# Strategic shipbuilding in a sea of States

PORT ADELAIDE MARITIME CORPORATION IMAGE

In July next year, when Cabinet concurrently deliberates at 'second pass' approval on the preferred design and acquisition strategies for both the air warfare destroyer and amphibious landing ship business cases, they will be effectively marking out a landscape that will shape the future of Australian naval shipbuilding for the next 20 years.

Trevor J Thomas/TOULON & FENE

## Key Points

- **In the past 10 years**, the Australian Shipbuilding Association says local shipbuilders have constructed $14 billion worth of ships, with another $6 billion on order or under construction.
- **The Royal Australian Navy** is said to have commissioned the bulk of these ships, estimated at 70% of all work by value, and almost all in terms of medium to large sized steel ships.
- **Defence figures indicate a major peak** in shipbuilding expenditure around 2010 due to the intersection of the AWD and LHD programs, with an equally major trough in the late 2020s.
- **A program for local shipbuilders to participate** in global naval platform construction work could bridge the ten years to the late-2020s until replacement 'Anzac'-class frigates and 'Collins'-class submarines are required.
- **Both bidders for Joint Project 2048 possess** considerable lattitude to help leverage Australian shipbuilders into overseas naval programs that are complementary to Australia's existing industrial and technological capabilitiles.

Both projects (Sea 4000 and JP 2048) represent the bulk of large ship construction work in Australia through to at least 2020, by which time eyes will have turned to replacing the 'Collins'-class submarines and the 'Anzac'-class frigates. Changes in military technology and construction materials, however, indicate it may not necessarily follow that such vessels are replaced identically one for one, or that the platforms themselves will be composed principally of steel.

Because the two current projects also represent the large majority of complex ship design and maritime/defence systems integration work within Australia for the next fifteen years, industry can be expected to naturally consolidate around them, especially in light of the Government's 16 August announcement it plans to privatise ASC Pty Ltd (the former Australian Submarine Corporation), over the period late-2007 to the second half of 2008.

**NAVAL SHIPBUILDING & AUSTRALIA:** Historically, naval construction projects in Australia were awarded to Commonwealth-owned Naval Dockyards or contracted out to private yards primarily focused on supporting the commercial shipping industry. Because this system was protected by Government preference arrangements, a non-cyclical construction schedule could be sustained without substantive loss of workforce experience and capability.

Deregulation, globalisation and privatisation have since caused considerable change to this comfortable arrangement. In the naval platform sector, both ASC and Tenix were unable to sustain the construction workforces at the end of their last substantive build cycle. Yet other investments in local commercial shipbuilding, especially the success of aluminium-hulled fast-ferry designers, have witnessed an overall expansion in maritime capabilities especially when viewed alongside work for the booming offshore oil & gas industry.

With this background, the Department of Defence is now looking at its next two substantive fleet renewal projects with not only an eye to focusing new domestic construction elements on fostering the growth of more sophisticated naval shipbuilding capabilities relevant to ongoing sustainment, repair and modification, but also consolidating indigenous capabilities to support the 'Collins' and 'Anzac' capability replacement projects.

Given the Government has clearly focused its priorities on air warfare destroyers and submarines, the merits of further expanding local capabilities to build two large (ie: around 20,000t) amphibious ships, nevertheless remains a subject of debate. BHP built Australia's last commercial steel freighters in Whyalla over thirty years ago, whilst the last Navy 'fat ship', HMAS 'Success' was built at Codock in the mid-1980s. Since that time, the nation's steel-hulled industrial landscape has changed substantially.

Against the boom in minerals and oil & gas projects in Australia's North and West, the consumer-oriented manufacturing bases of the larger (by population) States of Victoria and NSW have experienced substantial economic decline, producing what is commonly referred to as a 'two-speed' economy. As resources in NSW and Victoria have shifted out of manufacturing into the services industries, heavy engineering expertise has moved out of steel and ships into urban construction projects and infrastructure associated with the provision of utilities.

