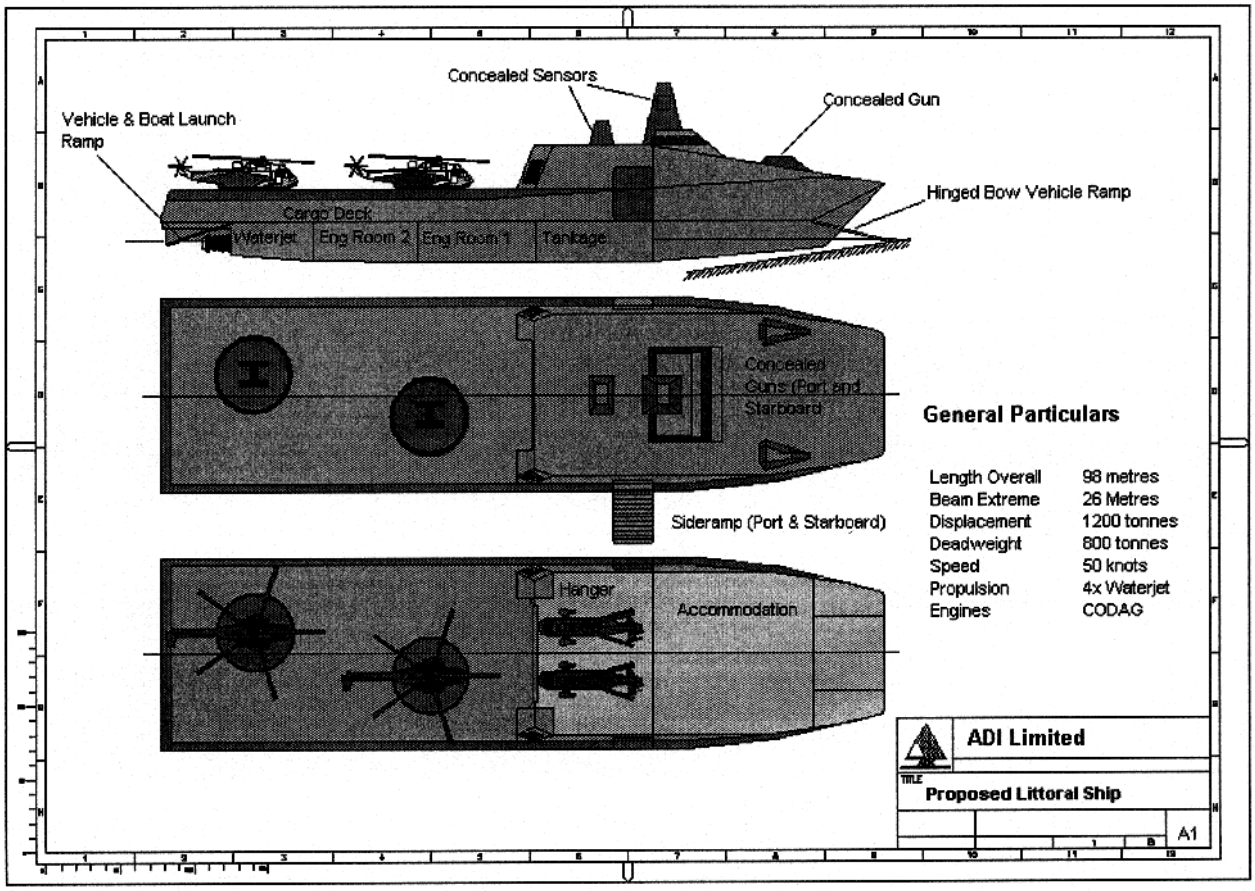
ADI SUBMISSION TO THE JOINT STANDING COMMITTEE ON FOREIGN AFFAIRS, DEFENCE AND TRADE INQUIRY INTO MARITIME STRATEGY



ADI

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EXECUTIVE SUMMARY

Australia's geography calls for a national security strategy with a strong maritime dimension. But priorities within the maritime dimension of the Defence of Australia strategy have evolved over time to meet changing circumstances. The most recent change in Australia's strategic circumstances involves the growing need for the ADF to be able to respond rapidly to asymmetric clashes in the archipelago to Australia's north. The speed, reach and lethality of modern weapons systems, and their availability to sub-national groups, mean that this vast region now forms part of Australia's littoral[1] area of interest. Increasingly, Australian maritime forces will be called upon to influence events in the littoral region in close cooperation with regional states.

The East Timor peace support mission in 1999 and the Bali terrorist attack in 2002 are two key examples of the need for an Australian response to growing regional instability. Future terrorist incidents or peace support operations are likely to require our maritime forces to undertake tasks such as the protected evacuation of citizens, provision of humanitarian assistance, or even limited combat operations in the archipelago. The higher priority now given to these tasks means they should influence the ADF's future capability development.

The Joint Committee on Foreign Affairs Defence and Trade's Inquiry into Maritime Strategy is a timely recognition of the need to revisit the maritime force structure assumptions of the last thirty years. It is time to reconsider the style and number of amphibious vessels that Australia will need in five-to-ten years time, and beyond. This paper brings to the Joint Committee's attention the possibility of providing our maritime forces with littoral vessels that are better suited to the types of operations anticipated in and around the archipelago, and the feasibility of developing these in Australia.

The following conclusions and recommendations are submitted to the Joint Committee for consideration.

First, Australia needs to recognise the importance of littoral operations in the Australian strategic setting.

Second, we need to consider the implications of littoral operations for strategic policy and defence investment, especially in regard to our maritime capabilities.

Third, we need to explore the characteristics of platforms and systems that are suitable for a littoral operating environment and the potential of littoral ships to satisfy our capability requirements.

Fourth, the competitiveness of Australian industry in this area needs to be acknowledged. The potential exists for an Australian solution that delivers expanded capability with reduced costs and crewing levels.

Fifth, and finally, it is recommended that Australia establish a funded development program for littoral ships to meet an Australian requirement, while simultaneously exploring the potential for cooperative research and development with international programs that have similar objectives.

[1] The word littoral means "of the shore", but its military definition is given in Box Two on page four.

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1. INTRODUCTION

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1.1 Evolution of Maritime Capability, Strategy and Priorities

In order to appreciate the case for a change in maritime priorities it is important to understand how the country's maritime structure has evolved into its current shape. From the time of the first white settlement in Australia until the early 1970s Australian defence planning was built around a series of assumptions that became known as 'forward defence'. These included an almost universal acknowledgement that Australian security was intimately tied to security of its great power allies – first Great Britain and then the United States.

Australian strategic planners judged that the best way to ensure Australia's long-term defence was to commit our forces into forward theatres alongside those of our allies in order to keep potential threats far from our shores. So Australia's maritime forces were configured to operate as an extension to the fleets of our great maritime allies.

