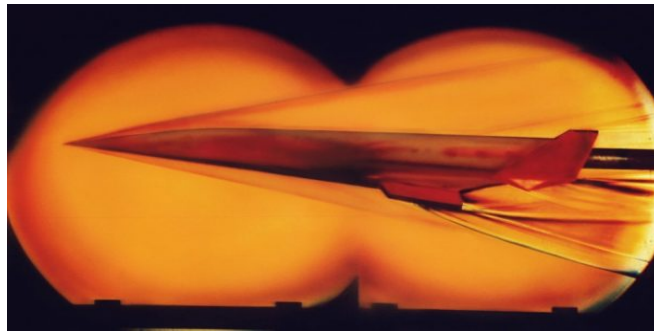


The ADF and the Way Ahead for an Australian Deterrent Strategy



9/30/18

The Williams Foundation Seminar on the Imperative for an Independent Strike Deterrent, August 23, 2018

In this report, the major presentations and discussions at the Williams Foundation seminar on the imperative for an independent strike deterrent held on August 23, 2018 in Canberra, Australia are highlighted along with interviews conducted before, during and after the seminar as well. The focus is upon shaping an effective deterrent strategy as the ADF works its way forward with force integration.

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THE WILLIAMS FOUNDATION SEMINAR ON THE IMPERATIVE FOR AN INDEPENDENT STRIKE DETERRENT, AUGUST 23, 2018

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OVERVIEW

On August 23, 2018, the Williams Foundation held its latest seminar, this one on independent strike. The seminar represents a next phase of examination of the way ahead for the ADF.

Over the past five years, the seminars have focused on the introduction of the F-35 and the generation of new opportunities to shape a fifth-generation combat force.

And the seminars have built out the concept and approach to crafting such a force.

A key question addressed in these seminars was how best to build an integrated force which could go beyond a platform centric approach?

How best to shape a multi-domain force capable of operating throughout the spectrum of warfare?

During the 2018 seminars, the focus shifted from building the force to the conditions in which that force would operate in the period ahead.

How to shape an effective deterrent strategy for higher end conflict and crisis management?

Put in other words, the focus shifted from the acquisition of new platforms and to the process of shaping a more integrated force, to the environment in which that force will operate and shape demands for enhanced deterrent effects from the force.

The seminar in March 2018 addressed the strategic shift and its consequences for the warfighting approach for the ADF and the core allies for Australia.

And with the August seminar, the question broadened to begin an examination of new means to enhance sovereign options as part of an evolving deterrent strategy.

As such, the August seminar began a process of looking at the evolution of Australian defense capabilities through a sovereign lens.

The seminar provided a series of snapshots of how best to understand the challenge and how to shape a way ahead to provide for enhanced sovereign options.

The morning session broadly looked at the question of deterrence in the period of the strategic shift and how the ADF might operate effectively to provide for deterrent options. Several questions were framed as tasks to be worked in the period ahead, notably in terms of nuclear threats, and evolving capabilities and strategies of competitors as well as evolving approaches and interests of key allies.

The afternoon sessions addressed the evolving environment within which strike systems themselves were evolving. Notably, with a fifth-generation force fundamentally changing the sensor-shooter relationship how best to incorporate new strike capabilities?

How best to leverage diverse platforms or capabilities within which strike could be more effective in playing a deterrent function?

A key question on the table was how best for Australia to shape its strike portfolio, lethal and non-lethal, as well as the question of how best to deliver such strike, from land, sea and the air.

What are the best ways to deliver effective deterrent strike for an evolving fifth generation force and how best to do so to ensure the defense of Australia within an effective alliance structure?

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Next year's seminars will continue to focus on the question of how best to evolve Australian defense capabilities from the standpoint of enhanced Australian sovereignty, undoubtedly a key element to be addressed in any future Australian defense white paper as well.

Certainly, a key question facing Australia is how best to build out its strike capabilities and within this effort, how might a missile industry might well be developed to enhance the sustainability and capability of the force.

And as geography returns as a key element in the defense of Australia, how might basing and mobility be introduced as key capabilities in the North and West of Australia?

While a work in progress, clearly considering sovereign options and building them into the evolving force is a key consideration for Australia and the ADF going forward.

In my interview with the Chairman of the Williams Foundation after the seminar, he highlighted a number of the key issues raised by the seminar which will inform the discussion about the way ahead.

Question: How do you view the way ahead with regard to the evolution of the ADF to provide a wider range of sovereign options?

Air Marshal (Retired) Brown: The Defence White Paper of 2016 guides the current modernization effort. It provided a coherent framework for force modernization.

But a lot has changed since then and we need to rethink the strategic guidance and the shape some additional force modernization elements.

The future is much more unpredictable. With Trump, we have seen a honest statement of the priority of American interests. We need to take account of the priority, which America will place, on its interests when we go forward. And to be clear, this is not simply Trump, but the reality of what powers will do in an Alliance as well.

We need a much more sovereign approach to defense.

That's not saying we should walk away, or not contribute to or benefit from the American alliance. But, we've got to be much more prepared to be able to act on our own in certain circumstances.

And by being able to do so, we will be a better Alliance partner as well,

Question: There clearly is the nature of the changing threat to Australia as well, notably in terms of North Korean nuclear weapons and the Chinese pushing their capabilities out into the Pacific and expanding their regional presence as well.

How do you view this part of the equation of the need for greater sovereignty?

Air Marshal (Retired) Brown: We need to have a greater capability to hold competitors at risk at greater range and distance.

The North Korean case shows that nuclear weapons are not going away any time soon. The Chinese have clearly focused on significant investments in longer range strike.

This means as we do the next defense review, we need to focus on options which can allow us to deal directly with these challenges and to shape how we do so within the reworking of the relationship with our allies going forward.

We need a major reset building upon the force integration process which we have set in motion.

Do Japan or South Korea go nuclear?

We need to have a realistic discussion of the nuclear impact on our defense policy as well.

What makes sense to do?

And how to do it?

Question: The question of the reach of Australian forces in a conventional sense also raises the question of the relationship between Australian territory, notably NW and Western Australia and the evolution of your defense forces?

How does the territorial dimension come back into play?

Air Marshal (Retired) Brown: Clearly, we need to look at ways to enhance our force mobility and to build out both active defense and long-range conventional strike in our territories closest to the areas of operational interest, both ours and the competitors.

The Australian Army is focusing in part in the evolution of fires both defensive and offensive, but we need a bigger commitment on this side of the force and with longer range, which could operate from our own territory as well as being projected forward outside of Australia.

Question: How does the strategic shift in Australian industry fit into this calculus of enhanced sovereignty?

Air Marshal (Retired) Brown: It is crucial.

As you noted, the shipbuilding side of industry is clearly about sovereignty and we need to look to expand sovereignty in the strike domain as well.

A key area going forward clearly should be in the missile development, build and sustainment area, where we can clearly build out our own capabilities in relationship with core allies also interested in this process.

And by flying the F-35 with a number of partner nations, there clearly is an opportunity to build out this capability as well.

Question: I assume if you are interested in longer range strike you would be looking to something in the range of a 2,000-mile missile but given the focus on industry and working with allies, wouldn't a modular build process make the most sense, where you can build various ranges into your missile production based on modularity?

Air Marshal (Retired) Brown: That would make sense.

But I think we need a serious look within our focus on shaping industry that both meets Australia's needs as well as those of key allies in the missile or strike areas.

We build ammunition and general-purpose bombs in Australia but we have never taken that forward into a 21st century approach to missiles and related systems. We should rethink this aspect of our approach.

There are plenty examples of success in arms exports; there is no reason we cannot do so in the weapons area, for example.

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STRIKE, DETERRENCE AND THE RAAF

The Williams Foundation seminar on joint strike and deterrence was led off by a presentation by Wing Commander Jo Brick.

The WGCDR focused on looking back at the experience of the RAAF in the strike domain historically and then posing questions about the way ahead for the RAAF within a joint force.

What is the role of joint strike in an Australian deterrent strategy?

She started by providing an overview of how she saw the context and the challenge for Australia today.

Since the advent of air power in the early 1900s, the threat of bombardment – both nuclear and conventional – has been perceived as one of the most effective measures for deterring potential aggressors or punishing those who have dared to cross the threshold of force.

Deterrence is broadly defined as ‘discouraging states from taking unwanted military actions, especially military aggression’.

The strike capability that is offered by air power as a result of its characteristics – reach, responsiveness, firepower, and precision – and have made it a useful means by which to assert a deterrence strategy.

Notably, much of the discussion in the 1970s and 1980s focused on the central place of air power in delivering Australian strike capability. In relative terms, during this period, land and maritime forces were not seen to have a significant role in offering a deterrent strike option, though both of them did add to Australia’s overall deterrence posture.

Further, much of the deterrence thinking during the Cold War focused on strategic nuclear options that were delivered via Intercontinental Ballistic Missiles or heavy bomber aircraft.

This again skewed much of the thinking regarding deterrence towards the primacy of strike via air power. The relatively favourable position occupied by Air Forces in this regard became a solid foundation for an independent Air Force that was not just an adjunct to the Navy or Army.

The end result of all these developments was a line of reasoning that inevitably fused deterrence with strike (bombardment) and air power.

This model was useful for Western countries during the Cold War, when there was a known threat – the Soviet Union – that could form the subject of detailed deterrence strategies; and when air power capability was the most appropriate option to support it.

The contemporary security environment offers a different set of challenges from the Cold War that arise from the changing character of war.

There are multiple, diverse, threats from both state and non-state actors; the information domain has become a vital part of the battlespace that must be managed accordingly; and there have been revolutionary developments in the means and methods of war.

This includes the increasing accuracy and range of weapon systems available to all the Services, the development of non-kinetic options that may also offer the same effects as traditional kinetic strike, and an integrated approach to warfare.

All these factors will require Australia to determine the kind of military posture that is required to maintain an effective and credible deterrence strategy in this context.

While deterrence and strike will continue to be linked, air power is unlikely to remain the primary provider, with greater emphasis being placed on the enhanced capabilities delivered by joint strike.

Further, as the lines between peace and war become blurred, strike as a deterrence option must be nested within broader conceptions of diplomacy and strategic engagement that accommodate ongoing shaping and influencing efforts, through effective management of the information environment, that form Australia's narrative of deterrence.

During her look back, she addressed the role of the F-111 as well as thinking at the time of the acquisition of the F-111 with regard to nuclear weapons.

This was an especially important phase in Australian deterrent thinking because it combined the acquisition and operation of a long range-strike platform with considerations of nuclear deterrence as well, something which may clearly be on the agenda again for Australia.

During the late 1950s military strategic guidance asserted the prevalence of limited war over global war, and the need for Australia to develop military forces that could form part of an alliance or take independent action to defend Australia's northern approaches against potential aggressors.

Strike aircraft, for the purposes of deterrence, were central to this policy.

The Chiefs of Staff Committee at the time considered that China and Indonesia posed the likely air threat to Australia.

The Sukharno policy of 'Confrontation' towards the new state of Malaysia also elevated the perceptions of the threat posed by Indonesia in the early 1960s. These factors led to policies that emphasised the need to deter such potential aggressors through the development of a strong air strike capability.

As a result, in 1963, the Menzies government ordered a number of 'Tactical Fighter Experimental' or 'TFX' bombers – later renamed the F-111, which remained the RAAF's primary strike aircraft during the Cold War until its retirement in 2010.

Before the decision to acquire the F-111, tactical nuclear weapons for the Canberra bomber were also considered, but the option was shelved due to intelligence assessments that dismissed the possibility of nuclear attack on Australia as a primary target.

Further, reliance was placed on the nuclear umbrella provided by the United States under the ANZUS alliance.

For the RAAF, the conventional bomber became the 'strike force' that was seen by the air staff as 'the essence of deterrence' and 'the primary expression of military strength'.

Strike aircraft were necessary for seizing control of the air through destruction of enemy air forces on the ground, followed by the destruction of strategic targets, and then support to the Navy and Army.²¹

This doctrinal foundation was maintained throughout the 1980s and 1990s.

After having provided an overview on the past and the key role which strike aircraft have played on Australian deterrent thinking within an alliance with the United States, WGCDR Brick then considered the

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relevance of this narrative to the contemporary situation and shaping a way ahead for the ADF within an evolving Australian deterrent strategy.

The emergence of new security threats such as non-state actors, and the significance of information as the currency of the 21st century, means that approaches to deterrence must be reconsidered.

Credible conventional options for Australia go beyond air power, and require an effective and integrated joint force.

Communicating a credible message to opposing countries requires a consistent narrative that involves hard and soft power options and a consistent deterrence message that bridges war and peace.

These approaches to deterrence require Western countries, such as Australia, to take a long term and coordinated approach to national strategy, whose credibility is underwritten by a resilient and capable joint force.

Her focus was upon the importance of the joint force providing capabilities for the Australian government to be able to shape a variety of coercive or persuasive means against potential adversaries.

Although she did not put it this way, the key challenge of crisis management with peer adversaries has become a central one, and deterrent strategy needs to be built to allow Australia and her alliance partners to find ways to persuade authoritarian states that the risk outweighs the gains to engage in or continue challenging Australian interests.

She clearly has in mind the ADF shaping a much wider range of joint tools within its quiver to allow the Australian government to expand its options sets with regard to influencing adversary behavior.

Developments in military capability, including non-kinetic options such as cyber-attack, have provided the ADF with the opportunity to create integrated joint capabilities to support Australia's deterrence strategies.

She then added her assessment of the Russian approach and its relevance to innovations in 21st century approaches to deterrence.

While deterrence has always been considered a whole-of-government strategy, the added complexity of the current strategic context requires us to re-consider the importance of all elements of national power.

An example of this is the holistic approach to deterrence that can be found in Russian strategic culture, which takes a 'cross-domain' approach to coercion that is tailored for different actors.

What is interesting about the Russian approach is the significance that is accorded to the informational tools of influence, involving manipulation of an opponent's perception of reality to impact on decision-making.

Termed, 'informational struggle', it involves a holistic merging of digital and cognitive-psychological actions; it is unified in that it synchronises kinetic and non-kinetic military effects; and it is continuous or uninterrupted in that it is employed in peace and in war.

The Russian approach involves a merging of hard and soft instruments of power. Conventional deterrence theories are centred on military capabilities – I just spoke about joint and integrated warfare previously.

However, given that deterrence is largely about communication and credibility, the incorporation of hard and soft power, and the focus on information effects in Russian deterrence theory has much to offer the Western strategist considering deterrence in the 21st century.

The approach to deterrence, the narrative as the WGCDR put it, is a key part of building 21st combat forces and shaping their concepts of operations.

It is not just about abstract capability or filling out the pages of a Jane's catalogue on military equipment, it is about an ability to prevail in a crisis and to position oneself to be on the ride side of war termination.

As [Paul Bracken](#) has put it with regard to the challenge:

The key point for today is that there are many levels of intensity above counterinsurgency and counter terrorism, yet well short of total war. In terms of escalation intensity, this is about one-third up the escalation ladder.

Here, there are issues of war termination, disengagement, maneuvering for advantage, signaling, — and yes, further escalation — in a war that is quite limited compared to World War II, but far above the intensity of combat in Iraq and Afghanistan.

A particular area of focus should be exemplary attacks.

Examples include select attack of U.S. ships, Chinese or Russian bases, and command and control.

These are above crisis management as it is usually conceived in the West.

But they are well below total war.

Each side had better think through the dynamics of scenarios in this space.

Deep strike for exemplary attacks, precise targeting, option packages for limited war, and command and control in a degraded environment need to be thought through beforehand.

The Russians have done this, with their escalate to deescalate strategy.

I recently played a war game where Russian exemplary attacks were a turning point, and they were used quite effectively to terminate a conflict on favorable terms.

In East Asia, exemplary attacks are also important as the ability to track US ships increases.

Great power rivalry has returned.

A wider range of possibilities has opened up.

But binary thinking — that strategy is either low intensity or all-out war — has not.

The deterrence narrative which WGCDR Brick is calling for needs to operate in the domain described by Bracken.

THE SECOND NUCLEAR AGE AND DETERRENT OPTIONS FOR AUSTRALIA

The Williams Foundation seminar held on August 23, 2018 on independent strike was operating within the background of the overhanging issue, or the elephant in the room, of the second nuclear age.

The question of what deterrence looks like with the rise of new nuclear powers and a more powerful conventional military force in the possession of a global authoritarian state, namely China, is a key one facing Australia.

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The alliance with its major ally, the United States, as a nuclear power is a key element of the equation, but what might Australia do as it builds out deterrent options to better protect its options and to enhance the probability that extended deterrence is credible to China, Russia and North Korea?

It can be overlooked that there are already three nuclear powers in Australia's region, and for two of them, the classic Cold War equation is not operative. For North Korea, this is obvious. For China, it is less so, but ultimately the Chinese are shaping more credible conventional forces options using its territory as a base, with the clear assumption that their nuclear capabilities provide a strategic umbrella over the use of their own territory to project power into the Pacific.

This does mean that as the Chinese move out into the Pacific they will face the capabilities of major powers in the region who have the capabilities to cut those forces off from the mainland. Do the Chinese nuclear weapons play any role in trying to prevent this?

In the presentation by [Michael Shoebridge](#), Director of Defence and Strategy at the Australian Strategic Policy Institute, a number of these questions were addressed from the standpoint of Australian options.

Nuclear weapons are great equalisers.

But they can't be the basis of equality between North Korea and the US. In coming years we'll be struggling to unpack effective models of deterrence that stop Pyongyang from over-reaching.

The proliferation of offensive strike capabilities draws us deeper into a world of strategic uncertainty.

The world doesn't have good deterrence models for the nuclear contests between a rogue state and a superpower.

Classic deterrence works best as a relationship between two responsible, risk-averse great powers, both of whom have a sound understanding of the costs of great power war.

Deterrence relationships between risk-tolerant rogues and risk-averse superpowers are likely to be more fraught—not because the risk-tolerant state lightly runs nuclear risks but because it runs risks at the sub-nuclear level because it believes itself to be immune from retaliation.

The doctrine of extended deterrence in a period where the non-proliferation regime has become seriously challenged is itself seriously challenged.

At a minimum, those emerging deterrence models threaten to make credible articulation of the US doctrine of extended nuclear deterrence more challenging.

That doctrine was built for a different age—the age of risk-averse near peer adversaries.

As I've mentioned above, it's not obvious to me that the US will be willing to run nuclear risks on behalf of its allies in a more densely proliferated nuclear world, where rogue actor behaviour is less predictable.

Such a judgement clearly poses the question of what should Australia do to enhance its deterrent options?

Here the prescription really revolves around the question of how to reinforce the credibility of extended deterrence.

How might Australia do this?

Our first and by far most important line of reaction to the risks of nuclear proliferation should be to think what we and our partners can do to reduce that risk.

One big step is to keep the transparency light on North Korea in the post-Summit afterglow – and underline the fact that the North Koreans are showing no signs of actual denuclearizing – which for anyone who has listened to Kim Jong Un at and after the Summit and watched North Korea in the past is entirely unsurprising.

