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Australian Naval Capabilities in the Littoral: Past, Present and into the Future

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Disclaimer

Cover image: HMAS Anzac fires a salvo from it's five-inch armament during the shore bombardment of the Al Faw Peninsula by several warships of the Royal Navy/Royal Australian Navy at the start of the Iraq War. This was dubbed 'Five Inch Friday'.

Australian Naval Capabilities in the Littoral: Past, Present and into the Future

By Jennifer Parker & Peter Jones

Abstract

Littoral operations are complex, and arguably represent the most challenging area of operation for navies. Historically a significant portion of naval operations are conducted in littoral waters. This has been the case for the Royal Australian Navy (RAN) with many of its operations in the coastal and archipelagic waters in the South-West Pacific and the Western Pacific rim. The Australian *Defence Strategic Review* (DSR) implicitly reinforces this geo-political reality. The unique challenges of the littoral environment can constrain naval forces and increase their vulnerability to ever more lethal offensive capabilities such as land-based maritime strike, uncrewed surface vessels, uncrewed underwater vessels and uncrewed aerial vehicles. Littoral operations not only demand a high level of Combined and Joint interoperability, but particularly within Australia's littoral regions, they require an integrated force. This paper considers the nature and challenges of historic, present and future RAN littoral operations and what that means for Australian naval capability. It also draws out key themes in the RAN's littoral experiences.

Introduction

Why do littoral regions of the world matter? Statistics paint the picture. The majority of the 193 United Nations (UN) member countries are coastal states, and at least 70% of the global population live within 150km of the coast.[1] For Australia, and its Southeast Asian and Pacific neighbours, the importance of the littoral is even more evident with the majority of populations living in vicinity of the coast.[2] Not only does the population density data highlight that our region is one where littorals matter, but the physical geography of Australia's north also makes this plainly evident. Should the Australian Defence Force (ADF) be required to operate to its north, in Southeast Asia, as Part 1 of this paper highlights it has been called upon to do numerous times before in peace, competition and conflict, then littoral operations will be key.

Littoral operations are central to the execution of the vast spectrum of operations to Australia's north. The importance of littoral operations to Australia's regional maritime environment highlights the need to consider what is the 'littoral' and what are 'littoral operations'.

The littoral is an area that all mariners and military strategists have a sense of but cannot always clearly define. It is important to start with a few definitions before any discussion of present-day and future littoral operations. The physical and conceptual area of the littoral arena fundamentally impacts the challenges that permeate through littoral operations and the likely capability and conceptual development that will evolve the nature of these operations. There have been numerous attempts at defining the littoral both geographically and conceptually. The US Department of Defense (DOD) defines the littoral as comprising:

> *'Two segments of the battlespace: 1. Seaward: the area from the open ocean to the shore, which must be controlled to support operations ashore. 2. The landward: The area inland from the shore that can be supported and defended directly from the sea'.*[3]

For its part, the RAN defines the littoral as 'the areas to seaward of the coast which are susceptible to influence or support from the land and the areas inland from the coast which are susceptible to the

influence or support from the sea.'[4] This definition goes on to warn that 'Platforms, systems and operating procedures that are configured for one condition may not be well suited for another.'[5]

To elaborate, proximity to land can degrade radars, while shallow water can have a similar effect on acoustic sensors. These operations also generally involve more complex interoperability with own air and land forces, and at times integration with civilian agencies. These challenges demand tailored doctrine and procedures as well as weapons and sensors suitable for littoral operations. Central to understanding the future of RAN littoral operations, is understanding its operational history in this battlespace.

The RAN has long conducted littoral operations. Indeed, it's very first action in the early months of World War I was a joint and combined littoral operation in the Pacific. The DSR in 2023 has included littoral operations as an integral part of the ADF's strategy, and sought to reshape elements of the ADF to be more effective in this area of operations, particularly through the acquisition of land-based maritime strike for the Australian Army and the acquisition of vessels designed for littoral manoeuvre.

Part 1: History of RAN Littoral Operations

World War I

It is important to appreciate that in both World Wars, the naval campaigns were orchestrated by the British Admiralty and were global in nature. The RAN played a role as an integrated element, as well as undertaking national tasking in home and adjacent waters.

The original concept for the Australian Navy as espoused by its first professional head, Rear Admiral William Creswell, and supported by Prime Minister Alfred Deakin, was for 'a self-sufficient naval force confined to defensive operations on local waters, with the Royal Navy providing Australia's blue-water defence'.[6] As Dr Joe Straczek noted, this reflected a recognition by first the Australian colonies and then Commonwealth that 'there was no guarantee that the RN could cover the naval forces of an enemy or prevent detached forces carrying out operations in the vicinity of Australian ports.'[7] This littoral focus took a dramatic shift as a result of the 1909 Imperial Defence Conference in which it was proposed that Australia and other dominions wholly or in part fund and operate Fleet Units on different overseas stations. Each Fleet Unit was a squadron, led by a battle cruiser and composed of cruisers, destroyers and submarines. They would be employed for Imperial Defence, and in particular to ensure the flow of trade was unmolested by enemy commerce raiding cruisers. Instead of Creswell's more modest naval force, Australia was being offered at attractive financial terms a Fleet Unit as its Fleet. In November 1909 the Deakin government accepted the proposal and in so doing took on greater defence responsibilities in addition to coastal defence.

At the outset of World War I, Australia's greatest concern was the whereabouts of the German Asiatic Squadron commanded by Vice Admiral Maxmilian von Spee. The powerful cruiser squadron could not only disrupt trade but could impede the sending of Australian troops to Europe and even bombard Australian coastal cities. Australia was, however, well placed to counter the German threat with its modern Fleet Unit, centred on the battle cruiser HMAS *Australia*.

To neutralise this threat, it was decided to occupy Germany's Southwest Pacific possessions to prevent them from being an operating base for von Spee's ships. The Australian Naval and Military Expeditionary Force (AN&MEF) was formed to occupy German New Guinea whilst New Zealand established the Samoa Expeditionary Force. The RAN Fleet, under the command of Rear Admiral George Patey was tasked to facilitate both operations.

Because of uncertainty surrounding the location of the German Asiatic Squadron, both operations had a strong naval presence. In August, *Australia*, the cruiser *Melbourne*, the British cruisers *Philomel, Psyche* and *Pyramus* as well as the French cruiser *Montcalm*, escorted the Samoa Expeditionary Force and provided sufficient deterrence for there to be an unopposed landing at Apia on 29 August 1914. The Union Jack flew over the city the following day.

Virtually the entire RAN Fleet, supported by *Montcalm,* covered the New Guinea operation. On 11 September 1914 the AN&MEF, under the command of Colonel William Holmes, landed at Bitu Paka near Rabaul. This time, the landing was opposed in spirited fashion by Melanesian Police led by German officers. It required the torpedo boat destroyers (TBDs) to hurriedly land additional sailors to bolster the landing party. It was not the smoothest of operations, primarily hampered by a lack of intelligence on German forces and inexperience in landing forces ashore. The unexpected resistance resulted in Australia's first casualties of the war.[8A] By the end of September, all German possessions had been occupied by Australian and New Zealand forces. As events were to reveal, von Spee was sufficiently concerned about the presence of *Australia* that he took all but *Emden* to the eastern Pacific and thence into the South Atlantic. After initial success in the Battle of Coronel, the German Asiatic Squadron was destroyed off the Falkland Islands.

The RAN's next littoral operation was in support of the Dardanelles Campaign. This took the form of two contributions. Most notably the submarine *AE-2* skilfully threaded its way through the heavily mined Dardanelles into the Sea of Marmara. She was the first submarine to achieve this feat which had the object of disrupting the Turkish seaborne resupply efforts to forces on the peninsula. News of *AE-2*'s achievement which was described to General Hamilton as 'the finest feat in submarine history',[9] helped him decide to have Anzac troops ashore hold their ground and not be evacuated.[10]

[A] The Australians lost 7 killed and 5 wounded whilst the Germans lost 31 killed and 11 wounded.

Picture: 1915 Kangaroo Beach, Suvla Bay. The 1st RAN Bridging Train served in the Gallipoli Campaign. This photo shows part of the Pontoon Pier and sandbag structures erected by the RANBT at Kangaroo Beach, Suvla Bay. Photo Credit: RAN.

