Future expeditionary warfare challenges

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Australian Bushmasters deployed in the Global War On Terror.

Expeditionary warfare has a long and eventful history dating back millennia, and if the present is any indication, this essential military capability continues to be problematic. Deploying military forces to distant places will be as important in the future, as it was when Hannibal ravaged the Roman countryside with his expeditionary army, but the challenges match the importance of projecting military force worldwide.

As valuable in strategic terms as putting an armed force into a distant opponent's territory may be, it is in many respects one of the most challenging tasks a military machine must undertake, as forces are removed from the support infrastructure that sustains their ability to deliver firepower against an enemy.

Considering the tortuous history of expeditionary campaigns, there are recurring themes. First is the challenge of force structure deployability, or how much difficulty is incurred in moving a fighting force from its home basing to a theatre of operations. The second is the challenge of logistics to sustain an expeditionary force, or sustainability. More recently, other problems have emerged – centred mainly on political imperatives, and technical capabilities.

Deployability and Sustainment

Constructing and equipping military forces capable of rapid and sustainable deployment to distant and often poorly accessible theatres of operation is not a new problem. It is more pronounced for land forces than for naval and air forces. Ships and aircraft are highly mobile so the difficulties in deploying these forces to distant and poorly accessible areas relate mainly to deploying support equipment and facilities into the theatre of operations.

The increasing potency of manportable anti-vehicular weapons suchas IEDs and RPGs has effectively rendered the traditional light motorised infantry force model obsolete. This US Marine Corp Cougar MRAP is being tested for blast resistance.

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Evolving technology has reduced the impact of the logistics train problem, with the availability of heavy global airlifters able to carry almost anything an air force needs to deploy. This includes a good proportion of what a navy would need, the remainder being mostly floating assets, which are self-deployable. However, land forces lack the inherent strategic mobility of navies and air forces, and are dependent upon airlift and sealift to deploy overseas.

Two recent case studies of land forces being dependent upon deployment support by sea and air relate to Pacific Island campaigns conducted by the United States during World War II, and the British campaign to liberate the Falkland Islands from occupying Argentinian forces. A common feature of both examples is that the spearhead of most operations were relatively light forces, designed for rapid deployment, with more conventional forces deployed in following waves.

In the Pacific campaigns, the US Marine Corps were mostly employed to initially assault the target and establish a beachhead. In the Falklands, Royal Marine commandos and Parachute Regiment troops led most of the pivotal operations. However, in these campaigns light and highly deployable land forces suffered disproportionate losses.

This illustrates the classical dichotomy between highly deployable light forces and typical statically deployed heavy forces: survivability in conventional land force combat is proportional to the fraction of heavier forces employed, in any given generation of capabilities.

The argument is basically that paratroopers are no match for Waffen-SS Panzer-Grenadiers, as observed at Arnhem in 1944, and that light forces deployed alone will suffer disproportionate losses if pitted against heavier forces, which in turn are more difficult to deploy.

Much of the force structure argument about the US Army observed in the US in recent years centred on this issue. Former Secretary of Defense Rumsfeld was determined to change the US Army view of force structure, centred on classical Cold War era heavy forces, to enable the Army to rapidly deploy globally. The Stryker Brigades, equipped with the light LAV derivative wheeled AFVs were a byproduct of this dispute, as was the cancellation of the Crusader Self Propelled gun.

The ideal force structure for expeditionary land combat is one which can be very quickly deployed, is self sufficient in larger unit capabilities, essentially following the 'all arms division' or brigade model, and is robust enough to take on opposing 'classical' heavy forces. Rumsfeld believed this could be achieved using considerable standoff firepower, digital networking of capabilities, and heavy reliance on light and highly mobile vehicles, built for rapid airlift. What Afghanistan and Iraq demonstrated

The two technologies central to the deployment and sustainment of expeditionary forces are sealift and airlift, exemplified by the Navantia LHD and C-17 Globemaster. The limitation of sealift is that is it slow, the limitation of airlift is high cost per tonne and limited payload.

A consistent feature of the long running argument over light vs heavy land forces is rejection of historical combat experience involving light forces. Heavy forces, such as the depicted SS Panzer Grenadier unit of the type which annihilated British paras at Arnhem, have consistently inflicted heavy losses upon light forces in close quarters and urban combat.

since is that IEDs and RPGs – basic man-portable anti-armour weapons – could shred most lighter vehicles, be they armoured or unprotected. The massive effort to re-equip forces with much harder MRAP (Mine Resistant Ambush Protected) category vehicles has dissipated the euphoria surrounding the idea of rapid deployment of light forces.

