



# Defense-Wide Manufacturing Science & Technology (DMS&T) Program

## Advanced RF Packaging

### PROBLEM / OBJECTIVE

Aggressive cost targets and a tight transition schedule led to an increased focus on non-developmental COTS hardware for the U.S. Navy Littoral Combat Ship (LCS) platform, resulting in LCS builders currently fielding foreign made radar systems. Affordability and performance expectations have not been met with these systems. Current solutions also do not provide the technical data rights the navy requires for performance and mission modeling.

The LCS Program Office is transitioning to a new radar system on both the USS Freedom variant and the USS Independence variant LCS platforms. Scalable design, improved acquisition cost and supportability are critical features of the new radar system.

Based on risks with the previous Low Cost Open Architecture ManTech program and challenges for the upgrade and sustainment of the current radar systems, the LCS Program Office is working with DMS&T and the Office of Naval Research Navy ManTech project office to integrate an Affordable Model-based Open-architecture Radar based on the non-developmental radar system (the AN/SPS-76, based on the Thales Signal Multibeam Acquisition Radar for Tracking, or SMART-S Mk2) on both LCS variants. *NOTE: This addresses the E/F radar band, formerly the S-band..*

### APPROACH / BENEFITS

#### **Objectives**

- Improve the assembly and packaging process for the Transmit/Receive (T/R) Line Replaceable Unit (LRU) integral to the radar, with the aim of reducing the radar acquisition cost 20%.
- Transition the production of the entire radar system from foreign to domestic production and support, employing state-of-the-art manufacturing techniques and industry best practices to the resulting production line.
- Develop models to create an Intelligent Technical Data Package (ITDP) per MIL-STD-31000 that will facilitate new technology insertion and competition between multiple vendors for the radar system.
- Develop a hardware- and software-based Hardware-in-the-Loop simulator that will be used to verify the accuracy of the MBE models developed on the program and allow for the verification of the performance of the radar components at the LRU level.

## ***Approach***

- Make use of an existing radar system already in production.
- Apply open architecture concepts.
- Eliminate the need for design and development tasks.
- Use a MBE framework.



Self-Defense Test Ship with the SMART-S Mk2 Radar

## ***Expected Benefits and Warfighter Impact***

- The U.S. Navy LCS Program will be provided with a US-built and supported 3-D volume search radar that meets all LCS mission requirements.
- Allows greater flexibility in location of below-deck equipment, allowing a lower center of gravity and improved ship stability.
- Enjoys radar acquisition cost savings realized by applying advanced assembly and packaging processes from previous ManTech programs.
- The U.S. Navy will be provided with full Government Purpose Data Rights.
- Transition to the LCS platforms to meet the LCS Program Office's need to make a procurement decision prior to the multi-ship buy scheduled for 2014.
- AN/SPS-76 radar could be integrated into the Technical Integrated Data Environment system to reduce both the shipboard and shore-based manpower required for maintenance and life cycle support.
- The ITDP will be used in conjunction with the Hardware-in-the-Loop simulator throughout the life of the LCS program to verify new technology insertion and validate the LRU performance without the need to test aboard a ship or in a full radar system.
- Demonstrate the total ownership cost savings that can be garnered through the development of models and intelligent technical data packages.
- The U.S. Coast Guard's Offshore Patrol Cutter and National Security Cutter programs have identified potential benefits from use of the AN/SPS-76 radar, which is also being considered as a potential replacement for the AN/SPN-43 Air Marshalling Radar on large deck amphibians. Additional systems expressing interest include the Army EQ-36 Counter-fire Target Acquisition radar (focusing on improving the affordability of the RF packaging of the Octapack T/R module, resulting in a cost savings of over 25% per T/R module), the USMC G/ATOR, and the USAF 3DELRR.

### **POINT OF CONTACT**

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