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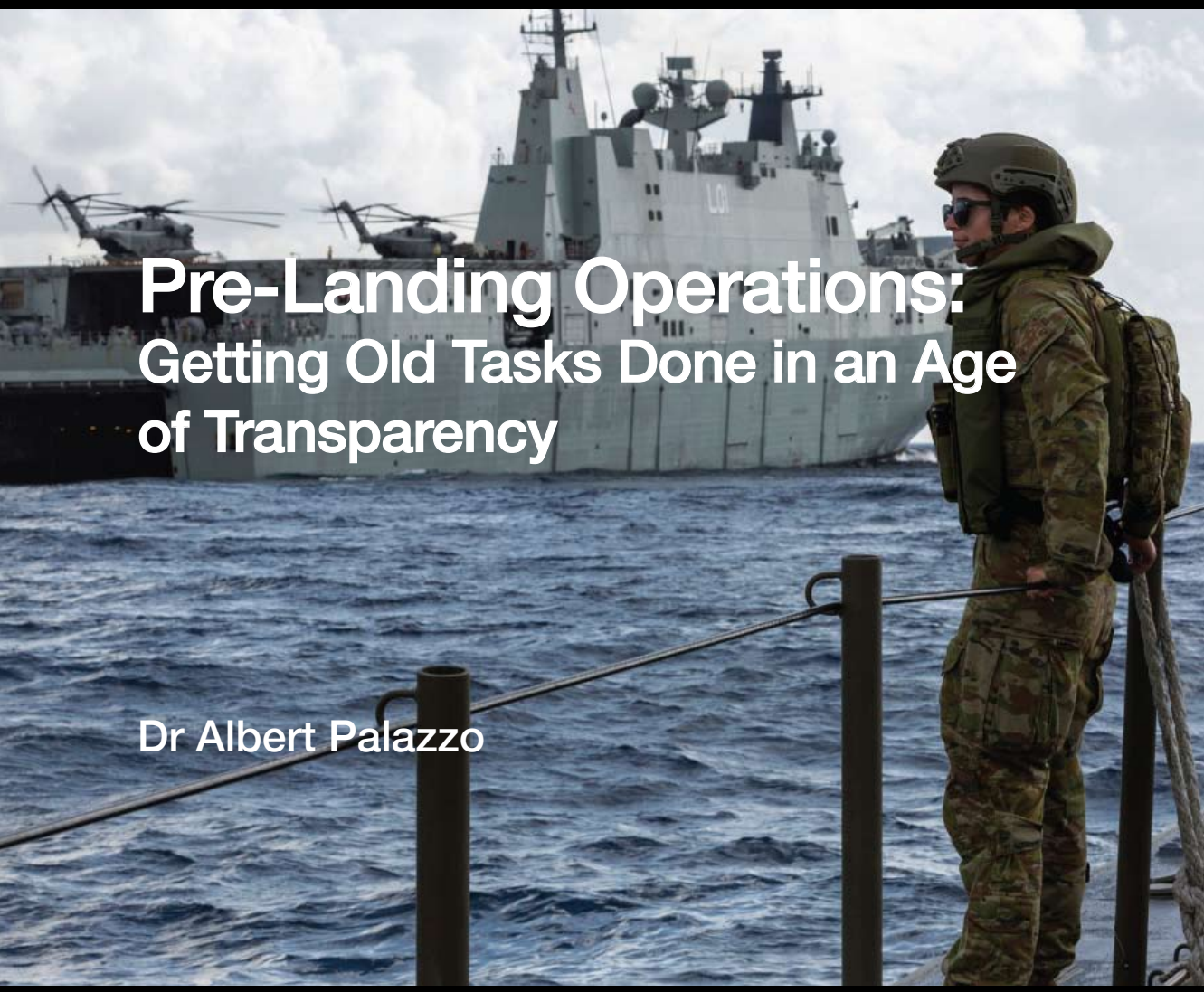

Pre-Landing Operations: Getting Old Tasks Done in an Age of Transparency

Dr Albert Palazzo

Serving our Nation

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This paper is part of the Operational Development Series and is published in line with the Chief of Army's primary task for AARC: to foster knowledge and debate about the profession of arms. Since warfare began, military leaders have considered what they do and studied the theories behind their actions. Today we study many of these thinkers and writers from the past while considering how their thinking fits into the modern construct of warfare both now and into the future. The unique challenges of modern conflict prompt the military thinkers of today to study the theory of warfare with renewed enthusiasm. This paper, and the others in this series, will add significantly to the body of knowledge in the area of operational development.

Figure 2. Soldiers of the Amphibious Beach Team prepare to support elements coming ashore at Freshwater Beach in Shoalwater Bay Training Area, during Exercise Hamel 2018. (Image: DoD)

Contents

List of Illustrations vii

Pre-Landing Tasks: Getting Old Things Done in an Age of Transparency - Introduction 1

Pre-Landing Tasks: A Definition 5

Integrating Pre-landing Tasks with Operational Requirements 11

Observations 33

Conclusion 47

List of Illustrations

Fig. 1 An Australian Soldier watches a Royal Australian Navy LHD embark US Marine Corps helicopters .....Front Cover

Fig. 2 Soldiers of the Amphibious Beach Team on Exercise Hamel 2018..... iv

Fig. 3 2 RAR soldiers on an LCM en route to the beach.....4

Fig. 4. Royal Marine Commandos head for Blue Beach, San Carlos during the Falkland Islands campaign, 1982 7

Fig. 5. Scenes from the Bayeux Tapestry depicting William the Conqueror's amphibious landing 8

Fig. 6. A US Marine Corps MV-22 Osprey 12

Fig. 7. A US Marine Corps Landing Craft - Air Cushion vehicle 12

Fig. 8. 2 RAR troops wade ashore during an amphibious lodgment during Exercise Talisman Saber 17.....13

Fig. 9. Australian Army CH-47 and MRH90 aircraft aboard a Navy LHD.....14

Fig. 10. An Australian Army Black Hawk helicopter approaches HMAS *Manoora* to land.....16

Fig. 11. A depiction of Julius Caesar's landing in Britain.....17

Fig. 12. A painting of General Wolfe's troops scaling the Heights of Abraham to capture Quebec City 20

Fig. 13. US Navy Underwater Demolition Team in training.....21

Fig. 14. The scheme of manoeuvre for the capture of Lae 25

Fig. 15. Troops of the 503 Parachute Infantry Regiment jump into the Markham Valley to capture the Nadzab airfield 25

Fig. 16. A small reconnaissance team about to depart the beach 26

Fig. 17. HMAS *Warramunga* firing its 5 inch gun 28

Fig. 18. An aerial image of the landing site for the Porton Plantation operation in Bougainville 30

Fig. 19. Australian artillery was critical to the rescue of troops pinned down during the withdrawal from Porton Plantation 31

Fig. 20. The minesweeper HMAS *Yarra* is dwarfed by HMAS *Canberra* 34

Fig. 21. US Paratroops from 25th Infantry Division jump into Exercise Talisman Saber 2017 after a non-stop flight from Alaska 39

Fig. 22. An RQ-7 Shadow 200 unmanned aerial vehicle is prepared for take off 42

Fig. 23. A map depicting the supporting deception operations on D-Day 44

Fig. 24. The landing craft of an LHD conduct training in Tonga 45

Fig. 25. US marines are delivered to the flight deck to board an Australian Navy MRH90 for an insertion ashore 46

Fig. 26. The Commander Land Force and Commander Amphibious Task Group discuss options 50

Fig. 27. A small boat party from 2 RAR head to shore during a recent exercise 53

Figure 3. Soldiers from 2nd Battalion, Royal Australian Regiment transit to the beach in one of HMAS Canberra's *landing craft during Exercise Talisman Saber 2017. (Image: DoD)*

Pre-Landing Operations:
Getting Old Tasks Done in an Age of Transparency

Dr Albert Palazzo

Introduction

Australia is in the midst of what some have described as an Amphibious Renaissance.[1] Not since the Second World War has the Royal Australian Navy had an amphibious capability of the scale provided by the new Canberra class Landing Helicopter Dock (LHD) vessels: HMA Ships *Canberra* and *Adelaide*. The Australian Army too is improving its amphibious clout, most evidently by its re-roling of 2nd Battalion, the Royal Australian Regiment (2 RAR) from a line infantry unit to a specialist pre-landing force.[2] Amphibious doctrine—Army and joint—as well as amphibious concepts continue to advance. A lot is happening, and with time and further investment the ADF will again have an amphibious capability whose inadequacy was first noticed in 1987 during Operation Morris Dance and further underscored during the East Timor Intervention of 1999.[3] It has been a long time coming.

Australia's timing in deciding to improve its amphibious capability could not be more problematic, however. As Australia seeks to become more proficient at amphibious operations, recent technological advancements are providing potential adversaries with more effective weapons that will make what is already war's hardest mission even more difficult and dangerous.

Anti/access and area denial (A2AD) platforms are enabling regional powers to create killing zones extending hundreds if not thousands of kilometres out to sea, while state-of-the-art sensors can observe a fleet's approach from well beyond the range at which an invader can launch its landing force. In combination, sensors and anti-ship missiles will create what is effectively a maritime no man's land which can be crossed only at what may prove a prohibitive cost.[4] China has been the world leader in implementing an A2AD system but the entry point for these technologies is lowering rapidly, placing such weapons within the reach of lesser states. In fact, in 2016 approximately 80 countries had access to these systems and over 22 had the ability to manufacture them.[5]

Amphibious operations have always been a complex and hazardous undertaking, even for the most powerful of states. In 1588, for example, Europe's great power of the time, Spain, failed spectacularly in its attempt to invade England. Today, the growing proficiency of A2AD systems promises to redouble the challenge of projecting a land force onto a hostile shore. No state is yet to conceive of a reasonable way to cross the ship-killing zone and come within the range from which to make an amphibious landing. Of course, no one has tried, the last major effort being the British landing on the Falkland Islands during its 1982 war with Argentina. Though a success, the operation still resulted in the loss of six British ships.[6]

Clearly the question of how to conduct an amphibious operation under current conditions is a far-reaching one. To make the remit more manageable, this paper will examine just one small, but vital, component of an amphibious operation: pre-landing tasks. The emphasis of this analysis is on amphibious operations against a hostile shore, although most of the observations made here have relevance for other types of tasks such as a non-combatant evacuation operation (NEO) and humanitarian aid and disaster relief (HADR) missions. If done well the completion of these tasks makes success possible, whereas without them, or if done poorly, no landing can succeed. This paper will identify the required tasks and look to history to explain how they were done in the past, before offering insights on how they could be conducted in a battle space watched by enemy sensors and dominated by hostile anti-ship missiles.