Changes in US and British defence policies during the 70s made this traditional form of forward defence unsustainable. Australian defence priorities shifted to give greater prominence to the direct defence of Australia[3] through policies that promoted higher levels of defence self-reliance.

[2] The word littoral means "of the shore", but its military definition is given in Box Two on page five.
[3] In this context, "Direct Defence of Australia" was interpreted narrowly to emphasise northern Australia and the air and sea approaches. In subsequent implementation both broader homeland security and more robust levels of military engagement in the region and further afield were de-emphasised or marginalised. This earlier interpretation did not give weight to one of the enduring features of Australia's strategic

Importance was attached to building constructive relationships with neighbours and friends and the maintenance of the close partnerships with key allies, especially the United States. But the prime driver for the development of the defence force became the direct Defence of Australia.

The first generation of the "Direct Defence of Australia" strategy required a capacity to operate independently in Australia's maritime approaches. During this era, defence planners gave the greatest priority to those threats that could be mounted by regional forces at short notice, such as raids and harassments – the so-called credible contingencies.

For the naval force, this first generation Defence of Australia thinking gave rise to the requirement for long-range patrol and interception vessels that could operate in a sustained manner in the sea-air gap across Australia's north, a requirement that lead to the development of the Anzac frigates. The strategy also required the maintenance of a small number of higher technology vessels. But overall, the focus of naval force development shifted to generating a medium technology force of surface combatants and maintaining an agreed number of platforms.

1.2 New Factors – New Priorities

A combination of new factors suggests that a further evolution of Australia's maritime priorities is now desirable.

First, serious gaming and other analyses of the challenges of defending Australia have revealed that much of the first generation thinking about Australian defence against short warning contingencies was over-simplified. In particular, there is now seen to be a need to operate in great depth throughout and beyond the archipelago to threaten, and possibly strike, assets of high value to an opponent. This may involve the use of sophisticated maritime and air forces well away from the Australian mainland, leading to a requirement for different naval vessels to those that had previously been assumed. Practical operational and campaign planning considerations gave rise to a second generation of Defence of Australia thinking that required forward operations in almost any contingency in which Australia faced a direct threat.

Second, it has become apparent that Australia has the potential to adopt a tailored but powerful version of the United States' revolution in military affairs by creatively combining new technologies, operational concepts and organisations. Put simply, Australian maritime forces should soon be able to operate with comprehensive situation awareness, even when electronically silent, by exploiting networks of Australian and allied sensor systems, and advanced command, control and communications. This has far-reaching consequences for the ADF's force structure and for operational options in a range of future crises, and increases the viability and attractiveness of new types of ships.

Third, Australia now needs to come to terms with chronic instability the archipelago to its north. From the Andaman Islands in the West through to the Solomon Islands, Vanuatu and Fiji in the East, deeply entrenched social, economic, political and security problems will be an enduring concern. Maritime forces will need the capability to operate rapidly and effectively throughout the archipelago to conduct protected evacuation operations of Australian citizens, intervention to

geography: that the maritime approaches include the extensive littoral region in the archipelago to our north.

restore legitimate governance, operations to assist regional governments, and other similar operations.

Fourth, the above challenges have been further complicated in recent years by the growth of so-called 'new terrorist' groups. These groups have radical apocalyptic ideologies, often with extreme religious overtones. They espouse world-changing goals and operate in highly dispersed and loosely coordinated cells. The attacks on the World Trade Center and Bali show they have no reservations about employing great destructive power to cause mass casualties. The existence of several of these groups within the archipelago raises questions about the maritime capabilities that need to be developed in response.

Box One: New vs. Old Terrorism

The nature and techniques of terrorism are changing. Old terrorist groups such as the Japanese Red Army, The Moro National Liberation Front, and Abu Sayaf were characterised by;

- Political motivation;
- Violence being used primarily to gain attention, not to generate mass casualties;
- Predictable organisation and financing;
- Behaviour as rational political actors in order to extract specific concessions from authorities.

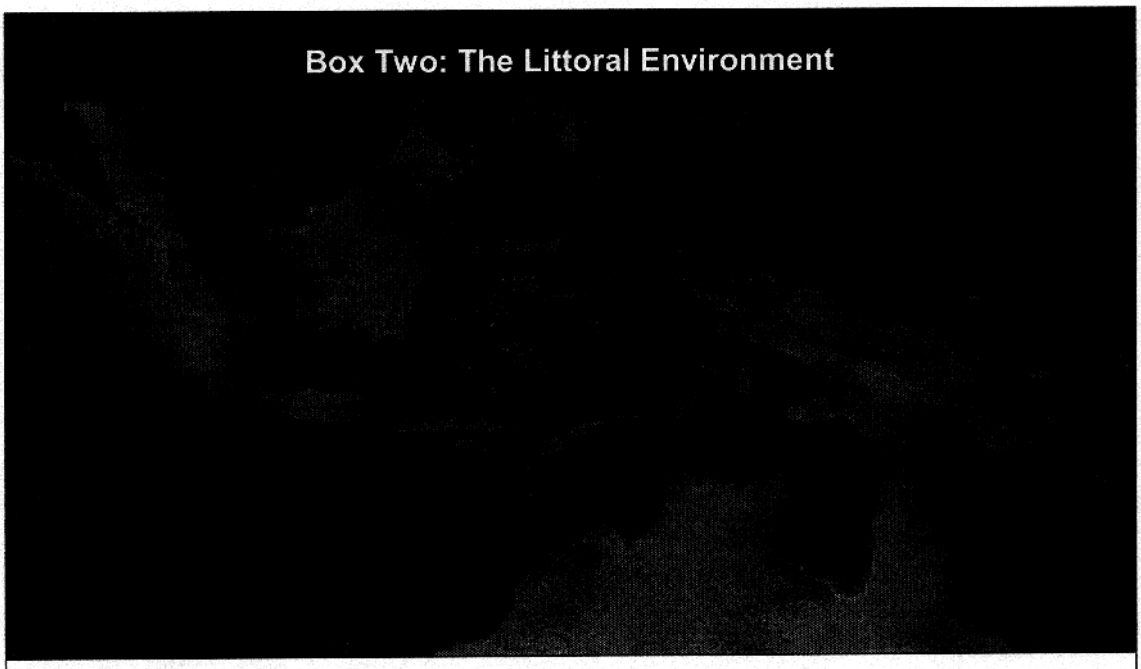
New terrorist groups such as al-Qa'ida and Jemaah Islamiah are characterised by;

- Apocalyptic, frequently religious, ideology;
- A broad international focus, largely indifferent to the interests of local constituencies;
- Highly networked and dispersed organisations (reducing the effectiveness of traditional methods of detection and apprehension);
- Preparedness to act in previously unthinkable ways including the use of weapons of mass destruction;
- Difficultly of mounting an effective deterrent; and
- The potential to wreak catastrophic damage.