**FEEDING THE TWO-SPEED ECONOMY:** Missions from the northern resource states into NSW and Victoria, have now become a regular part of the employment recruitment landscape, each seeking new volunteers to follow the estimated 10,000 workers that have moved to Western Australia in the past two years, let alone Queensland and the Northern Territory. A new campaign by the WA Government is seeking to attract 40,000 skilled workers in the next decade, whilst the state's Chamber of Commerce & Industry says additional labour is required to service $30 billion of current work, plus another $100b in the pipeline.

Against such competition, the Department of Defence is but a small player, and mindful that in a market already stressed by substantive skills shortages, it should be careful to only add to local demand in those areas that are seen as critical to the longer-term sustainment of core Royal Australian Navy warfighting capabilities.

Defence chiefs accordingly talk of 'intensively managing' major naval vessel construction projects, with the economics (as evidenced by comments in a recent Victorian government study) suggesting lower-skill construction work will inevitably be lost by the Eastern cities to mining 'growth' states where workers can be more easily and efficiently cycled to and from resource and military projects.

The Defence Materiel Organisation (DMO), at the Senate Foreign Affairs, Defence and Trade References Committee's inquiry into Naval Shipbuilding in Australia (which currently has the AWD and LHD projects in its sights), also expressed comfort with state government investment in naval support infrastructure to assure the sustainment of high levels of naval repair capability, in particular, at the Commonwealth owned/Thales Australia managed Captain Cook Dock at Garden Island (Sydney), and the Australian Maritime Complex (AMC) in Western Australia - in which the RAN is investing $4m for specialist naval suport facilities.

Similarly, more complex integration activity – which draws substantively on the accumulated experience of the Eastern cities and their sprawling educational bases - also needs to be tapped to help train up resident work forces in the West and North, which studies have shown are burdened by lower than average educational qualifications relating to shipbuilding. Those (predominantly older) workers resisting the call to move to the minerals states are often presented with 'fly-in/fly-out' arrangements, similar to the practices adopted by resource project managers in drawing workers out of Perth and Brisbane.

**SEA 4000 BUILD STRATEGY:** With the Government's decision to anoint Adelaide-based ASC Shipbuilders as preferred builder of the three project Sea 4000 air warfare destroyers (AWDs) – prospectively to be based on either the 'existing' Navantia F-100 or the Gibbs & Cox 'evolved' AWD design – a die has now been cast that will see substantive new naval shipbuilding construction and supporting engineering/integration expertise concentrate in and around Port Adelaide and the ASC's Osbourne site.

Adjacent to the ASC, the South Australian government has proposed to subsidise the construction of a Common User Facility (CUF) to support not only naval requirements, but other resource and infrastructure projects. Such responses aim in the next ship-building cycle to break the skill-up/skill-down cycle experienced by ASC (with the 'Collins' submarines) and Tenix (with the 'Anzac' frigates), by drawing in alternative work as a means of retaining expertise that can later be positioned to support follow-on naval platform construction endeavours.

Given the fleet is generally deployed from bases other than South Australia – and thus the majority of naval support work is likely to be undertaken in other states - this challenge might prove more difficult than first thought unless (like ASC already does for 'Collins' support in WA), workers are regularly cycled in and out of Adelaide to other locations as governed by roster systems matched to work breakdown structures.

Tension remains, however, as to the strength of the Government's commitment to build the two amphibious ships – or Landing Ship/Helicopter & Dock (LHDs) - in Australia. Outside of developments planned for Osbourne, Western Australia, Victoria, New South Wales and Queensland are all now positioning to contest work packages from the ASC's commitment that 70% of AWD fabrication work (albeit lower value modules) will be contracted out to other suppliers, whilst WA and NSW are pitching for the higher value consolidation component of the LHDs.

Should the LHD work end up not being substantively placed in Australia, there will be associated flow-on implications for domestic capability to support project Sea 1654/3 (scheduled to replace HMAS 'Success' from 2015), and phase 4C of Joint Project 2048 - which envisages the Navy acquiring a new strategic lift ship capability from 2016 as the second of current amphibious transports (LPA) is retired.