Figure 4. Landing craft from HMS **Fearless** *with Royal Marine Commandos aboard make their way to San Carlos' Blue Beach on 21 May, 1982. (© Crown copyright. IWM(FKD 392))*

Figure 5. William the Conqueror commenced his campaign in Britain with an amphibious landing at a beach in Pevensey. Here, scenes from the Bayeux Tapestry show the critical Channel crossing; the landing; and then William's troops moving quickly inland to secure food. The Latin says: '...venit ad Pevensae. Hic exeunt caballi de navibus. Et hic milites festina verunt hestinga ut cibum raperentur.' In English: '...came to Pevensey. Here the horses leave the boats. And here soldiers rush towards Hastings to seize food.' (Images: Public Domain)

Pre-Landing Operations: A Definition

Pre-landing operations are an essential part of any amphibious landing. They cannot be avoided. Without them, any amphibious landing would almost certainly fail. Their requirement can be summarised as being, 'to create the best possible circumstances for the actual landing by isolating the objective area from sources of help, obtaining information that will help inform the plan of assault and preparing the objective area by degrading the enemy defences.'[7]

Pre-landing tasks can be divided into two categories. Those that are conducted by subordinate elements of the amphibious task force in the objective area, and supporting operations that are not a part of the amphibious task force and may be carried out in a different theatre of operations. Supporting operations tend to be undertaken at the strategic level and typically consist of actions such as strategic bombing or cyber-operations.[8] This paper will limit its focus to those pre-landing tasks that are conducted in the objective area by force elements assigned to the task force. The tasks to be performed are:

- deceiving the enemy as to one's intentions
- destruction of enemy defences
- reduction of a defender's morale

- gathering of local intelligence
- isolation of the enemy from support
- managing pre-landing tasks in the face of persistent surveillance.

While not technically a pre-landing task, control of the air and the sea still remains a vital pre-requisite. To attempt an amphibious operation without at least temporary control of the air and sea would offer the enemy extremely vulnerable and tempting targets. In the absence of a window of air and sea control, the ships of the amphibious task force would be vulnerable to interception and destruction by the enemy's air, surface and sub-surface forces.[9]

The challenge for those planning and conducting an amphibious operation is to achieve a balance between preparation and surprise. On no account can the pre-landing tasks compromise or interfere with the time or location of the main landing, for to do so would reduce the landing's chances of success. The maintenance of operational security may also necessitate the acceptance of a significant amount of collateral damage among the local civilian people. For example, in their effort to isolate the Normandy landing area during Operation Overlord from German reinforcements, Allied bombers destroyed the region's rail and road network. The bombers also killed thousands of French civilians in the process.[10]

The Challenge

It was probably only shortly after humans learned how to move upon water that the naval domain of war came into existence. From the earliest recorded history there are accounts of large-scale amphibious operations, including the Persian invasion of Greece that culminated in the Battle of Marathon in 490 BC,[11] and Caesar's landings in Britain in 55 and 54 BC.[12] Athens, one should recall, did not hesitate to project power across the Mediterranean Sea when it dispatched an invasion fleet to Sicily during its long war with Sparta.[13] From these beginnings, amphibious operations have played an essential role in the projection of force and the waging of war.

However, recent advances in sensor and anti-access technologies have made the prospect of conducting an amphibious landing in the future increasingly problematic. Some commentators now believe that this most

complex of military operations may have become too difficult to attempt under contemporary conditions.[14] Zachery Keck has gone so far as to state that were the Allies to attempt a D-Day invasion today it would fail, and that because of anti-access and area denial technologies 'we are unlikely to see an amphibious invasion anywhere near the size and scope of D-Day anytime soon.'[15] This may indeed be true, but there have been no shortage of such predictions in the past. Nor is there anything unusual in this because every change in the balance between the offence and the defence has spawned assertions that amphibious warfare is at an end.[16] Technological changes do throw up obstacles to the undertaking of an amphibious assault by providing the defence with increased strength, but if the past is any guide, technology also provides the means to counter or neutralise the defence's new found advantage.

In March 1949, for example, General Omar Bradley advised the US Congress that atomic weapons had made amphibious operations impossible.[17] With uncharacteristic poor timing he was proven wrong within 18 months when United Nations forces successfully landed at Inchon, turning the tide in the Korean War. Bradley was by no means alone in the failure of his predictive ability. Less than 40 years earlier, British Brigadier General GG Aston of the Royal Marine Artillery, while commenting on the Chilean Civil War of 1891, wrote that 'the improvement of modern weapons has rendered a landing in the face of serious opposition almost an impossible task.'[18] Similar comments were made on the landing at Gallipoli, whose lack of success suggested that a future daylight landing was 'suicide and folly.'[19] The emergence of airpower caused B H Liddell Hart to reflect that a landing on a foreign shore had become 'much more difficult, indeed almost impossible'.[20] Although the British were successful in their reclaiming of the Falkland Islands in 1982, one thoughtful conclusion was that amphibious success may no longer be obtainable when a nation as weak as Argentina was able to inflict such carnage on the Royal Navy. Researchers at RAND have also concluded that it is undeniable that even a moderately sophisticated opponent can 'complicate' power projection, and one with a full suite of A2AD capabilities might make near-land operations nearly impossible.[21] Of course, if you happen to be the defender of a coast, periodic defensive capability advancements can only be good news. Julian Corbett believed that the military advances of the late 19th Century were to England's benefit. He recognised that they had the happy effect of making his island nation's maritime defences better.[22]

Figures 6 and 7. An MV-22 Osprey of the USMC on board HMAS Canberra as part of a joint combined exercise and (below), a US Landing Craft Air Cushion (LCAC) which can take personnel and equipment rapidly from ship to shore and deposit them directly onto the upper parts of the beach. (Images: DoD)

Technological advances, it should to be mentioned, sometimes have the opposite effect and have eased the maritime invader's task. The inventions of the helicopter and the air-cushion landing craft opened much more of the world's littoral to a potential invader, whereas the V-22 Osprey extended the amphibious force's strike range well inland. The result is that the defender now has to cover much more territory, whereas the attacker has greater latitude to select a weak point at which to land.[23]

There is a pattern. Every time the defence has gained the upper hand, commentators have concluded that amphibious operations have ceased to be practical if not impossible to conduct. In every case, the challenge has been overcome, either by the invention of counter-vailing technologies or through the adaption of existing tactics and procedures to the new

environment. This is one of the most enduring facets of war - in all its forms the constant seeking of advantage by offence and defence. In the context of amphibious operations this constant quest reflects the importance of such missions. Combatants have endeavoured to invest in ways that continue to make possible the projecting of force from the sea onto the land. Australia is an island continent whose wealth is derived from overseas trade and resides in a region dominated by archipelagic nations. If Australia's view of itself is as a maritime state, it has little choice but to regain the means to conduct amphibious operations. If it does not do so, then Australia's perception of its future is as a continental state. Military practitioners may not yet have found a way to overcome a potential adversary's A2AD defence, but there is every requirement that they do so.

Figure 8. Troops wade ashore with Bushmaster PMVs following. (Image: DoD)

Figure 9. Two Australian Army CH-47F Chinook medium lift helicopters and five MRH90 Taipan tactical lift helicopters on the helispots on an LHD (Image: DoD)

Integrating Pre-landing Tasks with Operational Requirements

Since amphibious operations are likely to remain a part of the future of war, pre-landing tasks will remain a necessary precursor to any assault from the sea. These tasks are not an end in themselves. They are undertaken in order to improve the odds of success of the main landing. A land force's transition from afloat to ashore is a hazardous one. Originally, it required the mastery of two physical environments—the land and the sea—and the integration of two military cultures—the army and the navy.[24] In contemporary terminology, it is a joint operation, which now involves the incorporation of the air, cyber and other domains, and the associated and different cultures of their practitioners. The extent to which the defender is able to interfere with the land force's movement ashore or to exploit the cultural division between soldiers, sailors and others will determine if the landing is a success.

While the focus in this paper is on amphibious operations in a contested environment, the observations it makes on the pre-landing tasks that must be performed for success will also resonate for those conducting a NEO or a HADR operation. For example, the planning and threat assessment for Operation Plumbob in June 2000 benefitted greatly from the intelligence provided by the police and diplomatic teams that were already on the ground in Honiara in the Solomon Islands. A further contributing factor to the operation's success was the overwhelming force that the ADF dispatched

on the HMAS *Manoora*. While the operation's 317 soldiers, supported by 11 light armoured vehicles and four Black Hawk helicopters never left the ship, they were more than a match for any opposition. Furthermore, the Manoora was a highly visible reminder of naval power's potency. As a result the Australians were able to extract approximately 1 000 Australians and other nationals from a rapidly deteriorating security situation without any loss or escalation in violence in Honiara. Although technically a non-warfighting mission, the rebel groups in the area could have contested the Australian mission, a reminder that planning for every NEO must include the possibility of a change in the threat environment.[25]

Figure 10. An Australian Army Black Hawk approaches HMAS Manoora *to land during the early 2000s. (Image: DoD)*

This section will describe the mandatory tasks outlined above in greater detail and provide historical examples of how they have contributed to the success of amphibious assaults.

Deceiving the Enemy as to One's Intentions

Of the pre-landing tasks, deception is arguably the most important. If an invader does not get into its opponent's head so that it may sow seeds of confusion or doubt, the landing force is likely to be met by a defender that is prepared. In the Second World War the British developed what they called a 'Theory of Spoof' which was a form of doctrine on how to conduct deceptions. They coined 'spoofing' in the context of defeating the German

radar network that could provide the enemy with the information it needed to intercept Allied air and sea operations against the Continent. Spoofing could be done in two ways: by persuading him [the Germans] that 'you are either (a) where you are not, or (b) not where you are.'[26] These means remain relevant to the movements of any amphibious task force today.