Fifth, it is clear that the United States and a wide range of other friendly countries now expect Australia to take a prominent role in – and perhaps lead - many categories of operations in the region. This will mean great pressure can be anticipated on the Australian Government in a range of future crises to lead combat operations within our region and to sustain these using Australian logistics and other infrastructure. The sharpened expectations of our allies and friends are further evidence of the need to review our maritime capabilities in the light of the gaps in Australian capabilities revealed by the operations in East Timor.

Sixth, and finally, the changed expectations of the Australian community mean that the present day concept of Defence of Australia has broadened to encompass the protection of Australian institutions and citizens, *wherever* they may be. Australian security concerns have expanded to comprehend a broader range of issues, including international terrorism and trans-national crime, especially following the bombing of Australian tourists in Bali. The likelihood of further asymmetric incidents and attacks, and of continued archipelagic instability, make it appropriate to review Australia's next-generation force structure priorities.

Box Two: The Littoral Environment



The effectiveness of operations in our region depends on Australia's ability to operate within a littoral environment. "Littoral" is formally defined as those areas on the land that are subject to influence by force structure elements operating on or from the sea, together with those areas of the sea that are subject to influence by forces operating on or from the land.

This definition comprehends the larger part of the archipelagic region to our north, including most of the population, industry, resources and trouble spots.

The littoral region is delimited by weapons-range as much as by geography. The effectiveness of modern military technology means that the northern archipelago is now to be considered a part of Australia's littoral.

2. NEW PRIORITY TASKS

In light of these six factors now influencing the evolution of Australia's maritime priorities, Australia's future maritime focus will increasingly fall upon tasks that take place in and around the archipelago. Complicating this picture is the reach and speed of modern military technology, which means that the archipelago is not an operationally distant theatre; but part of Australia's littoral environment. So tasks within the archipelago can be described as "littoral tasks".

Although currently considered lower priority tasks, littoral tasks will assume greater importance due to their increased likelihood. In addition to the more traditional tasks that will need to be conducted as a part of normal maritime operations, specific littoral tasks will include:

- Emergency Medical Relief. In the aftermath of terrorist incidents or natural disasters it may be desirable to augment the limited or rudimentary medical facilities available in the region.

- Offshore Resources Protection. Australia may face attacks on vital but vulnerable offshore national infrastructure assets such as oil and gas platforms. Damage to these could have profound implications both for both the Australian economy and environment.

- Special Forces Operations. These may include hostage recovery in the event of an terrorist incident in Australia or the region, and the recovery of offshore infrastructure in the event of harassing raids on Australian installations.

- Services Assisted and Services Protected Evacuation. At any one time up to 20000 Australian citizens are located in some regional capitals and up to 5000 in regional tourist spots. The evacuation of such numbers of people in the event of severe civil disturbance could confront the ADF with significant challenges in extremely demanding circumstances.

- Peace-Support Operations. Political Instability throughout the archipelago increases the likelihood of further peace support and enforcement operations like the UN mandated but Australian led Operation Stabilise in East Timor.

- Protection of Trade. The rapidly expanding East Asian market is dependent upon sea lines of communication through the archipelago. This includes the protection of extremely vulnerable bulk energy tankers, iron ore and coal carriers, which provide a large part of Australia's export earnings and support the economies of our major trading partners.

- Offshore Mine-Warfare. Choke points within the archipelago may be blocked in the event of a major conflict by sophisticated sea-mines. Australia will need the capability to remove and, under some circumstances lay sea mines, possibly in a protection of trade contingency.

- Littoral Lodgement. At the upper end of the threat spectrum, Australian maritime forces may be called upon to perform the difficult task of mounting a lodgement operation within the region. In current circumstances risk reduction will be important. Such an operation is likely to involve minimising the ashore footprint and to rely on offshore dominating firepower rather than the style of operation contemplated in World War II.

- Chemical, Biological, and Radiological Relief. In a worst case, but increasingly thinkable, scenario Australia may need to respond to a regional crisis involving chemical, biological or radiological weapons. The capacity of Australia's regional neighbours to deal with CBR incidents is likely to remain extremely limited, with Australian support critical to containing the incident and dealing with mass casualties.

3. FUTURE OPERATIONAL CHARACTERISTICS

Future Australian operations will find that maritime forces undertaking littoral tasks will require the following characteristics.

3.1 Speed of Reaction

Current events demonstrate that crises will arise with little warning, or in the case of a terrorist attack with no warning. The first 24 hours would be crucial to the successful treatment of

casualties following a terrorist attack or a natural disaster within the region. In many cases, strategic airlift will be able to provide an initial response, but a more substantial response is only possible by employing fast sealift. In remote areas, or areas where landing strips have been interfered with or damaged by natural events, sea lift may be the only means of delivering substantial relief.

The emergence of catastrophic terrorism means that the numbers of injured may be such as to make rapid air evacuation difficult, even assuming that airfields can be kept open. In such an eventuality sophisticated and well-resourced medical facilities will be required in-situ. If they do not exist in the area of the attack such facilities must be transported into the area within 24 hours. A fast sealift capability would be an ideal way to do this, and the deployment of helicopters from the deck of a sealift vessel would provide airlift and transport before the vessels arrive on the scene, and regardless of the availability of operational airfields.

In the event of conventional war contingencies, speed would be required in order to match or exceed the pace and tempo of an opponent's littoral operations. Speed assists commanders to disrupt an adversary's operations and seize the initiative by getting inside the adversary's decision loop. It closes the gap between the support base and the area of deployment, and increases the likelihood that an effective response can be mounted once adversary activity is detected.

3.2 Economy of Logistic Effort

Forces undertaking future littoral operations may resemble large-scale Special Forces groups rather than traditional mechanised infantry forces. They will be mobile and conduct temporary lodgement operations or raids into areas controlled by the opponent, only being ashore for short periods to accomplish specific missions. Inserted into multiple inland points by helicopters and supported by overwhelming firepower due to organic (offshore) fire support, these forces will rely on the concentration of effects, not on the concentration of force.

The move to an effects-based approach means that the volume of materials actually taken ashore would be kept to a minimum; a light logistics footprint would be required so that the volume of fuel, ammunition and other essentials does not weigh down highly mobile forces in the field. Materials would, as much as possible, be kept afloat rather than taken ashore.

One way of doing this is with the use of high-speed sealift vessels, with an appropriate level of endurance. Speed, cargo capacity and turn-around time are the key determinants for efficient sealift operations, making fast sealift vessels desirable for the support of offshore operations (Annex C). The existence of numerous high-speed logistic vessels will increase the velocity of strategic lift, enabling the logistic tempo to support the desired operational tempo. This would allow greater freedom of operation for forces in place in addition to reducing the need to establish heavy, inflexible and vulnerable logistics infrastructure preparatory to military operations.