But if that fails now what?

The intimidation effect of a nuclear armed state is sufficiently great that this seems to me to be very likely indeed to stop an Australian Prime Minister from using offensive strike beyond Australia's territories.

To take a pretty clear example, the idea of posturing to reach out and touch Beijing's leaders with precision conventional weapons just seems outlandish to me as anything but a way of ensuring a destructive counterstrike that is not conventional.

This does put aside the question of how then to directly strike Chinese forces operating in the region, and how to separate the threat of nuclear use from an ability of Australia to defend itself and work with allies to stop the Chinese in their tracks as the not only project power into the region but use it.

What then?

Kinetic strike is not the only kind that can deter others. The rise of the cyber world has created a new potential form of long-range strike: offensive cyber.

The attraction of this new capability is its global reach and its uncertainty: this kind of logic will be very familiar to the submariners in the audience.

The value of uncertainty about where a cyber capability is and what it might be prepared to affect makes it a tool of potentially large importance in the world of deterrence.

Yet its opacity and uncertainty can also reduce its value. And cyber tools tend to be boutique things that take a lot of preparation, but once revealed can be countered fairly rapidly.

So, the problem of how to signal capability without exposing it is one that is still to be worked out.

A further limitation on broad use of offensive s cyber for strike is that containing the effect is not simple – think of the StuxNet virus that seems to have been intended for limited use on a non-internet connected system, but went beyond that, and of the cyber disruption brought about by Wannacry and NotPetya.

Even within kinetic strike, Australia might have options other than air launched.

Pre-positioned Army units with ground launched anti-ship and aircraft systems could work with regional partners to strike adversary forces at a distance from Australia.

Australia's new naval combatants —surface and sub surface—might be equipped with cruise missiles or missile systems that fit into the launcher cells of ships. These require pre-positioning.

The option of air delivered lethal effect at range needs to be considered along with such other strike options.

The good news is that any offensive strike capability Australia might consider needs many similar underpinning enablers and capabilities if it is to be targeted effectively and if decisions on use are to be made well.

Among the enablers will be strong policy frameworks that put the posturing of strike and its potential use within a broader strategic framework.

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Long-range strike if emphasized would thus be in a context and if it involved direct confrontation with China, the US would very much be involved and hence it boils down to finding ways to make sure extended deterrence as well as credible conventional options to influence Chinese thinking.

Deterring great powers or nuclear armed powers from attacking Australia still seems best dealt with by reinforcing our alliance relationship with the United States.

Australia's circumstance here is quite different to South Korea of Japan, as a situation where Australia's security is threatened directly is likely to be one of a wider regional conflict in which America's direct interests are more engaged even than in North Asia.

This makes sense but earlier in his presentation Shoebridge highlighted the problems he had with President Trump as a custodian of US national security policy.

US President Trump's seeming willingness to give way on US allies' interests in his negotiations with Kim Jong Un – most obviously with his unilateral decision to halt US-ROK military exercises (and to use DPRK boilerplate language to describe them as 'provocative' 'wargames') is big news not just for the South Korea but for Japan and for other US allies – including Australia.

This signals that America First may not just mean trying to get allies to pay more for their defence, but also the potential for US security guarantees – including extended deterrence—to be less reliable.

Secretary Mattis has been strong in saying this isn't so, but Donald Trump, not Sec Mattis, is the President of the United States.

When it comes to something as fundamental as extended deterrence, saying that the undercurrent of US policy remains, or speculating about whether Trump will or won't get a second term is not a great way of generating confidence.

So what is Plan B?

THE SECOND NUCLEAR AGE AND THE RETURN OF THE NUCLEAR ISSUE FOR AUSTRALIA

Paul Bracken, has forcefully focused on the issue of deterrence in the wake of new weapons dynamics in his work on the [second nuclear age](#), and his work has certainly underscored the forceful return of the nuclear factor in great power considerations as well as for states which may well find the acquisition of nuclear capabilities to be an effective way to gain financial and diplomatic advantage.

But is clear that the great power conflict we are now focused upon involves powers which possess nuclear weapons.

How then does the return of the nuclear dimension affect allies of the United States who do not possess them but rely upon the United States to possess an effective arsenal and strategy to deal with return of the nuclear dimension.

Certainly, the last Administration clearly did not want to think about this and the President pursued a nuclear free world, which certainly does not seem to be any more realistic than his Syrian red line.

Now we have a new Administration which has focused on the return of the nuclear dimension and in its recent nuclear posture review looked at options and discussed the need to reintroduce nuclear cruise missiles as part of the effective combat force.

But how does the return of the nuclear dimension and evolving US policy affect Australian options and ways ahead?

At the recent Williams Foundation seminar on independent strike, one of the speakers, [Dr. Stephen Fruehling](#) from the Strategic and Defence Studies Centre of the Australian National University, provided an insightful look at the options and impacts upon Australia of the new strategic situation.

His presentation follows:

Australian Strike Capability and Nuclear Deterrence

It's certainly remarkable that nuclear weapons have made a return to Australia's defence debate, if you can call this what's going on in the relevant blogosphere, not least following more or less subtle hints by Hugh White, Paul Dibb and Richard Brabin-Smith that Australia might need to consider looking at relevant lead-times again, in the way the Defence Committee recommended to Governments from the late 1950s to the last Strategic Basis Paper of 1983.

Australian nuclear weapons is not what I will discuss today, however, although I might point you to an upcoming edition of Australian Foreign Policy, available in your well-stocked neighbourhood bookstore, for more on that issue.

That said, the question of what circumstances and to what end Australia might acquire nuclear weapons is an interesting one, since it really draws us to think about when not just our current force and posture, but also credible increases and a conventional posture in general would stretched to breaking point – and that certainly is of relevance to discussing the future of Australian independent strike.

But the current revival of interest in nuclear weapons is real, and it goes far beyond Australia – if anything, I would say the debate here as usual lags that of the northern hemisphere by several years.

At the heart of this is the return of great power conflict to the centre of Western security concerns, and this is something where nuclear weapons simply cannot be ignored as an integral part of the problem, and how we will manage it.

NATO's re-focus on collective defence since 2014 has brought with it a revival of institutional and governmental interest in, and engagement with the practical and political aspects of the Alliance's nuclear posture and deterrence, in a way we have last seen during the Cold War 30 years ago.

At its recent Brussels summit, the alliance reiterated that "If the fundamental security of any of its members were to be threatened, NATO has the capabilities and resolve to impose costs on an adversary that would be unacceptable and far outweigh the benefits that any adversary could hope to achieve".

As the Alliance re-examines the role of nuclear weapons in a coherent deterrence posture, it re-discovers old realizations such as that nuclear use by NATO should be remote, but should also not be left to the point where it ceases to be a choice; and that if there is not to be an option for conventional victory over NATO, NATO does need a credible nuclear option.

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In Asia, the return of nuclear weapons is less obvious since there is no nuclear alliance in the way that NATO is. Interest in nuclear deterrence, and possibly a domestic capability, in Japan and South Korea has now been part of the regional security landscape for quite some time.

What is different today however is that we have in Washington an administration, if one looks beyond the tweets, that has stopped pretending that business as usual would be enough to deal with the shifting conventional balance in Asia; that dealing with that balance is a genuine challenge in which the United States cannot assume it will by some natural right succeed; and that it is a challenge they are determined to take on within the constraints that competing fiscal demands in DC place up the US defence effort.

We've been there before. 65 years ago, President Eisenhower was in essentially the same situation, and he looked to nuclear weapons as the great equalizer. I don't propose that we are about to return to the heady days of the early atomic age, but I will put it to you that the United States will face a choice between increasing once again the role of nuclear weapons in regional deterrence, or reducing its role as a security guarantor.

The proposal to develop a new generation of submarine-launched nuclear cruise missiles in the last Nuclear Posture Review demonstrates where the current defence leadership wants to come down on that choice.

Any of those who argue that nuclear weapons are essentially useless will, sooner or later, be confronted with some basic facts of physics, such as that nuclear weapons remain the only way to stop an amphibious invasion of a defended island by delivering a single piece of ordnance.

What does all of this mean for Australia though?

First, in a world in which we are concerned primarily about conflict with and between nuclear great powers, and the role of Australian strike in such a situation, we need to think seriously about war termination. When we look at long range and precision strike in a defence force that has some of the most shiny kit available in its inventory, there is always a danger of tactical enthusiasm trumping strategic logic.

This isn't a completely new problem, in that strategic guidance during the 1970s and 1980s was always somewhat cautious about the role of strategic strike in a conflict with Indonesia. But that was a question not about what Australia could do in a war with Jakarta, but what would be prudent to do, given that war is ultimately about the nature of the peace that follows.

Now, however, we also need to acknowledge the operational limits of a conventional force. At the time of the 2009 White Paper, which mentioned land-attack cruise missiles for our submarines, there was certainly some rather silly debate, I think, which ignored the rather large delta between the damage that a few dozen of half-ton warheads can do to a nation of a billion people, and what might be required to force an end to hostilities on Australia's terms.

Some gaps are simply too big to fill with power points on Effects Based Operations.

When we contemplate conflict with a nuclear armed great power, we face an adversary that will always be able to take greater losses, and inflict more pain, on us than we are able to on them. Conflict will end not because of Australia could force an end to it, but because of the outcome of campaigns elsewhere, or because the cost-benefit calculation of the adversary shifts to make continuing conflict with Australia not worth the bother.

This means we need to think about strike in a way that does not reinforce the adversary's emotional investment in the conflict with Australia, while still increasing the cost of any offensive operations they might

choose to undertake against us. In that sense, I think the geographic limits of Australian independent strike, given the range of F-111 and current airborne systems, up to the Northern ends, but not much beyond the Indonesian archipelago, still make a lot of sense, even if the adversary's main base areas are located further to the North.

But it means that within that geographic envelope, the volume and intensity of strike we can deliver will be particularly important, as the adversary will be able to concentrate at a time and place of their choosing. And when Australia's theory of victory has to rest on exhausting the adversary, attrition will be the name of the game, including attrition of ADF strike assets.

Where do nuclear weapons play into this?

It is useful to think about the role of nuclear weapons in three different ways:

First, as a complement to conventional forces, bypassing the force-on-force battle to deliver a level of societal damage sufficient to induce war termination on their own.

Second, as a tactical substitute for conventional forces, which thanks to their yield-to weight ratios are able to deliver physical damage to major units and installations with an incomparably smaller number of ordnances than could ever be achieved with conventional means.

And third, in a strategy of flexible response, though use or threat of limited use, to deter or to bring about an escalation of conflict, so that we can manage the perception of cost and benefit for an adversary in the hope of forcing an end of hostilities, with an end state that manages to avoid the two perils of defeat as well as of a general nuclear war.

It is a complement to conventional forces that nuclear weapons are sometimes referred to as "the deterrent". But to be deterred is a choice by the adversary, there is nothing mechanical about it and we need to be very careful in how we use that term in relation to Australia's strike capability.

Deterrence works by making threats of unacceptable counteraction in advance of bad things happening, which is not even necessarily a kind of relationship we would want to have with our neighbours even if where we might be able to inflict that level of punishment.

Therefore, the formulation in some earlier strategic guidance documents of the ADF needing to be of a size and capability to always command respect and induce caution in adversaries is a more modest, but politically more appropriate, and strategically more credible way of thinking about ADF strike, unless and until we swap the explosive end of our ordnance for something a bit more powerful.

Thinking about nuclear weapons as a substitute for conventional forces on the other hand brings us to that stress-test of a purely conventional ADF that I mentioned earlier. Given what we know already about Chinese interest in developing potential base facilities abroad, and as we are talking about the long timespans relevant to the acquisition of major capability, we need to assume that the adversary will already have established air or naval bases in Australia's approaches at the outset of a conflict.

Given the size of Chinese armed forces and the nature of its installation already existing in Djibouti, we need to assume that these will be garrisoned to a size that will preclude amphibious operations as a means to destroy such bases. Hence, we're back to a replay of the Rabaul campaign under modern conditions, which will require sustained strike against an adversary that will be prepared, hardened, dispersed, and able to inflict attrition on Australian forces.

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Even before we take into account, the need to also meet adversary manoeuvre forces, I think it is very doubtful whether we could ever acquire cruise missile stocks large enough for such a campaign. While we might in future buy enough fighter-bombers to afford attrition over time, the question is how many tankers could we afford to lose before such a campaign unravels. If we think about stress-testing our current force mix in that way, I think we thus need to come to three conclusions:

First, we will in coming decades have a need for a survivable long-range bomb truck, of a kind where the new US long-range bomber is probably the only airframe currently on the horizon that approximates our requirements.

Second, when push comes to shove, there may well be targets in Southeast Asia where the unrivalled yield-weight advantages of nuclear weapons would provide significant military benefit to an allied campaign.

Third, the archipelago of Southeast Asia is the one area in the broader Indo-Pacific area where the most opportune targets for initial allied nuclear strikes will be located if the United States looks to escalate a conflict to the nuclear level.

This third point may seem like a bit of a leap, but a logical conclusion if one eliminates the alternatives. Like their Soviet predecessors, Chinese bases in the Indian Ocean are so exposed to US forces from the Atlantic that they are unlikely to remain in play for very long. If we and the Americans roll-up Chinese forces in Southeast Asia the war doesn't seem to be going so badly that the US and its allies would look to nuclear use. And Northeast Asia is so proximate to major population centres of both sides, and unlikely to feature adversary bases outside the Chinese homeland itself, so that any nuclear use up there would make for far more challenging escalation control.

Given that Australia has most to lose from enduring adversary presence in our approaches – Japan's control of the German mandate islands after World War One comes to mind as something worth remembering – we might not actually be that unhappy about such a development.

Hence, if we are looking at the effectiveness and role of strike in general in our region, there are reasons why I think it behoves on us to study the tactical as well as strategic and political considerations of nuclear use in our approaches in much greater detail than we have done since the 1950s.

The first is that we probably understand the limits of conventional forces in a contemporary maritime context far better than the potential advantages of nuclear use, whether that is Australian or more likely US use. The earliest influence of nuclear weapons on the conduct of naval operations was during the Korean War, when the US fleet at Pusan was spaced so as to minimize the damage from airborne Soviet nuclear attack. For reasons of effectiveness, low collateral damage and relative ease of escalation control, tactical nuclear weapons remained fundamental to naval concepts of operation in the Atlantic until the end of the Cold War.

But while it is easy to see how nuclear weapons they remain effective against fixed installations, are they as effective in a naval context today as they were then, given the extent to which modern air and naval forces can disperse in a networked environment anyway?

Without understanding the tactical benefit of nuclear weapons, we cannot have an informed discussion of the relevance to the defence of Australia or the defence of Southeast Asia, or what a 'militarily meaningful' initial use of nuclear weapons by the United States might look like, which Australia would have to look to if conventional strike capabilities are exhausted.

And if the history of the debates between Australian, US and UK planners in SEATO days is any guide, our assessment of their benefit in our particular circumstances does not necessarily align with that of our allies.

Second, well short of those considerations of actual use, we do have to ask how Australian independent strike capabilities relate to the need for demonstrating a credible US capacity for nuclear escalation and intra-war deterrence in our region. Nuclear signalling, coercion, and the dispersion of nuclear forces to maintain credible options for limited use have been part of major crises between peer great powers throughout the atomic age, and will remain so in the future.

In any major crisis with China, the United States will look to Australia as a dispersal area for long-range air assets, and that will bring with it nuclear connotations whether we like it or not.

If our strategic circumstances continue to deteriorate, we may well welcome this and even seek greater physical linkage with US nuclear forces in the way that exist in NATO, and Japan and South Korea have explored for some time. But Australian strike forces will be of relevance to nuclear signalling well short of nuclear sharing. In contemplating Australian independent strike in a conflict with a nuclear power, we will be operating aircraft or weapons systems that might be very difficult if not impossible for the other side to distinguish from US nuclear capable systems, and the question of whether and how Australian forces might be called upon to support US nuclear operations from and in our region, if only for signalling, will pose difficult political questions that we have not had to deal with in our alliance yet.

In conclusion, nuclear warfare and strategy are about the ability to deliver massed violence, but exactly for that reason they always also induce a measure and need for restraint. In those scenarios that will seriously test our force, and our defence posture and policy overall—in other words, those scenarios where independent strike really counts—we will not be able to escape the shadow of nuclear deterrence. Hence, when thinking about the future of Australian strike in the shadow of nuclear weapons, we will need to be able to deliver a far greater volume of massed violence at range than we are able to at present – we will also have to think a lot harder about when and where it would be more prudent to exercise restraint when we come to heads with nuclear powers.

THE WEAPONS REVOLUTION: A LOOK AT THE STRATEGIC CONTEXT OF WEAPONS MODERNIZATION

One of the key elements of discussion at the seminar was the evolving nature of missile modernization and the evolution of strike systems in a contested strategic environment.

Three presentations in particular focused directly on this topic. The first was by Group Captain Jason Begley, Director Joint Effects, Headquarters Joint Operations Command. The second was by Dr. Tom Bussing, Vice President, Advanced Missile Systems, Raytheon Missile Systems. And the third was by James Heading, Lockheed Martin.

The presentation by Group Captain Begley focused on the evolution of strike to encompass various non-lethal capabilities, such as electronic and cyber warfare.

He included information operations as well within the notion of broad-spectrum strike. His presentation highlighted that long-range strike need not simply be about weapons on target at longer range, but includes an ability to influence adversary behavior at home or at key choke points in the operational military capabilities of the adversary.

But the role of strike within deterrence cannot be an abstract subject; it needs to be focused on the particular adversary and what will influence that adversary most effectively from a deterrent or crisis management perspective.

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Begley's presentation raised some key questions which clearly need to be considered as one shapes new longer-range strike capabilities.

With regard to an authoritarian adversary, what really deters them?

How might we build in effect a SIOP dealing with specific authoritarian regimes?

And even though we have subsumed the strategic shift as a return of Great Power competition, the democracies are competing with various authoritarian regimes which have many dissimilarities, although their common interest is to make the world safe for authoritarian regimes.

But we cannot have one size fits all notion of what deters a specific authoritarian regime which means that shaping the strike portfolio and profile needs to be calibrated against our judgements about what deters a specific set of authoritarian leaders.

The presentation by Dr. Bussing specifically focused on the evolving strike capabilities of the authoritarian regimes in question. These capabilities were described as combining Anti-Access/Area Denial approaches with extended reach and range of weapons, with increased investments in working the problem of developing higher speed weapons as well.

With regard to the Chinese, the progress of the past decade has been significant in the weapons area and they have been leveraging their capabilities at an accelerated pace.

And with their entrance into the South China Sea have pushed their strike capabilities further forward into the Pacific providing greater reach and range for their strike capabilities.

The Russians under President Putin have prioritized missile development, notably because they have a large inventory of aging platforms, the weapons modernization piece provides enhanced capabilities beyond what their platforms can deliver.