Projecting a land force from the sea against a readied defence is likely to be costly and may only be possible with overwhelming offensive mass. Therefore, hitting a defended beach is only practical when the invader is very confident of success and not deterred by casualties. For example, when Caesar arrived off the British coast in 55 BC he 'found the enemy already awaiting his arrival, posted on the cliff tops and ready to deluge the shore with javelins and other missiles.' The Britons either saw the Roman fleet of 80 ships approaching or had been alerted by their kin from the continent. In either case, Caesar had made no effort to disguise his intentions or hide his sailing from Gaul. The Romans fought their way ashore, but only after sailing along the coast to find a less heavily defended beach.[27]

Figure 11. Julius Caesar conducted amphibious landings in Britain twice in the 1st century BC, the first with limited success. (Image: karacter designs)

By contrast, the Allies in the Second World War went to great lengths to confuse the Germans on the location and timing of their return to North-West Europe in June 1944. Operation Fortitude, as it was code named, was

a massive deception scheme that was years in the making and involved thousands of personnel. It represented shaping the battlespace and the enemy's mind on a grand scale. There were actually two parts to Operation Fortitude: a northern one and a southern one. The aim of ' Fortitude North' was to suggest to the Germans an invasion of Norway, whereas the goal of 'Fortitude South' was to fixate the enemy on the area around Pas de Calais in France. The Allies created mythical divisions and army groups, turned captured German agents and made it known that Lieutenant General George Patton, who the Germans assessed highly, commanded the non-existent force. The Germans took the bait and Hitler hesitated to release the armour reserves that, had they interceded promptly in Normandy, might have driven the Allies into the sea. Once D-Day took place the Allies sought to keep Operation Fortitude going for as long as possible, thereby pinning enemy divisions to stretches of the French, Belgium and Norwegian coasts rather than seeing them rush to the real fight at Normandy.[29]

Operation Mincemeat was a much smaller ploy, but one that became an almost legendary blueprint for how to confuse your opponent. It was the subject of a book, a motion picture, a play and even an episode of the '60s British comedy, the Goon Show, as well as the topic of numerous documentaries. The ruse involved the deliberate washing ashore on a Spanish beach of a British 'staff officer's' body which carried false documents indicating that the Allies' next Mediterranean landing would be in Greece, not Sicily. As the Allies expected, Spanish authorities promptly passed the remains to the Germans. The result was German and Italian reinforcements being sent to Greece.[30]

The Allies also excelled at amphibious tactical deception, and created a naval organisation dedicated to confusing the enemy as to the exact position of potential landing zones. In the US Navy, the organisation was given the name 'Beach Jumpers'. Its personnel worked from small boats that were packed with devices that could mimic the sounds and signature of the ships of an amphibious force which were poised to put troops ashore on a beach that was some distance from the actual landing area. The idea was to confuse the local commander sufficiently to hesitate in committing his reserves, thereby reducing the enemy's resistance at the actual landing beach.[31] When the Allies invaded at Salerno in September 1943 the Beach Jumpers were off the coast of Genoa at the opposite end of the Italian

Peninsula where they successfully mimicked an invasion fleet. Their goal was to pin German divisions in Northern Italy, because any delay in their move south would assist the landing force in establishing a secure lodgement.[32] In the Pacific, tactical deception techniques were also used. The US Navy raised a Beach Jumper unit for the Philippines Campaign where they employed sleight of hand techniques to confuse the enemy's radar during the landing on Luzon.[33] In the Central Pacific, decoy landings became a standard tactic, while for the planned invasion of Kyushu on the Japanese Home Islands, the United States encouraged the Japanese to 'discover' plans for an airborne landing in the island's interior. Operation Pastel's intent was to stretch the enemy's defence by increasing the amount of territory the Japanese needed to cover.[34] Deception became so accepted that the US Army raised a brigade – the 23rd Special Troops – to provide tactical deception throughout its march to Germany. These specialists ranged the length of the front and helped the Allies achieve surprise, tie up enemy resources and pin down German reinforcements.[35]

Allied deception operations in the Second World War represent the apogee of such activities, at least from the perspective of resources allocated to the task. Only their scale was unusual however, as deception has always played a critical role in the success or failure of amphibious operations. In 1759 for example, when General James Wolfe's troops scaled the cliffs leading to Quebec City, they were only able to do so because of a ruse. As their small boats navigated the St Lawrence River to the landing point, the British pretended to be a flotilla of French supply boats. The British had learned that the French were expecting a supply flotilla to pass. When French sentries challenged the British they accepted the claim that they were the scheduled vessels.[36] To further confuse the French, Wolfe arranged for visible demonstrations at other locations in order to disguise his true intention.[37] With surprise obtained, the British successfully scaled the cliffs, took the French by surprise and claimed Canada for Britain.

Figure 12. RC Woodville's painting of General Wolfe's troops scaling the Heights of Abraham to capture Quebec and claim Canada for England. This amphibious operation relied on cunning, guile and deception. (Image: Open Source)

Figure 13. Navy underwater demolitions teams - Frogmen - train to clear obstacles prior to operations in the Pacific.(Image: US DoD. Public Domain)

Clearance or Destruction of an Enemy's Physical Defences

The target of clearance or destruction tasks are any obstacles that may prevent the landing craft from reaching the shore, such as sea mines. These tasks also include the destruction or neutralisation of the enemy's ability to bring fire to bear on the landing zone. Destruction activities should also target enemy bases and logistic centres that would support the troops opposing the landing. In preparation for the landing on Iwo Jima for example, US Navy Underwater Demolition Team divers—then euphemistically referred to as 'frogmen'— worked to remove underwater demolitions and mark safe channels for the landing craft. Offshore, the guns of US Navy ships pounded Japanese positions while aircraft bombarded from above.[38] A Japanese survivor of the invasion quoted from a campaign report prepared by the Japanese commander as the garrison endured the massive US bombardment. The commander, General Tadamichi Kuribayashi, wrote:

> *The power of American warships and aircraft makes every landing operation possible on whatever beachhead they like and preventing them from landing means nothing but great losses.* [39]

By the time of the Iwo Jima operation, the US had mastered the application of naval and aviation fire against anti-invasion defences. Naval gun fire is particularly powerful, not just because of the weight of the heavy shells that ships can fire, but also because of the limited ability of a defending land force to return effective fire. Reflecting on the Gallipoli campaign, General Liman von Sanders, the Head of the German Military Mission to the Ottoman Empire, commented that this was the only time in the First World War that an army had to fight a fleet. The enemy fleet, he believed, constituted 'a support of extraordinary power for the landing army.'[40]

During the interwar period, the consensus was that Gallipoli showed that the defence was simply too powerful for a landing to succeed.[41] Only one military organisation, the United States Marine Corps, reached a different conclusion and incorporated lessons from Gallipoli in its doctrine.[42] The Marines were proved right: despite the great advantage of a good defence', only a handful of amphibious assaults failed during the Second World War. This is an oddity, for which the Soviet General, S G Gorshkov, provides an explanation. The success of amphibious operations in the Second World War was:

> *… due to the considerable increase in the offensive possibilities of the forces of the fleets, their increased capacity to break through the defence of the enemy and obtain the aims of the operation, and also the mass use of landing craft and disembarking devices.* [43]

He continues that the strength of the invasion force outstripped the capacity of the defence.[44] What Gorshkov is suggesting is that the invader must have a level of strength sufficient to overcome the inherent advantage of the defence if it is to succeed. For the invader, being strong is necessary to provide depth and redundancy, as is having a willingness to press on in the face of losses, however regrettable they may be. For example, during the Normandy landing, German naval mines sunk or damaged 43 allied ships, despite the work of 300 minesweepers. The Allies had such a quantity of shipping that they could absorb these losses without any material effect on their ability to prosecute the campaign.[45] By contrast, Admiral Woodward, during the Falkland Islands campaign was well aware of his lack of reserves, particularly of carrier-borne aviation, and keeping these ships safe dominated his thinking.[46]

The consequences for the landing force can be severe when it has not eliminated obstacles or neutralised the enemy defences. While transiting the Oslo Fjord during the German invasion of Norway, the heavy cruiser Blücher came under fire from the guns and torpedos of the Oscarborg Fortress. Hit repeatedly and holed by a torpedo the Blücher sank with a heavy loss of life.[47] Nor is the risk of losses a new reality. During the 1564 siege of Malta, a flotilla of Ottoman boats was stopped by an underwater palisade of stakes. The boats were then destroyed by fire from the shore and the crews killed by knife-bearing swimmers. Another Ottoman sea movement was sunk by a battery of guns whose position the defenders, the Knights of St John, had successfully concealed.[48] After a four-month siege the Ottomans gave up. Another example is provided by the battle for Wake Island at the onset of the war in the Pacific during the Second World War. The island's small but feisty US Marine garrison repelled the Japanese when the invasion fleet proved no match for the defender's coastal guns. The Japanese failure at Wake was one of the few instances in the Second World War where the invader was unsuccessful. The main problem was the insufficient firepower of the Japanese ships and the lack of accurate intelligence on the defender's strength. The Japanese rectified both deficiencies and in a second attempt quickly forced the garrison's surrender.[49] Finally, the planned landing at Wonson during the Korean War was cancelled because United Nations minesweepers could not remove quickly enough the vast array of seaborne mines the North Koreans had planted.[50] It took the minesweepers two weeks to clear the harbour at the cost of two ships destroyed.

