

Affordable, Model-based Open-architecture Radar (AMOR)

Status: Pending Implementation

PROBLEM / OBJECTIVE

The current Littoral Combat Ship (LCS) radar system solutions have posed various challenges to the U.S. Navy. Both variants of the LCS currently use foreign-produced and supported volume search radars (VSRs). These current radar systems do not fully meet the mission requirements or provide the technical data the Navy requires for performance and radar system modeling, vital for a new surface combatant platform. In addition, these current systems have not met the desired affordability objectives.

The Affordable, Model-based Open-architecture Radar (AMOR) Navy ManTech project has been formulated to provide the LCS with a VSR solution that meets its mission and affordability needs. The objective of this ManTech program is twofold: (1) facilitate an open architecture radar system that allows upgrades for new technologies and capabilities over the lifetime of a naval program, and (2) develop and implement new manufacturing technologies in critical sub-assemblies to reduce system cost.

Under this ManTech project, the ACIT/Exelis team is performing ManTech packaging and technology upgrades to the Exelis designed and produced PowerBook T/R module with the goal of improving its manufacturability and lowering its procurement cost. At the conclusion of the project the ACIT/Exelis team will provide to the Navy a production-level Intelligent Technical Data Package (ITDP) for the AMOR system.

ACCOMPLISHMENTS / PAYOFF

Process Improvements

- Exelis is making use of commercially available GaN RF Power Amplifiers in COTS packaging for their PowerBook re-design. ACIT has obtained Title III GaN MMICs from two separate sources, and is packaging them in inexpensive COTS common QFN and LCP-laminate based packages in the development of an alternative drop-in transmit chain for use in the Exelis PowerBook.
- ACIT has worked with Exelis and Thales to translate the drawing package for the SMART-S Mk 2 radar into a 3-D Model based Intelligent Technical Data Package based on PTC's WindChill Product Development Manager Software. This ITDP will enable the Navy to fully understand the A/N-SPS-76 radar, and will facilitate the spiral insertion of new technology as well as the qualification of alternate sources of supply as required.
- ACIT has developed an S-band Open-architecture Component Knowledge and Event Tester (SOCKET) hardware-in-the-loop simulator. SOCKET strings together all of the A/N-SPS-76 LRUs and subsystems into a 3-cabinet system which will enable the rapid prove-out of re-designed or alternate-source LRU hardware in a lab environment without the need for radiating power, which requires an expensive test range or on-ship testing.

Implementation and Technology Transfer:

The A/N-SPS-76 radar with the ManTech improvements facilitated by this project will be produced and supported by Exelis from their Van Nuys, CA facility, and will transition onto LCS-19 & 20 and subsequent hulls (FY15 Multi-hull Procurement). In addition to the LCS, the US Coast Guard is looking to use this radar on their Offshore Patrol Cutter program, and it has also been proposed for use on large deck amphibians as a replacement for the A/N-SPN-43. There is also the potential for application to the Navy's new Small Surface Combatant.

In addition to direct uses for the radar system, the technology and process improvements developed on this project will be made available, and can be leveraged on other DoD radar and EW programs across multiple platforms and services.

Expected Benefits and Warfighter Impact:

This effort will enable a \$1M acquisition cost savings per hull for both variants of the Littoral Combat Ship.

In addition, this project provides for:

- Improved radar performance which has a direct positive impact on ship survivability and associated mission success.
- US-based manufacturing and support, as well as full Government Purpose Data Rights, which facilitate accessibility to technical knowledge and support as opposed to the foreign-based support of the current systems.
- Rapid spiral insertion of new technology as well as qualification of alternate sources of supply at the LRU level is facilitated by the SOCKET hardware-in-the-loop simulator, which will drastically reduce the cost and implementation time of any upgrades & design changes.

TIME LINE / MILESTONE

Program Start:	March 2011
Program End:	September 2014

FUNDING

Navy ManTech Program:	\$11.1M
DoD MS&T Funding:	\$4.5M
ONR Swampworks funding:	\$4.0M (Reduced from originally planned \$7.8M)

PARTICIPANTS

IWS-8 (formerly PMS-501) – stakeholder
Lockheed Martin – Original LCOR manufacturer (since terminated)
Exelis R2AS – AMOR (A/N-SPS-76) producer
Thales, NL – Subcontractor to Exelis, and SMART-S Mk 2 radar designer
EMPF – Program management, technical support