And their efforts have been multi-domain, meaning that they have worked missile modernization on land, sea and air and have worked where possible leveraging approaches to shape common missiles which can be deployed on a variety of platforms.

With both the Russians and Chinese emphasizing weapons modernization as a core capability, dealing with longer range and faster weapons is becoming a core challenge to the US and the allies.

Dr. Bussing highlighted a number of key areas where US and allied investments were going or needed to go to deal with the evolving strategic threats.

First, there was a clear need to focus on hypersonic and counter hypersonic weapons.

Second, to get an advancement in the numbers of air breathing systems to provide for weapons delivery, unmanned systems were a key compliment to piloted aircraft.

Third, the undersea warfare domain is a key focus of attention within which there is a need to expand capabilities to generate solutions across the kill chain in denied environments.

Finally, with regard to weapons development, the speaker argued for the development and building of multiple weapons options in the future battlespace.

This presentation raised a number of key questions with regard to the broader strategic way ahead with regard to missile development.

How might the US and allies come up with a better division of labor in building out missile capabilities?

With the coming of the F-35, there is a clear opportunity for a significant diversification of effort, as already seen with the Kongsberg JSM missile which is now available to the F-35 global enterprise, without the US needing to invest in this capability.

What role will directed energy weapons play in the evolution of the weapons portfolio and profile going forward?

As directed energy weapons emerge to provide for specific tasks and functions, investments can be redirected for other weapons capabilities in the portfolio.

Clearly, a key advantage of directed energy weapons is the low cost of the weapons magazine which could have a major impact on the overall approach to building and funding a weapons stockpile.

What path might Australia take to shape their own development and production capabilities and who might be their partner in such an effort, notably as the Australian defense industrial model is changing to incorporate the need for co-development, cross-national technology transfer and enhanced sovereignty?

Finally, James Heading focused specifically on the long-range strike issue and options for further development in this capability area. He identified various vectors on which long range strike is development, namely, speed, range, timeframe, and altitude.

The vectors as defined provided a way to describe the evolving threat, namely speed is increasing, the timeframe to respond is decreasing, the altitude is higher and the energy being delivered on target is greater given the impact of speed and trajectory.

He argued that “We are on the cusp of a revolution in long range strike driven largely by the proliferation of hypersonic weapons throughout our region.”

He underscored that we will need a number of key elements to shape an effective strategy to stay ahead of the evolving long-range strike threat, namely,

- Cohesive, well-planned, joint doctrine and tactics,
- Knowledgeable people,
- Mature Partnerships,
- Information/Intelligence,
- Training in use of new capabilities.
- Considered Investment in:
 - Research and Development
 - Demonstrable Capabilities

In short, we are in the throes of a weapons revolution.

Our priority focus on the land wars has meant that we have emphasized short range and low collateral weapons.

This focus is really not relevant to the weapons revolution which we are now facing.

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THE PERSPECTIVE OF RAF AIR MARSHAL S.D. ATHA: PUTTING A BRITISH PERSPECTIVE IN THE EVOLVING AUSSIE STRATEGIC CONTEXT

During my time in Canberra during August 2018, one key point of conversation was the question of the impact of the evolution of Europe on Australian policies, and policy flexibility.

The uncertainty hanging over Europe with regard to Brexit and the UK's role in Europe, plus the centripetal forces operating on Europe, raised fundamental questions of the nature of European policies and defense capabilities going forward in the decade ahead.

It is clear that the Australians are looking to diversify their alliance relationships, even while maintaining the central relationship with the United States, clearly Japan and Europe are more important but the dynamics of change affecting Europe is a key variable affecting Australian options.

The presentation by Air Marshal S D Atha, Deputy Commander of Operations for the RAF, avoided a discussion of Brexit or Europe more generally.

What he focused on was the strategic shift from the land wars to engaging with peer competitors.

He underscored how the flexibility demonstrated by Western airpower over the past decade and a half in the counter-terrorism operations in the Middle East actually has led to a de-emphasis on the core function from a national point of view, which is deterrence of a peer competitor, and in the British case this was clearly Russia.

He noted that with the celebration of the 100th anniversary of the RAF, the refocus on the deterrence mission was central to British thinking.

The RAF is engaged in a number of Article V activities such as air policing in the Baltics and most recently in Romania.

He underscored that the ability to forward deploy and support allies provided for a key deterrent function, mainly, to deflect adversary actions.

He argued that deterrence obviously required have a punishment capability associated with it, and although he did not use the term crisis management, he clearly had in mind the key role of an ability to deny adversary objectives.

Airpower plays a crucial role in this function because of its ability to operate rapidly and over distance.

He argued that the RAF and the RAAF now flying common platforms, notably the F-35 and the P-8, could enhance their interoperability. The two Air Forces had much in common, including historically.

But moving forward they shared some common approaches to deterrence as well.

He did distinguish between the two air forces with regard to the question of building a fifth-generation force.

The Aussies are clearly moving from 4th to 5th generation and rebuilding their force around the new F-35 capabilities; according to the Air Marshal, they thought this put too much emphasis on a single platform and they will be flying Typhoons for several years as well as working on building a new air platform as well.

The Air Marshal emphasized a number of key capabilities which needed to be enhanced in the period ahead to have a more effective deterrent structure.

First was an ability to have much more effective mobile basing. With the coming of the F-35B as well as the Queen Elizabeth carriers, a new approach to mobility was being injected into the RAF.

Second, how best to interconnect 5th generation aircraft with 4th generation aircraft?

The RAF clearly has an approach evolving between Typhoon and F-35 but the overall challenge will be to shape ways for overall force capabilities to be enhanced as the new air system is introduced.

Third, from a deterrent perspective, how best to ensure that coalition forces can work together in a networked environment?

He did not put it quite this way but the question on the table certainly with regard to crisis management is how does C2 work with a coalition force of variant possibilities?

Personally, I think this question is a key one, but I also think that the fifth-generation forces will do operations separate from those allies which simply do not have those capabilities, not the least of which such a force can deliver much more lethal impact with significantly less deployed force than can a legacy one.

At the last seminar, Air Chief Marshal Stephen Hillier provided an overview of how the RAF sees the way ahead with which Air Marshal Atha provided a very helpful update.

But then as I said right at the start, I don't believe that what I've described can be bracketed within a particular geography.

"The challenges I've described are truly global and truly common to us all. I believe that airpower's inherent characteristics and capabilities make it especially able to respond effectively to those challenges."

A clear driver of the shift is that airpower advantage will have to be fought for and not assumed.

And his way ahead focused very much on leveraging what new platforms we are acquiring but to build out from them to shape new ways ahead to regain strategic advantage.

"But the asymmetric advantage airpower has given us for the last three decades at least, is narrowing.

"The integration into our air forces of fifth generation capabilities such as the F-35 Lightning will only redress the delta to a degree.

"Of equal importance in maintaining our combat edge is this ability to manage vast amounts of information, and make decisions more quickly and more accurately.

"Technological developments will be a key element in ensuring that the lever of the best possible output from our air and space platforms, but our C2 structures, processes, and approach to information sharing will be a decisive factor."

<https://sldinfo.com/2018/04/shaping-a-way-ahead-the-perspective-of-air-chief-marshal-stephen-john-hillier-the-royal-air-force/>

Despite the similarities between the RAF and the RAAF, there is a clear difference with regard to their approach to fifth generation aircraft, at least in terms of how policy is stated.

For the RAAF, the F-35 is being leveraged to configure a very different force and they are not looking to the next generation tactical aircraft. They may well consider ways to deploy longer range strike on a new

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platform, whether it be a bomber or something like an A400M. Their focus is clearly on fifth generation enablement of an offensive-defensive strike enterprise.

For the RAF, the government is already shaping a new air combat strategy built around building another tactical fighter. This will be challenging on several dimensions, but the Aussies prefer to invest in ADF force integration and development rather than a next generation fighter.

Put in stark terms, the Aussies are retiring their fourth-generation aircraft; the RAF is modernizing them.

The RAF and RAAF are on complimentary paths in some dimensions but a divergent one on others.

Britain is a nuclear power; Australia is not and this has an impact as well on approaches to deterrence of an authoritarian adversary.

It is clear that the British contribution to the Williams Foundation seminars has been a steady and important one over the past few years and will provide an important input to Australian thinking about the way ahead with regard to their own approach to deterrence.

THE INTEGRATED FORCE AND DETERRENCE: THE PERSPECTIVE OF AIR MARSHAL DAVIES

In my interview with the head of the Air Warfare Centre, [Air Commodore “Joe” Iervasi](#), prior to the August 23, 2018 Williams Foundation Seminar on independent strike, he raised the key question of the relationship between the ADF building an integrated force and the broader considerations of its deterrent effect.

“Does the demonstration or the perception that your force is integrated essentially provide a deterrent effect?”

“That is “I can’t just now attack the land force because I know it’s so interconnected with other things, I don’t know where I’m being attacked from.”

“Or “my ability to dominate has now diminished.”

“Does that actually produce a deterrent effect?”

For Air Marshal Davies, the head of the RAAF, clearly the answer is yes, but integration more broadly considered.

In his presentation to the Williams Seminar on August 23, 2018, Davies focused on the broader question of an Australian approach to deterrence and built out from the core focus on how the integrated force can create such an effect.

For Air Marshal Davies, in the current strategic situation, deterrence for Australia rested in part on the resilience and the flexible options which an integrated force would provide for Australia.

His focus was upon how to create a deterrent effect in the mind of the adversary, and it was the impact on the adversary which was crucial.

He saw that as requiring Australia to have a flexible, integrated fifth generation force, which could create redundancy through integration.

By having such a capability, when combined with effective partnerships in the region and beyond, would multiple the impact which the ADF as an integrated force could have from an adversary’s perspective.

Integration meant as well a capability to better work the ADF with a whole of government strategy to enhance the utility of that force and its impact in a crisis to become a more effective deterrent.

Deterrence rests on persuading adversaries that the risks are greater than hoped for gains from aggression.

To do this required an ability to operate an integrated force with reach, resilience and in credible partnerships and alliance relationships to shape influence relationships which can be leveraged and worked in a crisis.

He argued that as a non-nuclear power, a foundational relationship with the United States was crucial part of the Australian approach to deterrence; but an approach complemented by a wide ranging partnership strategy within “our” region.

Air Marshal Davies underscored several thrusts of change he felt were crucial to build out Australia’s deterrent strategy.

The first was virtual a revolution in the information domain whereby sharing of data, and assessments became much more the norm, than the aberration in operations. “We need to have a security framework which can work at a different level than we are operating at currently.”

The second was shaping a more integrated approach to strike, with longer range assets added as well to the mix. “We are not looking for a single missile effect; we are looking for coordinated strike, which can include various force elements, Special Forces, non-kinetic tool, cyber, as well as kinetic in shaping a deterrent effect.”

For Davies, it is not simply about adding another platform or tool considered in terms of itself in isolation from the whole force; it is about integrating new capabilities within an expanded and more flexible force which can deliver credible deterrent effects.

Air Marshal Davies argued that the “contest for national influence’ was increasing in the region, and “we need to increase our understanding of our own impact on the region and how to expand our influence.”

Because deterrence works by persuasion, Davies was arguing that it was crucial to enhance the tools and understanding of how to operate and leverage the integrated force to enhance its potential “persuasive effect.”

He concluded that “relationships, resilience and reach are the key elements of our deterrent strategy.”

THE ROLE OF THE SUBMARINE IN THE AUSTRALIAN DETERRENT STRATEGY

Currently, the Australian submarine force provides the longest-range stealth strike platform within the ADF.

Although it possesses modest force of six Collins class submarines, the Royal Australian Navy has focused on enhanced availability of these submarines to the joint commander.

With the upgrades on the Collins class, it is becoming a more effective platform in terms of integration with the US Navy as well.

The 2016 White Paper underscored the importance of Australia developing, building and evolving a new class of submarines which deliver a “regionally superior” conventionally powered submarine.

Submarines are an essential part of Australia’s naval capability, providing a strategic advantage in terms of surveillance and protection of our maritime approaches. The Government has determined that regionally superior

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submarines with a high degree of interoperability with the United States are required to provide Australia with an effective deterrent, including by making a meaningful contribution to anti-submarine warfare operations in our region.

The key capabilities of the future submarine will include: anti-submarine warfare; anti-surface warfare; intelligence, surveillance and reconnaissance; and support to special operations

The Government will increase the size of the submarine force from six to 12 boats. The doubling in size of the submarine fleet recognises that Australia will face a more challenging maritime environment in the decades ahead. By 2035, around half of the world's submarines will be operating in the Indo-Pacific region where Australia's interests are most engaged.

Australia has one of the largest maritime domains in the world and we need the capacity to defend and further our interests from the Pacific to the Indian Oceans and from the areas to our north to the Southern Ocean. Submarines are a powerful instrument for deterring conflict and a potent weapon should conflict occur.

The White Paper went on to add further detail with regard to the approach to ongoing modernization of the new submarines as well.

Australia's new submarines will be supported by upgrades to enablers and facilities such as wharves and port facilities, as well as simulators, training and submarine rescue systems. The key strategic requirements for the future submarines include a range and endurance similar to the Collins Class submarine, sensor performance and stealth characteristics which are superior to the Collins Class, and upgraded versions of the AN/BYG-1 combat system and Mark 48 MOD 7 heavyweight torpedo jointly developed between the United States and Australia as the preferred combat system and main armament. The new submarines will have advanced communications systems to link with other Navy ships and aircraft to conduct anti-submarine warfare operations.

The acquisition of the 12 future submarines will commence in 2016 with the first submarines likely to begin entering service in the early 2030s. Construction of the 12 new submarines will extend into the late 2040s to 2050 timeframe. The length of the construction process will mean that Australia will need to be planning the follow-on submarine well before the last new submarine enters service.

To ensure no capability gap and the ability to progress development of a replacement submarine in the 2050s, the Government has decided to implement a rolling acquisition program for Australia's submarine fleet.

A rolling acquisition program will ensure that Australia is able to maintain a fleet of 12 regionally superior submarines as submarine and anti-submarine technologies develop over the coming decades.

During the long life of the new submarines, the rapid rate of technological change and ongoing evolution of Australia's strategic circumstances will continue.

As part of the rolling acquisition program, a review based on strategic circumstances at the time, and developments in submarine technology, will be conducted in the late 2020s to consider whether the configuration of the submarines remains suitable or whether consideration of other specifications should commence.

The initial number of new submarines was identified as 12 or double the size of the current sub force, but clearly there is an interest in building out that number if an effective design and production system is put in place.

If the promise of a "continuous build" approach is realized, the role of the submarine as a deterrent capability will be enhanced as modernization evolves more rapidly against the threat environment.

At the seminar, Commodore Tim Brown RAN, Director General Submarines, Royal Australian Navy Strategic Command, Canberra, spoke with regard to the role of submarines within the overall Australian deterrent strategy.

As is the case with virtually all submarine presentations made in public, the discussion was a combination of stealth and statement.

The core message was clear throughout – the submarine was the key long-range strike capability within the ADF.

The modernization of Collins combined with the acquisition of a new submarine would enhance the role of the submarine within the ADF's arsenal.

At the same time, working the evolution of maritime, air and space systems in the ASW function was a key compliment to the ability of the submarine to operate as a long-range strike asset as well.

One could add that with the return of the territorial dimension to Australian defense, namely the importance of Australian territory as a chessboard on which to operate the ADF or to host allied forces in times of crisis, the importance of the submarine in providing barrier defense against maritime strike threats was of growing importance as well.

During my time in Australia prior to the seminar, I visited the Osborne shipyards and got updates on the [Collins upgrades](#) and improved availability efforts.

I received as well briefings on the new submarine build approach and the two together from a single strand of building out enhanced submarine capabilities within an overall deterrent strategy.

The Collins submarines will be in operation through the mid 2030's.

And the current cycle is to have two deployable submarines consistently available, with four available to the fleet commander, and of these four, three submarines consistently available for tasking with one in shorter term maintenance, and two submarines in long term maintenance and upgrade.

A new submarine is coming to the fleet in the 2030s, but given the experience with the Collins class, the Royal Australian Navy will play close attention to the question of built-in modernization and enhanced maintainability for the new class of submarines.

Within the overall defense business, there is a dynamic underway whereby the payload providers and the platform builders are dynamically changing their roles as the payload evolution is considerable more rapid than platform changes.

How might the platform side of this work more effectively with rapid changes on the payload and systems side of the house?

Clearly, the folks working Collins sustainment are thinking forward to what comes next.

Which given how important building platforms with enhanced modernization and maintainability built it is a good thing.

The Australians are coming to the new build submarine with several key expectations. The submarine is to be a large conventionally powered submarine with an American combat system on board allowing for integration with the US and Japanese fleets.

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The Commonwealth has already signed the combat systems side of the agreement with Lockheed Martin and the LM/US Navy working relationship in the Virginia class submarine is the clear benchmark from which the Aussies expect their combat system to evolve as well.

The new submarine is not an off-the-shelf design; it leverages the French Navy's Barracuda class submarine, but the new design will differ in a number of fundamental ways. The design contract is in place and the process is underway, with Australian engineers now resident in Cherbourg working with French engineers on the design.

The Aussies are looking to be able to have a fleet management approach to availability and one, which can be correlated with deployability, which is what they are working currently with the Collins class submarine.

This is clearly one of the baseline expectations by the Australians.

They simply do not want to build a submarine per se.

They want to set up an enterprise which can deliver high availability rates, enhanced maintainability built in, modularity for upgradeability and an ability to better embed the performance metrics into a clear understanding of deployability.

The continuous build approach will be correlated with domain knowledge of where does the Australian Navy need to go and how will it reshape its con-ops going forward and how do upgrades of the submarine fit into all of the above.

The continuous build concept is a key part of how the Australian Navy is looking at its contribution to their role within the joint force and their overall contribution to a credible deterrent strategy.

One needs to have a rapid modernization process for assets in operation in order to stay on the right side of the innovation curve to persuade adversaries that the risk of engaging the ADF is not worth the cost.

In my discussions at Fleet Base East with Captain Leif Maxfield, Deputy Commodore Warfare in the Royal Australian Navy, this priority was underscored.

The importance of getting the manufacturing/sustainment approach was highlighted by Captain Maxfield as a key element of the strategic shift to an effective joint warfighting strategy. If you do not design your ships with flexibility and agility in mind for a long-term effective modernization approach which encompasses joint integration, the RAN will simply not be able to get where it wants to go.

As Captain Maxfield emphasized, "We need to make sure that the integrated design concept and approach is on the ground floor as we build our new ships.

"We have shaped a navy-government-industry working relationship that we envisage will deliver life-cycle innovation for the joint force, not simply a one-off build of a new combat ship.

"We are building a consolidated industry and service approach to ensure that will give us the best possible chance of delivering integrated output."

Put another way, as the Aussies look to design, build and sustain a "regionally superior submarine," an ongoing innovative relationship with industry is a key part of the deterrent approach.