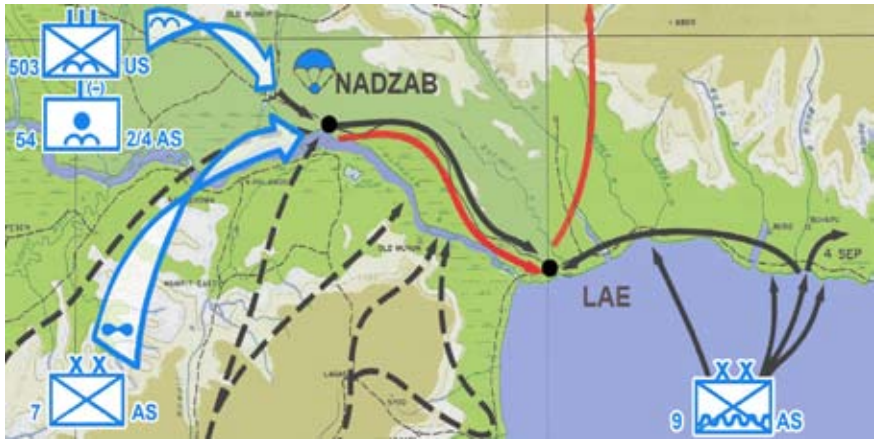
The removal of maritime obstacles is not limited to seaward approaches. Throughout the Vietnam War the Viet Cong mined and erected barricades on inland waterways to hinder riverine movement by the US and South Vietnamese small boats. Waterways provided a means to project power well into the interior of Vietnam, particularly in the road-poor Mekong Delta region. In one example the sailors of Royal Australian Navy's Clearance Diver Team – 3 were tasked with the removal of a log obstacle that the enemy had placed across the mouth of a canal in Kien Hoa province (now called Ben Tre), located in the Mekong Delta. Of course, the Viet Cong might have created the barricade to lure a clearing force into an ambush. Consequently, the divers were accompanied by a force of gunboats on the water and gunships in the air, plus infantry to man a defensive perimeter while the divers undertook the clearance.[52]

Reduction of a Defender's Morale

Ultimately, war is conducted in the mind. One of the means to weaken the resistance of an adversary's mind is through psychological warfare operations. These are actions that target the enemy soldiers' mental ability to resist, as well as to influence an opponent's non-combatant population, in order to get them to 'think and act in a way that will be to our advantage.'[53] According to the Australian Army, psychological warfare activities are those that are 'directed at enemy, friendly and neutral audiences to influence attitudes and behaviour.'[54] Therefore, psychological operations can play an important part in any plan to weaken an adversary's defensive capability prior to any battle, as war's great leaders well understood. Alexander the Great and Genghis Khan routinely spread false rumours before battle in order to affect their opponent's state of mind.[55] A more modern method of achieving influence is to disperse propaganda leaflets over the enemy's territory. On the eve of the 1991 Gulf War the US dropped leaflets with various messages onto Iraqi positions, including over one million delivered over Kuwait on a single day. The goal was to lower the enemy's will to resist by emphasising that the US-led Coalition fight was not with ordinary Iraqi soldiers but with the national government in Baghdad.[56] Similar tactics were used by the Allies throughout the Second World War. For example, the Saipan landing in 1944 was preceded by leaflet drops.[57] In fact, the aerial delivery of leaflets is almost as long as the militarisation of the air; the first known instance for which an example survives took place in October 1914 when the British dropped news leaflets over German positions.[58] With the wide ownership of smart phones and the prevalence of social media today, psychological operations will only grow in its importance and the effect it will have in the waging of future wars.

Another effective way to reduce the defender's morale is by achieving surprise. By any rational measurement, the German invasion of Norway in April 1940 should have been a disaster, not the great success it was. That a non-maritime power could project a land force across water and succeed was only possible due to surprise. Grand Admiral Eric Raeder accepted that the operation ran counter to all the lessons of naval history, but that it succeeded because the Germans caught the Norwegians—and the French and British—unawares. The effect of surprise on the defenders was not only a military one, it also paralysed the government and spread chaos, thereby impeding Norwegian decision-making and their ability to react.[59]

Another example is General George Wootten's plan for the 2nd AIF's 9th Division and its capture of Lae in 1943. Instead of a direct assault on the town, Wootten planned to land his force on the coast east of Lae beyond the range of the enemy's artillery. To assure surprise, the assault's preliminary bombardment was planned to last just six minutes. Wootten had also wanted to land at night to further enhance the element of surprise, but had been denied due to the Navy's fear of conducting such a large operation in the dark on a moonless night. Wootten's intent was to discombobulate his opponent's plan and force him to make hasty adjustments which the Australian's could then exploit.[60]



Figures 14 and 15. The capture of the Japanese base and village at Lae commenced with the parachute assault US 503rd Parachute Infantry Regiment and two gun crews from 54 Bty, 2nd/4th Field Regiment, 2nd AIF who were given a 'crash' course in parachuting along with their short-barrelled 25 pounder guns. The job of this airborne force was to capture and secure the airfield at Nadzab. They would then be followed by the 7th Division who were to be brought in by US troop transport aircraft. Meanwhile, to the east of Lae beyond the range of Japanese artillery, the 9th Division was landed by the US Navy and then both the eastern and north western attacks closed in on the Japanese defences forcing the enemy to capitulate or escape to the north. (Map adaptation by Major Conway Bown / US Dept of the Army - Public Domain)

Gathering of Local Intelligence

The importance of intelligence in war is without challenge. Solid, reliable intelligence offers commanders the opportunity to make better decisions and undermine those of their opponent. However, obtaining information on the enemy's locations and capabilities is not without its challenges, none more so than when an operation's objective requires the crossing of water.

Naturally, a competent enemy will go to great lengths to hide its dispositions from view, and the only way to learn what is needed may necessitate the insertion on the ground of small parties of troops to observe. This is not a recent requirement. Before putting his main force ashore on the Île d'Orléans during the campaign for Quebec, Wolfe landed a party of 40 Rangers to conduct a reconnaissance.[61] The Inchon planners had no information on the tides and gradients for the landing beaches.[62] To rectify this, a small team was inserted on a nearby island and by working with locals gathered information on the tides and beaches.

Figure 16. Small raiding and reconnaissance parties with night fighting equipment would be vital in gaining intelligence prior to amphibious operations. (Image: DoD)

The Australian Army has its own tradition of these activities. In the weeks preceding the Borneo landings at Tarakan and Balikpapan, observers were quietly put ashore. In fact, the first scout team at Balikpapan was put ashore by submarine two months before the landing. This was dangerous work. The

Japanese discovered the Balikpapan team's presence and a deadly game of cat and mouse ensued. The Australians eluded the enemy for weeks before the survivors were extracted.[63]

Intelligence gathering can also be conducted remotely. To build a picture of what they might face at Tarawa, US planners interviewed anyone who had lived in the Gilbert Islands, while long-range bombers conducted photographic reconnaissance missions over the atoll. The submarine USS *Nautilus* spent 18 days quietly offshore taking 2000 photographs through its periscope. Of course, that the US had broken the Japanese naval codes was an additional benefit, but such intelligence coups are not common.[64]

Of equal importance to the gathering of intelligence is the need to protect the security of one's own intentions. The enemy must not be apprised of one's plans, a sensible requirement that is not always observed. Prior to the landing at Gallipoli for example, information security by the invading force was poor. Cairo was an information sieve and the British forward base at Lemnos was very accessible to Ottoman agents and sympathisers. British newspapers published details of the forces involved. Even the selection of the landing force's name was unwise – Constantinople Expeditionary Force – which left little to the imagination. By contrast the British and French invaders had little access to knowledge on Ottoman preparations.[65]

Advances in technology have only made the securing of one's plans harder. While a defender's sensors are now of unparalleled capability, it is the spread of advanced communication devices within the civilian and business community that is the greater threat to operational security. Writing in 1910 on the effect of the introduction of submarine cables, Brigadier-General GG Aston concluded that enemy agents could report the departure of a fleet as soon as it occurred.[66] Now there is no need for a hostile agent to seek out a telegraph station to report. Instead, smart phones have merged cameras and communication devices in a single tool that is easily used by even the most inept consumer of technology. Every citizen can become an inadvertent agent of a potential adversary by the unconsidered postings of photographs and announcements. Aston could only pose one solution to the advent of rapid information exchange – flood the adversary's network with misleading communications to make it 'difficult for the enemy's agents to sift the true from the false.'[67]

Figure 17. HMAS Warramunga fires its 5 inch guns. This type of gun has a range of 24 km and can fire at a maximum rate of 16 - 20 rounds per minute. This class of ship carries up to 680 rounds.

Isolation of the Enemy from Support

The isolation of the enemy is carried out by aircraft, naval gunfire support (NGS) and raids against enemy communications, logistics and shipping. In the modern era, ground based air defence is an additional requirement in order to prevent interference from enemy aircraft.[68] The largest isolation plan ever implemented was the Allied effort to cut off the Normandy landing zone from the rest of France to prevent or delay the arrival of German reinforcements. Allied aircraft wrecked communication and transport links across France and the Low Countries. Railway lines, marshalling yards, roads and bridges were hit to paralyse the German ability to move troops and supplies to Normandy. Marauding Allied aircraft were so effective that German troops could only safely move at night. Naval gunfire support from seven battleships, 23 cruisers and more than 100 destroyers added another layer of protection for the landing force.[69]

While the Normandy invasion was the pinnacle of amphibious operations, lesser efforts have also benefitted from isolating the enemy from the landing zone. During the Seven Years War between Britain and France it was

practice to station warships and guard boats around the landing beach in order to protect the transports from any interference from the enemy's warships.[70] Once ashore, the landing force depended upon the fleet to destroy the enemy's defences and to dominate the landing area by fire support from ship's cannons.[71]

Land-based artillery can also contribute its weight to the destruction and isolation of the enemy. Immediately prior to the assault on Kwajalein Atoll in the Marshall Islands, US forces seized several nearby unoccupied islets. On these they positioned field batteries to supplement the naval gun fire.[72] Whenever geography permitted, the invaders considered the pre-placement of guns. The day before the Australians landed on Tarakan, they put ashore a battery of guns on a nearby island in order to provide intimate fire support to the troops as they advanced into the island's interior.[73]

In some cases, the invader inserts troops by sea or air drop around the landing zone to delay the enemy's response. Prior to the landing in the south of France, small parties of Allied troops established road blocks on coastal and inland roads to cause chaos in the German rear area.[74] While it has proven possible to isolate the enemy physically and to cut them off from reinforcements and sustainment, recent technological developments have made cutting them off from the outside world much harder. The widespread availability of mobile phones means that the invader must accept that they will act in an environment of constant public and media attention.[75]

To conclude this section it may be helpful to provide examples of what can happen when an amphibious task force undertakes pre-landing tasks poorly or not at all. Two examples are offered, Tanga and Porton Downs. Both serve as case studies in what not to do when planning and conducting an amphibious assault.