**MANAGING THE DEMAND FOR SKILLS:** The doubts over a domestic LHD build are in part motivated by perceptions that whilst AWD construction skills (and their longer-term retention) are highly valued, those associated with LHD construction and the later 'fat ships' do not appear similarly as sophisticated, with officials in Canberra mindful of the need - in progressing JP 2048 - not to encourage the building up of lower-value skills in competition with the resources sector which are unlikely to be sustainable beyond the LHD build itself.

This, to some extent, explains the caution expressed by DMO Chief, Dr Stephen Gumley, who does not apologise for insisting that prospective domestic tenderers for the two LHDs will have to keep their pencils sharp, and avoid domestic build costs moving too far outside of the bounds offered by partial or full offshore builds. This will be especially so if inflated costs are viewed as being driven by desperate tenderers having to enter bidding wars with resource developers to secure appropriately skilled workers.

In its submission to the Senate FAD&TR Committee, Fremantle-based Austal acknowledged this point in making it clear that the construction of LHD-sized ships in Australia (and more precisely, WA), would most likely be harmful to its corporate interests due to competitive pressures being placed upon already significant challenges it is having in maintaining its workforce building aluminium-based ferries and naval vessels.

To an extent – as with both ADI/Thales and Tenix - Austal's difficulties in relation to the recruitment and retention of skilled workers is currently being addressed through the payment of subsidies under Defence's Skilling Australia's Defence Industry (SADI) initiatives (ie: Austal was also awarded $4m in October 2005), as well as intensive use of the Federal Government's 'Skilled Migration' program.

Reporting on the company's 2005/06 financial results 21 September, Austal CEO, John Rothwell, noted the extent to which the growth of the company's Australian operations had been restricted by a shortage of skilled labour, whilst also acknowledging that skill shortages had similarly been moderated by resort to recruiting temporary immigrants on work visas.

**NAVANTIA SHIPBUILDING INFRASTRUCTURE:** Defence officials suspect Australia lacks the infrastructure required to build and integrate 32m-wide LHD modules, and any investment to develop such infrastructure would not be sustainable after completion of the amphibious ship build.

SPANISH BPE IMAGE, BPE KEEL LAYING ON 21 JULY, BPE MODULE WORK AT FENE AND FERROL - NAVANTIA IMAGE & PHOTO (L) AND ADBR PHOTOS (R)

In response to the above environment, and conscious of the sensitivities within the Department of Defence, the two competing LHD design groups - Navantia/Tenix and Armaris/Thales Australia (formerly ADI) – are understood to have closed off their respective JP 2048 bids at the end of September by firming up a number of initial construction offerings, each featuring a range of cost/risk-based options spanning a full onshore build, part offshore build/part onshore integration, and full offshore build and integration.

**MODULAR BUILD OPTIONS:** To a certain extent, both competing LHD designs adopt the modular construction ethic. Such endeavours require considerable shipbuilding and module handling facilities (to at least 400t/module), and it was the DMO who controversially noted in its submission to the Senate FAD&T Committee inquiry that Australia lacked the infrastructure (ie: very large cranes, module halls, etc) that would be required to fully build and integrate 32m-wide LHD modules. Previous programs (ie: 'Anzac' frigates) involved modules only 15m wide, whilst AWD modules will range from 19-22m wide.

Module handling deficiencies are nevertheless being addressed by state-funded investments (and proposed enhancements) at the Henderson CUF in Western Australia, with a Carpenter government Expenditure Review Committee to shortly consider a LHD-sized 'floating dock' capability acquisition proposal motivated largely by commercial demand forecasts, rather than waiting for more definitive smoke signals from Canberra.