As [Captain Maxfield](#) underscored: "The ability to deliver new platforms, to maintain those platforms, to sustain those platforms, to repair those platforms and keep ahead with cutting edge technology will rest on

our ability to support the effort with our educational system, our industrial system and effective cross cutting learning from the fleet back to the yards as we move forward.”

THE EVOLVING ROLE OF AUSTRALIAN GROUND FORCES IN AN AUSTRALIAN DETERRENT STRATEGY

Australia is building an integrated force and working to extend the reach and range of that force.

This is a core effort for the Royal Australian Navy and the Royal Australian Air Force and clearly focused on dealing with challenges in the Indo-Pacific region.

But what is the role of the Australian Army in this effort?

Clearly, the Australian Army has been a key player in working relationships such as with Indonesia and Malaysia, and with the new amphibious capability will expand its engagement in the region.

But if we are in the midst of strategic shift from land wars in the Middle East to crisis management in which peer competitors have force on force capabilities which significantly impact on our combat and diplomatic success, what is the role of the ground force?

At the Williams Foundation seminar, Major General Adam Findlay provided some insights into Army thinking about shaping a way ahead. Major General Findlay is the Special Operations Commander within the Australian Army with significant experience in the Pacific region as well as the Middle East.

Air Marshal Davies made the point at the seminar that clearly for the ADF, Special Forces are a key part of how they would think about the strike function in a future conflict within the region, and the Air Force and Navy certainly have a focus on how to support and integrated with Special Forces in shaping a strike function as well.

Major General Findlay reviewed the evolving threat environment, but turned the discussion around by underscoring that the ability of the Special Forces to leverage a multi-domain networked force provided them with opportunities to have significant effects beyond traditional operational means.

One could add to his observation that this certainly would be the case in crisis management of the sort one can envisage with peer competitors, notably with regard to conflict termination as well.

He noted that the Australian Army is acquiring new systems which can expand their role in operating in the evolving battlespace relevant to the regional environment. “Army is getting long range precision fires; we are getting maritime strike systems, short range active defense systems, and new ISR systems. This will allow Army to deliver targeted lethal effects over longer ranges. It is part of our approach to becoming a key member of the joint force.”

“We believe that we offer the joint force, access, persistence, presence, and lethality.”

Special forces are re-working its strategic reconnaissance approach after 15 years being in the Middle East. “We are working with our allies and partners in our region as a key part of reshaping our strategic reconnaissance approach. We can only move at the speed of trust.”

“Army considers itself ADF’s people force within our region.”

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He noted that the Special Forces were working new capabilities with the joint force going forward and he mentioned specially work with Wedgetail and Growler on the RAAF side. “We are working closely with Navy and Air Force to rework our role in operating in high end warfighting environment.”

He noted that exercises are becoming a key area in which to rework approaches to use them as “testbeds” for new or more effective approaches. For example, he saw the Talisman Saber exercises as evolving from a largely Army focus to becoming much more joint in character.

The goal is to provide access to forward operational areas where effective strike would be enabled against anti-access and area-denial capabilities of an adversary that were being used to threaten Australian interests.

He argued that the deployable headquarters within Army and the Special Forces will provide a key capability to enabling the effectiveness of joint strike forces as the ADF moves forward in a crisis.

“Our long-range strike systems will operate at hundreds of kilometers and will allow us to contribute to sovereign Australian Anti-Access and Aerial Denial effects. This will free up Air Force or coalition assets to operate deeper in the battlespace and the land based maritime strike capabilities will support the survivability of Australian maritime assets as well.”

“For the first time adversaries will have to consider the threat posed by land systems to their maritime forces.”

“We can provide persistence and presence by operating from land as well.”

He highlighted as well the evolving role of the Army in ground based active defense systems for the ADF as well.

The new chief of the Australian Army, [Lieutenant General Rick Burr](#), has provided some baseline elements for answering the question in his initial Commander’s intent published on July 14, 2018 and in his Futures Statement published on August 8, 2018.

The [Commander’s Intent](#) highlighted what the Chief of Army sees as an “Army in Motion.”

To be ready now, we must harness the whole Army and leverage the potential of the joint force and the entire enterprise. We need both capability and capacity. We must be physically, morally and intellectually prepared for operational deployment, at any time, wherever we are needed. Army must also transform to capture future opportunities. Being future ready is a way of challenging the status quo; constantly evolving how we think, equip, train, organise and prepare to compete in the future.

The statement then goes on to note:

The evolving character of war and the realities of an increasingly competitive and disruptive world demand we unlock our full potential.

We must create and leverage new opportunities to team with other militaries as well as across the joint force, government, industry, academia and community to generate capability advantage.

We will optimise what we have at every level in Army by thinking of new ways to operate, by experimenting, innovating and accepting risk.

And the statement concludes with this comment:

Army is always in motion.

Our next steps will be guided by a strategic framework, and articulation of our future warfighting concept, Accelerated Warfare.

What we can take away from this is a clear emphasis on the centrality of Army working effectively in the joint and coalition force.

That begs the question, that if the joint and coalition force in question in the Indo-Pacific region is engaging in dealing peer competitors, notably China, what role will the Army play and what innovations are crucial to play that role?

With the release of the [accelerated warfare](#) statement preliminary answers are provided to this question.

The challenge is described as follows in the accelerated warfare statement:

We live in an era of increasing competition where the rules-based international order is coming under increasing pressure. Being future ready means continuing our contribution to an open and fair international system, and being prepared for increasing volatility, uncertainty, complexity and ambiguity.

Our region is becoming increasingly defined by a changing geopolitical order and operating spectrum of cooperation, competition and conflict. At the same time, the pace of urbanisation and regional competition in littoral environments is bringing its own form of complexity. These trends are a major factor in accelerating the speed and dynamism across diplomatic, informational, economic and military interactions between sovereign states and other actors.

Our operating landscape is changing – adversaries, including violent extremist organisations and state-based threats can now control and influence all operating domains. The advent of rapidly evolving, easily accessed technology increasingly offers asymmetric capabilities to both established powers as well as non-state actors and even individuals. The ability to sense and strike from long range as well as swarming low-cost technologies are increasing the vulnerability of major military systems.

Future strike capabilities will not just be physical but also digital, executed often at the speed of a mouse-click. Sophisticated Anti-Access, Area Denial (A2/AD) capabilities offer the ability to deny manoeuvre while distributed systems that are ‘smarter’ and smaller are becoming increasingly essential to survivability. Networking will be critical in terms of generating a system capable of ‘cooperative engagement’.

While the nature of war as a contest of wills is enduring, technological disruption is rapidly changing war’s character. These characteristics include the convergence of big data, artificial intelligence, machine-learning, robotics, unmanned and autonomous capability with precision weaponry. Fused, synthesised and assured information for decision superiority is also likely to be an essential battlefield enabler with the challenge to protect this information from disruption and deception.

Technology is not the sole answer. Our challenge is to underpin technological change with a joint warfighting philosophy linked to future investment, force structure, mobilisation and logistics transformation to be relevant, adaptable and survivable in the modern operating environment.

The reach of sensors and fires means Army must address all domains and comprehensively integrate across them. Space and cyber have not been fully contested in previous wars and therefore we have limited knowledge for how conflict in these domains will play out in the future.

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Our ability to operate in the traditional air, sea and land domains are at risk of being debilitated from space and cyber yet there is also great opportunity in these domains for military advantage. Future conflict is likely to be across domains where networks and integration are the key to generating military power.

Put together, the geopolitical context, changing threat, disruptive technologies and domain integration means that we must prepare for an accelerating environment. Future warfare, in certain parts, will be fought at the speed of machines with success belonging to the side who can adapt the fastest.

Future advantage will lie with the side who can 'own the time' and best prepare the environment.

Let us take some of these items separately.

The ability to sense and strike from long range as well as swarming low-cost technologies are increasing the vulnerability of major military systems.

What is the Army's plan to work with Air Force on shaping an active defense and mobile defense of Western Australian defense assets to ensure longer range strike and support for the forces engaged deep within the region?

Future conflict is likely to be across domains where networks and integration are the key to generating military power.

Of course, the reverse is true, namely that Australia needs to have core capabilities to disrupt networks and rip apart adversary combat formations.

What is the Army's role in the offensive-defensive enterprise?

The [US Army at Fort Sill](#) is certainly trying to work through how offensive and defensive systems can support disruption of adversary systems and capabilities, although the US Army is falling short of sorting out how their systems will integrate with Air Force and Naval systems, in operations in an integrated battlespace.

The reach of sensors and fires means Army must address all domains and comprehensively integrate across them.

Of course, this is a major challenge because it boils down to rapid insertion of new sensors and software into combat platforms and integration of those ground-based platforms, above all with Air Force.

How is the Australian Army going to address that challenge?

The final section of the Accelerated Warfare futures statement addresses the question of how Army will respond to the threat environment.

Within this accelerating context, Army must respond. We must push ourselves to think in creative and unconstrained ways to ensure our warfighting philosophy is appropriate and informs our future capabilities.

Accelerated Warfare as a description of 'how we respond' means owning the speed of initiative to outpace, out-maneuvre and out-think conventional and unconventional threats. It requires excellence in the art and science of decision-making as well as deep thinking about Army's role in understanding, shaping and influencing the environment.

Our role for creating access, persistence and lethality in the joint force are areas for greater discussion. This includes aligning shared interests to create access to our preferred operating environments, technologies and partners.

We must discuss how we leverage persistent presence through access, endurance and our people-to-people links. Applying lethality on the land, from the land and onto the land for potency and influence across all domains must remain a central focus for our role in the joint force.

As we discuss 'how we respond', we will also think about our organisational elements.

Our people must be leaders and integrators who contribute to multi-disciplinary teams, enabling us to thrive in uncertainty, adapt to change and generate solutions.

We must leverage emerging technology as a potential source of advantage, integrating new technologies within the joint force. Partnerships through teaming with our international military partners, industry and academia will be of paramount importance to unlock potential and strengthen relationships for mutual benefit.

We must pull the future towards us rather than wait for it; Army must respond proactively by rethinking our contribution to joint warfighting philosophy, strategy and concepts. I look forward to your engagement as we explore these ideas together, define the next steps and inform our capability development priorities.

The key question of course is where one is doing this.

Geography matters.

Does the Army's role vary dependent upon which geography within the Indo-Pacific region it will be asked to deploy?

There is no one size fits all integration, and the ADF has emphasized this point with its emphasis on shaping a task force concept.

Where do the ground forces fit within which task forces to deal with which missions and in which geographical sectors in the Indo-Pacific region and beyond?

The new Chief has set in motion an interesting approach and we will see where it will and can go in the period ahead. And Major General Findlay added some interesting ideas and nuances to the new Chief's approach at the Williams Foundation Seminar.

EXPANDING THE REACH OF THE AUSTRALIAN RECONNAISSANCE-STRIKE ENTERPRISE

As Australia looks to expand its sovereign options, expanding the reach of its reconnaissance-strike enterprise is a key tool set to do so. As presenters suggested at the Williams Foundation conference, it was less a question of reaching and striking deep into potential adversaries' territory and more influencing the behavior of those adversaries as they reached out into the Pacific to directly affect Australian interests and territory.

This means that targeting needs to be specific and be guided by accurate C5ISR systems which could provide strike options at greater reach, range and speed for the ADF. This could be done by systems at sea in the air, or launched from Australian territory or as part of a forward deployed force.

This requires shaping a range of integrated capabilities to provide for the reconnaissance and decision-making side of a strike capability. The Aussies already have in train several capabilities to shape an extended capability in this domain, notably the F-35 and its regional reach through its interconnected sensor grid, and the P-8/Triton dyad.

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And as well, the Australians could be in a good position to leverage the innovations going on in the space business which can provide some new capabilities which could be integrated as well within an expanded reconnaissance and decision-making grid operating further and deeper into the Pacific.

(See the appendix below to read further on the impacts of each of these systems on the reconnaissance side of the strike enterprise, namely, the F-35 global enterprise, the P-8/Triton dyad, and the space business. We have written extensively about Wedgetail but it too is a key element of the learning curve for how to operate a longer-range reconnaissance strike enterprise).

At the Williams Foundation seminar, Michael Tarlton, Program Director, Northrop Grumman Aerospace Systems, provided an overview of how the evolving capabilities of remotely piloted aircraft could play an enhanced role for the ADF as they rework the range and reach of their reconnaissance-strike enterprise.

He started his presentation by examining the range and reach which the RAAF might wish to prioritize in the evolving strategic environment in their region.



What this graphic highlights is the importance of expanded reach in the defense of Australia and its interests and the importance of being able to curtail the intrusions of adversaries into the air and maritime space crucial for Australian defense.

To do so, will require both persistence and reach, for which remotely piloted vehicles, such as Triton can provided, and can do so in a complimentary role to other air, maritime ground and space systems.

He argued that a remotely piloted vehicle had several advantages for a combat force.

First, there is a significant increase in the ability to conduct missions for longer periods of time.

Second, there is enhanced survivability in persistent operations.

Third, there was no aircrew capture/casualty risk.

And, finally, there are significant potential cost effectiveness advantages, notably with regard to life-cycle costs.

He argued that by flying aerial refuellable remotely piloted vehicles, one could achieve a good balance between endurance and payload to perform the core missions which the vehicle would perform

The core endurance of the unrefueled air vehicle of 8-10 hours is clearly feasible and with aerial refueling much longer periods of operation are possible.

Remotely piloted vehicles can be configured for a variety of platforms. By building an aircraft capable of carrying multi-role mission payloads, air-to-surface and air-to-air roles can be performed. And a mix or core focus on ISR/T, EW or Strike roles can be prioritized.

But a key element for the future considerations of remotely piloted vehicles within the overall combat force really rest on their flexibility in terms of the configurability noted above, but also life cycle costs.

With regard to the costs of operating manned aircraft about 60% of the cost is for operations and support. He argued that comparing a pilot versus a UAS operator support model highlighted why life cycle costs will be much lower for the UAS.

Thinking about Pilot v. UAS Operator Training

Training Category	Pilot Flight Hour Burden	Pilot	Command-Function UAS
Basic Flight Skills and Specific Platform Flight Skills	200-300 Flight Hours Before Squadron Assignment	Unavoidable: Simulation already heavily used	MMCS functions: little value added from actual flight hours
Ongoing Flight Skills Certification Training	Up to 30 Hours per Month/AC [Combat Substitutes]	Unavoidable: Automation could plausibly reduce	MMCS functions: little value added from actual flight hours
Live Fire Exercises	Infrequent	Unavoidable	Unavoidable
End-to-End Mission Exercises	Infrequent	Unavoidable	Unavoidable
Joint Manned-Unmanned Exercises	Infrequent – but will increase	Unavoidable	Unavoidable
Maintainer Training	None	[Automatic benefit]	Can be scheduled, if otherwise insufficient, very little need for additional <i>flight</i> hours

In short, as the ADF worked on shaping a longer-range reconnaissance-strike enterprise, Tarlton argued that remotely piloted vehicles could play an important role in the evolving integrated force designed to deliver the kind of strike capabilities which could support an integrated ADF.

Appendix to Article

The F-35 Global Enterprise

Shaping Redundant Response U.S. Military Space Capabilities

Robbin Laird and Ed Timperlake, Space News, June 27, 2012

In a recent report by the U.S.-China Economic and Security Review Commission, the evolving threat to U.S. space capabilities was highlighted. “China is pressing forward with an ambitious counterspace program, including a ground- and space-based space surveillance systems, electronic warfare capabilities, and kinetic kill vehicles,” the report said.

As the United States shapes an Asian pivot, the ability to network U.S. and allied forces is growing in importance. The Chinese understand this, and their counterspace program is designed precisely to degrade

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such U.S. and allied capabilities and to undercut confidence in what the U.S. and its allies can do to deal with threats in the Pacific and beyond.

The answer to such a challenge is clearly robust and redundant space-enabled C5ISR (command, control, communications, computers, combat systems, intelligence, surveillance and reconnaissance) capabilities. But the response is not simply in terms of space platforms, it is about building from the recognition that air breathing systems being deployed and about to be deployed into the Pacific provide crucial building blocks for robust redundancy.

“No platform fights alone” is a key point in understanding the design of the attack and defense enterprise of the 21st century. Space platforms are not being tasked to provide the only response to a Chinese counterspace threat. Rather, the entire C5ISR enterprise built into a honeycomb is the correct response and approach.

The Pacific capability of the U.S. military can be built around three principles: presence, economy of force and scalability. Presence refers to having U.S. forces present and interdependent with allied forces in the Pacific. Economy of force is built around not having to bring overwhelming force to presence. But that only works if the force is scalable and has the capability to reach back and up to a surge of capability to provide for overwhelming force as necessary.

The key linchpin to do this is the C5ISR enterprise in the Pacific. With robust and redundant ISR, the enterprise enables a distributed force presence to be honeycombed. That is, the network is not about hierarchy and the ability of an adversary to whack the head of the hierarchy; it is about a honeycomb of deployed and distributed capability that no adversary can cripple with a single or easy blow.

A key element for shaping a robust and redundant ISR system in the Pacific is the F-35, a tactical aircraft with strategic impact. The new aircraft is a flying combat system that has C5ISR built into the cockpit. As a fleet, the F-35s provide a critical layer in shaping a robust and redundant ISR system, which is both synergistic with space systems and complementary to those systems.

A deployed fleet of F-35s — allied and U.S. — provides a powerful deterrent to any Chinese thought of a first strike on U.S. military space systems. It makes such a strike significantly less effective and useful to Chinese military planners. From the outset, the deployed fleet and space systems forge a powerful deterrent capability.

To understand how the F-35 can intersect with the deployed C5ISR systems and provide robust redundancy for military space, it is important to understand briefly what the F-35 actually is. The F-35 is often simply referred to as a tactical aircraft, and a replacement for fourth-generation or legacy aircraft. It is really something quite different.

It represents a dramatic shift from the past. Individual F-35 pilots will have the best database of real-time knowledge in the history of combat aviation. And all of this is internal to their cockpit and enabled by advances in computer processing and sensor information fusing.

Each F-35 pilot combined with human sensing (seeing visual cues outside the cockpit) will be enabled by machine-driven sensor fusion to have combat situational awareness better than any opponent.

Concurrent with their ability to look-see, which is limited by physical realities, the F-35 pilots will be able to “see” using cockpit electronic displays and signals to their helmet allowing them not to just fight with their individual aircraft but be able to network and direct engagements at more than 1,200 kilometers in 360 degrees of three-dimensional space out to all connected platforms.

A fleet of F-35s will be able to share their fused information display at the speed of light to other aircraft and other platforms, such as ships, subs, satellites and land-based forces, including unmanned aerial vehicles and eventually robots. Tactically, “Aegis is my wingman,” “SSGN is my fire support” will be developed for conventional warfare.

This enables a “tactical” aircraft to evolve into a key technology for strategic operations and impacts.

The F-35 is known as a fifth-generation player in the state-of-the-art for both the air-to-air fighter and air-to-air attack combat roles. It also adds an electronic warfare component to the fight.