The second contribution was the deployment of the RAN Bridging Train. This 230-strong engineering support unit was originally destined to support the RN Division on the Western Front but was redirected to support of the British forces at Sulva Bay. The Bridging Train was to become the most decorated RAN unit of the war and later served in Egypt before being disbanded in 1917.[11] Its function within the RAN was never revived.[12]

A lesser-known RAN involvement in the Mediterranean was by the RAN's four TBDs which operated in the Adriatic Sea in concert with British and Italian warships. Their roles as part of the Otranto Barrage force were to prevent Austrian submarines and surface ships from entering the Mediterranean and to protect merchant shipping transiting between Italy and Albania. This was arduous service and to maintain their effort, officers and sailors from *Australia, Sydney* and *Melbourne* in the Grand Fleet were regularly detached to serve in the TBDs. The highlight of the TBDs service was a gun action involving *Torrens* against Austrian destroyers. This was the only time the RAN fought the Imperial Austro-Hungarian Navy.

In the aftermath of the war, the RAN TBDs were used by the RN in the Black Sea to support the British land forces and allow liaison with White Russian leadership. In this theatre warships were the only viable means of long-haul communication and logistic support. The shallow draught of the TBDs commended them for these tasks, and they were even despatched into the adjacent Sea of Azov which at its deepest is only fourteen metres deep.

Inter-War Considerations

The inter-war period was for the RAN, like her sister services, a difficult one in sustaining capabilities in an environment of serious financial and manpower constraints. The war had demonstrated the lethality of submarines, particularly in the littoral. A submarine arm was twice raised, but twice disbanded due to

their high upkeep costs and successive budget cuts. During this period the Fleet was reduced in size to a squadron with less than a dozen partially commissioned cruisers and destroyers.

Despite this adverse fiscal environment important progress was made in the area of anti-submarine warfare, particularly in coastal waters. Plans were approved and installation commenced of port defences such as indicator loops, booms and contingency plans made to arm small civil craft.[13] In addition, approval was gained for the development of corvettes, minesweepers and converted trawlers for coastal anti-submarine and mine countermeasure operations. In 1938 Navy Office assessed that the task of trade protection was beyond the size of the Australian Naval Squadron. A minute titled *A Plea for Smaller Sloops in Larger Numbers,*[14] concluded that forty-two such ships of local, robust and simple design were needed. This resulted in Australia's largest warship program, the Bathurst class corvettes. These corvettes were to undertake a myriad of tasks in the forthcoming war, including support to the Army in the operations to Australia's near north.

World War II

While much had been done to prepare the RAN for World War II, time ran out for two initiatives relevant to littoral operations. They were the reinvigoration and expansion of the Coastwatcher network and the indigenous production and laying of sea mines. The former would involve a network spanning New Guinea, New Britain, New Ireland and the Solomons. About 400 men and women from the three services as well as servicemen from Britain, New Zealand and the US, served in this force. From its initial role of early warning of enemy air and sea movements the Coastwatchers conducted reconnaissance prior to amphibious landings in New Guinea, as well as leading small guerrilla groups in the Solomons. The Coastwatchers were the most decorated RAN unit in World War II.[15]

In September 1940 the Australian cabinet approved the local production of sea mines to an Admiralty design at the Ford Motor Plant in Geelong. The mines were to be used in defensive minefields in the Torres Strait, Great Barrier Reef and approaches to selected ports such as Port Moresby. They were designed to seriously constrain enemy surface and submarine activity. From August 1941 to December 1943 the RAN's sole minelayer HMAS *Bungaree* laid 9,289 sea mines.[16]

The most notable littoral operations conducted by the RAN in the first half of the war were in the Mediterranean. In early 1940, at the request of the British Government, Australia despatched the RAN's only destroyer flotilla to the Mediterranean and it was soon assigned to the Inshore Squadron. In this, the destroyers, under the command of the charismatic Captain Hec Waller, initially supported the offensive land operations and then undertook the hazardous Tobruk Ferry Service along the coast. In this they were joined by the sloop *Parramatta*. Their contribution was vital to sustaining the predominantly Australian garrison and then its rotation out during Operation Treacle.

Central to the effective support to the Tobruk garrison by the 'Tobruk Ferry Service' was the close coordination by the Senior Naval Officer Inshore Squadron. This was initially Waller and then Captain Albert Poland RN. The latter wrote he formed 'a grand liaison'[17] with the commander of the Australian 9th Division, Major General Leslie Morshead and his staff, as well as with the Air Officer Commanding (AOC) 204 Group, Air Commodore Raymond 'Collie' Collishaw. The coordination was put to the test with

the intricate planning and execution required for Treacle. Poland worked closely with Morshead and Naval Officer in Charge, Tobruk, Commander Frank Smith. As historian Anthony Heckstall-Smith noted,

> *'It was fortunate indeed to have these three able, level-headed officers in Tobruk at such a time; officers who not only inspired confidence in those under them, but who were masters of improvisation'*.[18]

The 139 ships that served in the Tobruk Ferry Service transported over 34,000 tons of stores, and nearly 200 tanks and guns and moved around 33,000 troops each way.[19] This effort was keenly appreciated by the garrison soldiers and led one Australian padre to say in his grace, 'For what we are about to eat, thank God and the British fleet.'[20] The losses incurred in this essential mission were twenty-six Allied warships being sunk. The RAN ships had mixed fortunes. *Waterhen* and *Parramatta* were lost, but *Vendetta* which did more runs than any other Allied warship remained unscathed.

The RAN was also active in the Arabian Gulf with the sloop *Yarra* and armed merchant cruiser *Kanimbla* taking part in British led operations against Iraq and then Iran. These operations were to prevent German access or interruption to oil supplies and to apprehend German flagged merchant shipping. This involved *Yarra* proceeding up the Shatt-el-Arab waterway in May 1940 to support operations against Iraq and then in August against Iran in which she disabled the Iranian sloop *Babr* at the mouth of the Kārūn River.[21] The *Kanimbla,* with 300 Indian troops embarked, led an operation which involved entering the Iranian port of Bandar Shahpur, engaging shore positions and capturing eight German and Italian merchant ships. The operation was a success, despite fierce opposition.[22]

For the RAN, the war in the Pacific was almost entirely conducted in the littoral and in support of land forces. The initial operations were ill-fated. In the Guadalcanal campaign, the Battle of Savo Island was disastrous with three US warships and the RAN heavy cruiser, *Canberra,* being lost when protecting the amphibious force. Among other things, the defeat highlighted deficiencies in RAN-USN interoperability and poor command arrangements in the RAN flagship.[23]

The command-and-control deficiencies are worth expanding upon. The Australian Squadron, not unsurprisingly, employed RN squadron command arrangements. The Rear Admiral had a very small staff of a commander as Chief Staff Officer, a Flag Lieutenant, a Signal Yeoman and Secretary. He was supported by the flagship's Commanding Officer, who was also then called the Flag Captain. Depending on the personal relationship between the Admiral and the Flag Captain, the latter may move with the Admiral and displace a ship's captain if the Admiral shifted his flag to another ship.[24] Whilst this structure had been in place for many decades, the more multi-dimensional and higher tempo war at sea in World War II was straining this arrangement. In contrast, a US Admiral had a staff of at least a dozen officers and sailors who were able to keep watch on the flag bridge as well as undertake planning, operations, engineering and logistics functions.

Doctrinally, prior to the Battle of the Coral Sea, the Commander of the Australian Squadron, Rear Admiral Jack Crace, issued his *Cruising and Operating Guide* based on RN procedures. The means of tactical communication was flashing light or signal flags. To aid interoperability communications sailors of the two navies were exchanged. These arrangements sufficed in the Battle of the Coral Sea but were to be found wanting in the night Battle of Savo Island.[25]

In the lead up to the Guadalcanal campaign, Crace was replaced by another British officer, Rear Admiral Victor Crutchley. Additional USN cruisers joined the force, however, Crutchley had not met their captains before the operation. Some, but not all, USN ships were fitted with the new Talk Between Ship (TBS) tactical communications sets. No RAN ship was so fitted.

