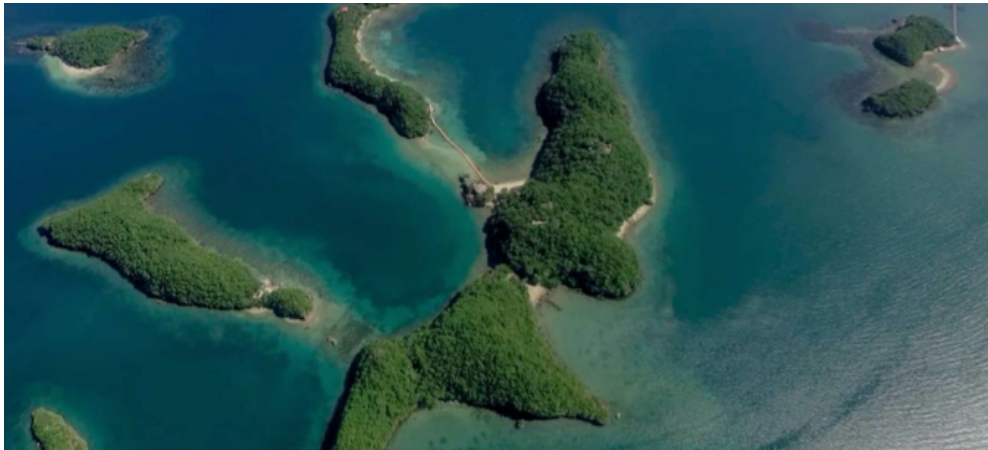




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Platforms, Concepts of Operations and Defense Decisions: The Australian ARH Decision



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Platforms and Strategic Options

As the Australian Defence Force shapes its future, one focused significantly on its neighborhood, and expeditionary operations, a key decision will be about its next armed reconnaissance helicopter. The Department of Defence has indicated in a number of reports over the past few years, that they would like to replace the current Tiger helicopter and have generated an RFI last year to examine options for so doing.

The choices being discussion are the Tiger replacing itself; or the American options, either the US Army's Apache or the USMC's Viper attack helicopters. And there have been suggestions as well by some analysts, that the Australian Army should forgo replacing its current ARH and add an unmanned capability and to prepare for the coming of the US Army's next generation attack helicopter which is at least a decade or more away.

But as is often the case, a platform choice is not simply about side by side comparisons as if picking different styles of bananas but are choices that have tactical and strategic consequences. Or put another way, tactical options and strategic consequences flow from platform choices.

The Australian Army is at a key inflection point in terms of its future; a choice in the ARH domain will be part of determination of which alternative futures are prioritized.

In this series, I will review the options and highlight some of the tactical and strategic consequences of the alternative choices.

Earlier this year, Scott Lovell, who has written an insightful series on the challenges facing Australian defense, provided a thoughtful overview of the platform choices.

That report was published on January 30, 2020 by the Royal United Services Institute of Australia and was entitled: Australian Defence Capability Analysis Project LAND 4503-ARH Replacement Program.

As the report noted: "Scott Lovell is an ex-Army Officer (RAEME) and an Electrical, Aerospace and Systems Engineer with 20 years Defence aerospace engineering experience. He has worked on several Defence helicopter acquisition and sustainment projects, including AIR9000 Ph2/4/6, AIR87 and AIR9000 Ph5C. At the time of writing Scott was working as an independent contractor on various civilian aerospace and infrastructure projects under his company LAESE Pty Ltd."

Lovell concludes his report as follows:

"The RFI released to Industry has shown the intent of the ADF to seriously consider replacing the entire ARH Tiger fleet with a proven, in-service attack helicopter that is capable of providing reconnaissance, security operations and air-attack on the modern battlefield. Whilst two very capable and proven contenders have declared their intent to respond to the RFI, the incumbent Tiger shall be fighting hard to retain its place in the ADF inventory.

"There are multiple defensible and justifiable reasons to select any one of the three aircraft under consideration for LAND4503. Each option presents its own unique advantages over the others, be its general characteristics, advanced avionics suite, sustainability, operational agility, suitability for specific roles or even operational costs and value for money.

“This paper outlines just some of the factors that may be taken into consideration during the Defence evaluation and selection process. In the end, the final selection decision that the Government makes will depend firstly on how well each contender presents their solution against the various declared and undeclared requirements and secondly on how each requirement is weighted by Defence.”

I would add that since the report was published, there has been further development with regard to Australian strategy and that that evolution has an impact as well with regard to considering options and choices.

The report can be read below:

https://www.rusi.org.au/resources/Documents/NAT/2020_01_31%20RUSIDSS-A%20Capability%20Paper%20-%20LAND%204503%20ARH%20Replacement%20Program.pdf

The Tiger Option

Airbus wasted no time to respond to the RUSI Australia report.

They did so by asserting that there was no evidence that the Australian Department of Defence had decided to move on from Tiger.

That was a bit of a stretch, but their response to RUSI Australia, dated march 20, 2020 focused on their core message: Tiger is and can be upgraded sufficiently to adapt to changing circumstances.

The original build of Tiger in Australia provided a significant opportunity for the Commonwealth in terms of standing up local industrial capability and that it would behoove the Commonwealth to leverage this investment.

Of course, one could simply ask, why such an argument needs to be made if indeed there was no real evidence of the desire by the ADF to move on from Tiger.

In any case, in this effort to suggest the RUSI assessment was somehow biased against them, Airbus highlighted the combat experience of Tiger, and cited the experience of French Army Aviation in this regard.

Airbus notes that the ADF has a “preference to use Chinook in its overseas operations”, but the ALAT of the French Army has used its Tigers extensively since 2009.

Certainly true, but the experience of the Australian army with Tiger and the Navy with NH-90 have been mixed which is why we are having this conversation in the first place.

The Tiger does face challenges of integratability with regard to the overall ADF, and has experienced sustainability issues as well, certainly seen in Europe.

This raises the question that if the Australian Army is focused on support to a regionally expeditionary ADF working air-naval integration, is the Tiger the best choice going forward?

Or put another way, is the Tiger the best fit for the ADF going forward as it shapes its regional power projection force in the Indo-Pacific?

The Airbus letter written by Andrew Mathewson, Managing Director, Airbus Australia Pacific, highlights that there are “profound issues that need to be examined prior to embarking on one course or another.”

That point certainly makes sense, and I intend to do so in this series.

Mathewson cautions: “Does it make sense to spend in excess of four billion dollars on replacing the ARH Tiger fleet with a like-for-like conventional helicopter....”

To be clear, the assessment by Scott Lovell precisely raised the question of whether indeed these were like-for-like options.

The Airbus response to the RUSI Australia report can be read here:

<https://www.rusi.org.au/resources/Documents/NAT/Australian%20Army%20ARH%20Tiger%20into%20the%20Future%20-%20Airbus%20Responds.pdf>

An Upgraded Tiger

The core case for the Tiger in effect replacing itself is largely about sunk cost and upgradeability. The sunk cost in terms of both the industrial base to sustain the current fleet and in terms of the Australian Army’s experience in operating and sustaining the Tiger would be considered a capital asset already invested by the Commonwealth in the ARH capability for the Army.

Upgradeability is about new technologies coming to the Tiger which could be available for the Australian program going forward. The hope has been that an expanded Tiger user community would be established to cross fund specific national programs, but this has not happened, certainly to the extent hoped for by Airbus. And in the current financial situation, it is clear that France is the most significant player for any Tiger upgrades, and there are real pressures on the French defense budget. Such a situation almost certainly means that the projected upgrades to Australian Tigers would be paid largely by Australia itself

In an interview which I did in 2013 with Norbert Ducrot, Eurocopter Senior Vice President – North Asia, this senior Eurocopter executive provided his vision of the way ahead. The argument which Ducrot made in that interview highlighted what Airbus now underscores as well with the program of Tiger replacing itself so to speak.

