

# Northern Exposure

**Developing a multi-capability approach to maritime surveillance and resource protection**

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In August 2001, the stance of the Australian government towards border protection changed inexorably from one of muted and moderately effective response to incursions and offences detected in the maritime environment, to one where the invulnerability of Australia's northern coastline is now seen as a measure of Canberra's leadership and its national priorities.

For the Australian Defence Force (ADF), the sea change in border security for the world's biggest island nation has engaged its maritime patrol and response capabilities in operations that have stretched the Royal Australian Navy (RAN) in particular; impacting on its training and maintenance schedules and adding longer periods at sea to some vessels that are already considered past their use-by date.

For the RAN, the sudden surge in patrol and response activities required of its fleet under Operation Relex also revealed a certain uneasiness at a professional navy undertaking what are, essentially, maritime policing roles.

For its part, the RAN is nonetheless well versed in meeting the unique challenges posed by low level, non-military threats that emanate from the sea-land-air approaches of Australia's vast northern maritime frontier. It enjoyed considerable success during Operation Relex and is the undisputed authority on long-range detection and response in the maritime environment throughout Australia's near neighbourhood.

In conjunction with the Royal Australian Air Force (RAAF) and to a lesser extent the Australian Army, the RAN effectively halted people smuggling voyages by sea following the flood of attempts during August and September 2001, one of few countries in the Western world to do so. However, that it was able to stem the tide of illegal immigrants arriving by boat is as much a reflection on Australia's enviable (and unenviable) geographic characteristics as it is on the capabilities of the RAN and the resolve of the Federal Government.

The figures paint a broad canvas: a coastline 37,000 kilometres long surrounding a mainland territory of 7.687 million square kilometres; an exclusive economic zone approaching 15 million square kilometres; and an area of responsibility stretching from the uninhabited but resource-rich Southern Ocean to the waters encapsulating Christmas Island some 2000 kilometres northwest of Western Australia, north to the borders with the southernmost sections of the Indonesian archipelago,

West Papua and Papua New Guinea, and east into the scores of tiny and largely aid-dependent island states of the South West Pacific.

It is an area of responsibility unmatched for its size, natural resources and variety of maritime environments, but serviced by an inventory of patrol and response assets too small to ever contemplate complete coverage. Given these geographic realities, it is remarkable that the RAN—Australia's principal provider of sea-based patrol and response platforms—has the use of just 15 elderly 42m Fremantle-class patrol boats (FCPB). Compare this to India's total of 46 inshore and offshore patrol vessels patrolling a 7500 kilometres coastline or Italy with around 100 vessels (navy and coast guard combined) and a coastline of just 5000 kilometres.

With this degree of coastline permeability, particularly that surrounding its northern shores, the threat from sea and airborne people smuggling operations, narcotics, native wildlife and firearm trafficking, and poaching of fish stocks is unlikely to lessen over the medium term. This is particularly the case with smugglers entering Australian waters and airspace from the 13,000-island Indonesian archipelago, Papua New Guinea and the South West Pacific islands, where the effectiveness and/or willingness of law and order authorities to combat such activities is questionable.

While per task or intercept the RAN and its FCPBs are efficient at what they do, the vessels themselves are nearing the end of their service lives; some say that point was reached several years ago. Of European design and never acceptable ocean-going vessels, the FCPBs have a range of around 4800nm at economical cruising speed, or 1450nm at the maximum speed of 30 knots. Armament consists of an unstabilised and refurbished (ex-World War II stock) 40mm/60 Bofors gun and two 12.7mm M2 heavy machine guns on pintle mounts.

For apprehension and detention of a suspect illegal entry vessel (SIEV), the FCPBs rely on suitable sea conditions and the use of embarked rigid hull inflatable boats (RHIB) to ferry the parent vessel's boarding party to the SIEV. Typically, vessels caught carrying illegal immigrants or prohibited goods or fishing illegally will be towed back to port, whereupon the boats are often burnt en masse and the crews prosecuted and jailed. The Patrol Boat Force is located at bases in Darwin and Cairns.

The Australian Customs Service (ACS) also operates

a fleet of eight 38-metre Bay Class patrol vessels designed and built by Austal Ships. The Bay Class boats possess a maximum range of 3000nm and endurance to permit 28 days of consecutive operations at sea. While a maximum standard speed of 24 knots is indicated, propulsion system options enable speeds up to 50 knots to be achieved.