3.3 Stealth

A key challenge for modern maritime forces is to remain undetected, at least until they have comprehensive situation awareness of their opponents. Modern sensors such as phased radar-arrays make the task of avoiding detection increasingly difficult, and improved target acquisition and terminal guidance greatly increases the probability of being hit once detected. Furthermore,

the chance of surviving an attack is greatly reduced by the increased lethality of modern weapons systems.

So stealthiness is of growing importance for survival in maritime operations. A range of system characteristics have been developed to reduce the likelihood of detection, including the greater use of passive and off-board sensors and stealthy construction techniques. Advanced composites offer special advantages in this area by allowing the stealth features to be inherently incorporated in the vessel rather than achieved as "add-ons". The ability of composites to minimise sound and magnetic signatures has already been demonstrated in the advanced composite hull of the Australian Huon Class mine warfare vessels. The Norwegian Skjold class littoral ships take this one step further, since they have been designed in such a way as to reduce radar and thermal signatures in addition to sound and magnetic signatures.

Future vessels may have the capacity to control their signatures by the incorporation of "intelligent" composites with tuned reflectance characteristics and systems that are optimised to minimise contributions to vessel signature. This could reduce the vessel's optical, acoustic, radar, magnetic and infrared signatures to much lower levels than typical in modern traditional warships. When loitering in such a state, detection by an opponent's sensors would be far less likely and the element of surprise thus conferred on the vessel would increase its chances of mounting a successful operation.

Stealth may not be necessary for logistics support ships, but will remain important for vessels that need to loiter in harms way.

3.4 Surveillance and Intelligence

Future surveillance sensors will be networked; digital data from Australian long-range sensors will be combined with data from allied intelligence-gathering sources. New generation satellite systems will provide real-time streaming video directly to inbound Australian platforms. Tactical unmanned aerial vehicles operating from Australian platforms and underwater acoustic devices will also provide both real-time surveillance and real-time damage assessment.

The distributed sensor architecture and network enabling of littoral vessels will allow comprehensive situation awareness in smaller vessels than was possible in the past, and will help to ensure that modern littoral vessels enjoy the benefits of significant improvements that have been achieved in sensor, processing and distribution systems.

3.5 Flexibility and Versatility

Ideally Australia should have the flexibility to respond to multiple events in the case of simultaneous attacks on geographically dispersed littoral targets, while retaining the capability to respond quickly to new incidents as they arise.

Given this need, together with the diverse array of tasks that maritime forces may undertake, our naval platforms need to be versatile and suited to multiple roles. Operational versatility can be enhanced by currently existing technology in the form of a modular payload system, which would enable a number of different missions to be undertaken by a single type of adaptable platform:

- Strategic lift and theatre support
- Maritime patrol

- Offshore mine warfare command and control
- Surveillance
- Medical support, humanitarian assistance and disaster relief
- Special forces operations and raids (specialised role)[4]
- Indirect fire support for land operations (specialised role)

3.6 Posture and Disposition

A basing policy with modular-payload sealift ships pre-positioned in both Darwin and Townsville/Cairns would enable a tailored response to events such as those in Bali or the Solomon Islands to be delivered rapidly – typically within 24-48 hours. By loading modules that are appropriate to a particular mission, ships could be reconfigured quickly. This flexible capability would provide backup and support to a rapid preliminary response by air, or the initial response where no serviceable airfield is available because of terrorist action or natural disaster. It should be possible to support modern littoral vessels with minimal augmentation of the existing naval and commercial support infrastructure.

3.7 Capacity limitations

The case studies presented in annexes A, B, C and D show that high-speed vessels can mitigate the current limitations on logistic capacity. Fast sealift vessels increase the speed of response for humanitarian relief operations and for difficult evacuations. Fast sealift can also, in some circumstances, compare favourably to available airlift.

4. IS THE CURRENT NAVAL FORCE STRUCTURE SUITED TO THESE OPERATIONS?

While the existing force structure, with its mix of platforms and capabilities, remains substantially appropriate and necessary for conventional high-intensity maritime operations, meeting the challenges of littoral operations may necessitate a rebalancing of Australia's maritime capabilities to accentuate the ADF's capacity to operate in the littoral environment.

5. OPTIMAL VESSEL CHARACTERISTICS

Current developments in Australia, Europe and the United States are leading to the active development of various types of technologically innovative vessels – generally termed Littoral Vessels, with Australia very much at the forefront of these developments. We note though the US must perform operations requiring trans-oceanic vessels, while the Australian requirement is for more affordable platforms.

5.1 The Littoral Vessel Concept

Littoral vessels will be design-focused towards joint maritime operations in areas that are within operating range of shore. Littoral vessels will be networked, fast, manoeuvrable, and versatile.

[4] By "specialised role" it is meant that the module for this role may be left on the vessel, only being changed over when absolutely necessary.

Some will have stealth characteristics built into their design. Littoral vessels will have a smaller displacement and draft than most current surface combatants, require advanced hull forms, be made of composite construction and utilise advanced propulsion systems – all of which confer on the vessel significant advantages.

The concept of these vessels is to allow freedom and security of operation within a littoral environment. The vessels will operate over a broad area with a level of firepower that is dominant for the type of threats they are expected to encounter. They will use superior knowledge of their surroundings together with speed and flexibility to regain the initiative from an opponent. Littoral vessels will operate within a network of similar vessels or of conventional surface combatants and will be well suited to network-enabled warfare.

In some respects, the philosophy of these vessels is closer in spirit to that of larger combat aircraft than to conventional amphibious vessels. Littoral vessels share with aircraft the characteristics of speed and flexibility that make aircraft so useful, but with considerably lower development, acquisition and operating costs for the level of capability they deliver.

Examples of international work in this area include the leasing of Australian fast ferries by the United States Army and Marine Corps, the "Sea-Lance" project at the US Navy Postgraduate School, the Norwegian "Skjold" (mentioned in Section 3.3 – Stealth) and the currently operational Swedish "Visby"-class composite-construction corvette. The flexible high-technology approach taken by these vessels makes them well suited to meet the operational characteristics that Australian maritime forces will face in the littorals (Section 3).

5.2 Characteristics of a Baseline Version of a High Speed Littoral Vessel

Australia has traditionally sought to maintain highly effective forces by gaining a technology edge. If littoral vessel technology were pursued the anticipated baseline version of an Australian littoral vessel might have the following characteristics.

- The ability to deploy at up to 50 knots in sustained sprint mode, and cruise at 40 knots where endurance is more important than outright speed. The speed (Section 3.1) and sensors (Section 3.4) of the vessel (Section 3.1) will allow evasive routing to by-pass submarine threats and perhaps even conventional surface threats, in addition to increasing the speed of the deployment and the tempo of operations.