“With regard to Australia, there are three key requirements for a company like Eurocopter.

“First, one needs to be price competitive. One as well needs to ensure that the price is realistic; there is no point to losing money on a sale simply to win a competition.

“Second, you have to become Australian. I would say that between 60 to 80 percent of your program must remain in Australia. Currently, we have about a 1,000 people working in Australia.

“Third, one needs to facilitate the kind of user group relationships, which allow the customer to get best value out of the product. In the case of the Tiger, there is a strong bilateral relationship between the Australian and French forces to share operational information with regard to the Tiger experience.”

He clearly underscored the support and sustainment challenge and made the case that Eurocopter was building out such capability in Asia.

“SLD: Let me ask a final question. How important is logistical support, training, and maintenance in shaping your market strategy?”

Ducrot: “It is a really foundational element. We have several subsidiaries already in Asia, and have more than 2000 people working on support in the region. We have seven flight simulators in Asia as well. We are building out our capacity to support our helicopters in the region and obviously this is a crucial element for success in any defense program.

“An Asian country is not going to buy a defense product, which they cannot support fully.”

Clearly, one of the contested issues revolves around availability of aircraft, sustainability and how effect Tiger will be in regional power projection in which living onboard ships will be part of the equation.

But I will return to that issue later.

Australian Business Defence Review has published articles which lay out the case for an upgraded Tiger as the replacement for legacy Tiger.

In an August 30, 2019 article, the focus was upon Airbus Helicopters offering an improved Tiger to update and upgrade the legacy fleet.

Despite the negative language which evolved from poor aircraft availability and high sustainment costs and an adverse Australian National Audit Office (ANAO) report, Airbus Helicopters has continued to develop the aircraft, and has proposed a number of capability and performance enhancements.

In Europe, the company is currently implementing Tiger Mark II upgrades for the French Army’s HAP Tiger, the version most common to Australia’s ARH variant. The Mark II will see the addition of new Thales-developed laser-guided rockets, as well as upgrades to the helicopter’s GPS receiver and CRPA antenna system.

Meanwhile, a more comprehensive Tiger Mark III upgrade program was launched through the European Organisation Conjointe de Coopération en Matière d’Armement (Organisation for Joint Armament Co-operation, or OCCAR) with member nations France, Germany and Spain. OCCAR had tried in vain throughout 2016 and 2017 to get a commitment from Australia to join the Mark III development effort.

While the definition of the Mark III upgrade is yet to be finalised, the program is working with Thales and MDBA to enhance the Tiger’s avionics and mission systems, and to develop a new common air-to-surface missile to replace the current AGM-114 Hellfire and Rafael Spike systems.

While Mr Mathewson wouldn't be drawn on any specific enhancements the company was offering for Tiger in its RFI, he did submit it would involve a mid-life upgrade, all of which would be performed in Australia at Airbus's Pinkenba facility in Brisbane.

"We feel that we're in a very positive position because Tiger simply isn't in the same place that it was at the time that the White Paper was written in 2016," he told ADBR. "Its improved performance means our customers are happy, and the cost has been reduced, so we're hopeful that we can convince our customer and government that Tiger is the best product to continue to operate out into the 2040s.

"The Commonwealth is after a mature system, they make that very, very clear in their RFI," he added. "So everything we're offering is a proven system with low risk. We need to do a mid-life type extension, that's a whole range of engineering work, of course. Tiger has been flying in Australia since 2004, and as part of the upgrade proposal that we have, is to extend the life of the product out into the 2040s.

"We see ourselves as the perfect bridging capability to whatever is the next capability that Defence would consider. And publicly, the indicators are that is likely to be the future vertical lift (FVL) capability. So for us, that would mean extending Tiger by a further 15 years beyond 2025.

"From a value for money perspective, that puts us in a great position, because any other alternative capability to introduce it, effectively it would only just be being matured in the early 2030s to be taken out of service in the late 2030s. To my mind it doesn't make a great deal of sense from a value for money perspective."

More recently, in a piece, published on October 7, 2020, the focus of Airbus activities to gain acceptance of its approach were highlighted.

Airbus Australia Pacific will double-down on its unsolicited proposal for the Commonwealth's LAND 4503 ARH replacement program by offering an enhanced Tiger ARH upgrade proposal.

Speaking to media on October 7, APAC Managing Director Andrew Mathewson said the company's initial proposal of an upgrade to the current 22 Tiger ARHs and an additional seven Airbus H145M helicopters had been formally rejected in a letter to the company from Defence Minister, Senator Linda Reynolds.

But Mathewson is not deterred and says that, rather than the previous offer of a mixed fleet including seven H145Ms to make up the LAND 4503 requirement of 29 airframes, the company will up the ante by proposing a more comprehensive upgrade to the current Tiger fleet, and is actively seeking seven additional Tiger airframes from European stocks. While he wouldn't be drawn on where these airframes could be sourced from Mathewson said that, while discussions were ongoing, he was relatively confident he could do so.

The Tiger assembly line closed in 2018, but the aircraft is also operated by Germany (51), France (40), and Spain (24), with the French and Spanish Tiger HAP/HAD model being the most common configuration to Australia's Tiger ARH.

He said the seven additional airframes would likely be the first delivered in the proposed upgraded form, and then the 22 Australian ARH machines would then be inducted and rotated through the upgrade process. Most of the upgrade work would be conducted by Australian industry led by Airbus from its Brisbane Airport facility in Queensland, and could be completed for less than \$1.5 billion.

Mathewson said he wasn't ready to publicly discuss what the enhanced upgrade proposal might include, but did offer that Airbus would be looking to leverage as much of the planned Tiger Block 3 upgrade which would bring the three European operators' Tigers closer to a common configuration. He added that, while the Block 3 upgrade had recently been defined, it has not yet been made public.

But despite claimed cost savings of up to \$3.5 billion compared to a FMS buy of new helicopters, Airbus may not have sufficient time to develop and present its enhanced concept before a decision to proceed to tender is made by the end of 2020. Recent media reports have indicated the Commonwealth is favouring a sole-source tender to Boeing to the AH-64E Apache.

The Apache Option

In responding to what he felt was an unfair set of comparisons in the RUSI Australian report on ARH replacement options, Andrew Mathewson, Managing Director, Airbus Australia Pacific, argued: "Does it make sense to spend in excess of four billion dollars on replacing the ARH Tiger fleet with a like-for-like conventional helicopter...."

This may fit a Tiger to Apache discussion, but really does not fit a Tiger to Viper discussion. The Tiger was developed from the outset as a competitor to Apache. The Tiger and Apache were designed for Army concepts of operations. The Viper was designed for USMC concepts of operations which are very different from that of the US Army, and with the dynamics of change within the US Navy's amphibious task force increasingly so.

But I will focus on that in later articles, first by addressing the question of the strategic direction of the Australian Army and then upon the Viper in the evolving USMC concepts of operations and compare the two.

The Apache has several advantages over the Tiger. It is embedded in a very large global force structure.

Not only is it the bedrock US Army attack helicopter, but according to the [US Army webpage](#) the Apache has the following FMS partners on the program: Egypt, Greece, India, Indonesia, Israel, Korea, Kuwait, Netherlands, Qatar, Saudi Arabia, Singapore, Taiwan, United Arab Emirates, United Kingdom, Japan and Morocco.