The first failed landing of the First World War was not Gallipoli but the British Indian Army assault at Tanga on 2 November 1914 in German East Africa. Both the British land and naval force commanders were either extremely over confident or unaware of the prerequisites for a successful landing. They made no effort to gain intelligence on the enemy's dispositions, conduct reconnaissance of the terrain or isolate the German garrison from reinforcements, which continued to arrive unimpeded throughout the course

of the battle. The lack of consultation and coordination between the land and sea elements was reflected in the absence of naval gunfire support. Despite an eight to one numerical advantage the British were routed and forced to re-embark after suffering 360 killed in action. The German casualties were just 67 dead.[76]

Figure 18. The ruined jetty at Porton Plantation. The dearth of suitable landing and extraction sites forced the 31st/51st battalion into a less-than-ideal situation. (Image: AWM P02729.008)

By June 1945 Bougainville could not have been more of a backwater in the Australian war against the Japanese. However, despite its lack of significance the Australians maintained an aggressive posture as they attempted to secure the entire island from the enemy. On the island's northern end the Australian advance had bogged down where it narrowed to a width of just five kilometres. The Australian plan was to land a reinforced company of troops behind the Japanese line at Porton Plantation in order to cut-off the defenders who were to be attacked with a frontal assault. No beach survey was undertaken nor an effort made to chart the reefs that guarded the only beach in the area. Aerial reconnaissance observed Japanese fortifications around the beach but the significance of these were ignored.

During the morning darkness of 8 June, a reinforced company from 31st / 51st Battalion was put ashore at Porton. None of the landing craft could make land fall so the men waded through the warm sea to the shore even

though the boats carrying the company's heavy weapons and supplies could not reach the beach, having grounded too far off-shore. At first there was no opposition but this soon changed, and as the Japanese brought up reinforcements the intensity of their fire increased. Soon the Australians counted 15 machineguns while mortar bombs lobbed onto their position. It was only the heavy and accurate fire of the Australian artillery that held

Figure 19. A 25 pounder gun of 12 Battery, 4th Field Regiment fires at enemy positions on Porton Plantation. If not for the support of artillery, the amphibious force would have likely been wiped out as it tried to withdraw from its tenuous foothold (Image: AWM 092785)

the enemy off—one battery fired 3 700 rounds in the course of two days. On the morning of the 9th the decision was made for the Australians to withdraw. The landing craft returned to pick up the company, unfortunately, two of the packed landing craft were stranded on a reef on the way out. For two days the enemy bombarded the stricken craft with fire while the Australians attempted a rescue. It was not until the 11th that they escaped. Australian casualties in the enterprise were 23 killed and 106 wounded, a very high percentage of the force that first landed. Poor intelligence, an under appreciation of the challenge of manoeuvring assault boats through uncharted waters, a lack of landing beach options that made deception impossible and, admittedly, a degree of Australian hubris doomed the landing before it started. Had the requirements of pre-landing tasks been tested, the landing would probably never have been allowed to go ahead.[77]

Managing Pre-Landing Tasks in the Face of Persistent Surveillance

It is clear that from the beginning of amphibious warfare, pre-landing tasks have been an enduring feature of this type of operation. The challenge contemporary military planners face is being able to conduct these essential tasks in an era of persistent sensors that are capable of seeing across the electro-magnetic spectrum and thereby creating an environment of virtual transparency over an adversary's maritime approaches. Critically, these pre-landing tasks must also be performed without revealing the location and timing of the main assault. Amphibious operations already have the reputation of being war's most complex task. Under the conditions of persistent surveillance they have become even moreso.

However, all is not lost, because from the commencement of amphibious operations in the classical age the type of pre-landing tasks that must be undertaken have remained the same. Rather, what is different is the defender's ability to identify—at a much greater range than previously imagined—the movement of a maritime task force, and to target its ships with precision anti-ship strikes while the force is still well out to sea. Therefore, the task facing the contemporary amphibious planner is not as complicated as it would first appear since the types of tasks that must be undertaken are already well known and understood. Where the difficulty lies is in updating the methods for undertaking these tasks in order to counter an adversary's A2AD system. This is a question of adjusting tactics and developing and incorporating counter-vailing equipment. In a sense, the challenge facing contemporary amphibious planners is the need to reinvent the wheel. This section will suggest ways in which this can be accomplished.

In his discussion of the 1891 Chilean War, Brigadier General Aston observed that when a ship let go its cables in order to anchor, the resulting noise could be heard from miles away. He knew that once the cables were released there was no possibility of maintaining secrecy. From the anchoring point on, the main issue facing the amphibious force was speed. That is, concentrating the landing force ashore at a rate greater than that at which the enemy could concentrate its defending force to oppose it. To maintain surprise for as long as possible, Aston suggested that the landing force

transfer to small boats some miles from the shore and use steam launches to tow them to the landing point. Of course, this represented a trade-off between maintaining surprise and speed of build-up, but the need to choose a balance between competing requirements is often the case in war's complexity.[78]

In future operations there is a real risk that if you can be seen you can be killed. While Ashton's steam launches may no longer be relevant, there are other deception options available to the amphibious task force by which to achieve surprise. These include:

- increasing the detection threshold by force minimisation or stealth technology
- destroying or blinding enemy's sensor capability by kinetic, electro-magnetic pulse or cyberattack
- hiding amphibious task force movements in signal clutter
- deceiving enemy as to intentions by a concerted diplomatic and military psychological operations (psyops) campaign
- reducing enemy's sensor capability by offering multiple targets, including false ones.

By no means is this list exhaustive. The emphasis is on the enemy's sensor capability because the ability to identify and track targets is a prerequisite for any attack by the enemy's suite of fires options, at least until the amphibious task force comes within visual range. If the sensors can be blinded or confused, the coordination system made ineffective (or the human in the decision loop deceived), then the weapons are rendered useless.

The misleading of the enemy as to one's intentions is the most important of the pre-landing tasks. Its success will ensure surprise which is always of great benefit to the attacker. It also has flow-on effects to the other pre-landing tasks by facilitating the destruction of the enemy's defences since an opponent will be less able to defend the physical obstacles to the landing.

While an enemy's maritime defences can take many forms they can be broken down into two broad categories: passive and active. Passive

defences consist of structural devices including sea walls, sunken vessels, 'pill boxes' and gun positions, mines and obstructions erected in and around potential points of entry. The destruction or neutralisation of the enemy's defences has long been a mission for the guns of the fleet supporting the landing, a task now incorporating bombardment by aircraft and strikes from missiles. For example, the United States has made wide use of the sea-launched Tomahawk cruise missiles in all its recent operations.[79]

The invader also needs to suppress the enemy's active defences, particularly their ability to intervene from a distance. This necessitates the establishment of an anti-electronic counter measures (ECM) envelope and a ground-based-air-defence system over the landing area in order to repel the enemy's electronic and aircraft attacks. To a certain extent this can be a responsibility of the amphibious fleet, and the key ship in a future amphibious task force may be a specialist ECM warship such as an air warfare destroyer, not a carrier or a more traditional kinetic-focused platform. Moreover, if the landing force is to remain ashore for any length of time, or if they move inland away from sea-based ECM protection, a ground-based protective 'dome' will be required. The need to operate with ECM protection and the ability to interfere with the enemy's electronic systems will likely be an even more mission critical requirement in the future than it is now.

Figure 20. The Coastal Minehunter (MHC) HMAS Yarra*, the fourth RAN vessel to bear that name, passes in front of HMAS Canberra, a Landing Helicopter Dock (LHD) (Image: DoD)*

Perhaps the most dangerous of all passive defences are mines; anti-personnel, but principally anti-ship, although how much longer such devices will warrant the term 'passive' is unclear as active mines that can hunt their

prey become more commonplace. The removal of mines in the surf of the landing zone has long been the work of clearance divers and explosive ordnance disposal (EOD) personnel, while those at sea have been the job of minesweeping ships. Unfortunately, the art of minesweeping tends to be underappreciated. It was the failure of British and French small ships to sweep the Dardanelles strait of Ottoman mines that precipitated the landings at Gallipoli. After the loss of three capital ships to mines, the decision was made to capture Constantinople by land.[80] During the Tanker War with Iran in 1984, the US Navy was woefully unprepared for mine warfare. It not only had no minesweepers in the Persian Gulf, but no such ships available in its fleet. At one point in the conflict US Navy warships had to sail in the wake of a tanker they were tasked to protect because the tanker was the only ship in the convoy capable of surviving a hit.[81] Seven years later, during the 1991 war with Iraq, the United States-led coalition virtually lost the ability to operate in the North Arabian Sea after the Iraqi forces sowed 1 300 mines in these waters. On 18 February of that year, Iraqi mines damaged the USS *Tripoli* and the USS *Princeton*.[82] Only the bravest of admirals would be willing to take an amphibious task force into seas in which a mine threat existed, or was thought to exist. The possession of a minesweeping capability has been a prerequisite of any significant amphibious landing for over a century and the clearing of mines remains a critical pre-landing task.

Unfortunately, the time required to sweep for mines can be extensive. At Tarakan, army engineers spent an entire day under enemy observation in the mud and surf of the beach as they cut passages through the Japanese mine and obstacle field in order to allow the landing craft to reach the beach.[83] At Wonson during the Korean War the amphibious task group commander was so frustrated by the more than 3 000 mines the enemy had sown in the harbour that he exclaimed, ‘we have lost control of the seas to a nation without a navy, using pre-World War I weapons, laid by vessels that were utilized at the time of the birth of Christ.’[84]

There is no reason to expect that modern mines will be any easier to detect and remove than those that stymied the plans of earlier admirals. If anything, the task will get harder, particularly once potential adversaries adopt mines that can identify and track targets or take advantage of the proliferation of unmanned sub-surface vehicles. However, there is no doubt that minesweeping will be central to any amphibious capability.

Operations to gather intelligence, isolate the enemy and attack its morale all share a common trait: they cannot be extemporised at short notice. They require long lead times to gather the information required or to weaken the enemy's will without its commanders realising it. As Michael Howard has written: 'Deception … demands not only good security, but also good intelligence.'[85] Psyops attacks need detailed information on the nature and composition of the targeted society if they are to be effective. In summary, one needs to know what makes the enemy 'tick'. The exploitation of social media also requires a deep understanding of the enemy. As the Allies realised soon after the start of the Second World War, such activities require large, well-staffed standing organisations whose key personnel are often not traditional military personnel but ones comfortable with disruptive thinking. They can be, or even must be, civilians.

In a similar sense, the understanding of the landing zone's physical environment also requires mastery of the detail. Before the landing at Tarawa, United States intelligence personnel had no choice but to interview anyone they could locate who had knowledge of the local conditions, such as gradients of the beaches that surrounded the atoll. The utility of a database that could provide such information had not been considered before the war. With hindsight the absence of such data seems an obvious omission.