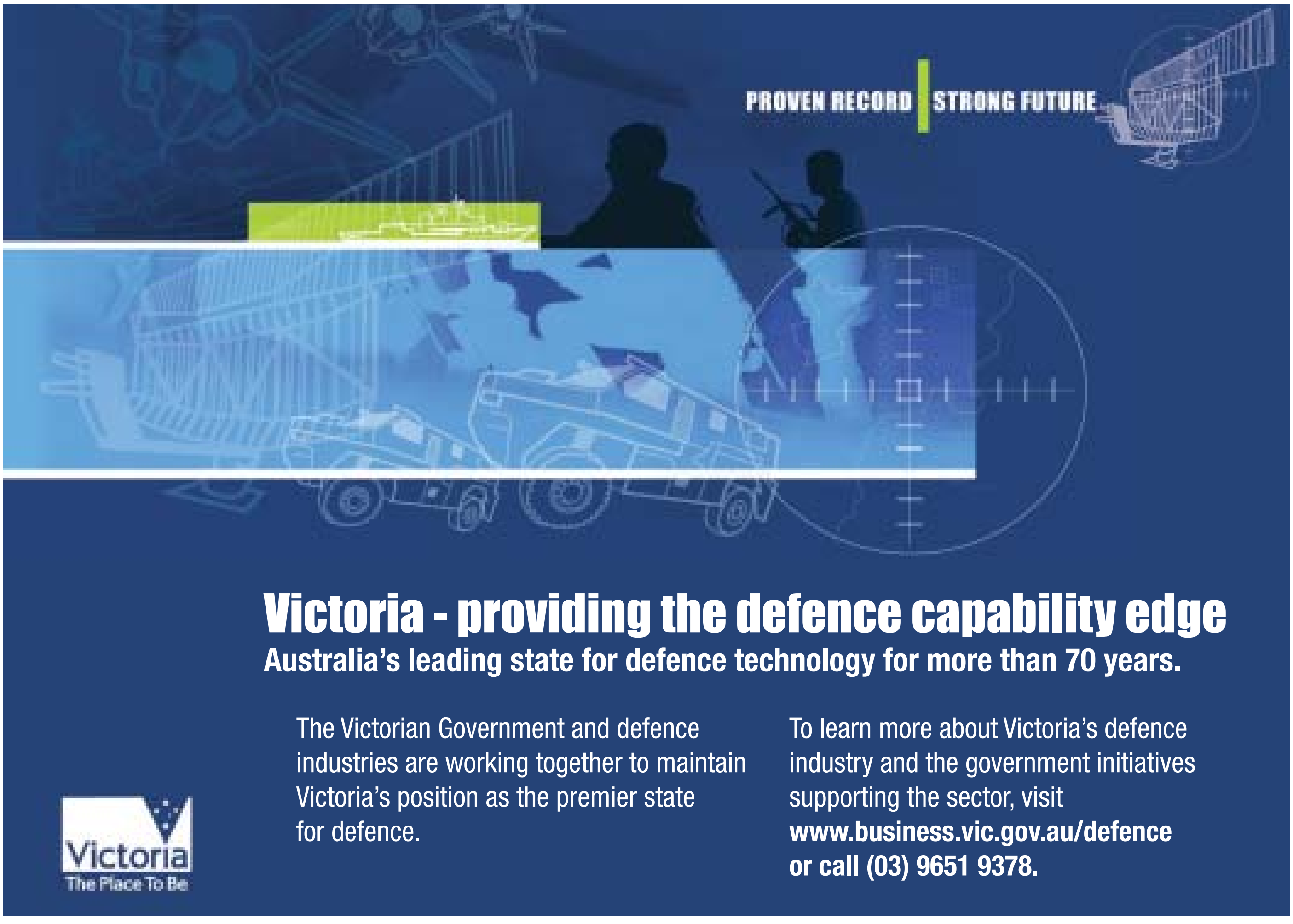
Other states have also mooted various proposals to re-develop existing infrastructure in the Hunter region (NSW) and Brisbane. For example, Queensland Treasurer, Anna Bligh, announced 6 October she had cut a deal with Viking Industries whereby state government funds would be applied to developing Viking's Hemmant facility for large scale metal fabrication work focused on the AWD and LHD projects.