The Australian Army would benefit from US Army upgrades as well as global partners investments in upgrades as well.

The Apache flies with the AN/APG-78 Longbow Fire Control Radar which gives it radar coverage.

But the system was not used in Afghanistan in its designed role for finding and designating targets for its RF Hellfire missiles.

In an [August 30, 2019](#) press release, Boeing provided a press release highlighting the advantages of Apache for the Australian Army.

CANBERRA, Australia, August 30, 2019 – Boeing today offered the AH-64E Apache to the Commonwealth of Australia in its search for a new reconnaissance helicopter platform.

The government is seeking 29 helicopters that would reach full operating capability by 2029. It's also seeking the availability of local industrial capability to sustain the fleet. The aircraft would replace the nation's current fleet of Eurocopter Tiger helicopters.

The Apache, flown by the United States and 15 other countries, has recorded more than 4.5 million flight hours with the U.S. Army alone. There are currently 1,180 Apaches in service today.

Australia would not only benefit from the AH-64's mission capabilities, it would also enjoy its technological and strategic advantages against adversary aircraft; a global parts and supply network and a domestic training, support and sustainment team. Boeing's Australia operations currently support the nation's C-17 Globemaster III, Airborne Early Warning & Control and other systems, helping to grow Australia's domestic aerospace and defence industry and supply base.

"Boeing's AH-64E Apache is known for its survivability, sustainability, interoperability and reconnaissance capability," said Terry Jamison, Global Sales and Marketing, Defense, Space and Security. "As an Apache operator, Australia would join coalition countries, including the US and UK, and regional partners Singapore, Indonesia, Japan and the Republic of Korea."

Australia would also benefit from the US Government's Apache Modernization program, which will see the platform upgraded through the late-2040s and beyond to ensure global fleet partners continue to operate the most advanced multi-role combat helicopter for decades to come.

Boeing's proposal is in response to a request for information from the Commonwealth of Australia's LAND 4503 Armed Reconnaissance Helicopter (ARH) replacement program.

"The benefits of Apache for Australia are more significant than continued platform upgrades," said Darren Edwards, vice president and managing director, Boeing Defence Australia. "Boeing plans to deliver support services in-country and engage local suppliers to maximise Australian industry involvement for the ARH replacement program."

In a June 29, 2020 article published by Australian Defence Magazine, the focus was upon Boeing's AIC model for the Australian Apache bid.

Boeing says it will replicate its established Australian Industry Content (AIC) model if the AH-64E Apache is selected for Australia's armed reconnaissance helicopter replacement under Land 4503.

Boeing has a network of Australian industry partners on the sustainment and training programs it delivers for rotary and fixed wing aircraft, including F/A-18F Super Hornets, EA-18G Growlers, CH-47F Chinooks, P-8A Poseidons and E-7A Wedgetails.

"We have successfully introduced more platforms acquired through the foreign military sales (FMS) process by the ADF than any other industry partner in Australia," Scott Carpendale, Vice President and Managing Director, Boeing Defence Australia, said. "To ensure success for our customer and Australian industry, we have developed and replicated a model that increases AIC over time."

Boeing has offered the AH-64E Apache for the Land 4503 program and is proposing acquisition through a FMS agreement followed by sustainment and engineering services through a combination of FMS and direct commercial sale.

“Our solution provides the ADF with a proven, military-off-the-shelf platform supported by a low risk, mature sustainment solution that can rapidly achieve initial operational milestones and enable the expansion of in-country sustainment capabilities with Australian industry partners,” Carpendale said. “We have maximised in-country services on all of our Australian programs and we will do the same on Land 4503.”

To grow AIC on the Land 4503 program, Boeing is establishing the Boeing Rotorcraft Network – Australia (BRN-A) to bring together Australian industry across its rotorcraft programs including the CISS and Helicopter Aircrew Training System programs.

And in an article by Greg Waldron published by *Flight Global* on September 15, 2020, a virtual media event by Boeing for Australia was highlighted.

The presentation highlighted Apache’s “interoperability with a broad number of allies who operate the type, cost certainty under the US government’s Foreign Military Sales process, and a long upgrade roadmap stemming from the US Army’s plans to operate the type until at least 2060.”

Jamison also highlighted that the UK has operated Apache’s from vessels at sea, which of course, is similar to how the French have operated their Tigers.

But it is from vessels at sea rather than an integrated part of an air naval task force.

The at sea issue is an important one for both Airbus and Boeing, so there is a clear focus on how their helicopters are expeditionary in a maritime domain.

But to be clear, this is **from the sea**, not at sea as an integrated maritime strike force element.

Frankly I have spent time in both the UK and France and have discussed at length with relevant military officers how these rotorcraft have been used as part of an assault force from the sea, with clear understanding that they are not designed to be part of what the USMC is focusing upon on its reworking with the US Navy of amphibious task forces.

An article which discusses the “Apache at Sea,” was published by *ADM* on April 5, 2020 provides further details on the from the sea point.

The Apache serves the US Army and how it operates using attack helicopters.

This means that it goes as part of a larger force package, and is supported as part of a force package.

The Apache has been deployed worldwide with the US Army, but as part of a sustained Army presence.

It is not known to operate with a small or even modest logistics support capability.

Some sense of how the US Army uses the Apache as part of a larger force packages was highlighted in the Task Force Hawk operation.

In an article by Ben Lambeth published in *Air Force Magazine* on February 1, 2002, this aspect was highlighted.

At first glance, the idea of using Apaches to reinforce NATO's fixed-wing aircraft seemed entirely appropriate, considering that the AH-64 had been acquired by the Army expressly to engage and destroy enemy armor. As Pentagon spokesman Kenneth Bacon put it in announcing the deployment, they would offer NATO "the type of tank-killing capability that the bad weather has denied us. It will give us the capability to get up close and personal to the Milosevic armor units in Kosovo."

In a normal weapons load, the Apache mounts up to 16 Hellfire anti-tank missiles, 76 folding-fin anti-personnel rockets, and 1,200 rounds of 30 mm armor-piercing ammunition. With that armament, it gained deserved distinction by destroying more than 500 Iraqi armored vehicles during Operation Desert Storm.

Yet in Desert Storm, the Apaches had deployed as an organic component of two fully fielded US Army corps. In this case, the Army was being asked by SACEUR to cobble together an ad hoc task force designed to operate essentially on its own, without the backstopping support of a fielded US ground combat presence in the theater.

The Army is not configured to undertake such ad hoc deployments, and its units do not train for them. Instead, an Apache battalion normally deploys only as a part of a larger Army division or corps, with all of the latter's organically attached elements.

Accordingly, the Army was driven by its own standard operating procedures to supplement the two Apache battalions with a heavy additional contingent of ground forces, air defenses, military engineers, and headquarters overhead. As the core of this larger force complement, now designated Task Force Hawk, the Apaches were drawn from the Army's 11th Aviation Brigade stationed at Illsheim, Germany. The deployment package included, however, not only the two battalions of AH-64s but also 26 UH-60L Black Hawk and CH-47D Chinook helicopters from the 12th Aviation Regiment at Wiesbaden, Germany.

Additional assets whose deployment was deemed essential for supporting the Apaches included a light infantry company; a Multiple Launch Rocket System platoon with three MLRS vehicles; a high-mobility multipurpose wheeled vehicle (humvee) anti-tank company equipped with 38 armed utility vehicles; a military intelligence platoon; a military police platoon; and a combat service support team.