Electronic warfare is a complex subject with many discreet but also connected elements. It was designed inherently into the F-35 airframe and C5ISR-D (for decision) cockpit.

Electronic warfare can include offensive operations to identify opponents’ emissions in order to fry, spoof or jam their systems. In successful electronic war, often-kinetic kill weapons can be fired. An F-35 can be a single sensor/shooter or offload its track to other platforms such as planes, ships and subs and eventually unmanned aerial combat systems.

The kinetic kill shot is usually a high-speed missile designed to home on jam. It has been said on the modern battlefield — air, sea or land — if not done correctly,

“you emit and you die.”

Defensively in electronic warfare there are a lot of other issues, such as electronic countermeasures, electronic counter-countermeasures, and all things “cyberwar,” which is a subject unto itself, extremely complex and not well understood.

Electromagnetic pulse concerns, infrared sensing, always protecting “signals in space” of the friendly info being transmitted and, as mentioned, jamming opponents’ signals, all are key considerations in electronic warfare.

What is necessary to succeed in evolving capabilities to fight in the age of electronic warfare?

In taking a lesson from history, before World War II, AT&T long lines research found that in order to build and keep operational a U.S. phone system, the key to success was the need for “robust and redundant” systems.

Two generations later, the F-35 was designed as both inherently robust and redundant with many sensors and systems built into the airframe structure from initial design forward. All the F-35 systems designed and developed sent electronic information into the aircraft cockpit “fusion engine.” Trusted fusion information generated by inherent aircraft systems, queued up electronically by threat, will send to the cockpit displays and the pilot’s helmet battle-ready, instantaneous situational awareness.

The ability of the deployed F-35s — again owned by allies as well as U.S. forces — presents a diversified and honeycombed presence and scalable force. This baseline force is significantly enhanced by reachback to space assets, but the space assets now receive redundancy by being complemented as well by a deployed fleet of flying combat systems. This joint capability means that the value of space-based targets goes down to the Chinese or whomever, and diversification provides significant enhancement of deterrence as well.

In short, in rethinking the way ahead with regard to military space — notably in a period of financial stringency — getting best value out of your entire warfighting enterprise is highlighted. Reorganizing the

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space enterprise within an overall C5ISR approach enabled by a honeycombed fleet of F-35s is a strategic opportunity of the first order.

And this re-enforces an American and allied advantage in facing competitors like China. In countless articles on the People's Liberation Army and its way of war, author after author refer to the brilliance of Sun Tzu and his "Art of War." The point they often make is always be alert to advantages accruing to the side that creates an "asymmetric war" advantage.

The evolving capability described above actually foreshadows U.S. and allied asymmetric robust and redundant strategic technologies. It is the beginning of a new level of deterrence against proliferating 21st century threats.

However, one of the best examples of the American "Art of War" was forcefully stated by William Tecumseh Sherman, a West Point-trained officer who arguably was one of the most visionary and capable generals in history. His words 150 years ago cautioning the South not to trigger a war still ring true to this day: "You are rushing into war with one of the most powerful, ingeniously mechanical and determined people on Earth — right at your doors. You are bound to fail."

<https://spacenews.com/shaping-redundant-response-us-military-space-capabilities/>

The Triton and Expanded Situational Awareness for the ADF

In an interview with the Commander of the RAAF's Surveillance and Response Group, the role of Triton in expanding the reach of the ADF was highlighted.

"For example, in a HADR event, the first thing we'll send out is a Triton.

"It will be there probably within five to 10 hours of the first reports.

"It can be sitting on top of a remote disaster area, a South Pacific nation for example affected by a cyclone, earthquake or tsunami, obviously with the nations permission, to pushback real-time information regarding the situation on the ground, in areas that previously might have taken weeks to assess

"It might even be relaying.

"It will be providing significant information that can then inform other whole of government international relief capabilities, be they C-17's, maritime, orland assets, that are going to roll in with a better understanding of the support required to help the people in the affected area.

"We see that as one of our key roles.

"And that's obviously one of the reasons we are acquiring the Triton, because of the extreme ranges we have to deal with, including the huge expanses of water, but also on occasions in the region in an overland scenario."

<https://sldinfo.com/2017/08/a-look-at-talisman-sabre-2017-the-perspective-of-air-commodore-craig-heap-commander-of-the-surveillance-response-group/>

The P-8/Triton Dyad and Its Impact

In a story which we published on July 11, 2016, we discussed the role of the P-8/Triton as a dyad providing significant enhancement of the reconnaissance strike capabilities for the US Navy.

On May 23 and 24, 2016, during a Jacksonville Naval Air Station visit, we spent time with the P-8 and Triton community which is shaping a common culture guiding the transformation of the ASW and ISR side of Naval Air. The acquisition term for the effort is a “family of systems” whereby the P-3 is being “replaced” by the P-8 and the Triton Remotely Piloted Aircraft.

But clearly the combined capability is a replacement of the P-3 in only one sense – executing the anti-submarine warfare function. But the additional ISR and C2 enterprise being put in place to operate the combined P-8 and Triton capability is a much broader capability than the classic P-3. Much like the Osprey transformed the USMC prior to flying the F-35, the P-8/Triton team is doing the same for the US Navy prior to incorporating the F-35 within the carrier air wing.

In addition to the Wing Commander and his Deputy Commander, who were very generous with their time and sharing of important insights, we had the opportunity to interviews with various members of the VP-16 P-8 squadron from CO and XO to Pilots, NFOs and Air Crew members, along with the wing weapons and training officer, the Triton FIT team, and key members of the Integrated Training Center. Those interviews will be published over the next few weeks.

The P-8/Triton capability is part of what we have described as 21st century air combat systems: software upgradeable, fleet deployed, currently with a multinational coalition emerging peer partnership. Already the Indians, the Aussies and the British are or will be flying the P-8s and all are in discussions to build commonality from the stand-up of the P-8 Forward.

Software upgradeability provides for a lifetime of combat learning to be reflected in the rewriting of the software code and continually modernizing existing combat systems, while adding new capabilities over the operational life of the aircraft. Over time, fleet knowledge will allow the US Navy and its partners to understand how best to maintain and support the aircraft while operating the missions effectively in support of global operations.

Reflecting on the visit there are five key takeaways from our discussions with Navy Jax.

A key point is how the USN is approaching the P-8/Triton combat partnership, which is the integration of manned, and unmanned systems, or what are now commonly called “remotes”. The Navy looked at the USAF experience and intentionally decided to not build a Triton “remote” operational combat team that is stovepiped away from their P-8 Squadrons.

The team at Navy Jax is building a common Maritime Domain Awareness and Maritime Combat Culture and treats the platforms as partner applications of the evolving combat theory. The partnership is both technology synergistic and also aircrew moving between the Triton and P-8

The P-8 pilot and mission crews, after deploying with the fleet globally can volunteer to do shore duty flying Tritons. The number of personnel to fly initially the Tritons is more than 500 navy personnel so this is hardly an unmanned aircraft. Hence, inside a technological family of systems there is also an interchangeable family of combat crews.

With the P-8 crews operating at different altitudes from the Triton, around 50K, and having operational experience with each platform, they will be able to gain mastery of both a wide scale ocean ISR and focused ASW in direct partnership with the surface navy from Carrier Strike Groups, ARG/MEUs to independent operations for both undersea and sea surface rather than simply mastering a single platform.

This is a visionary foundation for the evolution of the software upgradeable platforms they are flying as well as responding to technological advances to work the proper balance by manned crews and remotes.

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The second key point is that the Commanders of both P-8 aviator and the soon to be operational Triton community understand that for transformation to occur the surface fleet has to understand what they can do. This dynamic “cross-deck” actually air to ship exchange can totally reshape surface fleet operations. To accelerate this process, officers from the P-8 community are right now being assigned to surface ships to rework their joint concepts of operations.

Exercises are now in demonstration and operational con-ops to explain and real world demonstrate what the capabilities this new and exciting aspect of Naval Air can bring to the fleet. One example was a recent exercise with an ARG-MEU where the P-8 recently exercised with the amphibious fleet off of the Virginia Capes.

The third key point is that the software upgradeability aspect of the airplane has driven a very strong partnership with industry to be able to have an open-ended approach to modernization. On the aircraft maintenance and supply elements of having successful mission ready aircraft it is an important and focused work in progress both inside the Navy (including Supply Corps) and continuing an important relationship with industry, especially at the Tech Rep Squadron/Wing level.

The fourth point is how important P-8 and Triton software upgradeability is, including concurrent modification to trainer/simulators and rigorous quality assurance for the fidelity of the information in shaping the future of the enterprise. The P-8s is part of a cluster of airplanes which have emerged defining the way ahead for combat airpower which are software upgradeable: the Australian Wedgetail, the global F-35, and the Advanced Hawkeye, all have the same dynamic modernization potential to which will be involved in all combat challenges of maritime operations.

It is about shaping a combat learning cycle in which software can be upgraded as the user groups shape real time what core needs they see to rapidly deal with the reactive enemy. All military technology is relative to a reactive enemy. It is about the arsenal of democracy shifting from an industrial production line to a clean room and a computer lab as key shapers of competitive advantage.

The fifth point is about weaponization and its impact. We have focused for years on the need for a weapons revolution since the U.S. forces, and as core allies are building common platforms with the growth potential to operate new weapons as they come on line. The P-8 is flying with a weapon load out from the past, but as we move forward, the ability of the P-8 to manage off board weapons or organic weapons will be enabled.

For example, there is no reason a high-speed cruise or hypersonic missile on the hard points of the P-8 could not be loaded and able to strike a significant enemy combat asset at great distance and speed. We can look forward to the day when P-8s crews will receive a Navy Cross for sinking a significant enemy surface combatant.

In short, the P-8/Triton is at the cutting edge of naval air transformation within the entire maritime combat enterprise. And the US Navy is not doing this alone, as core allies are part of the transformation from the ground up.

Australia and Leveraging the New Space Industry

In a recent article published in *The Australian* by Alan Dupont, resident fellow at the Lowry Institute, the potential for Australia to leverage the new space industry was highlighted.

(Excerpt)

The US operates several kinds of satellites to which Australia has access because of our alliance and membership of the “five eyes” intelligence community that includes Britain, Canada and New Zealand. There are satellites equipped to provide imagery from: visible light photographs, radar or reflected infra-red emissions; early warning of ballistic missile launches; signals analysis from monitored radio and electronic emissions; and measurements of seismic, acoustic, chemical and biological signatures.

In 2001, the US used nearly 50 satellites in the search for Osama bin Laden. A decade later several intelligence satellites were used to help track him down and kill him in his Pakistani hide-out. If North Korea were to contemplate a nuclear attack against Australia, the first indication of a ballistic missile launch would come from a US missile early warning satellite relayed through a ground station that forms part of the Australia-US Joint Defence Facility at Pine Gap outside Alice Springs.

The ADF is also a heavy user of the US Wideband Global Satcom system, which provides rapid and secure communications for deployed troops and links them to our new ships, aircraft and drones. The holy grail of this increasingly integrated satellite architecture is a comprehensive picture of the battlefield and an adversary’s strategic capabilities regardless of weather, terrain and time.

Maintaining privileged access to this network of US satellites will be far more difficult under Donald Trump’s transactional approach to alliances, which places a premium on burden sharing. Developing complementary, niche space capabilities would blunt criticism we are not pulling our weight and strengthen our alliance credentials as well as the economy.

Obvious candidates for investment include: “launch on demand” Australian rockets and satellites to monitor a geopolitical crisis or support our troops on operations; a network of ground stations, incorporating advanced machine learning, to receive and process the information retrieved from satellite downloads; and nurturing promising technologies such as laser tracking of space junk where our science is leading edge.

While it is not the ASA’s role to pick commercial winners, the agency would be wise to keep abreast of national security requirements when thinking about the strategic direction of our space industry. Biddington is adamant Australia “needs a space strategy that embraces all aspects of space activity”, both civilian and military, as they are joined at the hip.

Integrating the security and civilian dimensions of space policy into a cohesive national strategy to create a 21st-century industry should not be beyond us, but sceptics worry our latest venture into space may crash and burn on the rocks of complacency, indifference and unrealistic expectations.

Such an outcome would be an indictment of our political culture, a failure of vision and another lost opportunity to develop a sovereign space industry that could help make Australia a genuinely smart country. Let’s hope we get it right this time.

<https://www.theaustralian.com.au/news/inquirer/let-the-countdown-begin-to-australia-building-a-space-industry/news-story/a626d774a1d2e08eb152606a66a497f3>

EOS and the Australian Space Business

EOS is a world leading sensor company and is an important player in the space business and well aware of developments globally.

In an interview with the CEO and founder of EOS, Dr. Ben Greene, the space side of the business was discussed.

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Question: Let us turn now to the space side of your business.

Could you describe the focus of your payload business in this domain?

Dr. Greene: We have built core capabilities to enhance situational awareness in space. We irradiate certain areas of space with lasers, and we then analyze the reflected returns.

We can determine range from that. We can also determine other elements of the spacecraft from a light signal directed at that spacecraft.

We have been in this business area for 40 years.

Question: How would you describe the complementarity of radars with lasers in terms of providing key ISR performance?

Dr. Greene: They're very complimentary. Radars are exceptionally good at detecting anything that's moving in a large area of space. Lasers are very good at characterizing that object and that motion very accurately.

For example, we can detect UAVs with radars and kill them with lasers.

The same thing applies on a much larger scale in space.

So space is really consists of two domains. There's 2,000-kilometer zone around the Earth, which is the lower Earth orbit.

In the space domain above two or three thousand kilometers, only optics applies, and so the lasers can operate to two or three times the range that radars can operate, and beyond that we have passive optical techniques with extreme range, where both laser and radar techniques fail.

And so the entire space domain from 3,000 kilometers to 50,000 kilometers is managed optically with lasers and light.

Question: Your work is rooted in a very strong working relationship between Australia and the United States.

How would you describe that relationship?

Dr. Greene: I think that there's a very strong two-way relationship.

Australia can offer special aspects of territory in terms of where we sit in the world physically, in terms of our geography. In addition, our technology combined with operating within our specific climate, means that if we deploy optical technologies from Australia, they are of immense value in terms of the information captured from the platforms that we deploy here.

That information can complement and support the intelligence database that US would apply for space information. And we would like to contribute to space information superiority for the alliance in that sense.

We've had a very strong program here that has always been a joint program with the US from its inception.

There's always been significant US participation in our program.

<https://defense.info/interview-of-the-week/dr-ben-greene-electrical-optical-systems/>

Wedgetail: Recent Pieces

<https://sldinfo.com/2016/04/the-wedgetail-the-raaf-and-shaping-a-way-ahead-for-the-australian-defense-force-a-discussion-with-the-commanding-officer-of-the-42nd-wing/>

<https://sldinfo.com/2017/08/an-update-on-wedgetail-and-shaping-a-way-ahead-with-a-software-upgradeable-multi-mission-21st-century-combat-capability/>

APPENDIX 1: THE TERMS OF REFERENCE FOR THE SEMINAR

Background

For over twenty years the F-111 provided the Australian Defence Force with a strike capability with the strategic reach to provide Australia with an independent strike option should deterrence fail. For over thirty years the F-111 provided an Australian Defence Force strike capability with the strategic reach to provide Australia with an independent strike option should deterrence fail. With the retirement of the long-range F-111, Australia's future air strike capability now rests in the capabilities of the F/A-18F Super Hornet and F-35A, both equipped with appropriate long-range strike weapons and supported by a capable air-to-air refuelling force of KC-30A aircraft; the air-to-air refuelling force necessary to extend the unrefuelled range of both the F/A-18F Super Hornet and the F-35A to achieve the desired strategic reach.

While Australia's geo-political circumstances and regional threats are much changed from those which existed in 1963, when Australia committed to acquire the potent F-111 air strike capability, they are now more complex and much less straightforward than the Cold War heritage scenarios of the 1960s. But one aspect remains unchanged; Australia's strategic geography, where strategic reach continues to support the case for an independent strike capability. The ability to strike at range brings a new dimension into any unfolding strategic scenario which, in itself, may often deter escalation into armed conflict. While in the event of escalation occurring, the absence of a long-range strike capability both limits Australia's options for strategic manoeuvre and concedes to an adversary the ability to dictate the terms of engagement.

An independent strike capability expands the range of options to achieve Australia's strategic ends; signals a serious intent and commitment about Australia's national security; and has the capacity to influence strategic outcomes short of resorting to armed conflict.

Joint Strike

Conceiving, planning, programming and delivering a credible strike capability is not easy. While some elements such as long-range strike weapons can be bought off the shelf, the integration of the various elements of a strike capability is complex and takes time before the conception develops into a mature and credible military capability. But a strike capability without the enabling capabilities such as electronic warfare support, surveillance support and air-to-air refueling is of little utility, hence enabling capabilities must also be part of the acquisition plan.

Plus, there are the doctrinal, C2, training and sustaining elements of the capability to consider. In short, the complexity and time required to build a nation's strike capability is such that a government has little option other than to retain a strike capability within a nation's force structure as, like many other elements of national power, the maturation timeframe for a strike capability is measured not in years but in decades.

There are also important lessons flowing from the last two decades of operations in Iraq and Afghanistan. These operations have illustrated the need for an integrated and sophisticated targeting process, for without perceptive and sophisticated targeting, strike operations achieve few useful outcomes. Targeting is

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intelligence-led and fundamentally joint in nature and the experience gained from the past two decades of air operations will be invaluable in establishing Australia's future long-range strike capability.

While the speed, reach, responsiveness and flexibility of an air strike capability are compelling arguments for Australia to retain an air strike capability within its order of battle, there are also other military capabilities that extend strike operations into the joint arena. The evolution of Australia's strike capability will also need to consider the contribution from evolving technologies, such as electronic warfare, unmanned systems, and of the contribution from new technologies which not only seek to employ traditional kinetic effects but also non-kinetic effects. A sophisticated strike capability seems a continuing and essential arrow in Australia's quiver of national power.

Aim of the Seminar

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There are also important lessons flowing from the last two decades of operations in Iraq and Afghanistan. These operations illustrated the need for an integrated and sophisticated targeting process, for without perceptive and sophisticated targeting, strike operations achieve few useful outcomes. Targeting is intelligence-led and fundamentally joint in nature, and the experience gained from the past two decades of air operations will be invaluable in establishing Australia's future long-range strike capability.

While the speed, reach, responsiveness and flexibility of an air strike capability provide compelling arguments for Australia to retain an air strike capability, there are also other military capabilities that extend strike operations into the joint arena. The evolution of Australia's strike capability also needs to consider the contribution from evolving technologies, such as electronic warfare, unmanned systems, and of the contribution from new technologies which not only seek to employ traditional kinetic effects but also non-kinetic effects. A sophisticated and credible strike capability is a continuing and essential arrow in Australia's quiver of national power.

APPENDIX 2: CONSIDERATIONS FOR AN EVOLVING APPROACH FOR AUSTRALIAN DETERRENCE POLICY

The Defense of Australia: Looking Back and Leaning Forward

During my August 2018 visit to Australia, I had a chance to meet with and discuss the question of the evolving approach to the defense of Australia with a member of the Australian National University, [Andrew Carr](#).