After the initial surprise achieved by the Allies in their landings at Guadalcanal and Tulagi, Crutchley, who was in charge of the surface protection of the amphibious force, relied on air surveillance from Queensland based Australian and US aircraft as well as from Admiral Jack Fletcher's carrier aircraft located well to the east. Due to a combination of gaps in the air surveillance and Crutchley's absence from the cruiser screen in *Australia* in order to attend a meeting with the amphibious commander, a Japanese cruiser force was able to conduct a devastating night attack on the Allied cruisers. Only the caution of Vice Admiral Mikawa Gunichi prevented the amphibious ships from also being sunk.[26]

Arguably, a properly constituted command staff would have been more proactive in maintaining a surveillance picture and utilised the cruiser-based floatplanes to survey the obvious threat bearing, in the same manner as Mikawa employed his floatplanes.[27]

In operations immediately to Australia's north, a motley collection of RAN destroyers, corvettes, harbour defence motor launches, and requisitioned craft supported the Army in its operations in the occupied Dutch East Indies and in New Guinea. Often these supply missions ran the gauntlet of Japanese air superiority. Inshore operations were also hazardous from a navigation point of view and the destroyer *Voyager* grounded on 23 September 1942 and was lost at Betano Bay, Timor. Another notable loss was the corvette *Armidale* sunk by Japanese aircraft on 1 December 1942 in support of Sparrow Force. This episode highlighted the risks associated in littoral operations in the absence of air cover.

The naval operations in New Guinea necessitated the establishment of a handful of small naval shore facilities under the command of Naval Officer in Charge New Guinea. This experienced captain also worked with the senior Army commander in providing naval support to amphibious operations. His shore establishments provided vital base facilities to the array of small warships and requisitioned craft that supported land and naval operations in theatre.

There was, however, a turnaround over the next twelve months such that the RAN's interoperability with the US 7th Fleet was without parallel. It is one of the RAN's greatest operational achievements in its history. The RAN cruisers and destroyers incorporated new equipment and procedures for amphibious operations. This included fitting of TBS, adopting USN procedures and improved voice procedures for shore bombardment. Radars for surface and air detection were also progressively fitted. This included the British Type 291 in *Shropshire* which was arguably one of the best radars in the 7th Fleet.[A] By this stage, suitably equipped cruisers, such as *Australia* and *Shropshire*, were able to conduct fighter direction of carrier-based aircraft. Anti-aircraft armament was also strengthened by retrofitting 40mm Bofors which had the weight of shell to impede the emerging kamikaze threat. These enhancements

[A] The Type 291 had a rotating aerial which could, in the hands of skilled operators, be tilted in such a way that it could detect aircraft over land. This made her particularly useful in tracking aircraft and controlling friendly fighters to counter air attacks.

were particularly important in improving the RAN's performance in the more demanding littoral environment and allowed the ships to better support amphibious operations.

Functionally, the RAN task group was also enhanced by hydrographic ships and the new small Harbour Defence Motor Launches for inshore work. Their work improved the navigational knowledge of the landing areas and their approaches. Equally significant, was the small fleet of mainly British flagged merchant ships commissioned into the RAN to provide victuals, stores, fuel and ammunition. The RAN ships were far from self-sufficient, and the extensive and growing US logistics force was heavily leaned upon. This issue became progressively challenging as distances grew to over 4,000 nautical miles from Australia. The effort of the motley collection of converted merchantmen was insufficient and the then Australian Squadron commander, Commodore Harold Farncomb, urged enhancements to the organisation while at the same time leveraging off the US supply train. Mail was a particular rub point and Farncomb had liaison officers placed in various island hubs to try and accelerate its delivery with frustratingly indifferent results.

From 1943, the main elements of the RAN operated with Admiral Thomas Kinkaid's 7th Fleet in support of General Douglas MacArthur. They took part in a succession of amphibious operations first in New Guinea, then in the mammoth Battles of Leyte Gulf and Lingayen Gulf in the Philippines, and culminating in the Borneo landings.

The development of an Australian amphibious capability relied on doctrinal and material assistance from both the US and Britain. From September 1942, training of both ship's companies and soldiers earmarked for amphibious landings took place at the base HMAS *Assault* in Port Stephens.[A] The three-armed merchant cruisers *Kanimbla*, *Manoora* and *Westralia* were converted in 1943 into Landing Ships Infantry (LSI). These conversions were extremely comprehensive with each able to embark 1,200 troops and eighteen landing craft. A factor in why these ships were so successful in service was the creation of the Ship's Army Detachment (SAD) in each ship and considerable work on internal organisation.[28] The Officer in Charge (OIC) SAD was an important liaison with the embarked forces. The ships had to adjust their procedures whether they were embarking Australian Army, US Army or US Marine Corps contingents. These merchant cruisers collectively referred to themselves as 'the three musketeers'. The Commodore then commanding the Australian Squadron, Commodore John Collins later wrote:

> *'I was, of course, aware of the plans for the Landing Ships at each point of invasion and saw from the bridge of my ship or flagship the spectacular execution of their orders. What I did not, indeed could not, see however was the vast amount of preparatory training and drill which the LSI's had to undergo before they could accomplish their task. The complete success of the missions proved the thoroughness of their intensive training and the split-minute timing of the planning and operations onboard'.*[29]

[A] By the beginning of October 1943 more than 1,000 naval personnel had been trained for combined operations at *Assault* including; 100 officers; 100 landing craft coxswains; 120 beach commandos; 40 landing craft signalmen; 453 boat crewmen; and 250 stokers. This was in addition to the 20,000 US soldiers and 2,000 Australian soldiers who, although receiving their primary training in the US part of the ATC, had also received training at *Assault*.

Australia's contribution in the Philippines campaign included precursor hydrographic survey, shore bombardment, air defence, troop lodgement and defence against Japanese surface attack. Notably, *Australia* was hit by the first kamikaze of the war and was hit by a further five kamikaze aircraft in the campaign before having to be withdrawn. *Shropshire* and *Warramunga* took part in the Battle of Surigao Strait, the last battle between battleships.

The RAN also took part with the Australian Army in the three amphibious operations in Borneo during May-June 1945. They were – Oboe 1 (Tarakan), Oboe 2 (Balikpapan) and Oboe 6 (Labuan and Brunei Bay). These were largely Australian operations and Farncomb closely coordinated first with Major General George Wootten for Oboe One. This did not always ensure faultless execution. During the Tarakan landing *Shropshire* fired upon Japanese strongholds to telling effect, killing a hundred Japanese, but tragically also two nearby Australian soldiers. Further bombardments took place the following day before Japanese resistance ended.[30]

The Balikpapan landings were Australia's largest amphibious landing. General Ted Milford, who commanded the 7th Division for the operation was a meticulous planner. A key issue that arose in the planning for the operation was the selected landing sites. Vice Admiral Daniel Barbey USN demurred at the locations selected by Milford as they would be harder to reach and carry more risk in the lodgement phase. The four proposed landing areas were along the Klandasan coast to the south of the Balikpapan township. Milford prevailed in the discussions because of the tactical advantage his preferred sites provided to troops once ashore. Once again Farncomb led his cruiser and destroyer force in support of the successful landings from the amphibious ships which included the trio of *Kanimbla, Manoora* and *Westralia.* The warships remained offshore for nine days providing round the clock bombardment support as well as harassing fire to wear down the enemy. During this time Farncomb went ashore to ensure that Milford was being adequately supported. A feature of the Balikpapan operation was the accuracy of the naval gunfire in dealing with Japanese positions and was a testament to the expertise the ships had gained since the beginning of the war. For most ships of the Australian Squadron, 9 July 1945 represented the day they fired their last rounds at the enemy.[31]

At war's end the RAN had developed a fleet adept at operating with the US 7th Fleet. The vast majority of these operations were in the littoral. The operations had highlighted the need for close co-ordination of the services from commanders, staffs and individual units if synchronisation was to be achieved. The increased lethality of aircraft in the littoral could only be countered by a combination of timely intelligence, well performing radars, development of a common air picture and a layered defence of fighters and high angle guns with sufficient stopping power.

Notably, the RAN had developed a modest but well-drilled amphibious capability, but it, along with other facets of littoral warfare, such as mining, would quickly wither. This was in the face of inevitable post-war reductions and the demands of the emerging Cold War.