The Army further determined a need for its Apaches to be accompanied by a mechanized infantry company equipped with 14 Bradley armored fighting vehicles; an armor company with 15 M1A2 Abrams main battle tanks; a howitzer battery with eight 155 mm artillery pieces; a construction engineer company; a short-range air defense battery with eight more Bradley armored fighting vehicles armed with Stinger infrared surface-to-air missiles; a smoke generator platoon; a brigade headquarters complement; and diverse other elements. In all, to backstop the deployment of 24 attack helicopters to Albania, Task Force Hawk ended up being accompanied by a support train of no fewer than 5,350 Army personnel.

The Apache solves some of the Tiger issues. The Australian Army would be part of a much larger community than the Tiger community. The Australian Army would have access to a wider range of technologies than with Tiger.

But it is essentially doing the same missions as designed for the Tiger.

It is a question of the like for like replacement, but the advantages of the Apache being part of a larger allied community clearly weighs in the Australian decision makers minds.

But there is a larger question:

What is the role of the Australian Army in the decade ahead and where would either the Tiger or Apache fight in?

Or put another way, is Tiger or Apache the best solution for the evolving ADF and its power projection role in the region and the concomitant role for the Australian Army?

What is the Role of the Australian Army in Australia's New Strategy?

The Australian Army faces a significant challenge as it adapts to its role within the ADF and as the ADF refocuses on the Indo-Pacific.

A clear consideration is how the Army will address force mobility, basing flexibility, and operate within an integrated air-maritime task force.

Several years ago when visiting MARFORPAC, a key dimension of the rethink going on then was about the expanded role for amphibiousness in the context of blue water expeditionary operations and force mobility.

In that 2015 interview with Brigadier General Mahoney, Deputy MARFORPAC, we discussed the evolution of defense in depth and amphibiousness.

Last year I visited MARFORPAC, and interviewed the staff and the then head of MARFORPAC, Lt. General Robling. During my last visit, I focused on the broad strategic restructuring which the Marines were undergoing which they refer to as the distributed lay-down.

The U.S. Marine Corps is in the throes of a significant shift in the Pacific in the disposition of its forces. Because two thirds of Marines are deployed to the Pacific, such a shift is a key event in shaping the Marine Corps stance in the decade ahead.

The demand to support distributed forces is rising and will require attention to be paid to the connectors, lifters and various support elements. Part of that demand can be met as allies modernize their own support elements, such as Australia and Singapore adding new Airbus tankers, which could be leveraged to support Marine Corps Ospreys as well as other aircraft.

Indeed, a key element of the distributed lay-down of our forces in the Pacific is the fact that it is occurring as core allies in the region are reshaping and modernizing their forces as well as partners

coming to the table who wish to work with and host USMC forces operating on a rotational basis with their forces. The military and political demands for the kind of forces that the Marines are developing also are what allies and partners want for their operations.

In turn, this drives up the importance of exercises in the Pacific with joint and coalition forces to shape new capabilities for the distributed force.

The distributed lay-down, the evolution of the capabilities for distributed forces, the modernization of allied forces and the growing interest in a diversity of partners to work with the USMC are all part of shaping what might be called a deterrence-in-depth strategy to deal with the threats and challenges facing the United States and its allies in shaping a 21st-century approach to Pacific defense.

In a visit to Hawaii on the way to Australia in late July 2015, I had a chance to sit down with Brigadier General Mahoney, Deputy Commanding General of U.S. Marine Corps Forces Pacific.

The key focus of discussion was on the evolving approach to shaping a coalition among amphibious nations in the Pacific, and the concurrent evolution of capabilities by the USN-USMC team with regard to their own amphibious capabilities under the twin impact of the Osprey and the coming of the F-35B to the fleet in the Pacific.

In May 2015, the Navy and the Marines hosted a first ever meeting of nations either with or aspiring to shape amphibious capabilities in the region.

“We just had the PACOM Amphibious Leaders Seminar here, PALS 2015, the first of its kind. Twenty-four countries either have an established capability, a burgeoning capability or an interest in amphibious operation. The PALS, the symposium I think was a great success just in folks who wouldn’t have ever talked to each other were now talking directly. We connected a matrix of people who now understand that there are other friends and capabilities out there that they can connect with. And I think we’re going to try and do that again next year.”

The clear focus of an emerging coalition is upon the application of amphibious capabilities to the 21st challenges posed in the Pacific region. How best to shape and use the tool sets provided by amphibious forces?

The May conference is an important step forward in shaping a narrative to craft a teaming approach for amphibious operations.

“One of the larger points in the evolving narrative is the teaming of force projection capabilities where the amphibious element is a core capability. It is not simply about amphibious ships being transport vessels; it is about reshaping forces to deal with 21st century operations.”

BG Mahoney discussed how under the concept of amphibious, there are very different notions at play, ranging from a transport and support fleet to a strike or force insertion fleet.

The term “amphibiosity” was used to express the broad umbrellas under which diverse notions of what kinds of amphibious forces a nation might wish to operate.

“What we learned during the, the PACOM Amphibious Leaders’ Symposium was what people understand and appreciate with regard to amphibiosity is sometimes completely different. There are close partners as well as some in our own joint force who in their mind’s eye really view amphibiosity as a floating a chow hall, an airfield, a hotel, and a mode of transportation; not a maneuver element, not a C4I node, not a presence effect.”

But clearly, the shortfall in amphibious ships, and support vessels, is of concern the Navy and the Marines.

“The demand side for Phase Zero operations in the Pacific is insatiable. And now we are in the process of distributing our presence among several different locations in the Pacific. Great, but how do we connect all of this into a true operational network? A challenge is that we do not have enough L-class ships; the Commandant and the CNO have made this point very clearly.”

When asked if investment could be increased where would he put it to deal with the demand rhythm and distributed operational requirements, the BG put it this way:

“Give me my 10th Amphibious Ready Group, and more L-class ships in the FDNF (Forward Deployed Naval Force). Then in teaming with PACFLEET, get after the job of dealing with the demands in the Indo-Asia-Pacific which is a growth industry.”

Given the high demand tempo, the Navy and Marines cannot wait around for the proper number of ships to show up, so the approach is to work a broader amphibious coalition and to work various pairings between grey hulls and MSC ships.

“I think that there’s a huge area under the curve to be exploited in experimentation and pairing, or combinations of, gray hull ships with other class ships. I know that in some quarters, that notion is blasphemy; it’s the proverbial slippery slope. But the fact of the matter, it is a practical reality that we need to explore capabilities in combining hulls like LMSR, TAK-E, AFSB, MLP, LCS, JHSV with that L-class ship and see what we can do with it, not assume what we can’t do with it.”

It should be noted that pairings do not make an MSC ship as capable as an L-class ship; but they do provide for greater operational sustainability and enablement of the L-class ship. In a discussion with the Navy, a senior Naval captain made a key point that pairing is crucial as long as one does not equate each member of the pair in terms of capability. A gray hull is neither an MSC ship nor does an MSC ship magically have the capabilities of an L-class ship....

In short, the Marines are leading the way in transforming the very meaning of amphibious operations.

We are only at the beginning of understanding what an F-35B and Osprey enabled amphibious fleet can do and might do; and with it the leavening effect such capability can have on the evolution of a Pacific amphibious coalition.

But one thing is certain: the MARFORPAC organization is crucially involved in shaping an evolving future.

That was five years ago; now as the Australian Army faces its evolving future, how will it tap into the dynamics of USN-USMC integration for blue water expeditionary operations?

The argument can be put simply.