Dr. Carr is working towards the conclusion of his forthcoming book on the defense of Australia and has looked back to identify key themes and key points in the evolution of policy over the post-World War II period.

And he has done so with an eye with regard to the next phase of the evolution of Australian defense policy, one which is very likely to feature greater emphasis on Australian sovereignty and continuing the modernization of the ADF with this in mind.

Question: How would you describe the focus of your book?

Dr. Carr: It's an effort to think through the question: "How do you actually defend a continent and land mass as large as the Australian continent?"

We have a very large landmass with a relatively small population.

"Throughout most of our history we have been part of a larger defense effort, first with regard to the British Empire, and then working with the Americans during and after World War 2.

Australians often see themselves as having to go overseas to achieve their security.

"This book addresses the importance for us to address seriously defense in our immediate region and to shape concrete ways that the continent can work strategically for us.

"In the book, I address how thinking about the continent and its role in defense has changed over time.

"With the Japanese in World War II, their primary interest in Australia was denying its use by the Americans. During the War Prime Minister Curtin started focusing on a strategy of holding the islands to our north in the post-War period. The British were on the way out, the Cold War was not evident, and the United States, although deeply engaged during World War II, was expected to go back to its post-World War I turtle strategy.

"Curtin's focus was on preparing for Australia to play a key role with regional allies in taking responsibility for our part of the world around Australia and New Zealand and the South Pacific.

"There was a clear desire to carve out more capabilities for Australian sovereignty and independence as the post-World War II period approached.

"But they like many later government's did not want to pay for a force that could achieve the large task they had set.

"But it was not until the Menzies Government invested in the F-111, that we saw a commitment to resources to enhance sovereignty in the region.

"In the early 1960s, the Menzies Government invested in range of new strike capabilities. The F-111 is ordered at that point. They ordered the Oberon submarines. They make significant upgrades to the frigates. There is a significant increase in defense spending."

Question: I assume that it was the emergence of the [Indonesian threat](#) in the 1970s, which was the next impetus to thinking about Australian defense capabilities in support of Australian interests?

Dr.. Carr: The Indonesian dynamic was a key trigger point, or to be specific Jakarta's policy of Konfrontasi, including threats to Papua New Guinea.

"This meant that Australia had to defend against a direct threat to the then territory of Australia.

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“Most of the history of the Australian military has been three independent services up to 1976. Each was very good at operating with their sister services overseas. That’s how they fought WWI and WWII, and that’s how they saw themselves.

“After 1976, you get this idea of an actual Australian defense force as a single, integrated force. Still keeps its three services, unlike Canada, but sees itself as having one larger mission, which is defending Australian interests.

“The new ADF still often wants to go back overseas, and do coalition operations, but much more as a larger unified national service, rather than being plug and play single service efforts within coalition operations.

“These efforts will lead eventually to the Defense of Australia doctrine. This process starts in the early 1970s but it is not until the mid-1980s, that greater clarity is achieved with regard to how to shape a more integrated force in service of the broader defense of Australia effort.

“But with the end of the Cold War, and the focus on global peacekeeping operations, and expeditionary engagement with coalition operations, the ADF as an integrated force for the sovereign defense of Australia does not really materialize.

“We clearly are focused upon shaping an integrated force which de facto clearly can serve sovereign purposes, but where do we take the force?”

“With the kind of direct threats which a China or Indonesia can pose directly against the Australian continent, what should and could Australia do to defend the continent directly?”

“This is the big question facing Australian defense in the period ahead.”

Question: You have worked what you see as key elements of the past Australian approach, which are part of the fabric of Australian defense going forward as the focus on the defense of continental Australia proceeds in the new strategic situation.

What are these basic key elements, which you have identified?

Dr. Carr: The first is that the threat emerges from the North; but our population lives in the East and South. This leads to a key challenge of geography, namely how to work the Australian geography to deal with a threat from the North?

“We are a country that doesn’t quite understand its geography in part because of where the people are clustered, and yet, Northern and Western Australia provide some of the most important geography in a defense sense.

“The second is that Australia is both a continent and an island. This reality goes to the fundamental division between the Army and Navy. A lot of Australian defense thinking actually came from the British, not just because of the kind of the cultural history, but as an island that is offshore from a heavily populated continent.

“The Australian Army thinks of itself in expeditionary terms and by that not operating on Australian soil but in expeditionary operations with allies. How might this change with a return to considerations of leveraging Australian geography to defend the continent from threats to the North?”

“The third is that the defense of Australia cannot begin with a narrow continental or fortress Australia focus. It doesn’t make sense to simply line up people and give them a rifle and tell them to stand on the beach and protect the continent at that point.

“Geography matters, but you have to have at least some understanding of what’s going on beyond your borders. The great fear has always been a hostile major power having control of an island base, or some significant piece of territory just off the Australian continent that can directly threaten the continent.

“The fourth is that Australia’s greatest security threat depends on how valuable it is to its allies. In WWII, the Japanese weren’t concerned by the Australian behavior. They saw us as too small, too irrelevant, not a significant security threat.

“But, because our continent was very valuable to the Americans, in trying to respond to their sphere of influence efforts, it then became attractive to the Japanese.

“I think this is something the Australians don’t always understand, when they think about alliance relationships.

“It’s not just about Australia and America as separate countries with distinct capabilities, but it’s also about the nature of the Australian continent and its significance within the region.

“I think this will probably play out again in the future.

“The Chinese won’t see Australians as a substantial direct threat, but they will see the Australian continent as substantial base for projecting power by Australia in an allied context.”

Combating 21st Century Authoritarian States

During my August 2018 visit to Australia, I had a chance to continue my discussions with [Ross Babbage](#) about the challenges of dealing with 21st advanced authoritarian states.

Recently, he co-authored a study entitled “Countering Comprehensive Coercion: Competitive Strategies Against Authoritarian Political Warfare,” and with that as the predicate we discussed the nature of the challenge posed by 21st century advanced authoritarian states and how to deal with that challenge.

<https://sldinfo.com/2018/08/information-warfare-and-the-authoritarian-states-how-best-to-respond/>

Question: Your new report lays out the nature of the challenge. Where is your project now headed in terms of working both the challenge and response to what I would call 21st century advanced authoritarian states?

Babbage: This is a starting point but we need to dig more deeply into their own thinking, their own literature, their own doctrine, and their own practices in political warfare.

We are proceeding by generating a series of case studies to highlight what those methods and approaches are so that we can assess them more concretely.

There is a lot of history.

Both the Chinese and Russian approaches are rooted in their history but using modern methods to execute their templates of political warfare.

Question: How would contrast the authoritarian approach to our basic liberal democratic mindsets?

Babbage: For the liberal democracies, there is a pretty clear break between what we would consider war and peace.

For the Chinese and the Russians, there is not quite the same distinction.

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They perceive a broad range of gray areas within which political warfare is the norm and it is a question of how effective it is; not how legitimate it is.

They are employing various tools, such as political and economic coercion, cyber intrusion, espionage of various types, active intelligence operations and so forth.

For example, in Australia, certain Chinese entities have bought up Chinese newspapers here so that there's very little Chinese language media in Australia, which is not pro-Beijing.

And they are leveraging their business people, students and visitors to work for broader political means within Australia as well.

In contrast, the West is employing very traditional means such as diplomacy and military tools.

Our tool set is clearly constrained compared to the innovative and wide-ranging tool set with which the Russians and Chinese are working and they are learning to use their presence in our societies to expand their influence on our policies.

Aaron Friedberg at Princeton really got it right when he said words to the effect that "a primary driver of Beijing's international policies is to make the world safe for all authoritarianism."

And that's what we're seeing.

What we're confronting is a new version of a long-standing theme in Chinese strategic thought which emphasizes the importance of shaping the strategic environment in your favor by reaching a long way into the enemy's camp, and putting him off balance, and getting him focused on internal problems and exacerbating those internal problems.

The goals are to distract and weaken the enemy and get him to not focus on things other than the main game.

The political warfare approach is one of interfering, disturbing, distracting, confusing, disrupting the institutions and the normal operations of democratic states.

The head of the Australian Security and Intelligence Agency (ASIO) has stated that the scale and pace of foreign intelligence and espionage activities in Australia is now higher than they were at the peak of the Cold War.

Question: What can be done?

Babbage: A key aspect of meeting the challenge is to recognize it exists and encourage the public focus on its existence and operations.

Regardless of domestic political persuasion, our people do not like to see this kind of authoritarian coercion operating in our society.

When they realize what is happening, they're upset, they're angry about what a foreign country could be trying to do, these sort of things, and they want to galvanize action.

And many pose the question of "What can we do to actually stop this and fix it?"

At present we are not telling the story of foreign political warfare broadly enough within our political and economic sectors.

We've got to improve our information operations. We need to throw sunlight on what these guys are doing and do so in a comprehensive and sustained manner.

Beyond that effort, I would identify a number of potential components of what one might call an effective counter strategy.

First is a denial strategy.

Here the objective is to deny, not just the operations and make them ineffective, but also to deny the political benefits that authoritarian states seek to win by conducting their operations.

Second is a cost imposition strategy.

We need to find ways to correlate their behavior with an imposed cost. We need to make clear that if they are going to behave like this, it will cost them in specific ways.

Third is focused on defeating their strategy, or making their strategy counterproductive.

We can turn their strategy on its head and make it counter-productive even within their own societies.

Their own societies are fair game given the behavior of the of our combined assets Russians and Chinese.

Fourth is to make it damaging, and even dangerous, for authoritarian regimes to sustain their political warfare strategy.

Authoritarian regimes have their own vulnerabilities and we need to focus on the seams in their systems to make their political warfare strategies very costly and risky.

And we need to do this comprehensively as democratic allies.

There's no reason why we can't coordinate and cooperate and make the most of our combined resources, as we did in the Cold War.

But do we have the right tools and coordination mechanisms for an all-of-alliance strategy to work well?

In my view, the Western allies have a great deal of work to do.

APPENDIX 3: THE ROLE OF THE AUSTRALIAN NAVY IN AUSTRALIAN DETERRENCE STRATEGY

Shaping a Way Ahead for the Royal Australian Navy in a Deterrent Strategy

During my visit to Fleet Base East in Sydney, I had a chance to talk with Captain Leif Maxfield, Deputy Commodore Warfare in the Royal Australian Navy.

At Garden Island, two of the latest additions for the RAN can be seen, namely the new amphibious ships, and HMAS Adelaide was in port the day I was there along with HMAS Hobart.

Captain Maxfield has a strong background in working in the amphibious warfare area and on the strategic shift worked by Vice Admiral Barrett while working on his staff. Currently, he works as the Deputy

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Commodore Warfare for the RAN, and among other things, the office is in charge of the Maritime Warfare Center.

The Royal Australian Navy is adding new ships, such as the amphibious ships, the air warfare destroyer, new frigates and new submarines. But at the heart of the rebuild of the RAN is a very clear focus on two key elements involving concepts of operations and working a manufacturing/sustainment “continuous shipbuilding dynamic.”

With regard to the first, the focus is upon air-sea integration and working multi-domain warfare within an integrated battlespace. As Captain Maxfield put it: “We are focused on integrated warfare approaches. Our maritime warfare center and the air warfare center have established a joint steering group to guide both centers down this path.”

At the heart of the focus is upon joint task forces and how to work the maritime and air components into effective task force operational capabilities. “We are bringing innovations on the air side and the maritime side into an evolving joint task force approach.”

The focus of the maritime warfare branch is upon force generation. “We are focused on shaping force training packages to be able to deliver the kind of joint warfighting capabilities we need.”

Another key element of the maritime warfare branch is engagement in multi-lateral training exercises, such as RIMPAC 2018, where they provide standing staffs to provide for the maritime warfare component for the Australian force engaged in the particular exercise.

With a close working relationship with the air warfare center, shaping a maritime joint warfare training approach and participation in key multi-lateral exercises, the focus is upon shaping a solid foundation or building blocks for the journey forward into a more effective joint warfare capability for the RAN and the ADF.

According to Captain Maxfield, “we are thereby laying the key stepping stones to how we take us to where we want to be in 10, 20 years’ time in shaping a truly joint, integrated force capable of seamlessly interacting and integrating with allies in the combined operational environment.”

The integrated warfare approach being pursued by the RAN is intended to be highly interactive with the shipbuilding approach being crafted to build out the new fleet for the RAN.

The Aussies refer to this as a “continuous shipbuilding approach” which [Vice Admiral Barrett](#) then the Chief of Navy described in an interview I did with him last year.

We spoke last time about the Ship Zero concept.

This is how we are focusing upon shaping a 21st century support structure for the combat fleet.

I want the Systems Program Office, the Group that manages the ship, as well as the contracted services to work together on site.

I want the trainers there, as well, so that when we’re maintaining one part of the system at sea, it’s the same people in the same building maintaining those things that will allow us to make future decisions about obsolescence or training requirements, or to just manage today’s fleet.

I want these people sitting next to each other and learning together.

It's a mindset.

It puts as much more effort into infrastructure design as it does into combat readiness, which is about numbers today.

You want to shape infrastructure that is all about availability of assets you need for mission success, and not just readiness in a numerical sense.

Getting the right infrastructure to generate fleet innovation on a sustained basis is what is crucial for mission success.

And when I speak of a continuous build process this is what I mean.

We will build new frigates in a new yard but it is not a fire and forget missile.

We need a sustained enterprise that will innovate through the life of those frigates operating in an integrated ADF force.

That is what I am looking for us to shape going forward.

The importance of getting the manufacturing/sustainment approach was highlighted by Captain Maxfield as a key element of the strategic shift to an effective joint warfighting strategy. If you do not design your ships with flexibility and agility in mind for a long-term effective modernization approach which encompasses joint integration, the RAN will simply not be able to get where it wants to go.

As Captain Maxfield emphasized, “We need to make sure that the integrated design concept and approach is on the ground floor as we build our new ships. We have shaped a navy-government-industry working relationship that we envisage will deliver life-cycle innovation for the joint force, not simply a one off build of a new combat ship. We are building a consolidated industry and service approach to ensure that will give us the best possible chance of delivering integrated output.”

When I visited Portsmouth this Spring, a key focus for the planners working the roll out of the Queen Elizabeth was how to ensure the best ways to ensure that ship availability and aircraft availability would dovetail to deliver best deployed capability. For the RAN, fast jets and MPA capabilities are provide by the RAAF, which means that one challenge will be to work closely with the RAAF to ensure that aircraft availability dovetails effectively with ship deployments.

This clearly is a work in progress but does highlight how cross-cutting availability of separate service assets need to be coordinated if there is to be a maximum joint capability which can be deployed in a crisis.

Clearly, the coming of the new LHDs in the RAN has been providing a window into that challenge, as an amphibious task force is a very flexible force, which requires coordinated consideration of air and maritime assets appropriate to a specific configuration for an amphibious task force. And this learning process is a good lead into the evolving task force approach being built by the ADF.

As Captain Maxfield put it: “We are on a journey of discovery with regard to the focus on an integrated task force approach. With the new LHDs and the air warfare destroyer, we have two platforms that are key elements of shaping the approach and forging or way forward. But it is a journey of discovery for sure.”

Captain Maxfield underscored the importance of what Rear Admiral Mayer, previously Commander of the Australian Fleet, emphasized during his tenure: “It is about the network.”

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“To deliver deterrence in the evolving strategic context, we need to deliver an effective integrated force and that relies on secure and capable networks. In the last few years, we have shifted from being a single-ship Navy to becoming a task group-focused organization that is appreciating the imperatives of joint integrated war fighting and what the sustainability and availability of assets delivers to the force.”

Vice Admiral Barrett emphasized in the various interviews I have done with him as well as his book on the Navy and the nation, how critical a comprehensive effort from the workforce as well as the uniformed military was going to be to get the kind of Royal Australian Navy the nation needs to lay a solid foundation for a 21st century integrated forces.

As Captain Maxfield concluded: “The ability to deliver new platforms, to maintain those platforms, to sustain those platforms, to repair those platforms and keep ahead with cutting edge technology will rest on our ability to support the effort with our educational system, our industrial system and effective cross cutting learning from the fleet back to the yards as we move forward.”

Visiting HMAS Hobart: A Key Building Block in the Remaking of the Royal Australian Navy

During my August 2018 trip to Australia, I started with the opportunity to visit the HMAS Hobart, the first Aegis Air Warfare destroyer for the Royal Australian Navy.

This was my second visit to Garden Island, and it is always exciting to see the city of Sydney in the backdrop to a major Australian naval base as the arrival of the First Fleet seems not so distant when you are not far from where they landed in 1788.

The HMAS Hobart is the first of the three Aegis Air Warfare destroyers to be operational with the Navy and the second ship will be commissioned later this year.

The ship introduces a new level of combat capability into the Royal Australian Navy in which the ship's reach is significantly greater than any previous ship operational in the Aussie fleet because of its Aegis Combat system.

It is a key building block in shaping an integrated air-sea task force navy in that the capabilities onboard the ship can contribute to an integrated C2, ISR and strike grid in which the evolving capabilities of the ADF can cover a wider area of operation in the waters surrounding Australia or in service of missions further abroad.

As [Rear Admiral Mayer](#) noted during an interview I conducted with him while he was Commander of the Australian fleet:

“We are joint by necessity.

“Unlike the US Navy, we do not have our own air force or our own army. Joint is not a theological choice, it's an operational necessity.”

What clearly this means is that the future of the Hobart class is working ways to operate in an integrated battlespace with land-based RAAF F-35s, Tritons and P-8s among other air assets.

Their future is not protecting the carrier battle group, as the Aussies have no carrier.

Rather, their [future](#) is “to provide air defence for accompanying ships in addition to land forces and infrastructure in coastal areas, and for self-protection against missiles and aircraft.”

The skill sets being learned to operate the ship, notably the workflow on board the ship, in terms of the use of data, ISR and C2 systems, working situational awareness throughout the work stations onboard the ship, are foundational for other ships coming to the fleet.

With the coming of the Brisbane, the HMAS Hobart will no longer be a single ship but the lead into a class of ships.

And with the Australian decision with regard to its new frigates which will leverage the Aegis combat system capability as well, the HMAS Hobart has become the lead into a whole new approach to how the Australian fleet will shape its combat networks as well.

This means that the training and support provided to HMAS Hobart is a foundation for a larger effort for the Navy as well.

And with the addition of F-35 as well as P-8s and Tritons as well as the evolution of the KC-30A tanker, the fleet looks to become a core element for an integrated air-maritime task force approach.

Indeed, when visiting HMAS Hobart one can already see crew from the Brisbane onboard getting ready for its initial deployments as well.

The Aegis combat system pioneered by the US Navy and Lockheed Martin has become a global capability as an Aegis Global Enterprise has emerged in which new types of ships have been built carrying variants of the Aegis combat system.