Photo: 1945 Modernised HMAS Hobart. The cruiser HMAS Hobart at war's end shows the enhancements fitted for the ship to be effective in operations, both in open ocean and littoral waters. These included air, surface and fire control radars. The air search radar allowed Hobart to vector Allied fighters against Japanese aircraft. To help counter the kamikaze threat her anti-craft armament was bolstered by 40mm Bofors. Photo Credit: State Library of Victoria.

The Korean War

During the Korean War, the RAN served as part of United Nations (UN) forces, to support the land campaign on the Korean Peninsula. By virtue of the mountainous terrain many of the North Korean supply routes were using rail, road and small watercraft hugging the coast. The RAN deployed on a continuous basis a pair of destroyers and frigates and for a two-month period, the new aircraft carrier *Sydney*.

In addition to interdicting enemy supply routes and coastal craft, the warships also provided protection for UN garrisons on islands sometimes offshore from territory held by North Korean forces. *Anzac* attracted global press coverage in 1952 whilst at anchor, for protecting the Ch'o Do garrison. She was fired upon by four 76mm mountain guns. The guns were sited in caves, and in their third salvo had rounds falling around *Anzac*. In this perilous situation *Anzac* quickly slipped her cable leaving a buoy marking the anchor. Nearby shoals prevented *Anzac's* quick seaward escape. Fortunately, in a spirited fight, *Anzac's* guns found the caves' entrances and the smoke and dust partly obscured *Anzac* from the North Koreans' view. A running duel ensued for nearly half an hour with *Anzac* firing 174 rounds with 50 enemy shells falling around the ship. Eventually, the shore guns were silenced but not before *Anzac's* anchor buoy had been hit and sunk. This inshore work and the need to understand traffic flows led the USN to develop comprehensive procedures for UN assigned warships to report and track all shipping along coasts. In this way, it was hoped intruder operations could be quickly identified.

Photo: 1953 Korean War. HMAS Anzac operating off the ice strewn coast during the Korean War in 1953. The destroyers conducted NGS against North Korean supply lines on and off the coast. They also protected UN garrisons on the off-lying islands. Photo credit: RAN.

The routine for the light fleet carriers was to conduct thirteen-day patrols off the Korean coast. This would include two days transit and another day midway through the patrol for fuel and ammunition resupply at sea. *Sydney* would eventually conduct seven such patrols. Her aircraft would be used offensively to interdict road, rail and sea transport which included destroying tunnels and bridges. They were also to provide spotting information for ships conducting shore bombardment as well as undertaking photo reconnaissance. *Sydney's* patrols were synchronised to ensure at least one UN carrier was always on task.

Sydney's Korean deployment was a successful one and the sole one by an Australian aircraft carrier in war. In sixty-four days on station her aircraft flew 2,366 sorties including some in support of Australian troops. In one twenty-four-hour period she flew eighty-nine sorties, which was a record for a light fleet aircraft carrier. The work rate was high for all onboard whilst on patrol. Most pilots were flying two sorties a day and nearly 40% of the aircraft returned unserviceable, placing great strain on the maintenance crews. In the end *Sydney* suffered three pilots killed and ten aircraft lost with aircraft hit by flak on 99 occasions. *Sydney* had, however, significantly disrupted the movement of North Korean forces as well as supporting UN troops on the ground.[32]

The Malay Emergency (1948-1960) and Confrontation (1963-1966)

Both the Malay Emergency and the Confrontation with Indonesia involved the RAN in British led littoral operations. In the first instance the RAN ships deployed were the two destroyers or frigates assigned to

the Southeast Asian Strategic Reserve. Their employment was to support Army operations ashore, and this included occasional shore bombardment.

During the Confrontation there were two areas of focus – the Borneo States and West Malaysia. In the latter, Indonesian infiltration by necessity was via the Malacca and Singapore Straits. It is estimated that the co-ordinated air and sea patrols prevented more than 80% of the infiltrations.[33]

In this work the RAN deployed their six newly acquired Ton class minesweepers. While the Tons had some success, their wooden hulls and slow speed were limitations. The experience with the wooden hulled Ton class, with an armament of two 40mm Bofors and a speed of just 15 knots, influenced the RAN when the operational requirements were formulated for the future patrol boats to be used in home waters.[34]

Photo: 1966 – Confrontation. HMAS Curlew entering Kuching in 1966 after conducting riverine and coastal patrols in Sarawak waters during Confrontation. Photo Credit: RAN.

Vietnam War

The RAN's contribution to the Vietnam War centred on four elements:

- Theatre logistic supply by the fast troop transport *Sydney* and for a short period the requisitioned merchantman *Jeparit*.
- Between 1967-1971 the RAN Helicopter Flight Vietnam (RANHFV) was deployed with the US Army 135th Assault Helicopter Company,
- A destroyer to operate with the 7th Fleet off the Vietnamese coast.
- An Australian mine clearance diving team (AUSCDT).

In 1962 the old aircraft carrier *Sydney* was brought out of reserve and converted to a troop transport. She could embark an infantry battalion with its wheeled vehicles and other equipment. She was a critical element in enabling Australia's contribution. In the South Vietnamese ports Vietcong swimmers placed

limpet on ships as well as laying bottom mines to disrupt port operations. The RAN's AUSCDT 3 served as part of the Harbour Defence Group, employed to counter this threat as well as dealing with improvised explosive devices ashore. Their particular focus was Operation Stabledoor, the clearance and maintenance of Vung Tau harbour.[35] The work of US and Australian clearance divers was critical in keeping the ports open and the land forces resupplied.

The three new Perth class guided missile destroyers and the older *Vendetta* were deployed on rotation in operations not dissimilar to their predecessors in the Korean War. Shore bombardment was conducted against enemy troops, supply routes or infrastructure. Enemy coastal craft used to resupply forces in the south were also interdicted. In this conflict, however, there were more active and accurate shore batteries to contend with when operating inshore.[36A]

In March 1972 Australia's combat role in the Vietnam War ceased. Later that year a Defence Review was conducted to reshape Australia's Defence Force. Arising from the review two of the RAN's roles were to be naval support of land operations and sea transport for the Australian Services.[37] Despite this requirement the ageing *Sydney* was paid off the following year. As a partial capability the six Balikpapan heavy landing craft originally ordered by the Army entered RAN service from 1974. In 1981 they were joined by the landing ship heavy *Tobruk*. This force allowed the Army and the Navy to start the long process of regenerating an enduring amphibious capability.

Photo: Vietnam War. HMAS Hobart in 1967 conducting NGS off the Vietnamese coast. Photo credit: RAN.

Gulf War

The Iraqi invasion of Kuwait led to a large multinational naval force being formed in the first instance to enforce UN Security Council resolutions against Iraq. Initially, these operations were conducted in the Arabian Sea and the mouth of the Strait of Hormuz. For the two RAN frigates involved, the task centred on maritime interception operations (MIO) where merchant ships were boarded and inspected to prevent cargo prohibited under UN Security Council Resolution 661 getting to Iraq.

As the preparations of the expulsion by force of Iraqi occupiers from Kuwait gathered pace, the naval forces moved into the Gulf. The second RAN task group (TG) was much better equipped for maritime interception operations and its ships were retrofitted with rigid hull inflatable boats (RHIBs) with boarding parties better equipped, based on the experience of the hastily deployed first task group.

A For example, in contrast to North Korea, the People's Army of Vietnam employed fire control radars for providing targeting for their shore batteries. This led the RAN to deploy 'chaff' for the first time as a countermeasure.

In addition to the three-ship task group, the RAN once again deployed AUSCDT 3 for envisaged port clearance operations. The RAN's war time duties during the Gulf War were for the task group to be part of the aircraft carrier protective screen and for AUSCDT 3 to help clear 411,000 square metres of harbour bottom at the port of Mina Ash Shuibah, during which it rendered safe or destroyed thirty-one sea mines.[38]

Immediately following the Gulf War there was a requirement for naval forces to enforce successive UN Security Council Resolutions 706, 712 and 986 against Iraq. For over eleven years the RAN was involved initially in the Red Sea and then with the Maritime Interception Force (MIF) in the northern Arabian Gulf in suppressing the smuggling of contraband in contravention of these resolutions. In particular, these operations focussed on the Iraqi illegal smuggling of oil and dates which was a source of foreign exchange. The scaled down commitment involved one frigate assigned to the US 5th Fleet. These maritime interception operations grew in sophistication to counter the ever-changing tactics of the smugglers. The latter would employ such measures as welded hatches, electrified guard rails and razor wire to prevent boarding parties gaining control of their ship before it reached the sanctuary of Iranian territorial waters.[39]

Peace Support Operations

In addition to the conduct of littoral operations in war, the RAN has played a part in peace support and peace keeping operations in Somalia, Bougainville, the Solomons and Timor-Leste. Typically, the naval contribution involved providing sealift and once in theatre logistic, communications, medical and helicopter support.

