centric warfare.

Our goal is to provide Sailors and Marines with rapid, accurate, and consistent situational understanding. We're giving them tools to turn that understanding quickly into plans and actions coordinated across all involved organizations and echelons in all Naval operating and functional environments.

Why is this Future Naval Capability important? Great precision and a high operational tempo will give us the edge in future conflict. Decision support systems help warfighters find the best solutions to rapidly changing problems. Information distribution and management over reliable, high data-rate, networked, wireless communications provide responsive, integrated, over-the-horizon command and control.

What's our investment strategy? The Knowledge Superiority and Assurance core investments focus on identifying and filling capability gaps, and on transitioning new capabilities to Naval acquisition programs. Four enabling capabilities of equal priority will meet these needs:

- **Priority.** Provide warfighters with common, consistent knowledge—an easily understandable common tactical and operational picture.
- **Priority.** Provide dynamically managed, flexible, and interoperable bandwidth, with high capacity connectivity (through advanced apertures, phased arrays, and wireless networking) and enhanced network management.
- **Priority.** Provide tools for rapid threat assessment and response to time-critical threats.
- **Priority.** Provide all levels of command with tools for distributed, collaborative planning, rehearsal, and execution.

How are we filling the gaps in those Enabling Capabili-

ties? Specific products are under development, each with a set of milestones and transition plans. Acquisition program offices and operational forces participated to ensure that the new capabilities will transition to production and meet the warfighters' priorities.



Priority: Common, consistent knowledge.

- **In FY 2002:** Integrated knowledge services and workload management.
- **In FY 2003:** Integrated and fused track and non-positional all-source intelligence.
- **In FY 2004:** Seamless integration of ISR sources into the COP.
- **In FY 2005:** Representation of meteorological and oceanographic effects for strike operations.
- **In FY 2006:** 3-D fused acoustic data management and visualization; common undersea picture analysis.
- **In FY 2007:** Cross-echelon situational awareness with timely correlation and information fusion.

Transition Opportunities:

- Knowledge Web—transition to PACOM in FY 02, to PMW-157 in FY 04.
- Fused Intelligence—transition to PMW-182, PMW-189, and PMW-157 in FY 04.
- DII COE Middleware—transition to PMS-425 in FY 04.
- Integrated Marine C2—transition to MCSC in FY 04.
- Imagery Fusion and Extensible C4I Framework—transition to PMW-157 in FY 04 and 05, respectively.
- Sea Combat Module and Common Undersea Picture—transition to PMS-411 in FY 04 and 05, respectively.
- Cryptologic Analysis—transition to PMW-189 in FY 05.

Priority: Dynamically managed, interoperable, high-capacity connectivity.

- **In FY 2004:** Integrated VHF/UHF/L-band antenna system; S-band phased array antenna system; X/Ku-band

phased array antenna system, enabling multi-band phased arrays for ships and aircraft. ELF on-hull antenna system for submarines. Link-16 with dynamic net membership and time slot allocation. Airborne Communications package for VTUAV.

- **In FY 2005:** K/Ka/Q-band phased array antenna system for ships, submarines, aircraft, and ground vehicles to extend high-data rate satellite communications. Next generation buoyant cable antenna system to enhance submarines' cooperation with other units. Advanced protocols for mobile wireless networking in a multimedia, high-data-rate information grid.

- **In FY 2006:** Underwater surveillance data link network for underwater surveillance data.

Transition Opportunities:

- Coalition Networks—transition to Battle Force E-Mail, NATO Information Data Transfer System, and ADNS in FY 03-07.
- Coalition Network Security—transition to Coalition Data Server, DoD PKI in FY03-07.
- VHF/UHF/L-Band Radiating System—transition to DD21 in FY 04.
- Dynamic Networks for Tactical Data Links—transition to Link 16 in F Y04.
- S- and X/Ku-Band Phased Arrays—transition to DD21 in FY 05.
- On-Hull ELF Antenna—transition to SSBNs in FY 05.
- K/Ka/Q-Band Phased Array—transition to DD21, DDG51, and SSNs in FY 05.
- Next-Generation Buoyant Cable Antenna—transition to SSNs in FY 05.
- Underwater Surveillance Data Link Network—transition to ADAR in FY06.
- Airborne Communications Payload—transition to VTUAV in FY06-07.

Priority: Time-sensitive decision-making.

- **In FY 2002:** Digitized auto-upload of ATO/ACO and automatic association AEW track data. Interactive and intuitive alerting for AEGIS C&D System.
- **In FY 2003:** Automated image compression and registration. Auto-correlation and precision geo-location for EP-3 ESM data. Multi-tasking and workload management for land attack and NSFS. Extension of JMPS collaborative planning to surface assault. Integrated decision tools for special operations.
- **In FY 2004 - 2005:** Rapid combat ID, threat assessment,

“There’s going to be a flood of data coming at us. Some people are intimidated by it. I’ve got to think we ought to understand that what we have to do to solve this technical problem because this will be the heart and soul of our ability to dominate the knowledge space. This is an American asymmetry.”

—Admiral Vernon E. Clark, Chief of Naval Operations

deconfliction and resource allocation for targeting. Automated course-of-action analysis for littoral operations.

Transition Opportunities:

- Advanced Alerting—transition to PMS-400 in FY 03.
- STORYMAKER—transition to PMA-290 in FY 03.
- Assault Planner—transition to JMPS in FY 03.
- Mission Planner—transition to PMA-299 and PMA-233 in FY 03.
- Image Exploitation—transition to PMA-281, PMA-233 and PMS-435 in FY 04.
- Merged AEW data/ATO—transition to PMA-231, PMA-233, PMS-378 and MCSC in FY 04.
- Course of Action Analysis Tool—transition to MCSC in FY 04.
- Rapid Execution and Decision System—transition to PMA-233 in FY 05.
- TLN Workstation—transition to PMA-282 in FY 05.

Priority: 21st century command capability.

In FY 2002 – 2003: Improved creation, distribution, assimilation and visualization of theater-level knowledge. Improved collaboration services for staffs. Enhanced open-source search, retrieval, verification, organization, and presentation capability.

Transition Opportunities:

- Collaboration and knowledge management toolset—transition to USCINCPAC, NMCI and PMW-157 in FY 03.
- Open Source Exploitation—transition to PMW-157 in FY 03.

What’s some of the sustaining discovery and invention science and technology? Exploitation and delivery depend upon discovery and invention. In ONR’s vertically integrated program, we will continue to exploit basic and applied science relevant to decision support and information distribution.

- **Cognitive science** undergirds intuitive human-computer interfaces and decision aids.
- **Radio frequency** architectures and technologies and the **physics of radiation** enable new radio technologies.
- **Information science** and collaboration technologies contribute to effective, reliable wireless networks, and their exploitation in planning and execution. They help create an accurate, common, consistent representation of the battlespace.
- **Environmental sciences** characterize the operational environment and its effects.

“At the structural level, network-centric warfare requires an operational architecture with three critical elements: sensor grids and transaction (or engagement) grids hosted by a high-quality information backplane.”

—Vice Admiral Arthur K. Cebrowski, U.S. Navy, and John J. Garstka, Network-Centric Warfare: Its Origin and Future.