

Government Funded Surface Ship Initiatives

Smart Carrier

Sponsor: PEO Carriers

Start: Jan 2002 **Complete:** Sept. 2002

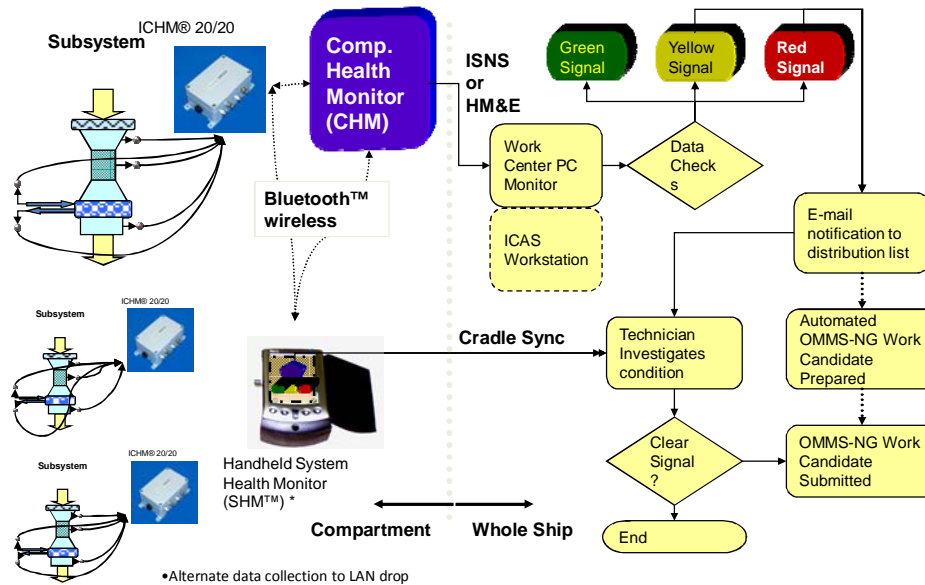
Developed and installed pilot ventilation health monitoring system for Smart Carrier program. Integrated system over ship's LAN with maintenance scheduling software package. Demonstrated automated health monitoring and maintenance scheduling solution with a projected ROI inside of two years.

USS Carl Vinson CVN 70 Smart Ventilation Program

One of Oceana Sensor's initiatives, the Smart Ventilation program, demonstrates the viability of CBM onboard an Aircraft Carrier, the USS CARL VINSON (CVN-70). Vent fans were chosen owing to their high maintenance requirements and distributed nature throughout the ship.

- On the current equipment, conventional sensors will be non-intrusively attached to the fan/coil units. These sensors will be wired to a local ICHM which provides all sensor signal conditioning and processing.
- The results of the analysis will be transmitted using Bluetooth wireless technology to a "Compartment Health Monitor" which provides an intermediate level of processing to identify issues which are "visible" from the compartment vantage point.
- The Compartment Health Monitor will also act as a bridge to the ship's LAN. Once on the network, the Smart Ventilation System can act as a server to any other client application.
- The initiative includes a the tight integration with the existing maintenance and work package planning systems (SKED & OMMS-NG).
- This provides a vital linkage to achieve actionable information from sensors and provide real workload reductions for ship's force.
- This as an approach that bridges the gap between what exists today (SKED 2.2) and the future Navy ERP system now under development.
- The Wireless e-Diagnostics implementation is being built around a MIMOSA compliant architecture.