The most complex and protracted peace support operation was in Timor-Leste. The RAN commanded the International Force East Timor (INTERFET) naval force which from time-to-time involved warships of ten nations. [A] The task undertaken ranged initially from reconnaissance by surface ships and a submarine, to hydrographic survey of Dili, to the logistic support of troops ashore. Later in the campaign the RAN conducted an unopposed amphibious lodgement in the Oecussi-Ambeno enclave complete with AUSCDT 3 conducting a clandestine beach survey.[40]

Warships can provide a symbol of national or international resolve in operations, such as with INTERFET. General Peter Cosgrove wrote:

> *'Another military blinding glimpse of the obvious…. The persuasive, intimidatory or deterrent nature of major warships was not to me as the combined joint force commander an incidental, nice to have 'add on' but an important indicator of national and international resolve and most reassuring of to all of us who relied on sea lifelines. It was a classic case of 'presence' pillar of seapower'.*[41]

Notably in operations in Timor-Leste, the leased fast catamaran *Jervis Bay* (known as the Dili Express) ferried 21,040 personnel, 1717 Internally Displaced Persons, 430 vehicles, and 5482 tonnes of logistic stores.[42] The *Jervis Bay* had been leased to augment the *Tobruk* while two former USN amphibious

[A] The nations were Australia, Canada, France, Italy, New Zealand, Portugal, Singapore, Thailand, UK and US.

ships had longer than anticipated modernisations. These ships, renamed *Manoora* and *Kanimbla,* joined the Fleet in 2000 while *Jervis Bay* was returned at the end of her lease in 2001. For the first time in 55 years the Navy had a three-ship amphibious force to support the Army.

Photo: 2001 East Timor. The fast catamaran HMAS Jervis Bay played a pivotal role in logistically supporting the INTERFET and UNTAET forces in East Timor. She completed 107 return trips between Darwin and Dili ferrying 21,040 personnel, 1,717 Internally Displaced Persons, 430 vehicles, and 5,482 tonnes of stores. Photo credit: RAN.

Iraq War

From 2001, the RAN alternated with the USN to command the MIF, which also included ships from the RN and Polish Navy. There were also US Seals and Polish GROM special forces attached to the MIF. By early 2002 the MIF had effectively established a close blockade of Iraq with frigates routinely operating in Iraqi territorial waters at the entrance to the Khawr Abd Allah (KAA) waterway. By this stage the RHIB's were larger, had longer endurance and took their boarding parties over the horizon from the MIF.[43]

The RAN involvement in the Iraq War built on the years of experience in the Arabian Gulf. The RAN Task Group consisted of the amphibious landing platform *Kanimbla* and the frigates *Anzac* and *Darwin.* Ashore were the clearance diving team AUSCDT 3 and a Logistic Support Element (LSE) in Bahrain. *Kanimbla,* by virtue of her shallow draught, excellent satellite communications fit, briefing rooms and space to embark 130 Coalition boarding parties and their RHIBs proved to be an excellent MIF command ship.[44]

Photo: 2003 Operation Falconer RAN Task Group. The three RAN ships that took part in Operation Falconer. Darwin (top), the Maritime Interception Force command ship Kanimbla (centre) and Anzac (bottom). Embarked on Kanimbla's foredeck are some of the RHIBs from the contingent of 130 Coalition personnel who embarked for the combat phase. For her part Anzac conducted exceptionally accurate NGS against Iraqi positions on the Al Faw Peninsula. Photo Credit: RAN.

Captain Peter Jones RAN commanded the MIF from *Kanimbla* and was the Coalition Maritime Interception Operations Screen Commander. The MIF foiled an Iraqi mining operation, supported the capture of the offshore oil terminals, conducted shore bombardment of the Al Faw Peninsula, countered suicide boat operations and escorted mine clearance operations in the KAA. Finally, the MIF conducted riverine patrols to ensure the safe navigation of shipping to Umm Qasr.[45]

Operational and tactical command and control was effectively conducted using the 'chat' facility on the Coalition Wide Area Network (CWAN). Specific activities such as MIO, logistics and NGS all had their own chat rooms. This proved particularly effective in both synchronising operations and providing a real time written record of operations.[46]

The MIO Screen Commander made extensive use of liaison officers with adjacent land and naval formations to help synchronise operations, reduce friction and prevent fratricide. In addition, operation specific doctrine and measures were developed for such areas as preventing blue-on-blue, naval gunfire support (NGS) and riverine patrol.[47]

A key ingredient in the MIF's effectiveness was its familiarity with the Northern Arabian Gulf (NAG). This was even to the point of identifying through soundings greater sea room in the approaches to the KAA than indicated on the official charts.[48]

Notably, the performance of *Anzac* and the three RN frigates in NGS in support of the Royal Marines assault on the Al Faw peninsula was a revelation. The combination of modern fire control systems, inertial navigation systems and muzzle velocity indicators resulted in the most accurate NGS in naval history to date.[49] As the frigates were all single gunned, they operated in pairs to ensure each fire mission was carried out, even if one ship's gun had a malfunction. In one fire mission *Anzac* destroyed an Iraqi artillery piece in a fire mission of three rounds. Coordination was via chat, but the spotters still used voice circuits with the ships.[50]

Kanimbla's Ship's Army Detachment (SAD) made notable contributions with the two LCM-8s helping pre-position the Royal Marines to Bubiyan Island prior to their assault on Al Faw. Later the LCM-8s were used to support RHIB operations up the KAA. The SAD also provided ship air defence with RBS-70 short-range air defence missiles and processed captured Iraqi servicemen from the thwarted mining operation.

An unsung part aspect of the RAN TG's effectiveness was the performance of the LSE ashore. This small group was well connected with ADF, USN and local commercial logistics and supply chains. The LSE even led a root cause review of RHIB reliability which led to a significant increase in their availability in time for the war.[51]

AUSCDT 3, which had been pre-deployed to Kuwait, travelled with UK and US clearance diving teams in a land convoy to conduct port clearance operations in Umm Qasr. This port was ear-marked for humanitarian shipping to offload cargo. The first ship to enter the cleared port was RFA *Sir Galahad* on 28 March 2003,[52] The coalition clearance diving teams cleared 1.5 million square metres of the port's bottom. They went on to do similar work at the port of Khawr Az Zubayr. Because of AUSCDT 3's versatile skill set they worked closely with the Royal Marines, clearing areas ashore, particularly on the Al Faw Peninsula, of unexploded ordnance.[53]

Part 2: Present Day RAN littoral operations

Part 1 of this paper outlined the vast spectrum of littoral operations the RAN has undertaken to date, and many of the challenges and lessons that have been identified. It is an important bedrock of knowledge to build from when considering present and future littoral operations.

Conceptualising the littoral

Through the advancement of technology, the conceptualisation of the littoral and its role in the RAN's maritime strategy is ever evolving. The 2023 DSR places the littoral region as central to its concept of deterrence by denial, albeit implicitly. Despite the perception of a Cold War focus on blue water operations, littoral operations for modern navies remain as relevant as always, although their execution is increasingly complex. The complexity of littoral operations is due to several factors, including significant developments in the type and speed of littoral threats but also the inherent vulnerabilities of naval assets operating in the littoral, whether that be due to shallow waters, proximity to navigation hazards or the vulnerability of conventional sensors.

In contemporary operations the proximity to land increases the vulnerability of maritime units to a larger spectrum of adversary threats, whether that be missiles, small boats, mines, uncrewed aerial vehicles (UAVs), uncrewed surface vehicles (USVs) and fighter aircraft whilst limiting the ability to provide early detection through Radar, Electronic Warfare (EW), Sonar and other systems due to environmental clutter. These challenges are often further compounded by geographical restrictions on movements of larger vessels, due to depth and draft.