It should also be clear by now that pre-landing tasks are interrelated. None of them alone, no matter how well they are undertaken, can assure success. For example, the gathering of intelligence and the weakening of morale share the same focal point for effect: their focus is on the enemy's cognitive sphere. Even isolation from the battlefield is best seen more as a mental state than a physical one. Having the enemy look elsewhere or failing to act on the signs of your intentions are all cognitive weaknesses whose physical manifestations are a lack of action.

The discussion above brings to mind several observations that apply across all the pre-landing tasks in particular, and to the conduct of amphibious operations in general.

Observations

Observation One: Amphibious Operations Require Superiority

With few exceptions, for success in amphibious operations the invader must have a superiority advantage. In part, this is simply a product of the complexity that is inherent to amphibious operations. As amphibious operations take place at the interface between the land and the sea there are many more things that can go wrong. One way to compensate for the tyranny of friction is to have an excess of strength. In addition, there is the traditional need for superiority in the attack that military theorists have recognised. As Carl von Clausewitz has explained, 'the defensive form of warfare is intrinsically stronger than the offensive.'[86] Sun Tzu believed that the greater one's strength the better the odds of success when attacking. He observed that the aim with odds of 10 to 1 should be to surround the enemy while with only 5 to 1 one should just attack. He concludes that when the strengths of the two sides are roughly equal, only an able general can win.[87] Across Western military organisations the rule of thumb is that the attacker should enjoy a 3 to 1 force ratio, although it is not clear how the ratio is measured, and there are plenty of exceptions when the attacker has won without the benefit of such favourable odds, such as the British during the Falklands Islands War when they overcame daunting power projection challenges. Despite exceptions, it is useful to have superiority whether it is in morale, training, technology or simply numbers.

In an amphibious assault the force ratio requirements are less clear due to

the inherent complexity of the operation. The amphibious task force can use the superior manoeuvre ability of the sea to launch the land force at a defender's weak point. When Caesar attempted to land in Britain in 55 BC, the landing beach he first tried was defended. His response was to sail along the coast faster than the Britons could march and he soon found a safer, though still contested, place to land.[88] Therefore, it is possible for the invader to strike at a point that the defender has left unguarded or that is less secure if pre-landing intelligence collection is able to reveal these locations. It is also desirable for the amphibious task force to impel the defender to guard as much territory as possible, thereby assuring relative weakness everywhere. This is what the Allies forced the Germans to do through Operation Fortitude in the Second World War.

However, in the future it is not clear if seeking out a weak point at which to land or forcing the defender to disperse its forces will provide the attacker with the same benefit as it has in the past. In fact, because of the capabilities possessed by modern anti-access technologies, the defender is likely to seek to disperse its forces on its own accord. In part, the defender will disperse in order to hide its forces from the attacker's strike assets, but it will also make efficient use of the tremendous range and precision of modern anti-ship missiles. Some Chinese missiles, the Dong Feng DF-21D for example, are believed to be able to strike a ship at a range of approximately 1 500 to 2000 kilometres and can adjust their flight in response to the target's movements.[89] Such missiles are proliferating rapidly across the Indo-Pacific, meaning that few bodies of water will not be covered by these weapons.[90] Even the 'minor league' Houthi rebels were able to fire two anti-ship missiles at a US destroyer in the Red Sea.[91] Their precision also means that the firer may need to employ fewer numbers to achieve an effect—depending on the amphibious task force's interception/deflection capability. The US Marine Corps has accepted that it will have to fight to gain access to the fight (the landing).[92] Instead of the attacker being able to select a weak spot in the defence for the landing, it is the amphibious task force that may be at the disadvantage because enhanced missile ranges put ships at risk for much longer periods of time than has previously been the case.

Commentators have seen that one part of the solution is the creation of more mass. These commentators believe that the US Navy does not have

enough amphibious lift or naval gunfire support for the contemporary environment.[93] However, this is a force ratio contest that the amphibious task force cannot win. The cost of missiles is too easily borne compared to the much greater cost of a warship. Nor does the ship have to be sunk since a missile strike will render the ship unable to continue its mission. A better argument can be made for increasing vertical insertion either through more parachute-trained formations or air landing with helicopters and the V-22 Osprey.[94] Airborne insertion is faster than by sea and the time required to reach the air point of entry is much less than for a seaborne insertion, even if the ground forces delivered are lighter.The amphibious force may become the follow-on force once the airborne inserted troops have established a protective ECM 'bubble' over the selected landing zone. The Australian Army's parachute capability is currently limited to the Special Forces and there is no plan to obtain Ospreys, so this option for achieving mass with airborne troops would require significant change in the ADF's current capability acquisition priorities.

Figure 21. US Airborne troops arrive in Queensland for Exercise Talisman Saber 17 after a 14-hour journey from their base in Alaska. Coordinated use of airborne forces with amphibious operations would allow for the rapid increase of mass ashore. (Image DoD)

There may be another way to achieve mass, albeit one that is just at the point of conception. The potential of a Fourth Industrial Revolution offers a discontinuous leap in technology that if weaponised could provide a nation such as Australia with the ability to achieve the effects of mass without necessarily increasing

the size of the military or of the amphibious fleet. Advances in artificial intelligence, quantum computing, robotics, human enhancements and other emerging technologies offer the possibility of a restart in how amphibious operations are conceived and conducted.[95] Instead of the ADF seeking to wage war according to the rules of the existing Third Industrial Age, perhaps a leap forward to a different way of thinking should be attempted.

There is an additional reason why the ADF should seek a discontinuous leap in capability that embracing the Fourth Industrial Age may offer. Throughout this paper the unstated assumption has been that an amphibious assault would be the only operation that the government would call on the ADF to perform. This is probably an unrealistic assumption because the ADF would be more likely fighting on multiple fronts across multiple domains. However, the resources of the ADF are quite limited and without a larger force its ability to conduct operations on multiple fronts simultaneously is severely restricted, at least from the point of view of a Third Industrial Age contest. Therefore, the need to solve the question of mass is even more urgent as the ADF will likely have to divide its resources along multiple lines of effort.

There is one exception to the need for superiority in amphibious operations: raids. These are actions that consist of just a group of a few individuals, a small party, or even a force up to battalion size, that is put ashore to conduct a particular task and then withdraws upon its completion. The raiders may be carrying out of a pre-landing task, such as the gathering of intelligence on the enemy's defences, or it may be a complete operation on its own. Examples of non-pre-invasion raids include the sabotage of a heavy water plant In Norway and the capture of technical equipment seized from the German radar set at Bruneval in occupied France. A larger raid was the US Marine landing on the Island of Makin in mid-August 1942. The primary purpose of the raid was to reduce the Japanese ability to reinforce Guadalcanal by enticing them to divert troops to Makin. Two companies of the 2nd Raider Battalion came ashore on 17 August, wreaked havoc for most of the day and then withdrew.[96]

Observation Two: Deception and Surprise are the only Current Offsets to Mass

For a country such as Australia whose ability to generate mass is limited,

its pursuit by traditional means does not make sense. Australia can only compete in a mass-dominated arena by either fighting as a junior partner in coalition led by a great power where the coalition leader brings the required mass to the fight, or by implementing disruptive technological/tactical innovations that provide the effect of mass—or negate the enemy's mass—by other means. The former is the way Australia has fought in all its wars to date while the latter has not been attempted. This means that without the embracement of disruptive technology, the only way for Australia to compete successfully against a larger or more powerful opponent is within the limits of the employment of deception and the achievement of surprise. A variety of deception ploys have been described above and will not be repeated here. Instead, this section will focus on what enablers the ADF requires to be a successful deceiver and surpriser.

The critical entity the ADF requires to be able to deceive future adversaries in a timely fashion, or for an amphibious task force to take a defender by surprise, is a standing joint amphibious operations intelligence and deception cell or cells. In effect, this represents a standing pre-landing task organisation that has, as its key outcome the ability to conduct those tasks identified here that must precede an amphibious operation. In turn, the critical element of this organisation is the development and maintenance of a database of information that any amphibious task force would require across the region and for any type of power projection mission. The information to be collected would include, but not be limited to, the environmental characteristics of potential beach landing sites, suitability of clearings to accommodate an air landing, and the critical infrastructure that would need to be secured or destroyed. The database would also provide a critical understanding of the opportunities for exploitation in an opponent's cultural/social mindset, thereby necessitating an understanding of the social, cultural and political context of the societal group or groups inhabiting the target area.

The amphibious task force commander must have at hand all the knowledge accumulated on potential landing sites before the fleet sails. This will allow the commanders of the amphibious task force and the commander of the landing force to shift the invasion location as opportunity presents without having to consider, for example, if beach gradients and tides are within the required ranges. This is specialised work which requires a highly educated

military and civilian work force, one that cannot be generated at the last minute. It might even require specialised career paths.

In fact, a data base of such design would make some pre-landing tasks unnecessary. Any reduction in the conduct of pre-landing tasks has the flow on benefit of improving the amphibious task force's chances of achieving surprise. Once pre-landing tasks commence, the enemy has a reasonably accurate idea of where the landing will take place and will be able to respond, unless the enemy has been deceived as the Germans were by Operation Fortitude. Clearly, the fewer pre-landing tasks performed the greater the odds of the enemy being surprised.

Figure 22. The RQ-7 Shadow as used by both the Australian Army and the US Marine Corps. This unmanned aircraft uses a noisy rotary engine which can be used as part of a deception plan. (Image: DoD)

New technologies can help in the accumulation of the required information. Reconnaissance unmanned aerial vehicles (drones) can be used to survey a potential adversary's landscape in order to identify targets for a future war. Drones can also be deployed just prior to the landing, just as humans were inserted in order to gather information on the enemy's posture and to reveal any adjustments to defences. These drones could also be a part of a calculated deception plan. Somewhat less than stealthy drones, such as the RQ-7 Shadow with its noisy Wankel rotary engine, could be used for false reconnaissance sorties where it would investigate numerous possible landing points thereby disguising the intended one amongst many options.

The result would be to cause the enemy to spread its defence and planting seeds of doubt that may cause the opposition commander to hesitate in the shifting of reserves.

