

SEMAPHORE

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THE CAPABILITY OF SEA-BASED LAND STRIKE MISSILES

From their earliest days, navies have provided transport, logistic support, and fire support to land forces as an ancillary to their primary role of controlling maritime communications. They have also conducted strategic strike, in the form of attacks on enemy ports, facilities and infrastructure. The ability to perform these functions has improved over time as technology offered new solutions to old problems. Mechanical propulsion, gunpowder, breech loading weapons, communications and sensor systems, and sea-based air power have all influenced the quantity, precision and effectiveness of the direct effects navies could deliver against targets on the shore.

Rapid technological development in the mid-twentieth century saw the battleship replaced as the paramount naval weapon system by the aircraft carrier and high performance aircraft. Although originally intended to provide support to fleet operations, aircraft carriers quickly proved their worth in World War II as platforms to support land attack aircraft. Indeed, this has proven to be the major combat function of aircraft carrier aviation since 1945, with sea-based air strikes having been conducted in the majority of conflicts by those nations that possessed aircraft carriers. The development of long-range, high performance land and sea-based strike aircraft, allied to nuclear and precision guided weapons, made strategic strike missions more effective and less costly in aircrew than the bomber raids of World War II. But the aircraft carrier and the dedicated strike aircraft, like the battleship, are only available to the richest of nations. In terms of land strike, sea-launched land strike missiles are rapidly supplementing aircraft. These missiles are becoming the preferred weapons against high-risk, high value targets, particularly in the early phases of a campaign when air superiority has yet to be obtained over the target area.

Following the signing of the first Strategic Arms Limitation Treaty in 1972 between the USA and USSR, which limited the proliferation of ballistic missiles, interest arose in the navies of both countries for the development of sea-launched precision land strike cruise missiles. The RGM/UGM-109 Tomahawk cruise missile, currently operated by the Royal Navy and the United States Navy, achieved operational status in 1986. The first operational use of the Tomahawk missile was in the 1991 Operation DESERT STORM, when 288 missiles were fired at targets in Iraq. Since this time, a further 1545 Tomahawk missiles have been launched at targets in Iraq, Bosnia, Serbia, and Afghanistan. A contemporary of the Tomahawk, the Russian 3M10/3M54 Granat missile is operated by the Russian and Indian Navies. Other sea-launched land strike cruise missiles currently under development include the American SLAM, the German Taurus, the French SCALP, the Russian 3M51 Biryuza/Alpha, and the Chinese HN-2/HN-3/HN-2000.¹

A limitation of land-based strike aircraft currently operated by regional nations, such as the F-111s of the Royal

Australian Air Force, is the need to expose the limited number of available aircrew and airframes to significant threat while attacking targets in an adversary's territory. Given the rising cost of third and fourth generation combat aircraft, multi-role aircraft, which combine fighter, strike and close-air support roles, are now standard. Additionally, the high unit cost of advanced combat aircraft and limited national defence budgets result in less aircraft being purchased by most regional countries. The lack of task dedication and limited aircraft numbers mean that there will always be a conflict over which role should receive priority at a given point in a conflict, particularly if a higher risk is associated with a land-strike mission. The resources required, and additional lives put at risk, to rescue downed aircrew are also a significant consideration. The political mileage that may be obtained in the international media by parading a captured pilot has been amply demonstrated in conflicts and crises over the last forty years. The primary strength of sea-based land strike missiles is that they can be used to attack well-defended high priority targets with precision and without fear of losing both aircrew and aircraft.



*Tomahawk overflying HMAS KANIMBLA
2003 Gulf conflict*

When compared with a sea-based missile, a key strength of using crewed aircraft in the land strike role comes from their sortie generation capability. They can return several times in a day to their base, re-arm and embark upon new missions. Moreover, being multi-role platforms, these new missions may involve different functions such as reconnaissance, whereas land strike missiles are a dedicated single-role system. The ability of aircraft to quickly relocate to a new area of operations at short notice is also a great strength. If a ship or a submarine has to transit more than a few miles to bring its missile within range then an on-task aircraft would, in the vast majority of situations, provide the fastest response option. In addition, if the surface ship is protecting an amphibious or afloat support task group, either the task group must approach closer to the target coast, possibly increasing the threat, or the ship must depart the task group, weakening the protection offered to the escorted units.



