SEA POWER 2014

Phased array radar on HMAS Perth and HMS Daring

Ship changes for Romeo arrival

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FROM THE SOURCE

MBDA Australia Managing Director

Andy Watson speaks to ADM
New markets for CEA’s innovations

With its world leading phased array radar and illuminator systems at the heart of the anti-ship missile defence (ASMD) system now in service with the Royal Australian Navy (see P14 for more on ASMD), CEA has quietly been pursuing other fields for its innovative developments in radar and communications.

CEA Technologies’ ongoing business model, now termed ‘solutions with commitment’ is to exploit the competitive advantage it has won in certain niches, supported by its ability to produce very high technology equipment and systems. A feature of this innovative approach is the development of systems that have contributed to the phased array radar but which have found markets in their own right.

An example has been the company’s developments in communications which have contributed to and drawn from its work with phased array systems. The communications system developed originally for the Mine Hunter class, the CEA Integrated Ship Communications System (CEA-ISCS), a modular, highly integrated external and internal communications system, is currently installed on the Fremantle class patrol boats.

This developmental approach remains the company’s primary driver in business conduct, ensuring that the company continues to be at the forefront of innovation with its achievements resulting in broad international recognition.

One of its greatest achievements was the delivery in November 2010 to the Royal Australian Navy of a world first – the first fourth generation active phased array radar (APAR) system to be brought into service anywhere in the world.

That sense of achievement must have continued with the 30 August 2013 announcement by the RAN and the DMO of the successful final Operational Acceptance Trial for the Anti-Ship Missile Defence (ASMD) system in HMAS Perth, the first of the Anzac class to receive the ASMD upgrade. See P14 for more on this program.

The trial included a number of successful ESM firings from HMAS Perth at the Pacific Missile Range Facility (PMRF) in Hawaii. During the trials, the ASMD system comprising CEA’s phased array radar and illuminator and the Saab 9LV combat management system (CMS) was challenged by a number of demanding firing scenarios. These included successful missile engagements against multiple sea-skimming targets including, for the first time in the RAN, successful engagements by ESM against two of the world’s most advanced supersonic targets, the GQM-163 Coyote. These efforts brought ringing endorsements by Chief of Navy, VADM Ray Griggs, of the upgraded ASMD system and in particular the CEA phased array radar.

CEAFAR scalability key to new markets

It would appear that CEA’s advanced and scalable active phased array radar technology has considerable promise in the development of ASMD packages, combining downscaled radar and illuminator with proprietary CMS, such as Saab’s 9LV, for corvettes, small frigates and even smaller
vessels such as OPVs. These can be interfaced to a warship's existing C2 system at far less cost than a total system upgrade.

In this last respect the company says CEAFA's tile based architecture has enabled the development of a downscaled 2 x 2 tile per face system - termed the Offshore Patrol Vessel Radar (OPVR) - to meet the modern surveillance, helicopter/UAV control and networking capabilities expected of Australia's future AORs (Tankers) and patrol boats. CEA points out that platforms, such as the AORs, OPVs and others, are expensive to procure, sustain and run. It is therefore logical to ensure they are equipped with sensors beyond the capability of standard navigation radars, so they can contribute to wider national situational awareness.

But CEA is also looking to upscale and has built and demonstrated a 64-tile face (four times the size of an ASMD face) in line with its award of a contract to develop high powered phased array technology based on CEAFA, that would support a number of defence acquisitions. In the maritime sector one might well assume that upscaled versions of CEAFA's active phased array radar could provide extended area air defence for accompanying ships (as the Anzac class ASMD will do for the LHDs) in much the same way as the Hobart Class AWD does with its Aegis Combat System and SPY-1D(V) radar.

According to reports Lockheed Martin is considering the provision of export oriented 'core Aegis' component for integration with third-party combat management systems that may open the way to the integration of phased-array radars outside the current AN/SPY-1 family. Since an upscaled active electronically scanned array (AESA) radar such as CEAFA, outperforms a passive electronically scanned array (PESA) radar such as SPY-1D(V), it would be safe to assume that those navies looking to acquire core Aegis systems for their destroyers and frigates might well consider acquiring CEA's high power AESA radar rather than SPY-1, for their main surface search and target acquisition sensor.

**Land domain opportunities**

But CEA is by no means solely focussed on the maritime domain and the area air defence capabilities. Phased array technology has obvious merits in the protection of airbases through use of mobile radar and surface to air missile systems as well in the development of advanced ground-based air and missile defence (GBAMD) systems. The company has already developed a ground-based radar as well as a portable radar which would be available for airport defence mounted on a vehicle or for mortar location and detection.

CEA's Land Transition Program, co-funded by CEA and Defence's Priority Industry Capability Innovation Program (PIC IP) involves the repackaging of the radar faces for GBAMD applications. The product developed is called the Ground Based Multi-Mission Radar (GBMMR).

CEA's CEO Merv Davis says that while the recent demanding operational test firings have proven that CEAFA is a world leading capability in the maritime domain - this technology is equally as capable in the land domain as was recently proven with the firing of the IRIS-T SLM in South Africa using the GBMMR version of a land-based CEAFA radar.

He was of course referring to Diehl Defence's successful demonstration of its IRIS-T SLM GBAD system, in the presence of international experts and military representatives from 16 nations, at the Overberg Test Range in South Africa on January 14, 2014.

IRIS-T SLM consisted of the new CEAFA, a Tactical Operation Centre (TOC) employing both the BMD-Flex command, control and communication system of Terma A/S, Denmark, and the Oerlikon Skymaster battle management system of Rheinmetall Air Defence, Switzerland, as well as the IRIS-T SL launch station with Diehl Defence missiles. All elements were integrated into the system by Diehl.

IRIS-T SLM detected the low flying target drone of type D0 DT-25 and established a stable track, which was classified as hostile. The missile was launched at a distance of about 20 km and intercepted the target with a direct hit. During the entire flight, target data updates from the radar were provided to the missile through the data link allowing the infrared seeker to lock onto the target in flight for the endgame. All hardware and software components performed flawlessly.

The demonstration firing was supported by the German Ministry of Defence and the Australian Department of Defence. Close to 90 visitors from around the world witnessed the live firing demonstration inside the test range control centre and were informed in detail about the operational capabilities and the technical details of the Ground Based Air Defence system during the test campaign.