Not only is the threat spectrum within the littoral greater for maritime units, the potential adversaries who may employ these capabilities have also expanded. Whilst blue water operations traditionally require large platforms - large ships, long-range aircraft and submarines which are expensive to acquire and operate - littoral operations can support the employment of relatively inexpensive and technologically simple threat capabilities. The operation of the Houthis in the Red Sea and Gulf of Aden is a clear example of this. Whilst the Houthi militia does not have a conventional military with surface ships and aircraft, they have managed to consistently employ explosive USVs, crude UAVS, mining or the threat of mining and anti-ship cruise missiles (ASCMs) to hold ships from the Saudi-led coalition in Yemen at risk in the Red Sea and Gulf of Aden. The successful 2017 engagement of a Saudi Frigate in the Red Sea by Houthi militia USV, and the recent December 2023 Houthi engagement of merchant vessels in the Red Sea with ASCMs and UAVs highlight just how easily non-conventional military forces with low-cost capabilities can hold shipping, and naval units at sea in the littorals.[54]

Photo: 2017 Houthi uncrewed surface vessel attack of Royal Saudi Naval Frigate in the Red Sea. Photo credit: USNI

From a surface warfare perspective, the threat of small boats and now USVs within the littoral poses a significant challenge to larger surface units. Not only are small boats that pose a potential threat hard to detect, track and identify,[55] they are also difficult to engage with most weapons systems onboard ships rendered ineffective due to the range, manoeuvrability and signature of these vessels, the exception being small -medium calibre arms. Some navies have sought to capitalise on this asymmetric advantage by fielding large forces that focus on smaller asymmetric capabilities in the littoral. A key example of this is the structure and employment of the Iranian Revolutionary Guard Corps – Navy (IRGCN) in the Arabian Gulf and the Strait of Hormuz who have consistently employed relatively simple, cheap capabilities to create challenges for US blue water naval capabilities in the littoral.

From an anti-submarine warfare (ASW) perspective the littoral can be a difficult environment in which to undertake submarine and anti-submarine operations due to the shallow depths involved and the number of smaller vessels generating acoustic clutter. However, small conventional submarines with good tactical placement can pose a significant threat in the littoral zone, with traditional ASW sensors often degraded by the environmental considerations of littoral operations. The potential advantage of smaller conventional submarines in the littoral has resulted in a trend of acquisition of smaller or mini submarines

by countries such as Iran and North Korea, which are more capable of operating in a constrained littoral environment.

RAN Capabilities for Littoral Operations

Effective maritime operations in the littoral generally require a force optimised to the unique requirements of the littoral, with enhanced manoeuvrability, speed and enhanced early warning and detection capabilities. The current RAN Fleet is designed to provide both an open ocean and littoral capability, however a number of its vessels lack the appropriate armament and protection for an increasingly contested littoral environment.

The smaller units such as the *Armidale* and *Cape* class patrol boats are presently configured for constabulary tasks in an uncontested environment. The limited armament on these vessels (*Armidale* - 25mm Typhoon, 2 x 12.7mm machine guns, *Cape* - 2 x 12.7mm machine guns) makes them vulnerable in a contested littoral environment. This vulnerability is equally applicable to their planned replacement, the *Arafura* class Offshore Patrol Vessel (OPV) which is expected to be armed with a 25mm gun and 2 x 12.7 mm machine guns. The lack of armament on the RAN's existing and planned smaller vessels is a key vulnerability and they or their replacements would require weapon and sensor enhancements for combat operations in the littoral.[56]

For the third time the RAN has a trio of amphibious ships. The Landing Helicopter Docks (LHDs) *Adelaide* and *Canberra* are a product of close development in marrying naval and land force requirements. For example, one driver for the size of the LHDs was the requirement to provide a simultaneous company helicopter lift with six landing spots.[57] Another aspect of the concept of operations was for the ships to be supported by a dedicated sea lift ship and this capability is being fulfilled by the Landing Ship Dock *Choules* which was acquired from the UK in 2011. The LHDs and LSD have proven their worth on numerous occasions in disaster relief operations, including most recently as part of Operation Tonga Assist in 2022 following the underwater volcanic eruption and subsequent tsunami.

The challenge with the RAN's amphibious capabilities in the littoral is their vulnerability. This is a challenge true of all amphibious capabilities, particularly during the phase of conducting amphibious operations, but both the LHDs and the LSD are particularly lightly armed when compared to international counterparts. The defensive systems on the LHDs include:

- Anti-Torpedo Towed Defence System (Nixie),
- Four 25 mm Typhoon remote weapons systems placed in each corner of the flight deck,
- Six 12.7 mm machine guns, and
- Nulka missile decoy.[58]

Whilst *Choules* (LSD) is armed with a Phalanx Close in Weapons System (CIWS),[59] this provides only a point defence capability against incoming sub-sonic missile threats, leaving *Choules* still highly vulnerable. By comparison, the US *Wasp* class amphibious ship is armed with two Rolling Airframe

Missile (RAM) launchers for point defence, two NATO sea sparrow medium-range surface to air launchers, two phalanx CIWS and seven twin 12.7 mm machine guns,[60] and the *America* class has a similar armament to the *Wasp.* The vulnerability of the RAN's amphibious vessels limits their potential employment in the littoral, where they are unlikely to be risked in a conflict scenario without the ADF and its allies having secured localised sea and air control - noting that in littoral warfare effective sea control also requires land control of coastal areas,[61] and can only be acquired through co-ordination of both maritime and land forces.[62] This may transition to sea denial, if these capabilities are being operated within Australian littorals as opposed to projected into Southeast Asia or the Pacific.

The RAN's surface combatant fleet consisting of eight *Anzac* class frigates and three *Hobart* class destroyers, are capable of operating in the littoral. Indeed, the *Anzac* frigates were originally conceived to operate in the sea-air gap in northern Australia as detailed in the 1987 Defence White Paper. The selection of the 5-inch gun, rather than the originally proposed 76mm, was to allow the frigates to conduct NGS.[63] For their part, the *Hobart* class destroyers' design is of Spanish origin. The ship was designed to provide air defence of the Spanish naval task group centred on its flagship the *Juan Carlos* amphibious assault ship.

Despite this heritage there are limitations in the littoral. Both of the RAN's types of surface major combatants presently lack the ability to engage targets ashore with land attack missiles, however, the 2022 announcement of the acquisition of the Tomahawk missile will address this in the long term for the *Hobart* class.[64]

Following the end of the Cold War, there has been a trend amongst global navies to transition their maritime strategies and operational concepts to littoral warfare, with subsequent resultant changes in trends in capability design. Notably, a few years after the Cold War, the USN shifted its strategic focus from 'open water warfare on the sea, to littoral warfare from the sea'.[65] The increasing focus on littoral warfare has led to a number of global capability trends in ship design, including the proliferation of offshore patrol vessels (OPVs), corvettes and the US *Freedom* and *Independence* classes of US Littoral Combat Ships (LCS). This global trend in the acquisition of smaller, more manoeuvrable vessels was driven by a number of key factors that remain relevant today, including:

- The recognition of the importance of the littoral;
- The limited number of navies with real blue water capabilities following the end of the Cold War;
- The need for cost and personnel savings in a number of navies following the Cold War;
- Advances in technology that made larger combatants more vulnerable.

The proliferation of smaller ships including OPVs and the LCS have sparked significant debate about the trade-off for size being armament and survivability.[66] Conceptualised during a period where both the US and RAN conceived of littoral warfighting in the context of recent operations in the Middle East and the Global War on Terror (GWOT), this led to a focus on constabulary operations and ship design to combat an IRGCN like small boat threat. With tensions between the US and China continuing to rise, the requirements of such platforms now seem to be undergoing a much-needed rethink to address the issues of armament and survivability. This has in part prompted the USN's project to acquire the *Constellation* class frigate.[67]

Photo: Iranian Revolutionary Guard Corps Navy vessels approaching a Coalition warship in the Arabian Gulf Photo credit: US CENTCOM.