- In addition to speed there will be an endurance requirement, including a greater capability to loiter in an area of operations than existing commercial designs. Endurance and replenishment are issues to be looked at in future ADI studies.

- Littoral vessels will be exceptionally manoeuvrable in the littoral environment for which they are designed because of their shallow draft and advanced propulsion systems.

- They will employ innovative hull forms for improved sea keeping, reduced hydrodynamic drag, and more economical operation.

- A large deck area will provide unprecedented options for sensor placement, antenna de-confliction and for operations by rotary-wing and unmanned aircraft.

- A roll-on/roll-off capability will increase logistics velocity at developed ports. And a combination of measures such as the use of advanced watercraft designs such as the latest watercraft being delivered to the Australian Defence Force by ADI Limited, the use of deployable flat top lighters, and the embarkation of general purpose helicopters will provide a range options for less developed points of entry.

- The vessels will increase the versatility and reduce the cost of the total fleet by making use of modular cargo arrangements for the easy installation of suitably designed military and humanitarian payloads. The modularity of payloads will enable economies to be achieved across a fleet of littoral vessels.

- The extensive use of automation will reduce crewing requirements in the baseline configuration.

- The vessel will have a defensive capability sufficient to counter fast attack vessels, strike aircraft and anti-ship cruise missiles. For operations in high threat environments it will be able to network with off-board sensors, (eg satellites) and more capable air, -surface and sub-surface combatants such as the planned Air Warfare destroyers.

5.2.1 Damage Control

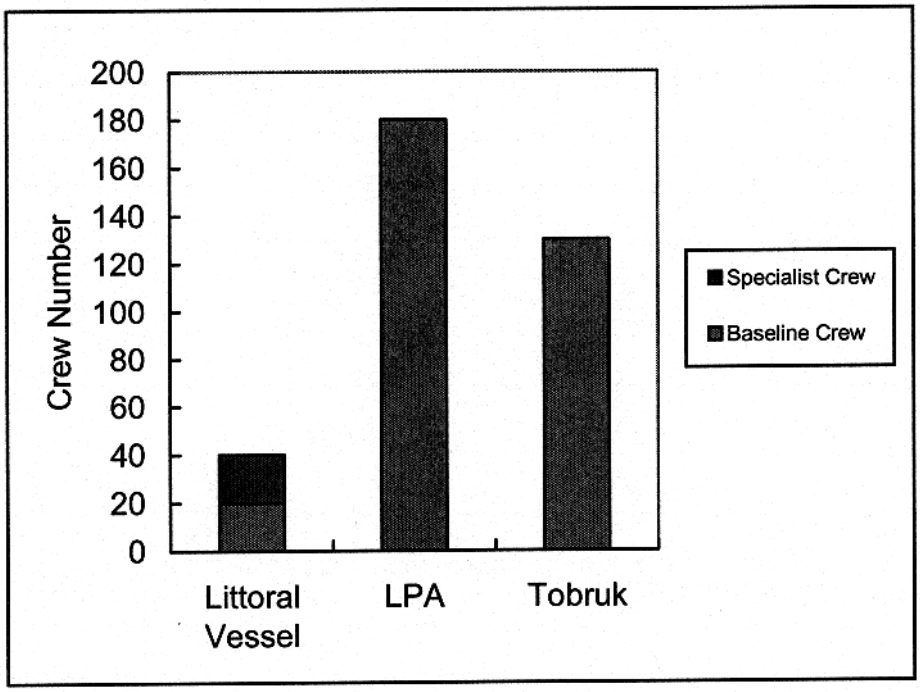
In the event of a littoral vessel sustaining battle damage, the low thermal conductivity of advanced composite construction materials would significantly reduce the ability of any fire to spread to adjoining compartments in the ship[5]. In combination with automatic fire suppression equipment, this would reduce the personnel required for damage control. In extreme circumstances, the loss of a littoral vessel would have less impact on maritime operations because of the larger number of vessels that could be acquired within a given budget. A design priority should be the protection of the small crew and the high priority systems rather than the recovery of a damaged hull.

5.2.2 Crewing

Increased automation will in the near future allow a ship's company to be minimised. Current commercial ferries require only 15-20 personnel in the baseline configuration. New US concepts call for crews in the range of 30 to 40 personnel for their littoral combat ships. And this is for a vessel considerably larger than discussed in this paper. For a future generation littoral vessel the 'core' crew size may be 20. This would be supplemented by specialist personnel embarked (together with their modular equipments) for the performance of specific operational roles such as the support of rotary-wing aircraft. This is to be compared with the total crew of 180 for the LPA vessels of the current amphibious fleet.

[5] DSTO, report number DSTO-TN-0410

Figure 1: Crewing Requirements[6]



5.2.3 Low Cost Platform (And Additional Module Cost)

In discussing the application of such vessels to US needs, the U.S. Navy Warfare Development Command makes the point that "The real cost of a baseline high speed vessel is commercially proven to be an order of magnitude less than current existing programs including the cost of development and acquisition (estimated costs are $70-100 million for baseline militarised vessels)." [7] And again, this is for a vessel considerably larger than discussed in this paper.

The comparatively modest cost of littoral vessels means that either more can be acquired within a given program budget than would be possible with the acquisition of more conventional amphibious vessels, or a given level of capability should be achieved at a lower program cost.

Modularity has the potential to further reduce overall costs because not all of the vessels will require all of the capabilities all of the time. This is a different philosophy to existing designs where all of the capabilities need to be built-in, with significant implications for platform costs and crew size.

[6] LPA and TOBRUK crew numbers from Australian Navy official web site.
[7] US Navy Warfare Development Command document – High Speed Vessel: Adaptability, Modularity and Flexibility for the Joint Force.

5.3 Characteristics of a Network of High Speed Littoral Vessels

Networked communication between vessels will provide all the vessels with real-time knowledge of their surroundings. Digital intelligence information will be provided to and shared between these vessels from every conceivable type of sensor, from both Australian and Allied sources and from the remotely operated submersibles and unmanned aerial vehicles deployed from these platforms.

The network of littoral vessels will, as discussed above, have a defensive capability sufficient to counter fast attack vessels, strike aircraft and anti-ship cruise missiles. At more demanding levels of conflict littoral vessels will operate within a bubble provided by more capable vessels such as the planned Air Warfare Destroyers and other maritime force elements such as the Airborne Early Warning and Command aircraft, with littoral vessels part of the wider network.

As US forces continue to digitise the maritime battlespace, the level of networking required for interoperability will become more demanding. To successfully interoperate with US surface combatants, littoral vessels will need to participate in their networking of sensors and information and to contribute to a cooperative engagement capability[8]. In practice all future Australian platforms will be networked in order to undertake coalition missions with high technology allies such as the United States.