Airborne maritime patrol and surveillance is provided by the RAAF's fleet of AP-3C Orion aircraft. Based at RAAF Base Edinburgh in South Australia, the 18-strong AP-3C fleet is currently the subject of an extensive systems upgrade, with the last modified aircraft due to be handed back to the RAAF in late 2004.

The upgrade, under the \$A902 million Sea Sentinel project, effectively shifted the emphasis of capability from one of anti-submarine warfare to that of anti-surface warfare, surface surveillance, detection and tracking in both open and congested waters. With an Elta EL2022(v)3 imaging radar system installed and a Star Safire 2 electro-optical system integrated into the existing sensor suite, the AP-3C is understood to be able to detect and track up to 100 surface targets simultaneously. Mission range is believed to be around 2500nm.

Coastwatch, a division of the ACS, provides a civil maritime surveillance and response service with a range of assets under its charter as part of the National Civil Surveillance Program (NCSP). These include the eight Bay Class boats belonging to the ACS's National Marine Unit (which in early 2002–2003 was allocated 2400 sea days per year), the RAN's FCPBs (1800 sea days per annum) and 250 hours of offshore patrol work a year by the AP-3C Orions.

These supplement six Coastwatch Pilatus Britten Norman Islander aircraft and one Shrike AC 500 Aero Commander aircraft for visual surveillance; five de Havilland Dash 8-200 series aircraft fitted with digital radar and electro-optic sensors including a Wescam infra-red turret; three Reims F406 aircraft equipped with radar and night vision equipment for both visual and radar work adjacent to the shore; one Bell 412EP helicopter with an infra-red detection system; and one Bell Longranger IV helicopter.

Following a Prime Ministerial Task Force recommendation for the introduction of measures to monitor all Coastwatch operational activities, the National Surveillance Centre (NSC) was established in Canberra in January 2000. The NSC is equipped with advanced communication links and an internal capacity to analyse information from deployed assets and other agencies in order to better manage the national surveillance effort.

Canberra has pledged to double the operational capacity of the Bay Class boats by employing an extra crew rotation, as well as add a further 1600 hours of Coastwatch surveillance flying and introduce improved Coastwatch communications capabilities.

The current surveillance contracts that provide the operational capabilities utilised by Coastwatch are set to expire from June 2004. Coastwatch has commenced a project known as Civil Maritime Surveillance 2004 to

develop and implement future civil maritime surveillance and response capabilities. Against a backdrop reaching out 20 years and taking into consideration the types and scope of future threats and risks facing effective border control, the project, through industry consultation and open tender, will seek to implement contracts for the provision of state-of-the-art civil maritime surveillance in support of Coastwatch's concept of operations.

To better support patrol and response operations against SIEVs in the far northwest, the ADF has permanently based a Mk 50 Sea King maritime utility helicopter and 20 air and ground crew on Christmas Island. The helicopter, which is likely to be rotated with other RAN rotary-wing aircraft such as the S-70B-2 Seahawk, will be tasked with surveillance, shore-based response and search and rescue.

Despite the variety of assets and agencies involved in coastal surveillance efforts, Australia's oft quoted 'tyranny of distance', sparsity of population in the northern states and subsequent lack of infrastructure capable of supporting more expansive surveillance capabilities ensure that Australia's borders remain somewhat porous in many areas.

And in spite of a wealth of natural undersea resources in those northern areas where poaching by predominantly Asian fishermen and organised poaching outfits endangers lucrative fish stocks, Australia's less than fully integrated and tiered patrol and response capability of just 23 patrol boats (15 RAN FCPB and eight ACS Bay Class) shows no sign of increasing in number.

## Capability Boost

While the RAN's project to acquire a new fleet of Replacement Patrol Boats (RPB) will not address the overall deficiency in vessel numbers, Project Sea 1444 will deliver the first of 12 Armidale-class RPBs by early 2005. These vessels will have significantly improved sea keeping and availability in all areas within Australia's marine jurisdictional zones, except those territories in Antarctica and deep in the sub-Antarctic Southern Ocean, into which only the RAN's Adelaide and ANZAC-class frigates (with their extra size, robustness and helicopter support) can effectively venture.

In pursuit of the requirement to enforce relevant Australian and international laws at sea, the RPB force will be capable of undertaking the following tasks: patrol, response, surveillance, surface contact detection, identification and interception; boarding of vessels using members of the RPB crew as boarding parties; sea boat operations for ferrying personnel and equipment to other vessels or ashore while the RPB is underway and making way; apprehension of vessels; tow to port apprehended vessels; the provision of steaming parties comprising members of the RPB crew to sea ride on apprehended vessels; maritime search and rescue and aid to vessels in distress.