Whilst the amphibious and surface combatant fleet detailed above make up the bulk of the RAN's littoral capabilities, there are a number of other capabilities worth highlighting. These include the RAN's Rapid Environmental Assessment capability, hydrographic, clearance diving and mine counter measures capabilities, all of which play key roles in littoral warfare.

Littoral Concepts

When it comes to operating concepts in the littoral, much of the RAN's doctrine centres on amphibious operating concepts including Ship to Objective Manoeuvre (STOM), littoral manoeuvre and Sea-Basing.[68] AMD outlines a number of key concepts that 'underpin' amphibious operations. Whilst they are linked to one subset of littoral warfare - amphibious warfare - a number of these core concepts are scalable to littoral warfare in the main. These core concepts include:

- Littoral Manoeuvre – 'the use of the littoral as an operational manoeuvre space from which a sea-based joint amphibious force can threaten, or apply and sustain, force ashore'.[69]
- Ship to Objective Manoeuvre (STOM) – 'projecting combined-arms forces by air and surface directly to critical operational objectives, dislocating adversaries in space and time'.[70]
- Distributed Manoeuvre – 'discrete tactical activities in separate, possibly non-contiguous locations, throughout the amphibious objective area'.[71]
- Sea-Basing – 'In amphibious operations, a technique of basing certain land force support functions aboard ship which decreases shore-based presence'.[72]
- Land-Strike operations.[73]

Operational concepts such as distributed basing and land strike operations expand well beyond amphibious operations, extending to concepts of general littoral operations.

Littoral Manoeuvre

Whilst the 2010 AMD may be somewhat dated, in the absence of a more recent document it still provides the bedrock of the ADF's maritime doctrine. Several the traditional littoral warfare concepts outlined in the 2010 AMD have gained renewed prominence since the release of the DSR. The DSR particularly highlights the importance of littoral manoeuvre to the ADF's strategy, stating that the 'Australia's Army must be transformed and optimised for littoral manoeuvre operations by sea, land and air from Australia'.[74] The relevance of littoral manoeuvre under Australia's DSR is further reinforced by the acceleration of Land 8170, the project addressing Army's amphibious requirements.

AMD takes a narrow view of littoral manoeuvre, choosing to define it through the lens of amphibious operations. UK naval doctrine describes littoral manoeuvre as:

> *'Exploiting the access and freedom provided by the sea as a basis for operational manoeuvre from which a sea-based amphibious force can influence situations, decisions and events in the littoral regions of the world'.*[75]

Whilst still referencing the amphibious context, this definition takes a more expansive view that appears to be more in line with the DSR's thinking on Army littoral manoeuvre. Littoral manoeuvre has been key to AMD for many years, with the 2010 AMD describing 'littoral manoeuvre [as] fundamental to most Australian operations in crisis and conflict'.[76] The Force Structure Plan (FSP) and DSR through the establishment of LAND 8170 and its subsequent acceleration have placed Army as central to supporting littoral manoeuvre.

Anti-Access / Area Denial (A2AD)

The recently released DSR references the concept of Anti-Access, Area-Denial (A2AD). Although not contained within the 2010 AMD or the 2017 Australian Maritime Operations (AMO) the A2AD concept is in part a littoral concept. Typically associated with Chinese strategies to secure the first island chain,[77] elements of the concept of A2AD have a direct impact on the littoral. In the littoral, its premise relies on employing capabilities such as surface to surface missiles, sea mines, land-based aircraft, SSKs, midget submarines, fast attack craft (FAC), and fast inshore attack craft (FIAC),[78] to deny an adversary access to a certain area, and should they gain access, limit their freedom of manoeuvre. This, in its practical application, involves contested littoral operations.[79]

The DSR put A2AD and subsequently its littoral elements front and centre in its recommended strategy of denial, stating:

> *'A strategy of denial for the ADF must focus on the development of anti-access / area denial capabilities (A2AD). Anti-access capabilities are usually long-range and designed to detect an adversary and prevent an advancing adversary from entering an operational area. Area-denial capabilities are shorter range and designed to limit an adversary's freedom of action within a*

defined operational area. A2AD is often synonymous with long-range strike capability, undersea warfare and surface-to-air missiles'.[80]

A2AD's centrality to the DSR's recommended strategy of denial, alongside other littoral concepts, will likely govern how ADF capabilities are designed and operated into the future, further demonstrating a resurgent focus on littoral warfare for the ADF and RAN.

The littoral concept of distributed manoeuvre is also addressed in the DSR's strategy of denial, albeit implicitly. The 2010 AMD references distributed operations as a core concept of Australia's amphibious doctrine,[81] but its centrality to littoral operations goes well beyond is role in amphibious warfare. The 2010 AMD defines distributed operations as:

'An operational approach that enables influence over larger areas through spatially separated small units, empowered to call for and direct fires, and to receive and use real-time and direct intelligence, surveillance and reconnaissance'.[82]

Whilst the 2010 AMD does not specifically define distributed manoeuvre, the 2017 AMO defines distributed manoeuvre as:

'Discrete tactical activities in separate, possibly non-contiguous locations, throughout the amphibious objective area. It enables simultaneous synchronised actions, but places a greater demand on command and control, fire support, tactical mobility and sustainment'.[83]

The 2010 AMD and its subordinate 2017 AMO view the concept of distributed manoeuvre through an amphibious lens, but it has greater applicability than just in a purely amphibious context and is linked to the concept of distributed lethality. Distributed manoeuvre allows for multi-axis offensive operations against shore targets, whilst complicating the targeting solution for forces ashore. The 2017 AMO also references the concept of distributed lethality, defining it as:

'Instead of concentrating forces to engage an adversary and overwhelm them this concept proposes the creation of smaller offensive and adaptive force packages comprised of surface action groups with a variety of support elements. These would be dispersed and operate across a wide region to confound adversary locating and targeting while introducing a threat to their sea lines of communication'.[84]

This notion of distributed lethality has evolved since the 2017 AMO into concepts such as 'mosaic warfare'.[85] Applicable to a wider problem set than just the littoral,

'Mosaic warfare places a premium on seeing battle as an emergent, complex system, and using low-cost unmanned swarming formations alongside other electronic and cyber effects to overwhelm adversaries'.[86]

Mosaic warfare could have dramatic implications for littoral operations as it seeks to embrace distributed lethality at scale. Networked autonomous uncrewed capabilities at mass assisted by artificial intelligence and effects such as cyber could have a significant impact on future littoral operations, should the technology evolve.

Whilst the definitions listed above allow for distinction between distributed operations, distributed manoeuvre and distributed lethality, when lifted above the lens of amphibious operations they lend themselves to a combined littoral operations concept of distributed operations designed at complicating an adversary's targeting calculus in the littoral.

In the DSR's discussion of the maritime domain, it provides the following commentary with respect to the structure of the surface fleet, stating that it 'requires the acquisition of a contemporary optimal mix of Tier 1 and Tier 2 surface combatants, consistent with a strategy of a larger number of smaller surface vessels'.[87] This structural conversation not only supports the centrality of the littoral concepts to the DSR's strategy of denial, but also links it to the requirements to be able to have a subset of the fleet designed to execute distributed littoral operations.

Key to all of these concepts of littoral operations is robust command and control, effective communications capabilities, diversity of platforms, sensors, weapons and a technological edge.[88] This must be underpinned of course by sea and air control in projected littoral operations, and at minimum requires sea and air denial if operating in the vicinity of the Australian littoral regions. The element missing from these concepts is the true integration of both land and maritime elements to effectively executed littoral operations in the maritime environment.

Part 3: Future trends and challenges

Under the section 'Conceptualising the Littoral', this paper touched upon the specific vulnerability of maritime littoral operations to technological advances, due to the proximity to land. The role uncrewed surface vessels (USVs) have played in the maritime domain of the Ukraine-Russia conflict is a key example of this. There are a number of trends that will impact both the nature, shape and execution of ADF littoral operations in the future. These trends can be broadly grouped into two categories: changing ADF capabilities; and technological advances increasing the range and vulnerability in the littoral.

Future ADF Capabilities impacting Maritime Littoral Operations

As noted, the DSR views littoral operations as central to the recommended strategy of denial. Whilst the RAN and wider ADF have a number of capabilities that are effective in the littoral, the current force structure is not optimised for this area of operations. There are clear trade-offs to be made and whilst the DSR does not focus on littoral warfare, there are clear implications that this is at least partially the case in a number of the investment priorities it puts forward for the various domains.