The problem with the land force model espoused by the Rumsfeld camp is that its capabilities are demonstrably too narrow. While a force of networked and light highly mobile vehicles with overwhelming long range precision sensor and firepower capability might well do an excellent job of cutting a classical Soviet/Wehrmacht style heavy armoured division to shreds, what then? Closing with the depleted enemy force, mopping up resistance, and holding terrain requires the ability to fight it out at close quarters, dealing with dug-in and hidden heavy weapons, man-portable weapons, and all manner of ambush tactics. A motivated and determined enemy will not disintegrate in the manner of Saddam's forces in 1991 and 2003, or the Argentines in 1982. A much better model is the conduct of Japanese, North Korean, Chechen or Hezbollah troops. The ugly reality of such campaigns has been the need to 'burn the enemy out of their foxholes' to actually seize and hold terrain.

What the US Army heavy versus light argument indicates more than anything is the prevailing 'panacea mindset', which has gripped Western military establishments since the end of World War II. That conflict evolved highly diverse force structures, with complex mixes of specialised capabilities to cover a wide range of contingencies. Since then, as the panacea mindset dictates, "we can do it cheaper and better with this new Wunderwaffe, which incidently can also do everything else."

The sorry history of conflicts contradicts this notion. Every new capability deployed has resulted in the evolution of technology, tactics and strategy to counter that technology, often with surprising speed.

Where does this leave the argument of 'light and highly deployable vs heavy and not so deployable'?

What the campaigns in Afghanistan, but especially in Iraq, reiterate is that heavier forces are much better at securing and holding ground, regardless of the agility of light high technology forces. Any smart enemy defending against the high technology, highly mobile light force will avoid combat where overwhelming standoff precision firepower offers an advantage, and try to force the fight into protracted close-quarter combat, often in the urban environment.

The imperative to shift away from heavy 'classical' force structures has been driven by the difficulties in moving large numbers of heavy vehicles over large distances. Increasingly, access to sea ports is politically constrained, a problem that has endured for centuries, but likely to get worse over time. As a result, there has been an increasing reliance on airlift for rapid deployment. This in turn has severely stressed airlift capabilities, as there's a finite number of heavy airlift aircraft available in any force structure. Longer term, the cost of aviation fuel will increasingly matter, as global competition for energy resources drives up costs.

Within the US military, the biggest beneficiary to date has been the Marines, as their model of diverse all-arms forces built for rapid deployment and amphibious assault has made them the weapon of choice for many contingencies. However, the Marines are tied to heavy sealift capabilities, and this sets time limits on deployment into a theatre of operations. Airlifting a Marine Corps brigade, including its heavier equipment, is almost as difficult as airlifting an Army brigade.

Sustaining deployed forces presents much the same issues as initial deployment. Sustained high intensity operations voraciously consume fuel, munitions, replacement personnel, and more mundane but equally important supplies such as food and water. Unsecured terrain and the use of irregular or Special Forces troops may well render the resupply convoy of trucks unusable in many situations. The US has increasingly relied on tactical airlift in such situations, driving up the delivery cost per tonne in fuel burn.

One argument for dealing with such problems is to simply buy more heavy airlifters, at high cost – and then there's the incompatibility of land force equipment with medium and smaller airlifters. The LAV series is a good example: few LAV variants are truly airlift compatible with C-130 sized aircraft whereas a light mechanised unit of the past, equipped with early M113s, could be readily moved by C-130s and C-141s. The same is not true of its contemporary equivalents, which require C-5, C-17 and An-124 class airlift capabilities.

Solving the Deployability and Sustainment Problems

Likely there's no single good solution to the deployability problem. The imperative of survivability against increasingly lethal man-portable weapons, and the increased proliferation of smart, guided munitions will drive greater ballistic hardness for land force vehicles. While lightweight armour technologies will evolve, so will the penetration power of projectile weapons.

As recent operations have shown, the idea of genuinely lightweight forces is problematic because of their survivability problems in any situations

The increasing demand for vehicle hardness to cope with more lethal manportable weapons has forced, increasingly, the use of scarce heavy airlifters instead of the medium airlifters used a generation ago.

The 30 tonne payload class A.90 Orlyonek Ekranoplan was specifically designed for amphibious assault operations. The whole nose hinges to the right, exposing a ramp for RORO vehicle deployment and recovery. The A.90 cruised at 200 KTAS with an 800 NMI range. Only three were used operationally.

The 400 tonne gross weight Izdeliye 903 MD-160 Lun Ekranoplan was developed for a range of roles, the sole demonstrator equipped with six SS-N-22 Sunburn ASCMs. It cruised at nearly 300 KTAS, and had a range of 1,600 NMI.

forcing close combat. The reality of the future is likely to be a gradual return to heavier forces. The conventional Army truck and smaller utility vehicles may likely be replaced over time completely by heavier protected vehicles.