5.4 Further Development

The inherent flexibility of the littoral vessel concept – large deck area, internal load carrying capacity – suggests a development potential beyond the roles examined in this paper.

With the addition of future weapons systems to extend the abilities of the vessel, future variants beyond the baseline concept may contribute to:

- indirect fire support – to support forces put ashore by the basic variant;
- conventional maritime tasks such as surface warfare; and
- the lift of, and support for, a Deployable Joint Force Headquarters (DJFHQ).

Selected variants on the basic hull form may require additional modifications. A fire support variant in particular will require extended loiter, firepower and additional stealth characteristics. The specialisation of variants may be extended in some cases to the size of the vessel since a fire support variant may need to be larger than baseline in order to lift bulky fire support units.

6. FORCE DEVELOPMENT OPPORTUNITY

The current amphibious fleet, consisting of HMAS TOBRUK, HMAS MANOORA, HMAS KANIMBLA and the LCHs, reaches the end of its useful life over the next decade. The LCHs will require replacement in the latter part of this decade and TOBRUK at the end. In addition, MANOORA and KANIMBLA will require replacement early in the following decade. Collectively these programs are worth in the vicinity of $ 1.5 billion.

[8] Cooperative Engagement Capability is the ability of one platform to attack and defeat a target that is being tracked by another platform.

6.1 Replacement (Manoora/ Kanimbla/ LCH/ Tobruk)

The advances in naval architecture, construction materials and propulsion systems discussed above will allow Australia to replace the current amphibious fleet with more versatile and capable high-speed littoral vessels. This would provide Australia with a technologically sophisticated and operationally flexible littoral capability whose lift capabilities have already been proven in realistic operational deployments (Annex D) and that is suited to the future tasks and operational characteristics discussed in Sections Two and Three (and Annexes A, B & C).

ADI Limited has a high level of capability in this field, including skills in project management, C4ISR system development, shipbuilding and maintenance, light and heavy engineering, weapons and advanced sensor development and manufacture, Command Control and Communications development, and sensor weapon and platform integration. This means that Australia is well placed to consider an indigenous program. An Australian littoral ship program should build on the strengths of Australian shipyards catering to the export of fast ships, and on the expertise in advanced composites and system integration that resides within Australia's leading defence systems prime.

US Rep. Ed Schrock commented to the US *Armed Forces Journal International* [9]: "you wouldn't need a massive shipyard to produce these ships. Some of the smaller shipyards around America that are falling on hard times are just the size that you need to build a ship like this (Skjold) – so you could bring back the shipbuilding industry as well." This statement could just as well have been said of Australia's shipyards.

Given that a littoral ship program is within the scope of existing shipyards and naval systems primes, a construction test-program would not require any large capital expenditure from the Commonwealth to establish new capabilities. Further, the program would build on the Australian Navy's experience gained in the leasing of a commercial vessel during the East Timor deployment, where the leased commercial vessel was found to be unsuitable in a number of respects. The main shortfalls of the vessel were a superstructure unsuitable for mounting needed communications equipment, the high level of broadband vessel noise and the lack of a helicopter capability. And these are on top of its lack of flexibility for various mission roles. The East Timor experience, though valuable, means it is now appropriate to develop designs that better meet military requirements.

The next step in an Australian littoral ship program may be for Australia to develop a vessel of the high-speed catamaran class for experimentation. The aim of these experiments should be to confirm the operational requirements and technological specifications for later vessels. The establishment of domestic demand for littoral ships, together with acknowledged Australian expertise, increases the likelihood Australia will be asked to play a role in international collaborative programs such as the US Littoral Combat Ship Program. These programs should not, however, be allowed to drive the more modest Australian requirement.

Australia's comparative advantage[10] in fast ferry and minor warfare vessel construction, would mean that amphibious replacement is likely to be achieved at a cost significantly lower than that of more conventional amphibious vessels, and with greater benefits for Australian industry.

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[9] Armed Force Journal INTERNATIONAL / July 2002

[10] Australian shipbuilding industry currently holds 40% of the world fast-ferry construction market – Naval Sector Plan.

7. CONCLUSIONS AND RECOMMENDATION

The likelihood of asymmetric clashes has lead to the emergence of the littoral as a prime security concern.

In response to events, the current generation Defence of Australia concept is broadening to encompass the protection of Australian institutions and citizens, wherever they may be. The prospect of further terrorist incidents or peace support operations in the archipelago leads to the expectation that the next generation of Defence of Australia capabilities will be focused on the ability to perform littoral operations.

The following conclusions and recommendations are submitted for consideration to the members of the Joint Committee.

First, Australia needs to recognise the importance of littoral operations in the Australian strategic setting.

Second, we need to consider the implications of littoral operations for strategic policy and defence investment, especially in regard to our maritime capabilities.

Third, we need to explore the characteristics of platforms and systems that are suitable for a littoral operating environment and the potential of littoral ships to satisfy our capability requirements.

Fourth, the competitiveness of Australian industry in this area needs to be acknowledged. The potential exists for an Australian solution that delivers expanded capability with reduced costs and crewing levels.

Fifth, and finally, it is recommended that Australia establish a funded development program for littoral ships to meet an Australian requirement, while simultaneously exploring the potential for cooperative research and development with international programs that have similar objectives.

ADI's extensive experience in naval systems integration, signature reduction and advanced composite construction positions the company well to be either a sole source for, or a consortium lead of, an Australian littoral ship program.

Current fast ferry vessels are designed for efficient transportation of a cargo at their design speed. They are not designed toward defence needs. ADI has the ability to take the required elements of the fast ferry industry and combine this with our knowledge of the defence environment, with stealth concepts, and with defence communications and weapons knowledge to come up with a vessel that is superior in its operational abilities to other available capability options.