With such a groundswell of activity and a likely increase in clamouring for the LHDs to be built in Australia as 'second pass' consideration comes nearer, it would perhaps be a brave Howard government in Canberra that in mid-2007 would opt for a full offshore LHD build (even if overwhelmingly justified on cost advantage, schedule and value for money grounds), on the eve of a Federal election campaign.

So perhaps the political realities will ensure a full two ship LHD build in Australia is a done deal? Alternatively, what circumstances could be envisaged whereby agreement was reached it was actually in Australia's long-term national economic interest to have the LHDs built overseas?

**GLOBALISATION & NAVAL SHIPBUILDING:** European naval shipbuilding entities have been undergoing a process of rationalisation for a number of years, and models proposing increased cooperation are on the up and up, as evidenced 14 April this year with confirmation that its five major shipbuilders – BAE Systems, DCN, Fincantieri, Navantia and VT Group plc – had formed a Warship European Procurement (WEP) club to promote synergies in materials procurement (ie: about 60% of the cost of a typical warship program), as part of broader efforts to reduce costs, improve quality standards and enhance value for money for its customers.

Two of the companies blooming under this rationalisation process have similarly found themselves with quite substantive forward order books, raising some internal questions as to whether they risk breaching their own capacity constraints. Backed by solid support from their home governments, the two most prominent continental naval shipbuilders facing such a position are none other than Navantia and DCN (half partner in Armaris) – the two nominated design competitors for the RAN's Joint Project 2048.



Both of these naval shipbuilders not only possess substantive warship build and support programs for their own national navies, but are also undertaking ship and submarine construction contracts for a range of export customers spanning Europe, pan-Asia (ie: India) and South East Asia, as well as South America. In short, is it possible JP 2048 could be fashioned in a way that leverages extant Australian naval shipbuilding capabilities more closely with global shipbuilding activity, securing substantial export opportunities for Australian-based industry even though LHD construction would be shifted offshore?

There are two scenarios. The first involves Tenix's facility in Williamstown, which boasts a string of successes in building and delivering all ten 'Anzac'-class frigates (including two for New Zealand), and is now mid-way through the construction of two 'Anzac'-sized Offshore Patrol Vessels (OPVs) for the Royal New Zealand Navy (under Project 'Protector). The company is also undertaking final fit-out (including weapons installation) for the larger 8,000t Multi-Role Vessel (MRV) - Nuship 'Canterbury' - which arrived from the Netherlands on 27 September.

In short, the investment made by Tenix through the 'Anzac' program appears to have served it well in carving out a leading role in the regional military/civilian patrol-sized vessel market, which has achieved repeated export sales as demonstrated by build programs for the Philippines and New Zealand.

Across the other side of the globe, in Fene, Navantia is now using a site formerly used for the construction of offshore oil & gas platforms to fabricate modules for the Spanish Armada's new 27,000t LHD (locally termed BPE or strategic projection ship) – the same design of which is being considered by the RAN for JP 2048. Navantia has previously constructed amphibious ships and aircraft carriers in the same vein as the new BPE.

Large modules (up to 800t) are now being built at Fene for combination with other modules built at Ferrol (home of the F-100 frigates being evaluated under project Sea 4000), and consolidated on Ferrol's 330m x 51m slipway. Having now worked up the required processes and procedures to support construction of this first vessel (whose 'keel' was laid 21 July), one view has it that the most economic option for the RAN would be to have its two LHDs built at Ferrol, if only to leverage off the expertise already established in that yard to deliver substantial cost and schedule savings over and above those which might be on offer from working up an Australian build program from scratch.

**MARITIME INDUSTRY POLICY:** But what of the economic offsets for Australia and the political risk for a Federal Government facing electors late next year? Navantia, of course, builds much more than warships for the Spanish Navy, and currently holds an extensive order book (Euros 3,600m) for foreign navies extending from warships to submarines and naval support vessels.

