The project to give the Navy’s eight Anzac frigates the ability to defend against saturation attacks from anti-ship missiles continues to meet local milestones and generate international interest. As at 7 February 2013, $654.143 million has been expended on the whole ASMD program, which equates to approximately 62 per cent of the total budget.

CAPABILITY

As to summarise the capability being provided under the project, a Defence spokesperson explained to APDR.

“Anzac ASMD will provide sustained protection against anti-ship missile attack which is an essential element of Australia’s maritime capability.

“The ASMD upgrades will ensure the Anzac frigates have an increased level of self-defence against modern anti-ship missiles. It will also enable Anzacs to give close-in protection to amphibious ships, supporting the Navy’s future Air Warfare Destroyer’s area air defence capability with a local missile defence inner layer for a Task Group.

“Key improvements to upgrade sensors and weapon systems include:

- Installation of an infra-red search and track system (IRST) providing improved detection and indication of low level aircraft and anti-ship missiles when close to land.
- Improvements to the existing fire control radar to increase the detection and engagement range against anti-ship missiles.
- Improvements to the command and control system to shorten the time between detection and engagement of anti-ship missiles.
- CEAFAR active phased array radar being developed by CEA, an Australian company based in Canberra, will offer significant enhancements over conventional radars to provide target indication and tracking of supersonic anti-ship missiles; and
- CEAMOUNT active phased array radar, also being developed by CEA, will be fitted to provide mid-course guidance and terminal illumination for the Evolved Sea Sparrow Missile. This will deliver multiple channels of fire, and enable more than one missile to be controlled in flight.

“The key difference with other missile systems is the ASMD project provides digital, fixed face, active phased array radars and illuminators that are fully integrated with the Combat and Weapon Systems that provide maximum capability, reliability, self protection and scope for future capability enhancement through software upgrades.”

UPGRADE

HMAS Perth was the first of class to be upgraded — work that was completed in February 2012 — and is soon to go through a further improvement in capability known as Stage 2. In essence, this will add even more channels of fire allowing for a greater number of Evolved Sea Sparrow Missiles to be fired against incoming threats. Exact figures are naturally classified, though the original intention of the project was to defend against saturation attacks.

Defence explains: “Stage 2 represents the final capability to be
program to be accelerated, and offers operational and cost benefits to the Commonwealth. BAES says there are currently more than 290 people based at the Shipyard, which has provided a great boost for the local economy.

**VAMPIR IRST**

While most Australian media attention has understandably focussed on the leading-edge digital active phased array radars being used for detection, tracking and fire control, the ship's Infra-Red Search & Track (IRST) system is also a vital component in ASMD. Produced by Sagem, the VAMPIR is in the unusual – and flattering - position of having received a bulk order from the RAN to equip not only the Anzacs but also the new Air Warfare Destroyers and LHDs.

While phased array radar is a formidable sensor, its performance – like almost all naval radars – is line-of-site and therefore it has some range limitations when it comes to the detection and tracking of very fast sea-skimming missiles. This can be mitigated by also equipping the ship with IRST systems that are optimised for extremely rapid and accurate horizon search. Any incoming missile will be hot – usually from its propulsion source (a rocket or jet) – and in some cases of very high speed missiles from friction with the air. Thoae heat sources can be picked up very quickly – especially so in the case of VAMPIR, which is a dual mode system incorporating features such automatic detection with a very low false alarm rate.

The company says VAMPIR is the most sensitive system on the market and is the only one using the ultra-rapid “step-and-stare” principle enabling 360° coverage with a single high-performance, 3rd generation 3-5 μm IR camera. The high-resolution, 3-axis stabilized video enhances advanced identification capabilities. It is backed by an image processing system offering optimal performance, even in rough seas.

Sagem explains that IRSTs - behaving like search radars albeit in a silent, passive fashion - have been used by various navies since the 1980s. Initially designed to detect sea-skimming missiles in the low-elevation region where multipath and refraction create difficulties for search radars, IRSTs have now come of age and can address many more requirements: Thanks to the high-resolution infrared imagery they deliver, they have become key contributors to tactical situation awareness in littoral environments where a large number of surface vessels of all kinds are likely to be encountered, in addition to new threats coming from the land.

An early believer in IRST technology, the Australian DSTO has studied this emerging field since its inception - according to Sagem thanks to scientists like Bernard Kachoyan and Bob Warren, who performed extensive theoretical work on the subject. This interest resulted in IRST being a candidate technology of the cancelled WIP (Warfighting Improvement Program) in the late 1990s. In 2000, DSTO and the RAN carried out an evaluation campaign of the VAMPIR MB (“MB” is a French acronym that stands for “monocéphale, biseptical”, i.e. “single head, dual band”) IRST aboard a RAN FFG, with the support of the French procurement agency (DGA). A number of live trials were performed in the tropics with fighter aircraft, which confirmed the capability for IRSTs to passively detect and track air targets in ranges that are of operational interest.

When the ASMD program took shape in 2004, Sagem responded with the successor to VAMPIR MB called VAMPIR NG (New Generation). This completely new system leverages the much greater sensitivity of matrix array IR detectors compared to that of previous generation line array detectors. This enhanced sensitivity enables the use of a single (medium wave) band rather than a dual band (medium wave and long wave) channel for all IRST operation conditions.

Sustainment is also at the heart of Sagem’s industrial strategy, with the creation of an Australian subsidiary whose tasks will include local support for VAMPIR NG in the Sydney suburb of Bankstown, leveraging significant investment made for the Tiger helicopter optronic sight maintenance.

**INTERNATIONAL**

Meanwhile, looking at international opportunities for the ASMD solution – and in particular the phased array radar – CEA Chief Executive Officer Rob Forbes is quietly confident of long term success. There has been considerable interest from the US, including potentially for ground-based versions of the system. Having Northrop Grumman not only as a shareholder but also an active partner advantages the company. He also mentioned Canada and New Zealand as potential customers.

New Zealand – which operates two Anzac frigates – is seeking to upgrade the combat system capabilities of their ships and ASMD could be a good candidate. However, no one wants to take anything for granted and it is a case of waiting to see what happens on the other side of the Tasman. An Australian Defence spokesperson would only comment: ‘The Anzac ASMD project and its progress has been discussed at the Royal Australian Navy/ Royal New Zealand Navy face-to-face meetings and dialogues. The RNZN has not proposed to extend the Anzac ASMD project to the two New Zealand Anzac class frigates.’