First, the new Australian defence strategy focuses on defense in depth and mobile defense out to the first island chain for Australia which is the Solomon Islands.

Second, the roles of integration of the RAAF and the RAN are quite clear in this strategy, but the Army less so.

Third, the de facto role of the Australian Army is to provide for defense of Australian territory by enhanced mobility within the continent, including base and missile defense.

In the new strategy, the roles of Western Australia and the Northern Territories is enhanced.

The role of the Army in providing for base protection should go up as well.

But the Australian Army in its land wars Middle Eastern phase has become U.S. Army like; not USMC like.

The new strategy de facto calls for a more Marine Corps like Army.

But can the leadership embrace such a shift, even while embracing the concept of an “Army in Motion.”

The outlier in this discussion is the question of how the Australian Army approaches mobility, mobile basing and even expeditionary basing.

And what role the afloat assets would play in this effort; and as well, how the Royal Australian Navy looks at the amphibious force as it looks to expand its integration across the fleet to contribute to the mobility options out to the first island chain?

In a recent discussion with an Australian Army colleague he highlighted the challenge this way:

“Our ships were largely acquired just to fulfill a mobility need rather than combat need.

“It has not been central to our thinking for sure.

“We’re in an area of operations predominantly enabled by others, and the United States, in many cases.

“But we understand the idea of what used to be sea basing, but we haven’t really conceptually organized things.

“For Army, this is a new capability that’s designed to get to the area of operations and then supporting those operations.

“We have fit our thinking into an approach to mobile basing, but conceptually, we haven’t really grasped the whole picture of sea-basing and operations as the USMC is addressing these operations.”

A recent discussion with Brendan Sargeant, the well respected and well-known Australian strategist, underscored how significant the strategic shift facing Australia is and notably, underscored how the strategic shift impacted most directly on the question of the future of the Australian Army in the decade ahead.

According to [Sargeant](#), “As we focus on our region, Army will have a key role, but in terms of the joint force.

“How best to work their role?

“What do they need to be able to do in the joint and integrated force context?

“One answer clearly would be for the Army to focus on how their new interest and capabilities in amphibious warfare would work within a regional joint force context?”

What is the Role of Amphibiosity in Australian Defence Strategy?

Will the Australian Army fully embrace amphibiosity?

Will they shift from the USMC’s legacy position of amphibious ships as greyhound buses to an area of operations to operating from sea and expeditionary bases?

Ian Bostock, the editor of *Defence Technology Review*, has provided a series of articles over the past few months in his journal which highlight a variety of ways to conceptualize how the Australian Army might do so.

The lead article in this rethink was published in his May issue and was entitled “Archipelagic Operations: Why Australia Needs to Get on Board.”

With the new strategic focus on prioritizing Australia’s regional defense, a key capability for the ADF will be their capabilities to fight in an archipelago. This May article looks at how the ADF could prepare itself to do so.

The author, who is an unidentified member of the Australian Department of Defence, argues that the Army’s concept of operations is to deliver a battlegroup as an “entry force for a follow-on brigade, for which no shipping exists, naval or commercial.”

The author poses a core question: “How can Australia make itself capable of fighting in an archipelago?”

The author then goes on to provide an assessment of how to do so, by starting with the nature of archipelagic operations (ARCOPS). “The key is having adequate surveillance and target acquisition plus the mobility necessary for distributed operations, which the force can be bypassed.” The author adds that “the ADF still sees the archipelago as a series of land problems connected by sea transport, rather than as a mutually interdependent environment. That reflects in its persistent attraction to heavyweight equipment ill-suited to archipelagic manoeuvre.”

This would require a highly mobile force which can tap into distributed C2/ISR and have both organic and kill web available strike capability.

“Where can Australia least afford to lose: in the archipelagos on its doorstep or on some distant continental land mass?”

In the months, since the publication of the May 2020 article, Bostock provides a number of insights with regard to how the ADF might embrace such capabilities for the Australian Army to be able to deliver integrated but distributed capabilities to prevail in ARCOPS;

In the June 2020 issue, Bostock addresses the question of helicopters and marinsation. After an article which provides a deep dive on what makes a military helicopter truly marinized, Bostock provides this argument:

HELICOPTER MARINISATION IN THE AUSTRALIAN ARMY

As the Australian Defence Force embarks on a realignment of its structure and capabilities back toward fighting in Australia's region of interest – the Indo-Pacific – and the subsequent realisation that archipelagic operations (ARCOPS) will predominate, the toll that environment will take on in-service and planned equipment and platforms cannot be overstated.

Whilst helicopters operated by the Royal Australian Navy are naturally optimised for shipboard operations, not so those used by the Australian Army. Here, the CH-47F Chinook, MRH90 and Tiger Armed Reconnaissance Helicopter (ARH) are all cleared to operate off the Canberra-class LHDs and the first two from the sealift ship HMAS Choules as well, but none of them are truly marinised platforms.

As the Army prepares to both pivot back to ARCOPS in the Indo-Pacific and replace the Tiger ARH under Land 4503, the issue of marinisation takes on far greater relevance. Land 4503 requires that the aircraft be able to deploy on ships for "extended periods". *DTR* understands that term translates to around 1 to 3 months, although this is more a reflection of training deployment periods than operational deployments.

The question should also be asked whether that figure pre-dates LHD First of Class Flight Trials and the emerging Indo-Pacific deployment schedule.

If the Tiger ARH replacement is to operate in support of land forces deployed on ARCOPS it will do so off the LHDs and from bases ashore where available. Given the level of support required to maintain embarked combat helicopters during an offshore deployment – something the Australian Army has not yet been required to do with Tiger ARH – the LHDs will probably remain the default location for maintenance, repair, refuelling and rearming; duplicating these facilities ashore is not likely to be a luxury an Australian Army task force could afford or execute, as its experience during Exercise Wewak 2012 demonstrated.

So whilst the Tiger ARH replacement will perform the armed reconnaissance and aerial fire support roles over land, on most occasions it will head back out to sea to the mothership parked over the horizon to replenish, before returning on another sortie in support of elements fighting ashore.

Clearly, if the Army is to operate predominantly in physical environments where proximity to the sea is the norm, marinisation needs to become part of Army culture across the board, not just an afterthought in the lead up to an offshore deployment.

With Land 4503 specifically, Army has the chance to address a core aspect of the Tiger ARH replacement functional specification so that marinisation becomes a central tenet of capability rather than simply desirable.

– Ian Bostock

In the June 2020 issue, Bostock highlighted a Royal Australian training event where the amphibious fleet operated with support ships to deliver an overall combat effect. Certainly an effective force as far as it goes and that is the point which Bostock underlines,

There are too few ships "to provide capability across a northern archipelago 5,000 kms wide, 2,000 km deep and made up of thousands of individual land masses, large and small."

He argued that the RAN needs to introduce "a fleet of smaller, cheaper, minimally-crewed landing vessels and watercraft that make distribute amphibious joint operations in an archipelagic environment possible."

And in various issues, Bostock addresses the question of the range of land vehicles which can support such a force. The Aussies have shaped indigenous capabilities to produce such a range of vehicles, and, in my view, the question is the focus of the evolving Australian Army: is it upon operating a heavy combat force at distance or a force optimized for mobile and expeditionary operations in the region?

And this takes us to the November 2020 issue which addresses directly the Army's new landing craft projects. As Bostock argues in opening the November issue: "These new landing craft – to be delivered via Phases 1 and 2 of Land 8710 – will have more payload, greater range and better sea-keeping than the craft they are to replace.