This started with the Japanese becoming the first foreign navy to buy Aegis and then in a critical breakthrough moment, Aegis was sold to the Spanish Navy which built a new type of ship on which to operate Aegis.

I was working for a consulting company supporting the Navy at the time, and was supporting what would become what I coined in the mid-1990s, the Aegis Global Enterprise.

There was opposition both within the US Navy and without to selling Aegis to the Spanish Navy but senior leaders at the time in the Clinton Administration, notably Secretary of Defense Perry, supported the effort.

Working on the issue at the time, I learned a great deal about how a good decision can navigate critics and challenges, and fortunately for the Navy the decision was taken to sell the Aegis combat system to the Spanish.

Much like the F-35 global enterprise, the benefits to allies and the US alike become obvious with the cross-learning and not just from the US to the allies, but among allies as well as from allies to the United States.

The HMAS Hobart is clearly a result of this process.

It is a variant of the Spanish ship and was sold via Spain to Australia.

The senior staff and crew operated on a Spanish frigate last year to get used to the form factor of the ship and could anticipate the workflow as well prior to getting their own ship.

According to an article published last year by the [Royal Australian Navy](#), the time spent onboard the Spanish ship was highlighted.

Captain Stavridis said he and some of his crew members were fortunate to have spent time at sea in their Spanish sister ship, Cristobal Colon (F105), earlier this year.

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“The time spent in Cristobal Colon was extremely valuable as it provided a unique opportunity to better understand the platform and to work with a crew that have a detailed working knowledge of the ship,” Captain Stavridis said.

“Cristobal Colon’s crew were extremely generous in their time and ensured that we were given all opportunities to learn as much as we could.”

He said the layout of Cristobal Colon was very similar to the Hobart class.

“In fact the Hobart class was based on the F104 design with modifications taken from the F105.”

Of course, the US Navy has been working with HMAS Hobart and indeed the ship will leave soon for San Diego for further collaborative efforts.

And as one US Navy officer put it: “We expect to learn a great deal from you as you shape the operations of the Hobart as it is integrated into the Australian fleet.”

This is the key advantage of a global enterprise approach.

We projected that this would be the case if their was the sale to Spain of Aegis.

Now one can walk onboard the reality, namely, the HMAS Hobart.

Reshaping Royal Australian Asset Availability: The Case of the Collins Class Submarine

It would be hard to find a key combat asset for the Australian Defence Force, which has received more criticism over the years than the Collins class submarine.

Yet while the past is behind us, the narrative has clearly changed.

The Royal Australian Navy working with its industry partners has clearly shaped a new narrative, one in which more ships are available on a reduced time scale to provide for the maintenance of this key asset.

And learning how to do so is a crucial part of the learning curve PRIOR to building a new submarine, one that will be bought at twice the numbers and be a larger ship as well.

Clearly, the Royal Australian Navy is looking to build a more maintainable submarine this time around and is building from lessons learned on the Collins class.

In my past discussions with recently retired Vice Admiral Tim Barrett when he was Chief of Navy, he highlighted the importance of getting the Collins class availability on the right footing.

During a 2016 interview, [Vice Admiral Barrett](#) put it this way:

Question: Clearly, building a sustainable navy from the outset is crucial to your design effort.

How do you view the challenge of building a more sustainable navy from the outset?

Vice Admiral Barrett: “It is crucial to deterrence. If your ships are not operating at sea they will have little effect.

“For example we have changed our approach to the Collins submarine largely around sustainment and working more openly with industry to achieve much greater at-sea operational tempos.

"We have put in place an enterprise approach, which focuses on availability of submarines; Industry and Navy are working closely together now to achieve that core objective.

"I've got industry keenly interested in the results of what the submarines do when they leave port and go on operations. And we've had a dramatic turnaround in submarine availability as partnering has improved.

"For me, deterrence, lethality, availability, sustainability, and affordability are highly interrelated for a Navy and its combat performance.

"And clearly as we design new ships, designing in more sustainable systems and ships is crucial."

And he added the following during one of our [2017 interviews](#):

For example, we have a small submarine fleet of six submarines; they are not going to deter anybody if they are not available and capable of going to sea.

As we discussed last time, we have put a major effort in getting much greater availability from our Collins class submarines, and the ways we have done so will shape our approach, our expectations and our template for the operation of the new class of submarines.

We have seen a dramatic improvement in our Collins class boats.

Question: In other words, by learning how to ramp up availability with today's fleet you are preparing the template for future operations?

Vice Admiral Tim Barrett: That is clearly our approach going forward.

We should be building our sense of availability in the design right now, so that when the future submarines arrive in place, we have maximized availability, and through that deterrence given their contribution to a distributed lethal force capability.

And this clearly is a key challenge for the workforce to shape enhanced availability.

During my current visit to Australia, I had the opportunity to visit the Osborne shipyards in Adelaide, South Australia, and get a look first hand at the changes in the Collins sustainment approach.

During that visit I had a chance to meet with Brad Hajek, Director Upgrades, Collins Submarine Program, who provided a comprehensive and thoughtful overview of the achievements of the new sustainability approach.

In addition, I was given a really first-rate tour by Kerry Fisher, the Naval Representative for South Australia, of the current Collins class submarine undergoing deep maintenance, namely HMAS Waller.

This process used to take three years for what they refer to as Full Cycle Docking (FCD), but have reduced to closer to two years. The FCD cycle is a 10-year one, so getting the savings of one year is clearly a major improvement.

And at dockside, HMAS Collins was preparing to leave after its FCD to go back to sea.

With the very significant upgrades Collins received, it was going to sea as a much more capable ship, notably with regard to its communications and warfare suites.

In 2016, the Collins review report was published and has been referred to as the Coles Report after its main author. In that report, the key challenge identified was to ramp up availability of the submarine itself.

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The focus was upon getting Collins up to the high end of international standards with regard to availability.

According to Hajek: “The international benchmark of submarine availability was set as a target and goal for the Enterprise to achieve.

“We’ve achieved that, and at the heart of reaching this goal has been establishing the 10+2 Usage Upkeep Cycle and an integrated master schedule for the class.

“This reduced the planned duration of FCDs to two years.

“Prior to that, there were a number of different submarine schedules developed by each individual group, Navy, ASC, and CASG (formerly DMO). Neither were aligned and they were in constant change.

“We now have an Enterprise agreed master schedule that now has all partners focusing on the one thing – the availability target.”

The integrated master schedule provides stability to the program and provides the means to plan the necessary upgrades to modernize the submarines more effectively.

According to Brad Hajek with the current maintenance approach of two-year FCDs and 12 month Mid-cycle dockings (MCD) we have the opportunity plan an aggressive upgrade program to modernize the Collins fleet.

With every major maintenance period there are a large number of upgrades and updates implemented in the submarines.

Examples include a new iteration of the combat system, and a new communications suite.

In broad terms, the approach has been to find ways to reduce the time in maintenance and to find ways to improve the ability of the work force to shorten core tasks in that cycle through process and productivity improvements.

The Enterprise approach has established a governance structure and collaborative relationship between Navy, CASG, and Industry partners.

Through this approach, the direct relationship between industry involved in maintenance and the navy itself have become tightly integrated into an overall effort with the focus upon fleet availability.

According to Hajek, “the crucial aspect to the submarine program is the enterprise collaborative approach.

“The Enterprise partners all work towards a shared vision and Navy’s requirements.

“This has ensured alignment as everyone has a mutual need of driving to that metric.

“The mutual need has driven key initiatives such as improving supply chain management by removing the Commonwealth from within the value chain of the supply chain, thereby reducing a level of complexity in getting the supply chain to be more effective in terms of delivery at the right time in the maintenance process.

“We also have granted a level of engineering authority to our key Platform and Combat System Integrators by bringing them under our authorized engineering organization.

“The focus is making them more responsible and accountable at the right levels across the business.”

And having achieved much better results on availability, they can now focus on enabling the Royal Australian Navy to address a broader concern with which availability is correlated, namely how does the Australian Navy use the ship and how is use correlated with availability?

As Hajek described this aspect of the effort:

“It’s great to have the submarines available, but are they doing what the navy wants them to do?”

“We are focused on deployability as a key metric. Can the submarine do the mission the navy wants it to do when the navy wants it to?”

“This is obviously not something that we can do in isolation. We have to do it as an enterprise metric.”

Another aspect associated with the correlation of availability and deployability embedded in the supply aspect of maintainability is clearly learning what needs to be where and when as the fleet operates.

Hajek described this challenge as follows:

“We need to make sure we’ve got the correct critical levels of spares.

“We need to make sure we’ve got the right number and types of spares on the submarine so the crew can repair it at sea and it doesn’t necessarily have to reach back to our contractor support to fly somewhere around the world to do that repair.

“It is also about effective forward staging of materials so having materials dotted around the globe, dotted around the country where we can effect a repair in a timelier manner.”

When I visited the yard, it was clear from the tour a major step which they have taken to ramp up repairs in the FCD. They have cut the submarine in two which allows them to remove the main motor and diesel engine generators. This allows them to be worked on them out of submarine and in the workshop, which clearly is a major shift which allows workers to be much more efficient.

Rather than being forced to work within the confined space of the submarine, they can now work directly on the key parts in an open work area therefore providing great access and improved productivity.

Further supply chain improvements is the procurement of a rotatable pool of key equipment to more effectively be able to repair key parts and then swap them from submarine to submarine, which can reduce the time for the next submarine to come in for an FCD.

In fact, one way they could further reduce FCD time would be if more resources were available to support the rotatable pool approach.

This would especially refer to motors and the long lead-time necessary to build or rebuild motors.

Kerry Fisher highlighted the importance of the rotatable pool for providing for greater fleet availability as follows:

“Having an effective rotatable pool means that we do not need to take things off the boat, and then sending it away for the refurbishment and have to wait for that refurbishment process to give us back the parts.

“We’re can take them off and replacing it right away with one from the shore. This is especially true of things like diesel engine frames.”

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Another key challenge faced by the ongoing repair and maintenance cycle is the obsolescence of key parts.

Given how long the submarine is in operation, several parts are no longer built which means that the repair cycle is challenged with regard to how to replace those parts or repair them.

One approach being taken by the team is to have the prime contractors focus on the obsolescence of parts by working with their suppliers to learn about upcoming obsolescence and perhaps buy up in advance parts that will be leaving the marketplace.

This problem is real one as parts suppliers can be purchased by global suppliers, which in turn changes who is responsible for what and may well effect which supplies stay in production or not as well.

At the heart of the change is reworking the relationship between Navy and industry.

As Hajek noted: "There's a big focus this year on embedding our CASG staff within our primes as part of our training and development strategy.

"This provides a broadening opportunity for our staff to learn the business of how they operate, this will help to improve their ability to perform second-level, third-level quality assurance governance roles."

Another aspect of change is how procurement of parts is being pursued.

Hajek highlighted how this is being worked.

"We have transfer inventory to the suppliers and made them Stock Item Owner.

"This in turn provides clear lines of responsibility for supporting and keeping the right materials on the shelf.

"We are focused on getting the right critical level of spares on the shelf, on board the submarines, so if there's a defect, the crew can then affect the repair, or the contracted support and affected the repair without delay."

The Collins submarines will be in operation through the mid 2030's.

And the current cycle is to have two deployable submarines consistently available, with four available to the fleet commander, and of these four, three submarines consistently available for tasking with one in shorter term maintenance, and two submarines in long term maintenance and upgrade.

A new submarine is coming to the fleet in the 2030s, but given the experience with the Collins class, the Royal Australian Navy will play close attention to the question of built-in modernization and enhanced maintainability for the new class of submarines.

Within the overall defense business, there is a dynamic underway whereby the payload providers and the platform builders are dynamically changing their roles as the payload evolution is considerable more rapid than platform changes.

How might the platform side of this work more effectively with rapid changes on the payload and systems side of the house?

In short, the folks working Collins sustainment are clearly thinking forward to what comes next.

Which given how important building platforms with enhanced modernization and maintainability built it is a good thing.

The Australian New Submarine Program: Clearly A Work in Progress

During my August 2018 visit to Australia, I have been able to follow up the discussions with the Chief of Navy over the past three years with regard to shipbuilding and shaping a way ahead for the Royal Australian Navy.

During this visit I had a chance to visit the Osborne shipyards and get an update on Collins class and enhanced availability as well as to get a briefing and discussion with senior Australian officials involved in shaping the new build submarine program.

Based on those discussions, I have continued pursuing discussions in Canberra with regard to the challenge of putting in place the new submarine program.

In this article, I will start with the expectations, which Australia is bringing to this new program and what they wish to see in the unique partnership they are forging with the US, France and themselves to build a new design diesel submarine.

The concern with Chinese submarines in the Pacific is real in Australia. And that concern has been reflected both in the decision to build new submarines and new frigates as well as buy P-8s and Tritons for anti-submarine capabilities as well.

The subsurface, surface and air elements are clearly to be blended into a longer reach capability to defend Australia and to work closely with allies seeking to constrain Chinese activities and to ensure freedom of navigation and defense of a rules-based order.

Even though the announced decision to build a new class of submarines came before the more recent frigate decision, the agreements in place and in process with the Brits with regard to the frigate provide a clear statement of the kind of partnership, which Australia wishes to see in the shipbuilding domain.

It sets the standard against which the new submarine program will be measured and any final agreements on production and manufacturing, deals which are not yet signed with France as of yet.

The Australians are coming to the new build submarine with several key expectations.

The submarine is to be a large conventionally powered submarine with an American combat system on board allowing for integration with the US and Japanese fleets.

The Commonwealth has already signed the combat systems side of the agreement with Lockheed Martin and the LM/US Navy working relationship in the Virginia class submarine is the clear benchmark from which the Aussies expect their combat system to evolve as well.

The new submarine is not an off the shelf design; it will leverage the French Navy's barracuda class submarine, but the new design will differ in a number of fundamental ways.

The design contract is in place and the process is underway with Australian engineers now resident in Cherbourg working with French engineers on the design.

But design is one thing; setting up the new manufacturing facility, transferring technology, shaping a work culture where Aussie and French approaches can shape an effective two-way partnership is a work in progress.

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And agreeing a price for the new submarine, and the size of the workforce supporting the effort in France and Australia are clearly challenges yet to be met.

And with the build of new frigates and submarines focused on the Osborne shipyards, workforce will clearly be a challenge.

Shaping a more effective technical and educational infrastructure in the region to support the comprehensive shipbuilding effort is clearly one of the reasons that the yard was picked as a means for further development of South Australia.

The Aussies are coming at the new submarine program with what they consider to be the lessons of the Collins class experience.

This includes limited technology transfer, significant performance problems and a difficult and expensive remake of the program to get it to the point today where the submarine has a much more acceptable availability rate.

And clearly, the Aussies are looking to be able to have a fleet management approach to availability and one, which can be correlated with deployability, which is what they are working currently with the Collins class submarine.

This is clearly one of the baseline expectations by the Australians – they simply do not want to build a submarine per se; they want to set up an enterprise which can deliver high availability rates, enhanced maintainability built in, modularity for upgradeability and an ability to better embed the performance metrics into a clear understanding of deployability.

The partnership perspective is clearly provided by the agreement put in place with the British with regard to the frigates. Here the UK and Australia are looking to wide ranging set of agreements on working together as well as determining what Aussie assets might go onto the UK version as well.

There is a clear design and build strategy already agreed to and a key focus is upon the manufacturing process and facility to be set up at the Osborne shipyards.

The ship building process, which is part of the UK-Australian agreement, was identified in one article as follows:

Digital shipyards use software to instantly transmit plans across the globe to enable construction with fewer errors, rework, and associated delays and cost increases than has been seen with traditional shipbuilding practices.

It also can involve digital technology to create a “paperless” ship from design and manufacturing to operations and service.

Mr. Phillips said a digital shipyard would ensure every aspect of the ship during the design and construction and throughout its service life was “live and accessible” to crew, maintenance staff and approved suppliers.

“Having a single point of truth in the design phase will mean that each of the nine ships will be replicated, which hasn’t been done in Australia previously, and which will benefit every stage of the program, including the upgrading and maintenance of the ships during service,” Mr Phillips said.

“It will also be the first time in Australia where a ship’s systems will have the intelligence to report on its own performance and maintenance needs and have the ability to order both the maintenance and parts required prior to docking.”

The move appears to fit with the federal government's outlook, with Defence Industry Minister Christopher Pyne yesterday revealing investment priorities for the coming year, including \$640m to support the development of "innovative technologies".

<https://www.theaustralian.com.au/national-affairs/defence/bae-uses-digital-shipyard-in-35bn-shipbuilding-project/news-story/6736a04c40baa8ee409488e88227aced>

In my discussions in Australia, there is a clear focus upon building a state-of-the-art facility along these lines with regard to the submarine program as well.

This means that the Aussies are not simply looking to see the French transfer current manufacturing technologies to build the new submarine, to co-innovate in shaping new and innovative approaches.

By looking at Asian innovations in shipbuilding, the Aussies would like to see some of those innovations built into their manufacturing processes in their new manufacturing facility.

Put simply, the Aussies do not want to repeat the Collins experience.

They want modern manufacturing processes, which they anticipate with the new frigate and have seen with regard to P-8, Triton and F-35, all programs in which they are a key stakeholder.

The question is: Can the cultural dynamics of France working with Australia, an Australian with these expectations, be managed to deliver the kind of long term, cross-learning partnership which Australia seeks in this program?

There are clearly key challenges of cross-culture learning and trust to be sorted out to be able to make this partnership work.

From my discussions in Australia, it is clear that on the Aussie side there is a fundamental desire to shape a long-term partnership with France in what the Aussies are calling a "continuous build" process.

Here the question is not of a one-off design, and then build with the Aussie workforce operating similarly to the Indian workforce in the process of a build as was done by DCNS with India.

If one looks at the frigate contract, at the core of that contract is BAE Systems not simply transferring technology to an existing company in Australia which would then take over the task and execute it, the model is quite different.

The process of the build will see a new entity being created within Australia capable at the end of this process becoming the kind of manufacturing center of excellence which can master maintainability and upgradeability of the new platform for the next phases of the life of that platform.

This process was described in part as follows by ABC News:

ASC Shipbuilding, which is owned by the Australian Government, will become a subsidiary of BAE during the build. Its shipyard in the Adelaide suburb of Osborne will be the hub once production starts in 2020.

The Hunter class frigates are expected to enter service in the late 2020s and will eventually replace the current Anzac class frigates, which have been in service since 1996.

However, the UK Royal Navy is also buying the Type 26, the first two of which are currently under construction. That fleet is not expected to be operational until 2027, which has some questioning whether the Australian frigates will be delayed.

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At the end of the building program Australia will resume complete ownership of ASC Shipbuilding, meaning intellectual property of the Australian type 26 will be retained by the Commonwealth.

<http://www.abc.net.au/news/2018-06-29/hunter-frigate-build-bae-what-you-need-to-know/9923912>

This agreement is now becoming the benchmark against any future agreement with France and Naval Group would be measured.