To be built by Austal Ships at its Henderson, Western

Australia yard under a A\$550 million contract (build phase value A\$350–\$450 million), the RPBs will also undertake a range of military tasks in both peacetime and during military contingency operations. These include: the provision of support to embarked military forces (e.g. transportation, insertion and extraction of special forces elements and their equipment, and communications relay for shore-based units); a limited ability to protect harbours, naval bases and coastal shipping; participation in Australian and foreign military exercises; regional engagement deployments; the provision of support to government agencies such as the Defence Science and Technology Organisation (DSTO); disaster relief operations in Australia and overseas; defence aid to the civil community; medical evacuation and the collection of environmental data.

The 56m Armidale-class will provide a minimum of 3000 available sea days per calendar year. In addition to this, the RPB force must be able to provide a surge capacity of an additional 600 sea days per year, at no more than 48-hours notice when deployed from Darwin or Cairns. The RPBs will be expected to maintain a mission availability rate of at least 98 per cent per quarter. It is anticipated that up to two thirds of the RPB fleet will be home ported in Darwin.

Each RPB will also have an area set aside for the separate transportation of up to 20 personnel in austere accommodation. These personnel, for instance, could be other ADF elements or groups of apprehended illegal immigrants, smugglers or poachers. Crew size would typically be under 25.

The minimum required range of the RPB will be at least 3000nm with 20 per cent fuel remaining. Payload is to enable stowage of 42 days worth of dry and frozen provisions and 14 days of fresh provisions. A typical deployment for an RPB unit would be at least 42 days, with extended deployments up to 90 days in duration.

Even though range and endurance are the primary performance parameters, vessel speed will also be important in response and pursuit missions. In this context, the RPB shall possess a maximum continuous speed of no less than 25 knots, a cruising speed of 12–16 knots and a continuous loiter speed of 4–10 knots. Speeds must be sustainable to the top of Sea State 4 in all areas of operation.

The two ‘mission critical’ components of the RPB will be the embarked RHIBs and the communications-sensor system. The former is to comprise two self-righting 6m (minimum) RHIBs capable of 25 knots and with a range of 100nm at 12 knots when fully laden. A full boarding party would typically comprise eight naval personnel, one fisheries officer and support equipment. The RHIBs must be robust enough to withstand hard use in coral waters and enable the boarding of other vessels ranging in size from a small dinghy to a large merchant vessel.

The RPB crew will be able to communicate with and receive a variety of communicable data from the

entire spectrum of military and civil surveillance stakeholders: ADF command and headquarters organisations; relevant ADF and civil surveillance assets; government agencies (Coastwatch, ACS, Australian Fisheries Management Authority, Department of Immigration, Australian Federal Police and State police services); other maritime users (Australian and foreign flagged commercial ships, aircraft and port authorities); the public switched telephone network; existing and modernised high frequency networks; ADF Joint Command and Support System; RPB sea boats and detached boarding parties and landing parties.

## On Land

Selected land elements of the ADF also play a part in building up a surveillance picture of Australia’s northern coastal regions. The 4th Intelligence Company manages extensive civil reporting and coastwatcher networks across Australia’s north to detect unusual activities along our coasts and their hinterlands. These networks are backed up (and a limited response capability to small-scale incursions provided) by the Australian Army’s Regional Force Surveillance Units (RFSU), which collectively total around 1500 personnel, many of whom are drawn from local aboriginal communities. The RFSU include the Western Australia-based Pilbara Regiment; the Darwin-based Norforce and the 51st Battalion, Far North Queensland Regiment.

Equipped as light infantry and with the use of modified 110 series Land Rovers and Zodiac inflatables, the RFSU can maintain a presence in and around remote vessel and vehicle access points, as well as monitor coastal shipping from vantage points and uninhabited islands dotted around the coast.

## Radars to the Rescue

To combat in part the remoteness of the northern coastline and its expansive sea and air approaches, the ADF first investigated the feasibility of establishing radar coverage over these areas to act as a ‘tripwire’ in provision of advanced warning of suspected illegal entrants.

Up until the mid-1990s, most efforts were focused on the development of the ambitious Jindalee Operational Radar Network (JORN), which, after five years delay and cost overruns, was officially declared operational in April this year. Under development

since the late 1970s by DSTO and overseas sub-contractors, JORN is one of few large scale over-the-horizon radar (OTHR) capabilities to enter service worldwide, and is expected to provide around 20 million square kilometres of radar coverage over northern Australia.