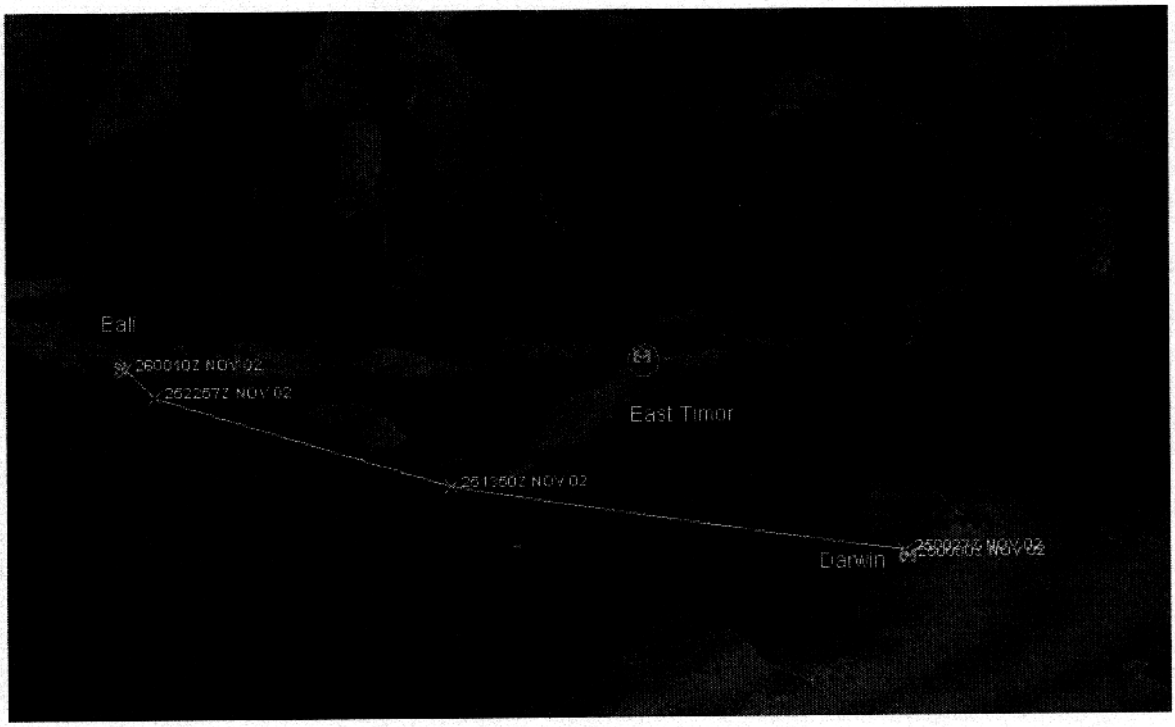
ADI's contribution has been to initiate a study of the strategic and operational issues surrounding littoral vessels. ADI's independent operations analysis, naval architecture and engineering studies are focussed on identifying the optimal mix of crew size, modules, payload, speed and operating range, with more detailed design concepts to be available by mid 2003. The resulting design may have elements in common with existing fast ship designs, but the vessel will likely have significant elements of composite construction and include a level of modularity in order to facilitate platform integration with a variety of different payloads.

Indicative mission one: Humanitarian and Medical Assistance

- Consider a humanitarian crisis within the region
- The ADF is tasked with moving up to 400 tonnes of supplies up to 1800 km from Darwin
- In the case of a medical crisis in Bali (1774 km from Darwin) a Field Ambulance unit, which includes
  - 126 personnel,
  - 6 light ambulance vehicles,
  - 14 light vehicles,
  - 10 medium vehicles and 23 light trailers;

  may need to be transported from Darwin.
- Such a task can be achieved in 24 hours and 10 min (travel time) with the expected lift and operating range of one high-speed littoral vessel, as indicated by the ADI-developed Joint Command Support System (which is in service with the ADF). The track of the vessel is illustrated by the following overlay produced by the Joint Command Support System.
- A future medical module, as part of a modular payload system, could also be carried in the same amount of time.

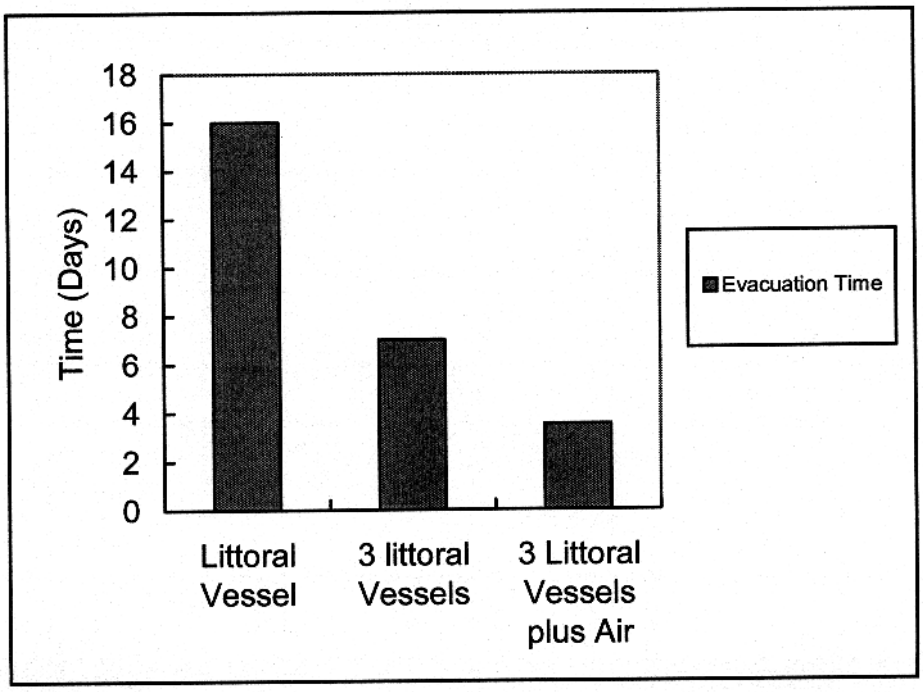
Figure A-1: The track of a High Speed Littoral Vessel transiting to Bali from Darwin



Indicative mission two: Services Protected Evacuations

- Australia has in past years evacuated citizens from regional trouble spots: from Jakarta (by commercial aircraft) in 1998 and from Honiara (by sea – HMAS TOBRUK) in 2000
- Consider a crisis in Bali during the tourist season while Bali is occupied by a large number of Australian citizens – perhaps 5000 people. The crisis is severe and the airfield has been closed
- The ADF is tasked with evacuating all Australian citizens in the shortest time possible. Given the number of civilians multiple trips are clearly required
- One High Speed Littoral Vessel (HSLV) would need 7 trips to complete this task. The first HSLV can be on the scene after only 24 hours and 10 min and would complete the task after 16 days. Three HSLVs operating concurrently would need 7 days to complete the task
- The first of the three HSLVs carries Australian Engineers who are tasked with returning the airport to operational status. Assuming the engineers open the airport 48 hours after their arrival on the scene, the airport will be open 72 hours 10 minutes after the start of the operation. At this point 2600 people remain in theatre with the remainder having already been evacuated by the three HSLVs. After the airfield is open the evacuation proceeds by airlift, using four 747 or 747-class transports, and evacuating the remaining 2600 people takes 11 hours 44 min. The total time for the operation is 83 hours 54 minutes.
- The following chart presents the estimates (made using the Joint Command Support System software) for the total operation time, for each type of evacuation.