“They will be neither glamorous nor high profile platforms but essential components of Army’s capability aspirations amidst a return to thinking about how Australian forces operate in the Indo-Pacific and engage with the near region.”

In short, Ian Bostock’s journal and his own perspective has contributed significant insight into how amphibiosity can deliver an Australian ARCOPS.

Putting the Viper Option into Strategic Context

Unlike Andrew Mathewson, Managing Director, Airbus Australia Pacific, I do not think all three options — Tiger, Apache and Viper — are one for one options.

The Viper is clearly different as a helicopter designed to operate in the context of the USMC approach to expeditionary and sea-based operations.

A key consideration is how the Australian Army will evolve in the context of the overall strategic shift for the ADF in Australia’s region.

The strategic context factor is a decisive one in terms of whether one chooses a more traditional army attack helicopter or a USMC focused attack helicopter.

That strategic context has been dealt with in two articles which I recently published on Second Line of Defense.

Will the Australian Army fully embrace amphibiosity?

Will they shift from the USMC’s legacy position of amphibious ships as greyhound buses to an area of operations to operating from sea and expeditionary bases?

A look at how significant this question is in terms of thinking through how the Australian Army would be configured was pursued by looking at the analyses which DTR’s Ian Bostock has put together this year in his journal.

He posed his version of my question this way: “How can Australia make itself capable of fighting in an archipelago?”

In my view, analyzing the Viper option can only really be considered if one looks at such a strategic shift and considers how Viper fits in or even enables such a strategic shift.

And it is not the Viper of the land wars which such be the focus of attention, but the Viper transitioning along with the US Navy-USMC team and its return to prioritizing module and expeditionary operations, or blue water expeditionary operations,

I have done many interviews this year with the US Navy and the USMC with regard to this shift, and it is clear that significant change is underway, and a change symmetrical with what Bostock has focused upon.

This is how the CO of MAWTS-1, Colonel Gillette put the transition as he sees it:

“For the USMC, as the Commandant has highlighted, it is a question of how we can most effectively contribute to the air-maritime fight. For us, a core competence is mobile basing which clearly will play a key part in our contribution, whether projected from afloat or ashore.

“What assets need to be on the chess board at the start of any type of escalation?

“What assets need to be brought to bear and how do you bring them there?

“I think mobile basing is part of the discussion of how you bring those forces to bear.

“How do you bring forces afloat inside the red rings in a responsible way so that you can bring those pieces to the chess board or have them contribute to the overall crisis management objectives? How do we escalate and de-escalate force to support our political objectives?

“How do we, either from afloat or ashore, enable the joint Force to bring relevant assets to bear on the crisis and then once we establish that force presence, how do we manage it most effectively?

So where does the Viper fit into this scheme of maneuver?

This spring and summer, I had a chance to talk with USMC officers involved in the digital interoperability transition as well as Marines and Navy officers involved in the redesign of mobile and expeditionary basing.

And in a piece I published earlier this year, the answer to the question of where the Viper fits in was very clear.

And my core point can be put simply: If The Australian Army is transitioning to a an expeditionary approach to leveraging islands and sea bases, then the Viper choice is a clear one.

This is how the evolution of Viper fits into the strategic shift which the USMC is undergoing, a shift which certainly the ADF is engaging in, and perhaps the Australian Army will become a key part of this shift as well.

Digital Interoperability and Kill Web Perspective for Platform Modernization: The Case of the Viper Attack Helicopter

June 16, 2020

With integratability comes an opportunity to shape a kill web approach to platform modernization.

It is a question of how the whole is greater than the sum of the parts, and what each platform not only can contribute to the whole, but what it needs to be a robust and redundant part of the kill web.

This clearly can shape how to think about platform modernization going ahead.

Ensuring that the core platforms have the digital tools to work together, then there is the opportunity to think of the integratable task force and what the platforms operating within that task force can bring to the fight, and what they can leverage from other platforms, and what they can contribute.

A case in point is how to conceptualize the way ahead for the Viper attack helicopter.

Building in Link 16 and video links into the Viper allows it work differently with both Aviation and the Ground Combat Element within the USMC.

And allows it to operate differently within the Navy-Marine Corps team at sea as well.

As argued in an earlier article:

As the US Navy reworks how it is operating as a distributed maritime force, which is being reshaped around the capability to operate a kill web force, the question of how best to leverage and evolve the amphibious force is a key part of that transition itself.

This is a work in progress, and one in which a determination of various paths to the future are in evolution and will be subject to debate as well.

Part of that evolution are changes in other elements of the amphibious task force which can over time play roles different from how various “legacy” platforms can be reworked to provide for new or expanded capabilities for the US Navy overall.

A case in point is how the Viper attack aircraft can evolve its roles AT SEA with the addition of key elements being generated by the digital interoperability effort, as well as adding a new weapons capability to the Viper, namely, the replacement for the Hellfire missile by the JAGM.

What this means is that the Viper can be a key part of the defense of the fleet while embarked on a variety of ships operating either independently, or as part of an amphibious task force.

Because the Viper can land on and operate from of a wide range of ships, thus enabling operational and logistical flexibility, and with integration of Link 16 and full motion wave forms as part of digital interoperability improvements, the Viper can become a key member of the kill web force at sea.

Additionally, with digital interoperability enablement, the Viper can be reimagined in terms of how it might work with other members of the at sea task force.

A key example would be how it might work with the Seahawks operating from the L Class ships as well.

As argued in an earlier article:

My interviews with [NAWDC](#) have underscored how the Navy is working through the question of how the integratable air wing will change when the MQ-25 joins the fleet, and working ways for the Romeo to work with MQ-25 and Advanced Hawkeye will inform Romeo as part of its fleet defense function.

“The Romeo community is already looking at how having sensors onboard the MQ-25 can expand the reach and range of what the Romeo’s onboard sensors can accomplish for the maritime distributed force.

“It is also the case that as sensor demands currently made on the Romeo can be shifted elsewhere.

“The Romeo can refocus its task priorities and enhance its contributions to broader mission sets such as ASW and to focus on contributing capabilities that other platforms within the strike group are not prioritized to perform.”

Clearly, integrating Romeos which fly onboard the amphibious class ships with the Viper would provide a significant enhancement of the flank defense capabilities for the amphibious task force.

And working a Romeo/Viper package would affect as well the evolution of the Romeos that would fly off of the L class ships as well.

And all of this, frees up other surface elements to support other missions at sea, rather than having to focus on defending the amphibs as greyhound buses.

Working cross modernization of Romeo with Viper is an example of how a kill web perspective built on digital integratability can provide a clear concept for providing both timely and cost-effective modernization.

In a follow up conversation with Major Thomas Duff and Mr. Michael Manifor, HQMC Aviation, APW-53, Attack and Utility Helicopter Coordinators, about the Viper maritime attack helicopter, we discussed some ways to think about a way ahead.

One aspect of a cross-modernization approach shaped by integratability is finding ways for Viper to leverage Seahawk.

They noted that the Seahawk has a surface radar which the Viper does not but with integratability, they could have access to that data in addition to what they have organically onboard the Viper.

Currently, Viper and Seahawk pilots go to flight school together.

But what is needed is moving beyond the initial experience to shape an integratable capability with the deployable force.

Another aspect is the emergence of “smart” aircraft which can work together more effectively in combat packages.

For example, aircraft working together in a USMC assault package that could share information on the nearest fuel sources via wave form links, and sharing onboard information such as fuel state and fuel burn rates with such links, can lead to more effective integrated operations.