Although not born of the DSR, one of the most notable changes to the RAN and ADF's intended force structure with a direct bearing on littoral operations, is the acquisition of an offensive and defensive mining capability. Foreshadowed in the FSP,[89] the acquisition of a sea-mine capability will be central to the execution of the A2AD concept in the littorals, particularly, but not exclusively, in the vicinity of the Australian coastline.

A second future trend in the execution of RAN littoral operations is the optimisation of the Army for littoral manoeuvre, as foreshadowed in the DSR. This optimisation comes in two pillars. The first is the

acceleration of the Army amphibious craft under Land 8170, and the second is the acquisition of a land-based maritime strike capability for the Army. Army's acquisition of High Mobility Artillery Rocket System (HIMARs) combined with Precision Strike Missile (PRsM) will provide this capability. This capability may be further enhanced under Land 4100, the project exploring land-based maritime strike for Army, which could acquire Naval Strike Missile (NSM) which the RAN plans to roll out on its *Anzac* and *Hobart* class vessels.

These capabilities will enable the Army to project force from ashore into the littorals, a clear increase in the ADF's littoral warfare capability. Effective integration of these two capabilities into the RAN's existing littoral warfare operating concepts will require strides to be made towards the transition from a joint to an integrated force as articulated in the DSR.

Successful integration of the Army's land-based maritime strike capability will require commonality of targeting processes and procedures, and effective communication between platforms at sea and ashore with a need for commonality of systems. Beyond the technical requirements, it will require a greater cross-pollination of littoral operational concepts across all domains, and particularly an understanding amongst RAN and Army personnel of how these concepts intersect and complement each other. For the effective integration of these capabilities into what has historically been a predominantly RAN dominated sphere of warfare, a common doctrine and understanding will need to be developed. Whilst this discussion is predominantly focused on land and maritime capabilities, it must be acknowledged that successful future littoral operational concepts will need to incorporate integration of all domains. Development of an operational warfighting concept for the littorals, akin to concepts such as the US Navy and Marine Corps' 2017 concept of 'Littoral Operations in a Contested Environment (LOCE)',[90] will need to be developed.

The integration of uncrewed surface vehicles (USVs) and Uncrewed Underwater Vehicles (UUVs) is also likely to be a key trend in RAN littoral operations into the future and central to effective employment of modern concepts of distributed operations. The future importance of uncrewed capabilities is clearly articulated in the DSR and is evident in the RAN's current development focus.

The RAN has acquired and is undertaking testing of a number of uncrewed capabilities including through the acquisition of five Bluebottle USVs with an intelligence surveillance and reconnaissance (ISR) capability. The RAN is reportedly also working with Austal on a patrol boat autonomy trial. The former HMAS *Maitland* will be renamed *Sentinel* and refurbished to allow for autonomous and remote operations. The RAN has also acquired and tested a maritime tactical systems catamaran, which although it is not presently armed, its intercept speed makes it potentially ideal for port control operations. In the UUV space, the RAN is experimenting with the 'Ghost Shark', an autonomous robotic undersea warfare vehicle.[91]

The primary roles that uncrewed surface vessels will likely play in the littoral include ISR, mine countermeasures (MCM), and as armed force protection boats. Whilst the RAN is still at the embryonic stage in terms of research into and development of these capabilities, clear trends for littoral operations can be drawn from a number of navies that are presently more advanced in this space. Both Israel and Turkey have produced armed versions of reconnaissance craft, with clear roles for port security.[92] A number of countries have explored the role of USVs in the littoral, most notably the US Navy, which has

established Task Force (TF) 59 based out of Bahrain and operating both in the Arabian Gulf and Red Sea. Predominantly focused on ISR, uncrewed capabilities provide an advantage in differentiating between large numbers of contacts in these congested waterways, providing target discrimination at low cost, aiming to address one of the most significant challenges for naval operations in the littoral.

Emerging trends in littoral operations

Littoral operations are heavily influenced by technological advancements and there are consequently a number of trends that will influence future littoral operations. The development and acquisition of USVs and UUVs as identified above is a key trend that will influence future littoral operations. This trend will further increase the vulnerability in littoral operations of capabilities designed for blue water naval operations as has been seen in the recent Ukrainian engagements of the Russian Black Sea Fleet.[93]

Photo: 2022 image of a Ukrainian uncrewed surface vessel. Photo Credit: BBC

Army's acquisition of HIMARs with PrSM is representative of a broader trend in the increased proliferation of land-based maritime strike. This proliferation, alongside developments in the speed, manoeuvrability, and profiles of these missiles further exacerbates the vulnerability of large ships operating in the littorals. The increasing range of land-based maritime strike capabilities, coupled with combat UAV operations are also evolving the geographical range of littoral operations by increasing the range at which 'areas to seaward of the coast which are susceptible to influence or support from the land'.[94]

Like all operations, littoral operations are also susceptible to trends in the proliferation of cyber capabilities and vulnerabilities, the implications of space reliance, and the increasing contestability of space. The potential interference with ship's navigation and targeting systems through cyber-attack or space denial are however amplified in the littoral, which is often characterised by restricted navigable waters and increased vulnerability to attack from shore-based threats.

Conclusion

Littoral operations have always represented the most challenging elements of naval warfare. Since its inception, the RAN has had a long history of undertaking littoral operations spanning the full spectrum of peace and conflict. This experience has stretched from the AN&MEF formed to occupy German New Guinea in War War I, through the 'Tobruk Ferry' runs in World War II, patrols of the Malacca and Singapore Straits during the Malaya Emergency and Confrontation, to the execution of '5-inch Friday' on the Al Faw peninsula by *Anzac* during the Iraq War.

Through these experiences, amongst numerous other operations, the RAN has learnt significant lessons about the importance of communication and co-ordination in littoral warfare and the requirement for forces designed to meet this particular subset of naval warfare. Effective littoral operations have always required close coordination between services (Joint) and allies and partners (Combined) as evidenced by the effective relationships between then Captain Hec Waller and his Army and Air Force counterparts during the execution of the Tobruk Ferry run in World War II, or sadly demonstrated by the deficiencies in USN-RAN interoperability at the Battle of Salvo Island that resulted in the loss of a number of ships, including *Canberra.*

Whilst littoral operations, by their geographically constrained nature, have always been challenging, these challenges have been further amplified by a number of technological trends including the proliferation of land-based anti-ship cruise missiles, uncrewed capabilities and the evolution of fast inshore-attack craft. This has been evidenced in recent years by the asymmetric and disproportionate threats posed by non-conventional military forces such as the IRGCN in the Arabian Gulf, the Houthis in the Red Sea, and Ukrainian forces in the Black Sea.

In many ways, the nature of the threats in the littoral regions and their associated ranges are expanding the definitions of what littoral operations are, beyond geographical constraints of the coast. The range of threats in the littoral regions is also coupled with technological advances across all domains that further emphasise the traditional vulnerabilities of conventional naval assets in the littorals, thereby challenging traditional littoral operating concepts. Maritime operations in the Australian region will be littoral, and the examples from Australia's experiences in operations from peacetime to conflict highlighted in Part 1 of this paper demonstrate that the ADF must focus on concepts that will ensure effective execution of littoral operations by an integrated force.

This is clearly evident in the thinking behind the DSR that puts the centrality of the littoral concepts at its heart and will increasingly see the ADF's focused force designed around littoral operations. Coupled with the evolution of threats in the littoral has been the development of joint capabilities. Although littoral warfare has never been only the domain of one service, the increasing range and capabilities of all three services in the littoral requires a new level of integration. This is particularly evident with the RAN and Australian Army, where advances in maritime based land-strike and land-based maritime strike

capabilities in both services, will require a higher degree of commonality of systems and processes than seen before, which echoes the DSRs call for the need for an integrated force.

Should the current geo-strategic challenges continue to evolve unabated, the RAN can expect to increasingly operate in a contested littoral environment, as it has been called upon to do throughout its history. In order to do this effectively, it will need to consider the specific force design and doctrinal requirements of littoral warfare, and how to effectively integrate with the other services. In this regard, there is much to learn from the RAN's history.

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