Smart Ventilation Data Management Process



AAAV (Advanced Amphibious Assault Vehicle) STTR

Sponsor: US Marine Corps

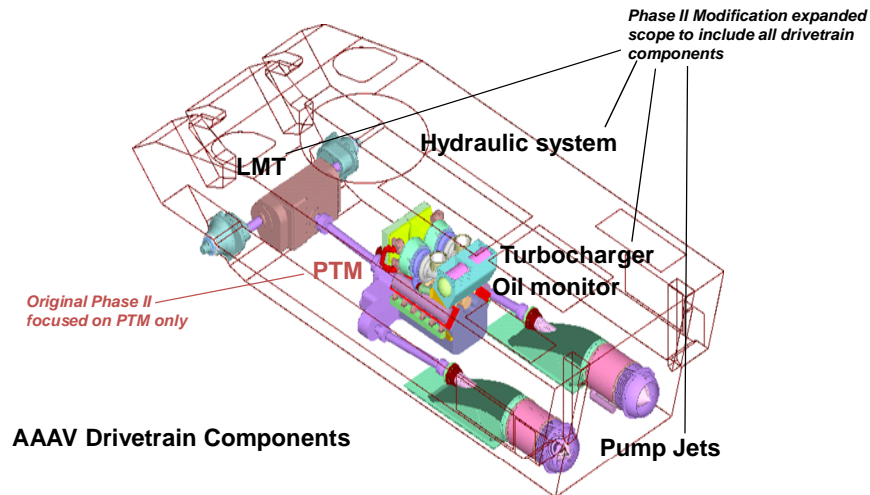
Start: June 1999 Complete: July 2002

Developed wireless prognostics and maintenance decision support system for the drive train of the AAAV. Developed the core of the ICHM 20/20 product. Embedded wavelet advanced feature extraction algorithms and maintenance decision support intelligent agent in the system. Demonstrated the capability of wireless to function successfully on the vehicle.

AAAV (Advanced Amphibious Assault Vehicle) STTR Contract

The ICHM® 20/20 product resulted from the development efforts of this program. The design used in this program accommodates 6 channels of sensors provide full signal conditioning, acquisition, processing, internal test and wireless communication. Packaged in a high strength polymer NEMA 4 enclosure measuring 120mmx80mmx50mm, the ICHM provides for survivability in harsh environments. Battery backup provides for data security in the event of vehicle power failures. Bluetooth™ wireless technology was used to provide a very robust communication capability in a small, affordable profile. The ICHM technology supports all levels of the OSA CBM information model. Initial system design allowed for up to 4 ICHM 20/20s to be used in order to collect a comprehensive and robust set of data

during operation of prototype vehicles. Use of COTS components insure affordability and takes advantage of rapid evolution of digital communication technology. In production, the ICHM would be scaled to accommodate the necessary number of sensors for each subsystem and component.



Distance Support Program

Sponsor: Dept of the Navy, NSWC Carderock Division

Start: Oct 2004

Estimated Completion: Oct 2009

Developing the Next Generation ICHM[®] for shipboard CBM and PHM monitoring with secure wireless data transmission to the existing ICAS (Intelligent Condition Assessment System) LAN for on ship monitoring as well as remote monitoring by Stateside experts in the DS group for analysis and logistics planning.

Next Generation Analytics for Shipboard Monitoring Systems

Sponsor: Dept of the Navy, NSWC Carderock Division

Start: July 2007

Completion: September 2008

NSWC requires support and expertise related to the design, testing and installation of machinery onboard condition monitoring, diagnostics, prognostics, troubleshooting, and

remote condition monitoring technologies to provide reliable critical systems performance. This includes knowledge and experience of both currently installed machinery control, monitoring, diagnostic, prognostic, troubleshooting, and remote condition monitoring systems as well as new technologies related to these systems to update the US Navy ships to State-of-the-Art. Provide a broad range of logistic, technical, engineering, software, IT, integration, and installation support for NG-ASMS as well as the existing ICAS, MELS, IPAR, DS, and RDS systems and process in place for ship maintenance programs.

ONR's YP Patrol Ship

Sponsor: ONR

Start: June 2001 Complete: Aug 2002

Developed and prototyped an optimized power ICHM[®] for powering via thermal energy scavenging. Developed thermal power scavenging from commercial thermoelectric components integrated with ICHM[®] and demonstrated self-powered temperature sensing on shipboard diesel engine.

Reduced Ship's Manning Through Virtual Presence (RSVP)

Sponsor: OSD ATD

Start: April 1999 Complete: Feb 2000

Teamed with the ARL at Penn State and Draper Labs, Oceana Sensor utilized the ICHM technology to help develop prognostics technology for the US Navy's existing shipboard gas turbine generators. OST validated the successful communication capability of spread spectrum RF in and around the generators at the Land Based Engineering Test Facility in Philadelphia.