The other key to deception is to have one's adversaries believe what one wants them to believe. A magician might describe this as tricking an audience through illusion. For the military such magic is better known as information operations that exploit social media, cyber, intelligence or diplomatic means to achieve the objective of suggesting to the enemy what you want them to think. They may also be a result of ruses or spoofs, such as false landings at alternate sites or flooding the enemy's sensor network with extraneous data that disguise an operation's true intent. An example of this was the Allied dispersal of chaff—small slivers of tinfoil only a few inches long—from slow flying bombers. This technique, codenamed 'Window', provided false radar returns and could spoof enemy radar receivers. Operations Taxable and Glimmer were part of the deception plan for the D-Day landings and simulated two sea convoys approaching the French coast at two different locations some distance from the actual landing zone at Normandy. The false clouds were duly reported by German radar stations.[97] Other deception techniques included the dropping of dummy paratroops and the active jamming of voice and radar signals.

A successful ruse requires two ingredients. The first is the foresight to plan well in advance of the actual event one intends to hide. The second is a deep understanding of the enemy's culture. The first is the easy one as it plays to the military's strength in diligent planning. The second is much harder as it requires judgement in the soft world of the humanities and social sciences and a feel for cultural nuance. The key to the development of an ADF ruse capability is the investment in people who have a talent for deception and then giving them license to conceive of ways to play with the enemy's – or potential enemy's – mind. Such an organisation should become a part of the ADF peacetime establishment. There is no sense in waiting until the onset of war to shape a future adversary's resistance to the imposition of one's will. In fact, to wait until after the onset of hostilities will cost Australia the initiative as well as the opportunity to compensate for a lack of mass through deception and surprise.

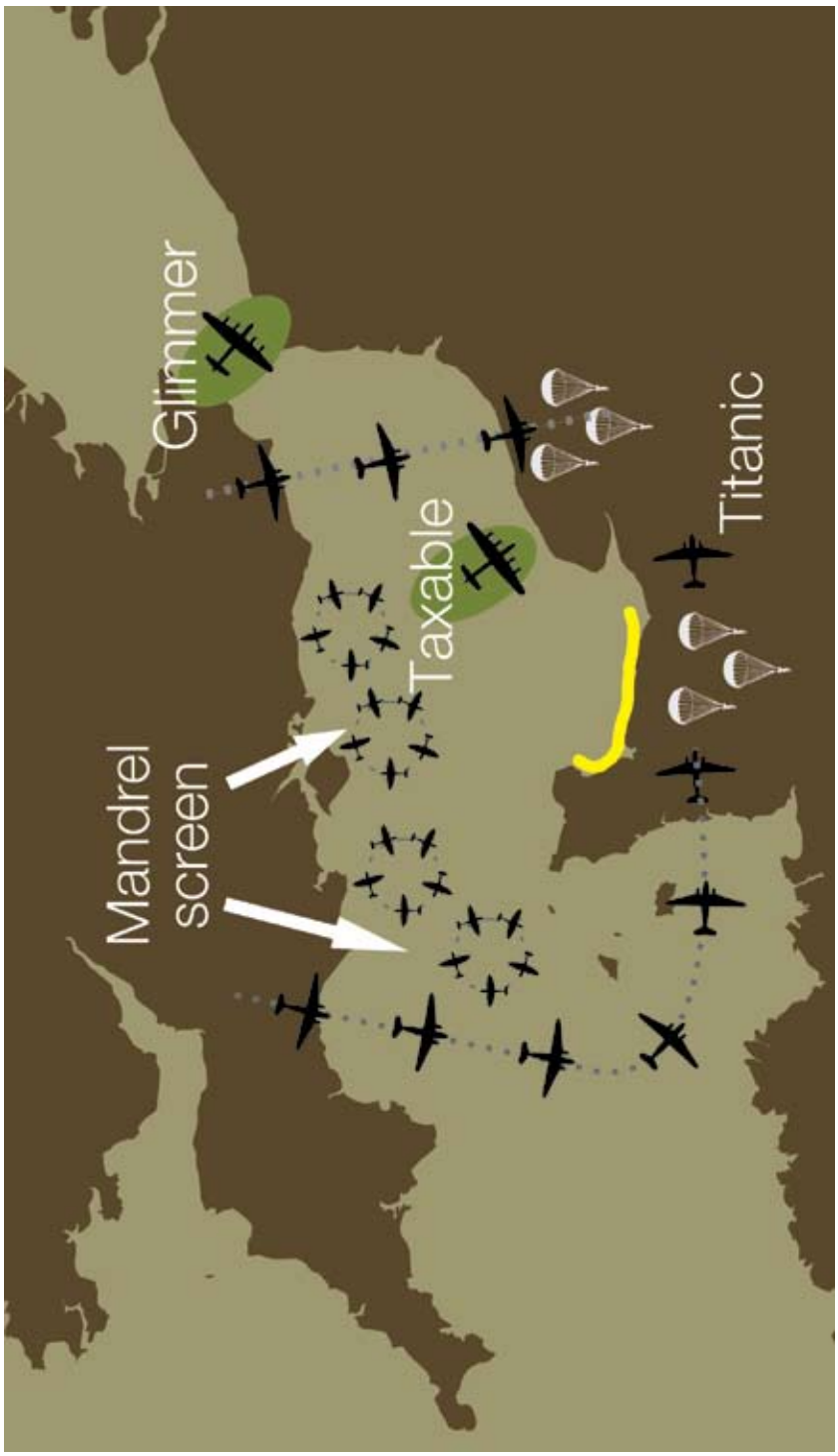


Figure 23. As the Allied forces landed on the Normandy Beaches - shown here marked in yellow - deception operations ran concurrently. Operation Titanic dropped dummy parachutists in rear areas. Aircraft fitted with the Mandrel active radar jammer created a screen to protect aerial forces and Operations Taxable and Glimmer used clouds of metallic strips - codenamed 'Window' - to create the illusion of massive armadas of ships. (Image by Major Conway Bown)

Observation Three: The Need for Speed Remains

After deception and surprise, speed is the next most important way to counter the inherent superiority of the defence as well as to compensate for an enemy's advantage in mass. As the Confederate US Civil War general Nathan Bedford Forrest said, in war it is vital to 'get there first with the most men,' and his timeless advice remains relevant for those considering the conduct of amphibious operations today.[98] The invader must build its strength ashore at a rate faster than the enemy can reinforce its defence, if it is not to be thrown back into the sea or caged in a coastal enclave and thereby suffer the fate of the Allied troops who landed at Anzio in January 1944.[99] As troops come ashore they are also at their most vulnerable. Reducing the time that they are so exposed is to the attacker's benefit.

Figure 24. HMAS Adelaide's *two Landing Craft Medium (LCM-1E) conduct training with Australian Army and Royal Tongan Marines while the LHD is alongside in Tonga. (Image: DoD)*

For Australia, the build-up phase of a landing is problematic because of the relative slowness and limited capacity of its ship-to-shore connectors that are meant to operate with the LHDs. Each LHD is able to carry no more than four landing craft in its well deck. With the designation LCM-1e (Landing Craft Medium – 1E [echo]), its maximum speed is only 13.5 knots with a full load of 110 tonnes.[100] Because of the need for the LHDs to launch the "Echoes" some distance from shore, (USMC thinking puts the distance at 65 nautical miles) in order to minimise the vulnerability of the amphibious task force to the enemy's A2AD defences, each landing craft will be able to make just one, or at most two, transits per day.[101] A rapid build-up of military power ashore is not possible with such craft, especially in a non-permissive environment. This problem is not limited to the ADF. The

US Marine Corps is similarly beset by the challenge of how to get ashore quickly, and its capability development commander has admitted that not much has changed in ship-to-shore manoeuvre since the Second World War, even with the addition of Landing Craft Air-Cushion (LCAC, ie hovercraft) vehicles.[102]

The development of a fast futuristic ship-to-shore connector is possible, but as long as it is water-bound it will be unable to approach the speeds that are possible through the air. One commentator has been bold enough to state that the future of amphibious warfare is airborne, an observation worthy of serious consideration.[103] If the ADF needs to seek an advantage, embracing airborne amphibious operations may be the most suitable option. The land force will still need an LHD-type ship with traditional landing craft to deliver its heavy equipment and stores, as well as to provide the effects that do not need to be put ashore, but in the future the need for speed may mean that the initial thrust will come by air.

Figure 25. US marines are brought up to the flight deck of HMAS Adelaide *to embark on its helicopter to be inserted ashore. (Image: DoD)*

Existing helicopter and Osprey aircraft can already move troops by air from ships directly to their objectives ashore. This is the basis of the ship-to-objective maneuver concept (STOM) that was defined some years ago.[103] However, emerging technologies offer even more potential for the rapid movement of forces from the amphibious task force to the land. Imagine a

squadron of unmanned attack drones descending on a landing zone and using their on-board fires to suppress the enemy's defences that watch over the position. Simultaneously, ship-borne guns and missiles would extend the strike perimeter to other enemy positions that could interfere with the insertion. Other drones self-destruct into the adversary's transport and communications infrastructure, bringing down bridges, littering roads with obstacles and shutting down communication nodes in order to isolate the landing zone from enemy reinforcements. As the enemy's fires are suppressed, a mass of single soldier aircraft fly the landing force onto their targets while the attack drones continue to strike targets of opportunity. Amongst the first troops to land are signallers who set up an ECM-bubble over the landing zone. Transport drones now begin to arrive to establish an aerial sustainment pipeline. Meanwhile additional troops drop by parachute and commence to attack the enemy's seaward defences from the rear in order to allow the amphibious task force to near the coast in order to commence the unloading of the invader's heavy equipment. This scenario is not as futuristic as it may seem. The police force in Dubai has recently tested a Russian-designed flying motorbike that is capable of carrying one person.[105] Its maximum speed is approximately 65 kilometres an hour with a maximum capacity of 265 kilograms.[106] Other companies are working on a variety of airborne personal transport devices, for example the Flyboard Air, a jet-powered hover board.[107] Perhaps a swarm of these devices could carry a part or even an entire landing force to its objectives at speeds that no water-based landing craft could ever achieve.