There are few obvious solutions to alter the economic balance in favour of expeditionary forces, if Western militaries continue to rely on established technologies and thinking. In the long-term strategic context, a package of solutions will be required. This is because the Global War On Terror is likely to last for decades, until the Islamo-fascist movements burn out and lose support, just as fascism and communism did over time.

In terms of nation state conflicts, the greatest potential for long-term problems will be across a rapidly industrialising Asia, which has become addicted to an arms race in high technology weapons. Any conflict in Asia of substance will present much the same issues for the West as the World War II Pacific Theatre campaigns. Campaigns will be characterized by long distance deployments, little terrain for staging, politically imposed no-go zones, and opponents equipped with a diverse range of modern high technology weapons, likely operated by nationalistic, well motivated, educated and trained troops. Many of the strategic realities of Asia today mirror those observed in 1940, except on a much larger scale. What is needed are some new ideas on how to quickly and efficiently deploy and sustain expeditionary forces.

Numerous experiments since the 1940s have endeavoured to crack this problem but none have been adopted on a large scale. One idea was embodied in the Hughes HK-1/H-4 Spruce Goose, which was a [then] giant flying boat transport designed to carry 750 troops. The challenge with any large airlifter is fuel efficiency, so the question arises whether it is better to cruise at 36,000 ft AGL and 480 KTAS, or 50 ft AGL and 200 KTAS? The technology of large airlifters designed to cruise in ground effect needs to be re-examined very carefully.

Another related idea worth exploration is the technology of specialised Wing In Ground-effect (WIG) vehicles, exemplified by the Soviet Ekranoplans or 'Caspian Sea Monsters'. WIG vehicles cannot be termed aircraft in the conventional sense since their designs are built to fly in ground effect only, with limited obstacle clearance, and given the low flight altitude, limited speeds.

The Soviets performed numerous experiments, and intended to deploy large numbers of the A.90 Orlyonok, a WIG in a payload class between the C-130 and A.400, but the collapse of the regime saw only three introduced into Voenno-Morskiy Flot service. The largest Ekranoplan built to date was in the 500 tonne class.

A tier below the WIG is the technology of Surface Effect Ships (SES), which share attributes of hovercraft and catamarans. The US Navy experimented with the 100 tonne class SES-100A/B designs during the 1970s, achieving 60 to 80 knot sustained speeds. Unfortunately much larger designs have yet to be built.

Finally there is the technology of wave piercing catamarans, in which Australian industry is well established. The Australian experience in East Timor and subsequent US trials demonstrated that catamarans have considerable potential for fast sealift.

All these technologies offer considerable long-term promise in alleviating or arguably even solving the problem of deploying and sustaining a land force equipped with predominantly heavy equipment. Promise, however, does not constitute the kind of maturity which risk averse contemporary military bureaucracies prefer in military systems.

All these technologies result in vehicles that are structurally much lighter than conventional amphibious and RORO transport vessels, and thus potentially more vulnerable to combat damage. Unlike conventional airlift aircraft, which transit at 400 to 480 KTAS speeds and high altitudes, all of the ground effect and catamaran technologies qualify in aviation terms as 'low and slow targets' and are thus susceptible to attacks using modern anti-shipping missiles, as well as air-to-air missiles.

The survivability argument is however not that simple, as the higher speeds of these technologies compared to a 25 KT conventional ship make them harder to target, especially by surface and subsurface threats, and would result in much shorter exposure times transiting high risk areas.

Robust and battleworthy designs for 500 tonne or larger long range WIG, SES or Catamaran hulls will require much careful thought and good engineering design at a system level. It will also require sufficient risk funding to permit a range of choices and options to be explored properly.

The reality of coming decades is that the current systems used to support deployment and sustainment of expeditionary land forces are simply inadequate, and the prospect of ongoing fuel cost increases will only exacerbate a well established problem. A cheaper solution than airlift, yet much faster than conventional sealift, is becoming essential.

Once a new technology for this purpose is properly demonstrated, a program akin to the low cost mass production of Liberty ships during the 1940s needs to be pursued, which even on a much smaller scale will close the developing gap between deployment and sustainment capabilities, and the now unavoidable future needs of expeditionary combat.

The A380 sized H-4 Spruce Goose of 1947 was intended to carry 750 troops across the Pacific (Wikipedia image).

Wave piercing catamarans are a useful technology in logistical support of deployed forces, with high speed and RORO configuration well suited to sealift operations.

US Navy Surface Effect Ship demonstrator.