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Land-based aircraft need a secure airfield within striking distance of their targets. Even with air-to-air refuelling an aircraft's range is limited by having to maintain sufficient fuel to divert to the nearest friendly airbase should a technical fault, weather or enemy action prevent refuelling. The assets required to secure, protect and operate an airfield should not be underestimated, as they present a key target for an enemy, particularly if international politics and geography limit availability. Furthermore, as demonstrated in Bosnia, Afghanistan and Iraq, political sensitivity may preclude the host nation support necessary to bring strike aircraft within range of their targets. This impacts on the ability of nations that do not possess aircraft carriers to conduct land strike, as land-based strike aircraft may not possess sufficient range to operate from that nation's own airbases. By contrast, under the provisions of the 1982 United Nations Law of the Sea Convention, naval forces have assured access to over two thirds of the world's surface and have a level of poise and persistence far exceeding that which land-based aircraft can provide: the reverse of the speed advantage that aircraft enjoy over ships and submarines. Therefore, with a maritime land strike missile, ships and submarines can maintain a firing solution on almost any land target on the earth's surface for prolonged periods without the need to secure an operating base in or near the area of operations.

Weather has the potential to seriously degrade the capability offered by strike aircraft, particularly when missions are conducted over extensive approaches by short-range multi-role aircraft. In these cases, acceptable weather conditions are required in four locations: the airfield from which the strike aircraft departs; the airfield from which the tanker aircraft operates; the target area; and the air-to-air re-fuelling area. Although an extreme example, in Kosovo during 1999 the weather was judged to be favourable for air operations for just 21 days out of the total 78 days of the campaign.² Weather conditions are less likely to affect a cruise missile to the same extent as an aircraft. Only cyclonic type conditions would limit their employment, or that of the surface ship firing the missile. A submarine firing a missile could take underwater refuge from these events, further expanding mission availability. Given the infrequency of these extremes of weather a commander could rely on a missile being available to attack a target at almost any time. Many modern systems use dual modes of guidance, such as TV imaging and GPS or radar, in order to provide redundancy in the event that the primary guidance method is degraded by the prevailing weather conditions.

A crewed aircraft strike takes considerably longer to plan and execute if the target was one previously not considered, such as a short-notice target of opportunity. This is because of the need to plan routes to the target and home again, as well as to prepare the aircraft and brief the aircrew. The response time is further lengthened if air-to-air refuelling is required to execute the mission. A transient strategic or tactical target may simply be beyond viability. The rapid planning and execution systems available with today's generation of land strike missiles show a clear advantage against short-notice targets. If tasking an aircraft a strike planner must determine a safe route back from the target, which, for obvious reasons, may be the most dangerous leg of the mission. A missile is a one-way weapon that does not require in-flight

refuelling and is less susceptible to hostile ground fire. The nature of a ship's crewing, training and extensive real time communications connectivity also makes it very responsive to short-notice targeting. Therefore, for time-critical targets, a maritime-based missile has the potential to react in less time than any other option apart from an aircraft already tasked, briefed and on-station.

Training and retaining aircrew is an issue for airforces worldwide. Reducing the number of aircrew required to be current in day/night, poor weather, low-level flying reduces the demands on this specialised workforce. In addition it frees more airframes to conduct the fighter's primary role of maintaining air superiority as well other roles such as maritime strike and close air support. Personnel with a less costly skill set can be used for a missile-based system, significantly reducing operator training overheads. Weapon employment training and skills maintenance are all computer based, and without the need to 'fly' the missile training time and expense are reduced.

The most significant weakness of a maritime-based missile is the inability to return and reload the launch platform within a short timeframe. Re-ammunitioning at sea is not feasible in the vast majority of cases, due to the possibility of damage to the missiles and the tight tolerances of missile magazines. A return to harbour to reload may involve days or weeks off station. The significance of this is magnified many times by the fact that surface ships and submarines are multi-purpose platforms. For instance, the loss of a surface warship will reduce a commander's ability to fight the air, surface, and sub-surface maritime battles, as well as reduce the volume of naval gunfire support available to land forces. The operational commander must consider maritime land attack missiles as a more finite resource.

As with other new technologies, such as those from the commercial sector that are driving Network Centric Warfare, the rapid advances in missile technology provide an opportunity for regional naval forces to enhance their current operational capabilities. There are no treaties or international conventions, such as the Missile Technology Control Regime through to the Wassenaar Arrangement, to which regional nations like Australia are signatory, which would prevent such a capability being obtained.

Long-range maritime land strike missiles have the potential to complement the strategic strike capability delivered by crewed aircraft, but cannot completely replace it. Both delivery methods are almost the mirror image of one another in terms of relative strengths and weaknesses; they complement one another and do not substantially overlap. The rising costs of modern strike aircraft, the proliferation of high performance surface-to-air missiles, and the increasing unacceptability of personnel losses in high-risk strike operations suggest that the options for future operations need to be carefully evaluated. If regional nations like Australia are to maintain a cost effective, flexible, balanced and reliable land strike capability that provides maximum operational flexibility, then the introduction of a sea-based land strike missile needs to be investigated in a mature and considered way.

¹ *Jane's Naval Weapon Systems*, Janes Information Group, Edn. 43 [online service], 21 May – 17 December 2004 (12 May 2005).

² MOD (UK), *Kosovo Lessons from the Crisis*, Report presented to the UK Parliament, June 2000, para. 7.33.