Observation Four: Achieving Operation Morris Dance

With the introduction of the LHDs into service and the transition of 2 RAR to a specialist amphibious unit, as well as the advances in maritime thinking being brought to fruition by 1st Division, the ADF has achieved the capability that it needed to undertake Operation Morris Dance in 1987. Those who sail in HMA Ships *Canberra* or *Adelaide*, or disembark in the landing craft and helicopters these ships carry, will do so in craft that look remarkably similar to equipment introduced into service either during or soon after the Second World War. This is an accomplishment that should fill all with pride – for it is a significant improvement in capability - but also with a fair degree of disappointment.

It is worth asking why has the ADF has taken 30 years to achieve a capability it needed in 1987, instead of one designed for the potential operations of the future. Australia is not alone in these circumstances. Most military organisations remain conceived, both physically and intellectually, along lines that are optimised for wars waged according to the limitations and potentials of the Third Industrial Age. The Second World War represents the apogee of that age's military art. A complex interplay of political, budgetary, social and cultural answers could be offered to explain why Australia is embracing an amphibious capability that would be instantly recognisable and employable by the nation's naval and land commanders of the Second World War. For here a simpler answer will suffice – no one asked for anything else. The ADF will receive exactly what it sought.

Will the ability to conduct a modern version of Operation Morris Dance be sufficient for an Australia and an ADF in what is now the second decade of the 21st Century? Again, the answer is complex because it depends upon circumstances that will only reveal themselves when the need to conduct an amphibious operation arises. Perhaps the planned amphibious capability is all Australia will need. However, to be so accepting is to disregard the potential for any change in the future character of war. It is also to be hoped that a future war will conveniently align its operational requirements with Australia's capability, although for one to seek comfort in either option smacks of self-delusion.

It is becoming increasingly clear – though admittedly not fully so – that human society is on the cusp of a systemic shift in how it organises itself. Technological advances which have ramifications for the physical, digital and biological organisation of society, are coming on line at an accelerating rate. 3D printing, for example, which only a few years ago was a novel idea, has quickly gained traction and threatens to displace traditional manufacturing as the main means of designing and producing goods. When this occurs the effect on the nature of work will be profound. Artificial intelligence, nano-biology, ubiquitous computing and robotics, to name just a few areas of innovation, all promise to affect the present organisation of society, much as the perfection of the steam engine by John Watt in 1775 led to the first industrial age and the industrialisation of war. Of course, this is all dependent on the existing trend lines continuing their current trajectories into the future. This represents a hazardous guess at best for there are many events –

climate change for one – that could see human development forced onto a different path.

However, no matter the form the future takes, one thing is clear: Australia is already ill-placed to succeed in war under the present conditions of precision strike and ubiquitous sensors. This situation will only worsen as wealth and power shifts from the satisfied nations of the West to the hungry ones of the East. A complacent Australia cannot win competitions with adversaries that are already much more populous but who soon will also be wealthier and will be technologically equal, if not more advanced. To maintain its present position Australia must seek a discontinuous leap in advantage in how it prepares for, and wages war. For Australia, a continued investment in Third Industrial Age capabilities may forge a potent military force, but it will be one that will still lose against a peer rival.

One further explanation is perhaps needed here. To some observers it might appear that this section has wandered a bit far from the intended focus of this paper: the ability to conduct pre-landing tasks under contemporary surveillance conditions. However, all military operations are conducted within the context of their age. When Caesar sailed from Gaul for Britain in 55 BC the military operation he conducted was played out at the nexus of Roman, Gallic and British societies. War, and its context, cannot be separated. Therefore, as the ADF and the Australian Army consider the conduct of amphibious operations in the future it is important to factor in the likely or probable future character of war, as best as can be done. Otherwise, the force delivered will be optimised for the operations of the past.

Figure 26. Commander Land Force discusses options with Commander Amphibious Task Force. Cooperation and collusion are critical between the Services' command and control elements. (Image: DoD)

Conclusion

As this paper has suggested, the necessity of pre-landing tasks is enduring. They must be conducted if success is to be possible. At Quebec, that General James Wolfe sought to deceive, surprise and outwit his opponent should not come as a surprise. War has always been such. Nor would Wolfe do otherwise if he was to find himself the Commander Land Forces in an amphibious task force given the same mission today but under modern conditions. The only difference between Wolfe at Quebec in 1759 and the present is the technology available to the defender and the attacker, and how each side interprets its uses. The tasks are the same.

This finding of continuity in pre-landing task requirements should be both comforting and troubling for the Australian Army and the ADF. It is comforting because the tasks to be done and the reasons for doing them are easily understood. That these tasks are inescapable also simplifies the thinking required by amphibious commanders and planning staffs. However, their unavoidability could also create dilemmas for the conduct of amphibious operations by the ADF as well as for the ethos of the Australian Army.

The critical shortfall Australia faces is an old one: the impossibility of generating the required mass for amphibious operations on its own. Of course, this statement is situationally dependent and there are some exceptions. The Australian and New Zealand Expeditionary Force that

sailed for the German colony of New Guinea in November 1914 to capture, among other things, the German wireless station on Rabaul, proved more than a match for its tiny garrison. But Rabaul was a minor outpost at the far reaches of Germany's imperial possessions, something no longer seen in a post-colonial globalised world.

The demographic, technological and wealth development trends that are accelerating throughout the Asia-Pacific region do not bode well for Australia's ability to achieve and sustain the superiority of mass that is needed to conduct amphibious operations. Australia will be able to offset some of its deficiencies in mass by deception, surprise and seeking advantage through technological innovation. However, each of these offsets, in their own way, is of transient benefit. Australia would need to gamble on its ability to surprise or deceive its enemies on multiple occasions or hope that the enemy does not embrace technologies that offset those upon which the ADF's advantage is based. War, as we all know, is a dynamic contest between adaptive adversaries and it would be rare to find an opponent who does not evolve; the constant swing of the pendulum of war does not allow it. Australia could embrace robotic soldiers and autonomous drones, but so could potential adversaries who, unfortunately, will soon be able to afford them in greater numbers than the ADF can.

Traditionally, Australia's primary means to offset its lack of military heft has been to rely on a great power partner. This has been the policy from European settlement. Originally the United Kingdom filled this role, but since the middle of the Second World War it has been the United States to which Australia has looked for the provision of the mass it needs for its security – the nuclear umbrella guarantee, for example. Will this guarantee still be available in future years? The 2016 Defence White Paper certainly believes so, but it must be recognised that the power balance in the Indo-Pacific is shifting. Furthermore, not all parts of the government as confident. A senior Australian commentator on the Department of Foreign Affairs and Trade 2017 Foreign Policy White Paper recognised that 'elements of the world that we have taken for granted … are now in flux.' It is probably not yet time to question the ADF's ability to conduct amphibious operations against a peer competitor in the absence of a partner's support, but that time may not be far off.

As the Australian Army and the ADF continue to consider the requirements of amphibious operations, the need to conduct pre-landing tasks will raise uncomfortable questions across the land force, the joint force and the Australian Government; from the tactical to the strategic levels of war through to the creation of national strategy. Except against a very small opponent, Australia is unable to act unilaterally with any prospect for success. However, the ability to conduct amphibious operations remains important because Australia sees itself as a maritime power. This means that in addition to the need to secure its territory, Australia also seeks to secure its overseas interests. A maritime power must have an amphibious capability of sufficient strength if it is to be seen by potential rivals as being able to safeguard its interests. Without recourse to the threat of force to deter a challenge to its interests, Australia could no longer lay claim to being a legitimate maritime power. The implications of this for the culture of the Australian Army are profound. What does it mean for the ethos of a land force, one that prides itself on being expeditionary, if it is no longer able to conduct such operations? Pre-landing tasks are rightly named. Not only do they underpin the conduct of amphibious operations, they also underpin a nation's perception of itself and that of its military forces. The evaluation of pre-landing tasks is surprisingly complex, but then an amphibious operation is the most complex operation a military force can undertake.

Figure 27. A small boat party from 2 RAR speeds towards the shore. (Image: DoD)

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110. For an example see, Department of Defence, *2016 Defence White Paper*, Canberra, Department of Defence, 2016, p. 121.

111. Martin Parkinson, '2017 Foreign Policy White paper: advancing Australia's interests,' *DFAT Blog*, 22 November 2017 at https://blog.dfat.gov.au/2017/11/22/2017-foreign-policy-white-paper-advancing-australias-interests/ (accessed 14 December 2017).

Call for Submissions

The role of the Australian Army Research Centre (AARC) is to foster new ideas and debate about the future of land power. It does this through engagement with other militaries, academic bodies and think tanks as well as organising events and seminars where ideas can be exchanged.

Another critical role is the administration of research projects and the publication of their findings as well as the publication of submission to its various platforms.

Below is a guide on the various publications the AARC oversees and the targeted size of submissions as well as advice to authors. All submissions are reviewed for tone, content and style and those that are accepted may require editing in order to meet the required professional standard and adhere to the relevant style for the publication at which it is aimed.

Land Power Forum Blog Posts

the LPF is a web log designed as a forum to foster conversations on any idea relevant to the furtherment of land power. Submissions should be between 600 to 1000 words in length and any references should be in the form of hyperlinks. To view the Land Power Forum blog, visit www.army.gov.au/our-future/aarc/blog

Book Reviews

Book reviews on publications relevant to land power should be in the vicinity of 500 to 800 words.

Australian Army Journal

The AAJ has been published for the Army since before the Korean War. Articles submitted should be between 4000 to 6000 words in length with referencing in the form of Endnotes. Images should be supplied as high resolution images. PDF copies of the AAJ can be found at www.army.gov.au/our-future/aarc/publications.

Occasional Papers / Monographs

The AARC publishes papers from serving members of the ADF, academics and those who have conducted research into issues relevant to land power. An occasional paper/monograph should be approximately 10,000 words in length as a guide. PDF copies of the AAJ can be found at www.army.gov.au/our-future/aarc/publications.

Army Research Scheme

The Australian Army Research Centre is seeking service providers to undertake paid research on topics to inform future land force development and modernisation. The areas of interest are wide-ranging and include operational, technological, social, cultural and organisational topics. The results of this research may be published. For information on the ARS, visit www.army.gov.au/our-future/aarc/research-and-development/army-research-scheme.

Books and other major publications

The AARC may publish larger works as standalone books. These works would normally exceed 50,000 words in length and would be the subject of significant review and editing in order to bring it to an appropriate standard.

For further information on writing styles and types of contributions, please visit www.army.gov.au/our-future/australian-army-research-centre-aarc/advice-to-authors for downloadable documents to assist with submissions.

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