One such “smart aircraft” is the CH-53K. It as an all-digital aircraft with significant flexibility within its data management systems could, if properly configured, proactively know that an H-1 was in need

of fuel and give them a time buffer to establish a FARP site, which would lead to more effective combat operations as well.

Another aspect is the modernization of the EW capabilities onboard the Viper.

There clearly needs to be enhanced organic EW capability provided for the Viper, but if done in the kill web manner, of being able to leverage the integrated distributed force, it is clearly a case of no platform fighting alone, but being able to both enhance the Viper's survivability, but being able to provide data, and strike capabilities to support the kill web force.

Another aspect is working future weaponization from a kill web perspective.

A key aspect with regard to weaponization is the coming of directed energy weapons within the fleet.

Directed energy weapons reduce logistical footprints, extend ranges and allows for effective engagement across many targets.

It is clear that ships have significant advantages over aircraft with regard to the ability to operate directed energy weapons.

This means that the aircraft which fly with a directed energy enabled fleet will be able to tap into those capabilities as part of the kill web without having to operate them onboard their particular aircraft.

Third party targeting is enabled by a kill web; and with the enhanced impact of both directed energy weapons and the fusing of weapons and remote carriers, there is an expanded role which a modernized Viper can provide.

With directed energy weapons in the fleet, which is clearly coming, the airborne assets working with the fleet can focus more broadly on longer range strike opportunities. This is especially the case as targeting data becomes available from assets operating within the kill web that could inform a shooter like Viper, even though the Viper will not carry directed energy weapons itself.

The question then is putting longer range strike weapons on the Viper itself.

With the coming of low cost, collaborative, and tube launched systems like the Coyote UAS, the Viper can fire at greater distance with targeting data provided by C2 at the tactical edge from a partner platform. Swarms can be created by a system like Coyote UAS, but the swarm does not have to be generated by a single platform, but integratable platforms operating as a wolfpack.

A final point is the absolute centrality of common weapons throughout the kill web force.

A Viper needs to land at a FARP, or FOB, or on a Navy ship and be able to fly with common weapons and expendables. With a distributed missile and swarm UAV capability deployed to mobile or expeditionary bases, an asset like Viper can provide integrated strike capability which empowers a kill web.

The Viper has the ability to land virtually anywhere which means that it can tap into a widely dispersed weapons load outs on ships and FARPs throughout the extended battlespace.

In short, as the kill web approach gains traction, it can clearly affect the way ahead for platform modernization as well as to find ways to get best value out of legacy and evolving platforms and shape the kind of new platforms that will come into the force.

The Viper is a case in point.

The Viper Option

BAE Systems is leading "Team Zulu Viper" in the Australian ARH competition.

Here is their presentation on [their website](#) of the offering and its advantages.

Proven in Australia and ready for the region, the Bell Viper delivers the broadest mission sets across the harshest environments.

Bell is offering the AH-1Z Viper under a foreign military sales framework, while BAE Systems would draw on 65 years' experience and leverage suppliers both new and existing to bring the aircraft into service. Together we form 'Team Zulu Viper.'

Optimising Australian Industry Capability (AIC) is at the core of what we do and is the foundation of the Team Zulu Viper solution. More than 400 Australian businesses attended AIC roadshows to express their interest in joining BAE Systems' 1600-strong supply chain to provide specialised equipment and services for Team Zulu Viper.

Supported by a significant local supply chain, training and sustainment capability across the land and sea battlespace, Team Zulu Viper will deliver a superior and more reliable ARH for the Australian Army.

The Viper has a proven 94% availability along with the lowest maintenance man-hour to flying hour of any helicopter of its type. BAE Systems, with 375,000 incident free flying hours under our Initial Basic Flight Training contract bolstered by more than 25 years of proven reliability in sustaining the Black Hawk, Seahawk and Chinook helicopters, is ideally positioned to deliver through life, in-service and training support services.

Certified for all aero modifications, the Team Zulu Viper solution will keep capability upgrades in-country and Australians in highly skilled work.

From design to delivery, the Viper is environmentally hardened to prioritise safety over land and water. The Viper's design provides a compact and capable deployment with a small support equipment footprint. A single person can deliver a semi-autonomous blade fold in four minutes.

The Team Zulu Viper philosophy focuses on maximising capability, providing high availability, consolidating support requirements and lowering the total cost of ownership. The Viper is the only attack helicopter built to simplify maintenance, training, and supply efforts.

Already deployed in Australia and the Indo Pacific region, the Viper is a proven solution bringing together unrivalled speed, range, capacity and interoperability to deliver combat helicopter reconnaissance, security and attack effects in any environment.

And in a [September 3, 2019](#) article by Andrew McLaughlin, the offering was discussed as well.

Bell has released a statement extolling the virtues of its AH-1Z ‘Viper’ helicopter to replace the Tiger ARH in Australian Army service....

“The combat proven Bell AH-1Z Viper is the only marinised attack helicopter in the world that is specifically designed and built for expeditionary and maritime operations,” a company statement reads. “Marinisation is more than just corrosion protection against saltwater. Unlike unproven and costly add-ons, Bell’s marinisation begins at aircraft design and is built into the aircraft at point of manufacture to insure conformity to shipboard operations.”

The company says the marinisation process also includes the AH-1Z’s composite rotor blades and yoke style main rotor hubs which it says “significantly outperform legacy ‘strap-pack’ type systems which are prone to corrosion and failure”.

The AH-1Z, “also includes semi-automatic blade folding for quick stowage either on board ship or for rapid C-17 deployment, rotor brakes, ease of maintenance, electromagnetic environmental effects (E3) hardening which provides safety against the ship’s powerful radars and other sensors from interfering with aircraft onboard weapons and systems.”

The company also points out the Viper’s commonality with those helicopters operated by the US Marine Corps, some of which are based in Australia on regular rotations to the Northern Territory, and which are permanently deployed to the wider region.

The Unmanned Option

In an article by Marcus Hellyer, ASPI’s senior analyst for defence economics and capability, an unmanned route was proposed.

It’s commonplace in commentary about the Australian Defence Force to say that its force structure looks today a lot like it did 30, 40 or 50 years ago. The structure remains largely the same, while the systems in it are replaced with newer, better, often larger, and always more expensive versions of the old systems. While Defence likes to talk about ‘effects’, when it comes to buying actual equipment, it defaults to getting something that looks a lot like what it’s familiar with.

When we combine this deep-seated institutional trait with the very human tendency to judge the performance of machines more harshly than that of humans, it’s not surprising that Defence’s adoption of autonomous systems has been incremental, to use a polite term, or slow, to use another one.

That’s despite the widespread recognition of the benefits that autonomous weapons systems can potentially provide to militaries have been widely recognised. They include removing humans from high-threat environments, breaking out of manned platforms’ vicious cost cycle, achieving greater mass on the battlefield, exploiting asymmetric advantages, leveraging the civil sector’s massive

research and development spending on autonomous systems, and accelerating capability development timelines.

In a new ASPI report I suggest ways to accelerate the adoption of autonomous systems in the ADF and turn the potential benefits into actual ones.

At its core, it's an issue of trust. Defence has been gradually improving its members' trust in autonomous systems, both individually and collectively. It's also been making moderate investments in improving autonomous technologies so that they are more trustworthy. But others are moving much faster, including potential state and non-state adversaries, and the civilian world.

It's also a matter of reconsidering how we view risk. While it's easy to see risk in autonomous systems, we need to recognise that manned platforms can also present significant capability risk; if they can't protect their precious human cargo on an increasingly dangerous battlefield, we won't deploy them, rendering the investment in them worthless. Defence's investment strategy of doubling-down on manned platforms is itself high risk.