On 30 May, the Spanish Defence Ministry was authorised to begin contract negotiations with Navantia for the construction of a fifth F-100-class destroyer, as well as four new coastal/EEZ patrol corvettes (termed Buques de Accion Maritima, or BAM), for a total cost of Euros 1,102m. Navantia also has in hand a construction contract from Venezuela for four 'Economic Area' patrol vessels plus four coastal patrol vessels (total of eight), to be constructed between September 2007 and June 2011.

Accordingly, one 'win-win' option for both Navantia and Tenix - should the Australian Government similarly decide to substantially upgrade military/industrial cooperation with Spain - would be to have the RAN's two LHDs either partially or fully built at Fene-Ferrol, in facilities already established and sized for the job, and utilising a workforce already skilled up on the first Spanish Armada BPE vessel, now due for launch in November 2007 (formal Navy delivery is due in 2008).

In return for this work, and no doubt accompanied by a formal BPE technology transfer and skills development program with Australian shipbuilders, elements of Navantia's current OPV/EEZ vessel order book might be sub-contracted to Tenix for higher value module construction/consolidation at its Williamstown dockyard, supported by a further outsourcing program of sub-module and ancillary work to contractors across Australia, and perhaps even New Zealand – and drawing on all the accumulated skills of the 'Anzac' and 'Protector' programs.

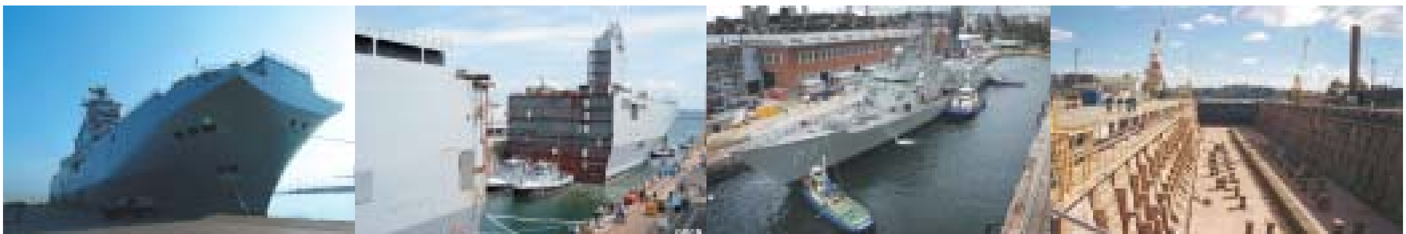
Such a construct would make best use of both national shipbuilding capabilities as they are presently focused, whilst also building a firm partnership between Spain and Australia in terms of addressing regional markets. It would provide some capacity relief for Navantia, which has an unstarted order backlog for eight submarines, twelve OPVs and two Ro-Ro Ferries, whilst also consolidating Australia's extant capacities as a world-class builder of OPVs - an area with considerably more export opportunities than the non-existent LHD export market, given Australia is unlikely to fully acquire LHD design intellectual property.

A US Coast Guard study in 2001 into the global market for OPVs and patrol-sized frigates (undertaken as a part of their 'Project Deepwater' investigations), identified a market worth US$62.2 billion for close to 300 of these types of ships out to 2017. Tenix is currently constructing two 'Otago'-class OPVs for the RNZN (ie: slightly shortened version of the 'Anzac'frigates, but without military combat systems), whilst the Australian Customs Service is wet-leasing one OPV-type ship and tendering for a second, with a prospective local build in prospect at the conclusion of these leases.

**THALES IN THE BOX SEAT?:** The second scenario is similar to the first, and alternatively provides an opportunity for the new management of a consolidated Thales Australia - as well as prospects for much closer military/industrial cooperation between Australia and France - concomitant with FIRB/Treasury approval 12 October for the assumption by Thales of 100% ownership of ADI Limited.