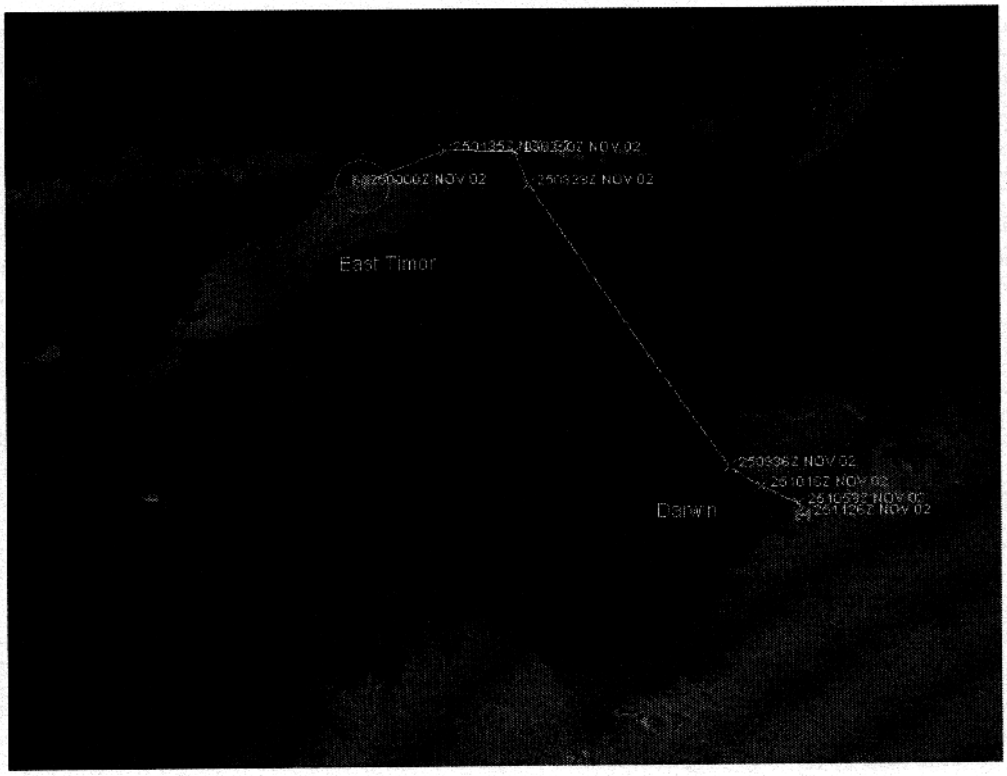
Figure B-1: Evacuation Time



Indicative Mission Three: Logistic Sea Lift

- Consider the crisis that occurred in East Timor in 1999.
- A commercial high-speed catamaran provided significant logistics support for the subsequent operation (Operation Stabilise). It could carry up to 500 fully equipped troops in addition to their vehicles.
- This leased vessel made a total of 75 trips between Darwin (Australia) and Dili (East Timor), making one trip there and back in each 24-hour period.
- Had HMAS MANOORA been in service instead, she would have taken approximately 60 trips[11] to perform the same lift, making one trip there and back in each 48-hour period.
- The superior speed of the fast sealift vessel meant that what actually took 75 days (total) would have taken the MANOORA a total of 120 days.
- The Australian Navy would have required both HMAS KANIMBLA and HMAS MANOORA to complete the task in less time than it took a non-militarised fast catamaran.

Figure C-1: Transit to East Timor



[11] Load data: 400 tonnes fast catamaran; 500 tonnes for an LPA

Deployment Example

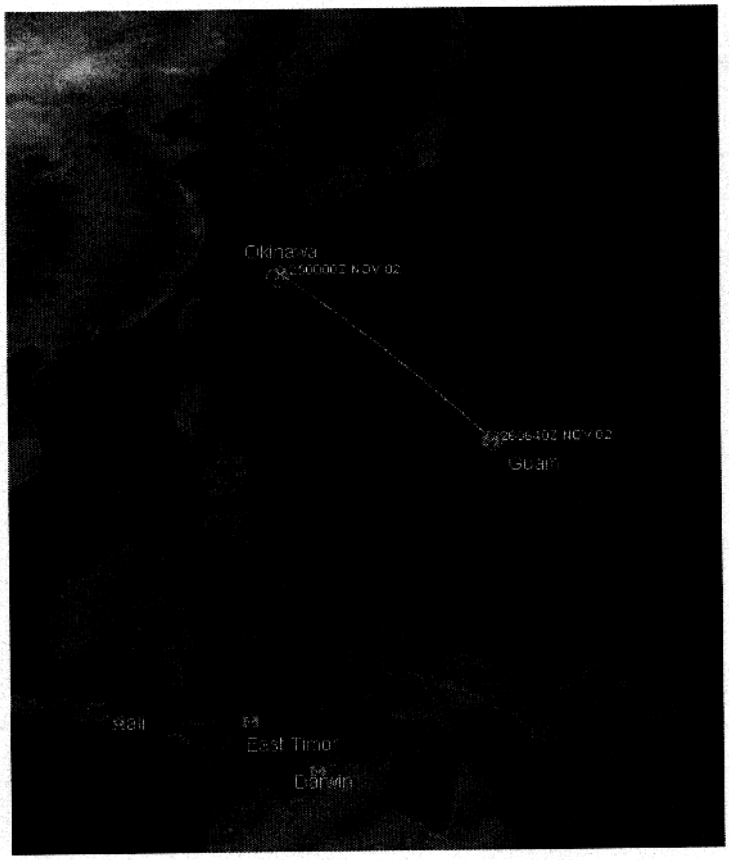
A high-speed catamaran has been leased by the US Marine Corps in the United States. It has been demonstrated that the vessel can "...reliably transport a 400 tonne load to include 370 Marines and their camp gear, five Cobra helicopters, two Huey helicopters and aviation ground support equipment from **Okinawa** to **Guam** within 40 hours *at far less time and cost than the currently employed airlift.*"[12]

In commenting on this success, Marine Colonel Michael Godfrey said the vessel "... cuts down the travel time dramatically ... where it could take an average of 14 days to get a full battalion – 880 to 1000 Marines – and its equipment to a training site by air transport, it now takes an average of 2 days."

US Vice Admiral Art Cebrowski (Ret.) has said, "It is paramount that the US Navy has experimental ships." He also said of a similar vessel, "The craft has an unparalleled potential as a force multiplier. (It) would be a cost-effective high speed addition to any amphibious operation."

Modern hull forms enable an increase in speed due to a corresponding reduction in drag. The use of composites will lead to a weight reduction that in combination with advanced hull-forms and engine management will allow sustained speeds in excess of 40 knots.

Figure D-1: Transit to Guam



[12] US Navy Warfare Development Command document – High Speed Vessel: Adaptability, Modularity and Flexibility for the Joint Force.

Conceptual Design: Australian Littoral Vessel

Figure E-1: Conceptual Design