It's time to do more. Securing greater investment in autonomous systems will be difficult, considering Defence's continued heavy investment in traditional platforms, which is unlikely to be moderated in the near term. However, autonomous systems offer the potential for Defence to hedge its capability risk, particularly if they can come at reduced cost and relieve pressure on Defence's investment program.

How can Defence jump-start its approach to autonomous systems? One way to achieve this is to not replace manned platforms with other manned platforms where there's no compelling need to do so. This frees up funding not only for autonomous systems but for other emerging priorities. Another way is to not seek to replace manned platforms with an autonomous solution that essentially does the same job. Rather, Defence could think disruptively and explore new roles that autonomous systems can perform that are quite different from those of current manned platforms.

The Tiger armed reconnaissance helicopter (ARH) provides a clear case in which it's possible for Defence to avoid an expensive 'like for like' replacement of a manned platform. While the Tiger has had a troubled history, the army has publicly stated that it now provides a high level of capability, including operating from the navy's landing helicopter docks in amphibious roles. Defence's Integrated Investment Program is also delivering systems like the Reaper armed unmanned aerial vehicle and long-range rocket systems that provide many of the effects sought from an ARH.

Therefore, this is an area where Defence can experiment safely with the accelerated adoption of autonomous systems without extreme capability risk should that experiment not succeed. It's an ideal area to explore human-machine teaming. It's also an area where accelerated experimentation can produce positive lessons for Defence more broadly.

As part of the strategic and capability review that Defence is currently conducting, it should avoid investment of the roughly \$3 billion needed to acquire a new ARH. Rather, it should keep the Tiger in service while investing around \$1 billion of the funds saved in the development and acquisition of autonomous systems.

While these systems could deliver some of the effects sought from an ARH, Defence shouldn't seek primarily to develop an unmanned version of an ARH. Instead, it should actively explore in an open-

ended way the disruptive potential of armed unmanned and autonomous systems for battlefield aviation.

Such systems would initially complement the Tiger to create greater effects than the Tiger can generate alone. Eventually, this pathway would allow Defence to remove the Tiger and its human crews from the battlespace.

To accelerate this development, Defence could establish an interdisciplinary team, including representatives from a broad range of the army's trades as well as industry and academia, whose sole function would be to identify and experiment with disruptive autonomous innovations in battlefield aviation. By sitting outside Defence's day-to-day business, they would have the ability to think disruptively—to the point of replacing the business as usual model.

And to promote technological innovation more broadly, around \$850 million of the savings realised by not replacing Tiger with a manned ARH could be dedicated to doubling Defence's innovation funds. Currently they represent less than 0.5% of Defence's funding. Doubling them (at no net cost) would send a clear signal that Defence sees itself as a leader in technological innovation.

This approach would offer greater benefits to both the ADF and Australian defence industry than acquisition of a new, manned off-the-shelf ARH and jump-start the transition to an increasingly autonomous future.

Marcus Hellyer is ASPI's senior analyst for defence economics and capability.

This article was published by ASPI on December 11, 2019.

Conclusions

The Australian Department of Defence has indicated several times over the past few years, both in public statements and private ones, that they intend to replace their NH-90s and their Tigers.

A key reason why this is so is the sustainment and ops costs of the fleet.

As [Marcus Hellyer](#) put it in a recent piece:

“The business-as-usual approach can also be seen in Defence's management of underperforming helicopters. After stating for many years that it would make the Tiger armed reconnaissance helicopter work, and then telling parliament it was working,

Defence appears to have lost patience with the aircraft due to its high cost and low availability.... The sunk-cost fallacy has also kept Defence from replacing another chronic underperformer, the MRH-90 utility helicopter. Incredibly, it's Defence's fourth most expensive capability to sustain. Between the two, Defence is spending \$460 million this year to sustain them.”

Hellyer's own recommendation is not to replace these helicopters but to move on to the unmanned options. “Rushing to replace it with another manned helicopter is a high-risk move in the light of the vulnerabilities inherent in helicopters.”

I will turn to that assertion later in this article.

The Tiger Option

The Tiger in the Australian Army has had a tough history. Clearly, many of the challenges which the Tiger faced early on have been dealt with to provide a decent operational armed reconnaissance helicopter.

The Tiger has had similar challenges in the European forces using the Tiger, but as my colleague Murielle Delaporte, has highlighted both in her French defense magazine and in her travel with the French forces in Africa, Afghanistan and the Middle East, the Tiger has become a key member of the French combat forces.

We have published a number of articles on Tiger over the years in operations, and over the past decade, the French have gained more experience with the aircraft, and it has proven to be a significant upgrade over the Gazelle, for example, and is a key part of any assault or ground maneuver force which the French army operates in combat.

To date, 185 Tigers have been produced for France, Germany, Spain and Australia. Three versions of the helicopter were initially identified to be built around a common airframe: HAP (Hélicoptère d'appui et protection), HAC (Hélicoptère anti Char) for France and the PAH2 (Panzerabwehrhubschrauber 2).

In Europe, the TIGER program is managed by European intergovernmental organisation OCCAR (Organisation Conjointe de Coopération en matière d'Armement, "Organisation for Joint Armament Cooperation"). The prime contractor of the program is Airbus Helicopters.

The relatively low numbers of the aircraft, plus the diversity of users poses challenges for a non-European customer such as Australia. But certainly, the French military are extremely competent users of the aircraft and have a close working relationship with Australia, a relationship which we have personally witnessed in both Australia and in France.

The Apache Option

The advantage of Apache for the Australian Army is the very significant numbers of Apaches in use and the global user base. And Australia can work directly with the United States and Boeing to shape their options from a common pool of deployed capabilities.

Also, Boeing Australia has a significant presence in Australia and is working with the ADF on a number of key programs, including the P-8, the Wedgetail, the new loyal wingman program, the C-17 and the Chinook medium lift helicopters.

These capabilities, numbers, global user base, shared investments in a much larger force than Tiger, and significant Australian presence all provide an alternative to the Tiger, beyond the question of the platform itself compared to the Apache.

These are largely like to like choices, but if the Australian Army is looking for a fully sourced and supported global partner, this may well be an alternative attractive to the Australian Army. But this

will provide capabilities for missions similar to how the Australian Army has done business in the Middle East projected into its future regional roles and missions.

The Viper Option

This is a very different option than the first two. If the Australian Army is significantly rethinking its role within an evolving basing strategy for the ADF in the region, then the expeditionary capabilities of the Viper are very attractive.

It is integrated into a sea base, can operate from ship to shore, can be integrated with a wide range of assault assets operated by the Marines to shape expeditionary basing as well as to work with F-35, a major force enabler in train for the Australian Army. If this is the Australian Army's future, then Viper is a very desirable option.

The Unmanned Option

It is clear that over the decade ahead remotes will become a more important payload within the overall combat force. The communications links pose a significant vulnerability, and concepts of operations have to be developed to work through how manned-unmanned teaming will operate in a contested environment.

The USMC is clearly committed to working through ways to develop and operate remotes in conjunction with their assault force, a subject about which I will deliver several articles in next year's reporting. As the Viper adds its full motion video and Link-16 capabilities, it will clearly be part of the working of the remotes within the assault force mix.

Again, if the Australian Army is reshaping its capabilities to be a key expeditionary force, manned attack and reconnaissance helicopters will be key elements for shaping force packages in the decade ahead. Waiting for UAVs to anchor this task, is a bridge too far in my view.