Thales is linked through Armaris with DCN, France's predominant naval combatant designer and warship builder, and prime contractor for the dual vessel 'Mistral'-class amphibious ships – the other contender for JP 2048. Although not due to commence formal French naval operations until October, the first-of-class BPC, the 'Mistral' (delivered in March), undertook its first deployment (to Lebanon) in July to assist with relief efforts during the Hezbollah-Israel conflict.

Similar to Navantia, DCN also boasts an extremely full forward order book (valued at Euros 7.9b at 30 June 2006), and amongst other French naval programs is partnered through Armaris with Italy's Orizzonte Sistemi Navali under contract to the Organisaton >>>27



**DCN SHIPBUILDING INNOVATION:** Thales Australia's build plan for the RAN's two new LHDs could take advantage of the method adopted in France for construction of its 'Mistral'-class ships, whereby each ship was assembled into two sea-worthy 'super blocks', then shipped to a central yard for integration. THE FIRST-OF-CLASS 'MISTRAL' IN BERUIT, 'MISTRAL' SUPER-BLOCKS BEING JOINED, GARDEN ISLAND (SYDNEY), CAIRNCROSS DRY DOCK - THALES & ADBR PHOTOS

'Three Block War' concept), potentially exposing forces to attack without recourse to the full complement of defensive methods and countermeasure systems.

Such views have led to a rejection of very lightweight armoured vehicle solutions (around 18 tonnes) - especially those specifically designed to be airlifted by C-130 'Hercules' aircraft - due to difficulties in ensuring an adequate level of vehicle survivability in the modern battlespace.

The Manned Ground Vehicles (MGV) envisaged in the FCS are being specifically designed for C-130J airlift limit, yet will rely for high-level survivability on high situational awareness delivered via networking, along with Active Protection Systems (APS) and other 'hit avoidance' countermeasures.

While all valid methods of force protection, in the Australian Land forces deployment environment they are not viewed as adequately to protect a Land force that is not free to use the full gamut of defensive methods, as encountered when forces equipped for combat are required to engage in peace support missions. The conduct of such missions, however, does not mean such a force could not be intermittently attacked by weapons that would be more prevalent in higher threat environments.

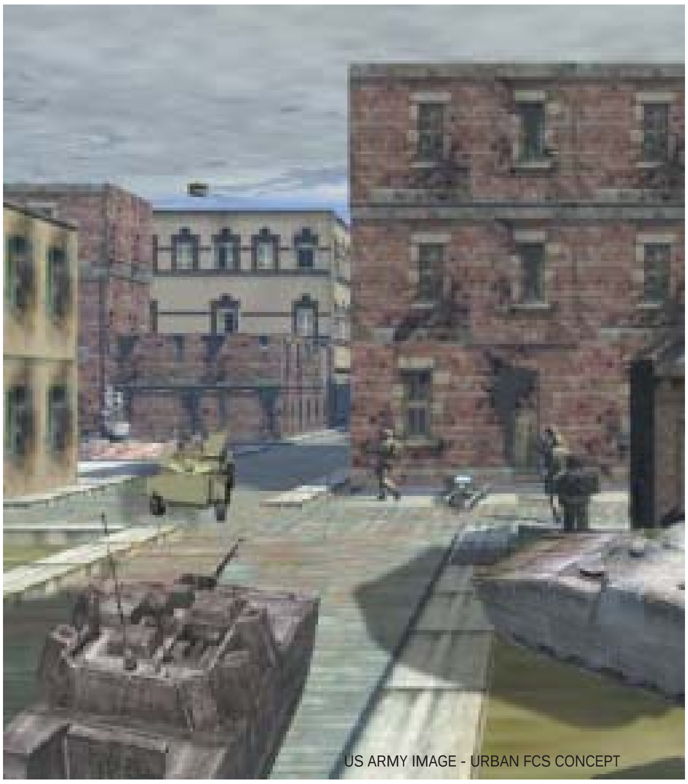
The quid pro quo in the development of official guidance, therefore, is to perhaps acknowledge that to provide the level of protection that is required to neutralise always-present combat-level threats scenarios underpinning the vision for project Land 400, the IFV and later phase acquisitions of Armoured Engineering Vehicles (AEV) – as well as the eventual M1A1 tank replacement - will all need to feature heavy armour and a mass over 30 tonnes.