Primarily tasked with the detection and tracking of surface and airborne platforms, JORN will be able to pick up targets as small as a fishing boat and low flying light aircraft attempting to pass through known 'blind spots' in existing ADF and civil-operated radar systems. The complete JORN capability consists of transmit and receive radar antennae installed near Laverton in Western Australia and near Longreach in central Queensland.

An equally valuable capability in either the maritime or air surveillance environment, JORN will be capable of picking up contacts out to at least 3000 kilometres. Reports indicate that in 1997 the experimental JORN site at Alice Springs in the Northern Territory detected missile firings by China's PLA off Taiwan, information about which was passed on to the commander of the US 7th Fleet. Minimum effective range is approximately 500 kilometres.

By bouncing radio waves off the ionosphere and detecting and then tracking surface targets at long stand-off distances from the coast, JORN will add significantly to the RAN's ability to respond to and apprehend SIEVs, giving RPB commanders a baseline surveillance picture of the area of interest together with most of the surface and air movements contained therein.

Of more recent developmental lineage, the Surface wave Extended Coastal Area Radar (SECAR) originally developed by DSTO and now Daronmont Technologies will provide broad area littoral surveillance across northern Australia under a \$A15 million February 2003 trials contract with the Department of Defence.

To be operated by the company on behalf of the ADF and Coastwatch, the trials are expected to confirm SECAR's ability to provide coastal radar coverage out to approximately 300 kilometres and over an arc of 120 degrees. Both surface vessels and low flying aircraft can be detected. According to Daronmont Technologies, SECAR can provide radar coverage of a designated area in around five minutes, compared to four hours and 60 hours required by radar-equipped fixed-wing aircraft and patrol boats respectively.

SECAR, which utilises 5–20 Mhz high frequency radio waves that 'stick' to the sea surface, is able to see well beyond the horizon, and will likely fill the capability void between land-based and horizon-limited microwave radars and long-range OTHR such as JORN should trials prove successful.

Other locally-developed hardware includes the Sonacom Sea-Watch underwater surveillance system that has so far been trialled in a deepwater port (Sydney Harbour), the shallow tropical waters of the Great Barrier Reef and in the Indian Ocean off Broome, Western

Australia. Remotely monitored, Sea-Watch is built around a low-cost, Australian-made sonobuoy containing an integrated sensor and communications system. These sonobuoys float on the surface and are positioned in a predetermined pattern. With power supplied through solar panelling to enable extended unmanned operation (up to six months), Sea-Watch sonobuoys can detect a range of surface and sub-surface targets, the latter including submarines and special forces 'swimmers'. Data collected from the peripheral sonobuoys relating to that surveillance picture is then fed back through a 'master buoy' to a monitoring station using radio frequency or satellite links. The ADF and overseas military and paramilitary forces have expressed interest in the product.

JORN and SECAR will complement the RAAF's new B737-700 inspired airborne early warning and control (AEW&C) aircraft due to come online in 2007/2008 under the A\$3 billion Project Wedgetail. In addition to undertaking the traditional airborne command and control role for RAAF air combat assets, the AEW&C capability will also involve, by default if not design, considerable means by which to detect, track and in some cases classify sea surface targets at long range. With a Northrop Grumman Multirole Electronically Scanned Array radar installed along the aircraft's centreline as the primary aircraft sensor, it is thought the aircraft will be capable of simultaneously detecting sea and air targets out to around 200 nm, with 360-degree coverage every 10 seconds in the maritime mode. Time on station is approximately eight hours.

Under Phase 2 of Joint Project 2062, it appears likely that a quantity of Northrop Grumman RQ-4A Global Hawk high altitude, long endurance, unmanned aerial vehicles (UAV) will be acquired by the RAAF to undertake predominantly maritime surveillance. This follows what were believed to have been fruitful trials of Global Hawk during a six week self-ferried deployment to Australia in May–June 2001 under which the aircraft flew no less than 11 surveillance missions and profiles at various geographic locations, including participation in the combined ADF/US Marine Corps Tandem Thrust 01 joint exercise. During a maritime surveillance tasking, Global Hawk was able to detect and track a small surface target at 170 kilometres distant. The aircraft's synthetic aperture radar later identified the contact as a 12-metre fishing boat.

Global Hawk was flying with a number of modifications, including an enhanced maritime surveillance mode engineered largely by DSTO to suit ADF requirements and those, including the US military, with an interest in broad area maritime surveillance. Should the, as yet, unapproved JP 2062 proceed as currently envisaged, the first Global Hawks could enter Australian service around 2007. ♦

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