Outside of the United States, other national Armies have made similar assessments on the necessity for high armour levels, including the German Army, which has since launched the 'Puma' IFV development program. Through Project System and Management (PSM), a '50/50' joint venture of Rheinmetall Landsysteme and Krauss-Maffei Wegmann (KMW), the 'Puma' has been designed to provide scalable protection within a vehicle weight of 40.7 tonnes (unloaded), at maximum Protection Level C (Combat) armour.

Flank and some layers of armour will also be able to be removed, thus lowering the vehicle's weight to 31.45 tonnes, and allowing air mobility by the Airbus Military A400M airlifter, as well as offering lower running gear stress during more frequent peacetime training.

With Level C armour, the 'Puma' will be resistant to handheld anti-tank weapons and medium calibre KE penetrators across its flank, in addition to frontal arc. The high level of protection is also designed to resist very large blast mines, such as improvised explosive devices (IEDs) and anti-tank mines utilising explosive formed penetrators (EFPs).

ADBR



US ARMY IMAGE - URBAN FCS CONCEPT

## Joint Project 2048 - Ctd from page 19

for Joint Armament Cooperation (OCCAR), to build 27 frigates under the Franco-Italian Multi-Mission (FREMM) program. Outside of the US, the FREMM program is the world's largest warship construction program, and offers opportunities for a host of systems and sub-systems suppliers, including Australia.

FREMM vessels are due to be delivered in stages from 2011 to 2015, and it was interesting that Rydalmere (NSW)-based Thales Underwater Systems (TUS) announced 21 August that it had already secured contracts to supply complex acoustic sub-systems to the FREMM program, together with signal and processing electronics for the UMS 4610 sonar suite comprising the hull-mounted UMS 4110 and towed UMS 4249 CAPTAS (a variant of the Royal Navy's Sonar 2087) sonars.

Thales Australia's build plan for the RAN's two LHDs takes advantage of the method adopted in France for construction of the two 'Mistral'-class ships, whereby each ship was first assembled from modules into two sea worthy super-blocks, which were then shipped to a central yard for final integration. In the French program, the forward (more commercial-like) section was built by Alstom Marine-Chantiers de l'Atlantique's Saint-Nazaire shipyard, while the aft military standard section was built (and later consolidated with the forward section) by DCN at it its Brest facility.

Compared to the previous discussion of Defence JP 2048 acquisition strategies, the design and construction features of the BPC provide Thales Australia with the option (outside of a full offshore build) of constructing perhaps the more complex rear super-block at an existing French yard, then shipping it to Australia for integration at its Garden Island facility (Sydney) with a front-section constructed from Australian-built modules, themselves initially consolidated at its 'Cairncross' facility in Brisbane.

**FREMM CONTRACTS FOR AUSTRALIA:** Similar to the scenario developed for Navantia, either a full or partial offshore build of the RAN's two LHDs in France could be offset by DCN subcontracting substantial module work from the FREMM program (or other French Navy or export programs) more suited to the extant capabilities of Australian maritime fabricators. This work is well within the extant capabilities of Australian yards, as the FREMM frigates are not dissimilar to the technical demands of the 'Anzac' frigates, and will themselves serve as front-line vessels with autonomous strike capabilities. It also makes sense from the point of view that Australia is unlikely to ever build 'Mistral'-class LHDs for export.

According to a Thales statement, the FREMM ships will allow the French and Italian navies "to carry out multiple missions linked to deterrence, crisis mitigation, maritime security, force projection, and deep land strikes with superior effectiveness based on a wide range of combat systems permanently installed onboard, rather than for specific missions." The French frigates will be equipped with the 'Exocet' anti-ship missile system, the 'Aster 15' vertically launched air defence missile system, and torpedoes guided by a full suite of sonars and radars.

ADBR