The Aussies are not in a rush and as one Aussie put it to me: “We want the right kind of agreement; we are not interested in the wrong type of agreement.” And when we discussed what the right type of agreement looked like, it was clearly something akin to the UK agreement.

The challenge though is that the Commonwealth has a longstanding working relationship with BAE Systems and the UK. And the UK is part of five eyes, which provides a relatively straightforward way to deal with security arrangements.

According to an article by Jamie Smyth and Peggy Hollinger published by the *Financial Times* on June 28, 2018, the importance of the broader working relationship with the UK was highlighted.

Michael Shoebridge, an analyst with the Australian Strategic Policy Institute, said the decision by Canberra to choose BAE probably reflected some emotional and strategic factors, which went beyond the technical criteria in the tender.

“The UK and Australian defence partnership is long and deep. There is also a lot of emotion around Brexit, which may have played a role given the potential for a deeper partnership with the UK into the future,” he said.

The UK has embarked on a diplomatic charm offensive over the past 12 months in Australia, including visits by Boris Johnson, foreign secretary, and Michael Fallon, a former defence secretary.

It has pledged to upgrade defence co-operation with Canberra and play a more prominent role in the Asia-Pacific, where China has begun to militarise islands in the contested waters of the South China Sea.

The choice of the Type 26 will ensure interoperability between the UK and Australian navies. Gavin Williamson, defence secretary, said the award was a “formidable success for Britain . . .

This is the dawn of a new era in the relationship between Australia and Great Britain, forging new ties in defence and industry in a major boost as we leave the European Union.”

<https://www.ft.com/content/845e88e0-7ac7-11e8-8e67-1e1a0846c475>

Against this background, the Commonwealth has had a more limited working relationship with France and the defense industry within which France is a key player. It has had experience working with programs in which France is a key player like KC-30A, NH-90 and Tiger. The very good experience has clearly been working with Airbus Defence and Space on the KC-30A, but the NH-90 and Tiger experiences with Airbus Helicopters has not been as positive.

When the Collins Class experience is married to the air systems experience, then the Aussie tolerance for agreeing to anything that is not comprehensive and well thought out is very low.

The challenge for France and Naval Group will be to build a long term partnership which can clearly set in motion a new working relationship which is not framed by these past experiences, but can leverage the very positive KC-30A working relationship. The KC-30A is obviously different from the submarine because the

plane was built abroad and the working relationship very good with Airbus Space and Defence where the Aussies are a cutting edge user pushing the way ahead with the company to shape future capabilities.

That is also the challenge: is Naval Group really a company like Lockheed or Airbus Defence and Space?

Or is the French government involvement so deep that the working processes with Naval Group not be transparent enough and credible enough to shape the kind of partnership the Aussies are looking for?

The change in status of Airbus, notably under the leadership of Tom Enders, has clearly underscored the independence of this key European company and Naval Group has more of a challenge demonstrating its independence to deliver not a product nor a build of an existing product on foreign soil, but an open-ended partnership able to shape and evolve a new build product where the digital processes of build and sustain are so significant.

[President Macron](#) put it this way with regard to the partnership: “As President of the republic, I will do everything to ensure we make the necessary arrangements to meet the requirements of this contract but more broadly, to accompany you in this strategic partnership.”

President Macron has clearly emphasized the Chinese challenge and has been very visible in working relationships in the region, notably with Australia and India.

The political intent is clearly there.

Yet it is to be remembered that Australia down elected the French team under the previous government and now they are dealing with a different government although the same DCNS/Naval Group.

But there is a new DGA team, and their engagement seems to have grown in the negotiations and complicated Aussie perceptions of the negotiating process.

The Aussies down selected the French option because it provides a good way ahead.

The French correctly understood the emphasis which Australia was placing on designing and builder a larger submarine than either Germany or Japan was offering; and the desire to have a regionally superior submarine for the Aussies is not simply about the design and the initial build.

It is about having a regionally superior submarine enterprise which embraces design, upgradeability, modernization, production, sustainment and redesign as enabling what they refer to as a continuous shipbuilding process.

There is little doubt that the design part of the bid can be met; the challenge will be building the kind of enterprise and ongoing partnership, which Australia wants for it, is not simply a historical repeat; it is blazing new history and new industrial approaches.

It would be shame if the right kind of partnership is not put in place to achieve what the Australians needs – a new capable submarine which can deliver operational superiority in the region.

And for the French, the benefits of working with a key partner investing and working a way ahead in shaping a cutting edge approach can provide reverse technology transfer opportunities, notably with regard to manufacturing processes in the years ahead.

But this is a work in progress, or not.

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Australia Builds Out Its Alliance Relationships With Shipbuilding Deals

As the Chinese challenge grows, Australia is clearly concerned about expanded Chinese influence within Australia and with regard to Chinese efforts to reshape the external environment to expand the influence and power of the Chinese authoritarian state.

Clearly the United States remains Australia's core ally in dealing with the Chinese challenge, but as Australia modernizes its forces, it is broadening as well its working relationships with other key allies

The case of dealing with the region's [growing submarine threat](#) provides a good case study of how the Aussies are working their alliance relationships. With the P-8 and F-35, the Aussies are working closely with the US to add new multi-domain warfighting capabilities to the force. The Aussies just stood up their own training facilities for the P-8, have eight P-8s already at RAAF Edinburgh and are moving ahead with this new capability. They are concurrently working to stand up their F-35 squadrons in rapid succession as well.

The Royal Australian Navy has worked hard to rebuild their once-flawed Collins class submarines and to generate higher availability rates as part of their response to the growing submarine threat in the Pacific. With the P-8 working with Collins, and with the F-35s working with P-8s as well, the RAAF and RAN will shape a new template with the United States to work anti-submarine warfare over the next few years, one in which their reach and capabilities are extended.

The next round of naval capability is being worked with the Brits and the French in terms of platforms, though the US is slated to play a continuing role in terms of force integration.

The UK and Australian Shipbuilding

[As Britain faces](#) a post-Brexit world, working with the Aussies is seen as a key political objective, in addition to any technological relationship. Australia decided to buy the new UK Global Combat Ship frigate at the end of June 2018, a key touchstone of how London sees its new role. It also is a good indicator of the Aussie point of view on what it needs for a new approach to shipbuilding.

The Australian anti-submarine frigates will be known as the Hunter Class and will be built by ASC Shipbuilding at the Osborne Naval Shipyard in Adelaide, South Australia. The Hunter class should enter service in the late 2020s. They replace eight Anzac frigates, which have been in service since 1996.

The ships will carry the Australian-developed CEA Phased-Array Radar and the US Navy's Aegis combat management system.

The UK and Australia are shaping a wide-ranging set of agreements on working together as well as determining what Aussie assets might go onto the UK version as well. There is a clear design and build strategy already agreed to and a key focus is upon the manufacturing process and facility to be set up at the Osborne shipyards.

The priority is upon creating a digital build process. According to a top [BAE Systems](#) official involved in the process, the benefits will be significant.

"Having a single point of truth in the design phase will mean that each of the nine ships will be replicated, which hasn't been done in Australia previously, and which will benefit every stage of the program, including the upgrading and maintenance of the ships during service," Glynn Phillips, CEO of BAE Systems Australia, said. "It will also [be the first time in Australia](#) where a ship's systems will have the intelligence to report on its own performance and maintenance needs and have the ability to order both the maintenance and parts required prior to docking."

With the coming of the Queen Elizabeth class aircraft carriers and the new UK frigates, and with extensive collaboration to build the Aussie frigates, a key foundation is being laid for working the UK-Australian strategic relationship in the years ahead.

Australia Reaches Out to The French

The Australians signed an agreement in 2016 to work with the French in building what the Australian government called “a regionally superior submarine.” That agreement has seen the first key enabling contract to establish the ship design process, but not yet the build agreement with a target price for the initial submarine.

What has been signed in addition to the agreement on intent and the security agreements in 2016, is Mobilization Contract for \$5B (Aussie) which set up the working facilities to work the design process. in Adelaide and in Cherbourg

With the election of President Macron, the French have been forthcoming in focusing on the Chinese challenge and have highlighted the importance of the strategic relationship with India and Australia as well. Building a new submarine capability in Australia will allow France not only to enhance their partnership with Australia but could allow French forces as well as industry to play a greater role in the region as well.

But the challenge for France is providing by the need to ensure that the two cultures can find ways to work together effectively in delivering what the Australians seek, which is a work in progress, and no easy task. And now the agreement with the UK with regard to the frigate is shaping a baseline expectation with regard to the build process for the submarine as well.

The Australians are coming to the new build submarine with several key expectations. The submarine is to be a large conventionally powered submarine with an American combat system on board allowing for integration with the US and Japanese fleets.

The Commonwealth has already signed the combat systems side of the agreement with Lockheed Martin and the LM/US Navy working relationship in the Virginia class submarine is the clear benchmark from which the Aussies expect their combat system to evolve as well.

The new submarine is not an off-the-shelf design; it leverages the French Navy’s Barracuda class submarine, but the new design will differ in a number of fundamental ways. The design contract is in place and the process is underway, with Australian engineers now resident in Cherbourg working with French engineers on the design.

But design is one thing; setting up the new manufacturing facility, transferring technology, shaping a work culture where Aussie and French approaches can shape an effective two-way partnership is a work in progress. And agreeing a price for the new submarine, and the size of the workforce supporting the effort in France and Australia are clearly challenges yet to be met.

And with the build of new frigates and submarines focused on the Osborne shipyards, workforce will clearly be a challenge. Shaping a more effective technical and educational infrastructure in the region to support the comprehensive shipbuilding effort is clearly one of the reasons that the yard was picked as a means for further development of South Australia.

The Aussies are coming at the new submarine program with what they consider to be the lessons from the Collins class. This includes limited technology transfer, significant performance problems and a difficult and

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expensive remake of the program to get it to the point where the submarine has a much more acceptable availability rate.

Clearly, the Aussies are looking to be able to have a fleet management approach to availability and one, which can be correlated with deployability, which is what they are working currently with the Collins class submarine.

This is clearly one of the baseline expectations by the Australians – they simply do not want to build a submarine per se; they want to set up an enterprise which can deliver high availability rates, enhanced maintainability built in, modularity for upgradeability and an ability to better embed the performance metrics into a clear understanding of deployability – where does the Australian Navy need to go and how will it reshape its con-ops going forward and how do upgrades of the submarine fit into all of the above?

In my discussions in Australia, I've found a clear focus on building a state-of-the-art facility along these lines with regard to the submarine program as well. This means that the Aussies are not simply looking to see the French transfer current manufacturing technologies to build the new submarine, to co-innovate in shaping new and innovative approaches. By looking at Asian innovations in shipbuilding, the Aussies would like to see some of those innovations built into their manufacturing processes in their new manufacturing facility.

Put simply, the Aussies do not want to repeat the Collins experience. They want modern manufacturing processes, which they anticipate with the new frigate and have seen with regard to P-8, Triton and F-35, all programs in which they are already a key stakeholder.

The question is, can the cultural dynamics of France working with Australia, with very clear Australian expectations, deliver the kind of long term, cross-learning partnership which Australia seeks in this program?

There are clearly key challenges of cross-culture learning and trust to be sorted out to be able to make this partnership work. From my discussions in Australia, it is clear that on the Aussie side there is a fundamental desire to shape a long-term partnership with France in what the Aussies are calling a “continuous build” process.

Here the question is not of a one-off design, and then build with the Aussie work force operating similarly to the Indian workforce in the process of a build as was done by DCNS with India.

The Aussies are not in a rush and as one Aussie put it to me: “We want the right kind of agreement; we are not interested in the wrong type of agreement.” And when we discussed what the right type of agreement looked like, it was clearly something akin to the UK agreement.

The challenge though is that the Commonwealth has a longstanding working relationship with BAE Systems and the UK. And the UK is part of Five Eyes, which provides a relatively straightforward way to deal with security arrangements.

The Commonwealth has had a more limited working relationship with France and the defense industry within which France is a key player. It has had experience working with programs in which France is a key player like KC-30A, NH-90 and Tiger. The very good experience has clearly been working with Airbus Defence and Space on the KC-30A, but the NH-90 and Tiger experiences with Airbus Helicopters has not been as positive.

When the Collins Class experience is married to the air systems experience, then the Aussie tolerance for agreeing to anything that is not comprehensive and well thought out is very low. The challenge for France and Naval Group will be to build a long-term partnership which can clearly set in motion a new working

relationship which is not framed by these past experiences, but can leverage the very positive KC-30A working relationship.

The KC-30A is obviously different from the submarine because the plane was built abroad and the working relationship very good with Airbus Space and Defence where the Aussies are a cutting edge user pushing the way ahead with the company to shape future capabilities.

That is also the challenge: is Naval Group really a company like Lockheed or Airbus Defence and Space? Or is the French government involvement so deep that the working processes with Naval Group not be transparent enough and credible enough to shape the kind of partnership the Aussies are looking for?

The migration of Airbus, notably under the leadership of Tom Enders, has clearly underscored the independence of this key European company and Naval Group has more of a challenge demonstrating its independence to deliver not a product nor a build of an existing product on foreign soil, but an open-ended partnership able to shape and evolve a new build product where the digital processes of build and sustain are so significant.

Looking Forward

All of this adds up to the Australians building out their force capabilities with the Americans over the next five years, and then start to see UK and French led efforts in shipbuilding then fielding new capabilities, which can be integrated into the evolving Australian force structure. with these engagements comes in tow the reshaping of their alliance relationships as well.

In effect, the Australians are in the throes of remaking their history. Their history has been to be part of a broader power defending their interests; first as part of the British Empire, and then during and after World War II as part of the American presence in the Pacific.

What we are seeing now is a more sovereign and independent approach building on that American relationship and broadening their alliance in practical terms as well, And as Japan extends its perimeter defense and industrial investment to do this, almost certainly the relationship with Australia will become a key part of this evolving alliance mosaic for Australia as well.

This article was first published by [Breaking Defense](#) on August 22, 2018.

APPENDIX 4: THE EVOLUTION OF THE RAAF AND ITS CONTRIBUTION TO AUSTRALIAN DETERRENCE POLICY

Australian Force Integration and Allied Interoperability: Facing and Meeting the Challenge

I have been coming to Australia for five years and working the seminar reports for the Williams Foundation in support of the Australian Defence Force Modernization.

This modernization process has been very much focused not simply on recapitalization of the force but shaping a new approach to force integration.

And force integration will yield a more capable and effective force able to better defend Australian sovereignty and contribute more effectively to overall deterrence in depth in the Pacific.

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Yet there is an inherent challenge which faces the United States as it comes out of a long period of fighting the land wars and relying upon geographically defined command structures.

The geographical commands are organized to shape forces used in a particular geographical area and in the conditions of land warfare against a non-peer adversary many of the tasks are almost fed ex in nature in terms of logistical movement of force and force aggregation, and joint operations understand in terms of supporting ground operations, even if air enabled.

This becomes very different in the face of peer adversaries where the need is to have an effective integrated force postured to dominate rather than simply to collate force up against a relatively slow moving adversary without force on force capabilities that can compete with you.

The challenge of shifting from the geographical commands to an integrated targeted force capability was highlighted in the interview we did with the then head of NORTHCOM Admiral Gortney in 2016.

As [Admiral Gortney](#) put the challenge:

We are a different combatant command than the other geographic combatant commands, and the reason is who's in charge in dealing with the threats to the homeland.

In contrast, NORAD is pretty clear-cut.

It is an air mission command, although the changes over time have been significant facing the command. NORAD was born in the Cold War when the air battle was going to occur above the Great Lakes and over the Seattle area.....

The rise of China and the new Russia are driving a reconsideration of the NORTHCOM mission, for we really do need a commander for the homeland in a more classic sense. But when we were stood up it was not done to deal with more traditional or classic defense threats.

But the challenge for us is to shape what we in the US Navy call the NIFC-CA or Naval Integrated Fire Control—Counter Air battle network solution for North American defense. Put in simple terms, we need to shape a more integrated air and maritime force that can operate to defend the maritime and air approaches to North America as well as North America itself.

It is a question of shaping in this case the US and allied integrated forces able to deal with a peer competitor threat rather than relying on geographical commands to administer military force against a relatively limited capability by adversaries directly against the force.

In my visit to the Australian Air Warfare Centre located at RAAF Edinburgh on August 10, 2018, I had a chance to discuss the challenge of how force integration was shaping the need for new approaches to working with allies.

In my last interview with [Air Commodore Joe “Vinny” Iervasi](#), he addressed the key challenge of how do we learn what we have not done before?”

In this interview, the focus was upon the challenge of both Australia pursuing a force integration strategy and at the same time working out ways to work effectively with allies.

Air Commodore Iervasi put it this way:

We talk about two things, integration and interoperability.

Integration is about the internal mechanisms of putting your force together and operating it across multi-domains.

Interoperability is how your force interfaces with another force.

For the Australian Defence Force, we are driving to deliver military effects as an integrated Joint Task Force, as we believe that is the most effective fighting force, particular for multi-domain warfare. If we are leading a campaign, then we'd inherently design the campaign and associated command and control on the basis of a Joint Task Force.

However, if we are contributing to someone else's campaign, then our force 'fit' will be influenced by the design of that particular campaign. The main point in case is operations with the U.S.

Generally speaking, the U.S. conducts operations within their respective geographic combatant commands under a component framework, utilizing a supported/ supporting command and control arrangement. The consequence of this arrangement is that we have to disaggregate our Joint Task Force to be accommodated within the relevant component.

This inherently poses a dilemma for us; do we retain the integrity of our Joint Task Force and seek accommodation within that campaign to operate as such, or do we fallback to the component model? Either way, there are implications for the way we plan, organize, train and prepare for operations.

Put in other terms, if Australia enhances its warfighting capabilities through force integration and task forces, how does the United States work with such a force?

One solution would be to task assign or geographical assign a task within a coalition operation but what might be other ways to deal with the opportunities opened up by the Australian approach to force integration?

But Air Commodore Iervasi sees the Aussie challenge as somewhat similar to the US Marine Corps working within the broader US force structure. The US Marine Corps has shaped an integrated force, which is designed to operate that way for a period of time or within an area of operation, but its integration does challenge the USAF and the US Navy in terms of how best to operate with such an integrated force.

This challenge is reflected in the Aussies approach to working the F-35 within their force integration efforts.

On the one hand, the Aussies are working closely with the US Navy in developing P-8, Triton and F-35 integration. However, the USAF mission is different to that of the USN, and therefore their mission integration priorities are also different.

According to Air Commodore Iervasi: "The differences in mission between the U.S. services is reflected within the components of a combatant command. Whilst the U.S. has sufficient mass to be able to segregate missions, a small-medium force like the ADF does not have that luxury. We are required to be interoperable across a broad mission set, and therefore we need to keep abreast of the different integration priorities of the U.S. services.

"There's a segregation of responsibilities about what they do but we don't fight that way.

"We're trying to fight as an integrated force across all the warfighting domains."

Another aspect of the force integration approach, which we discussed, is the impact which force integration might have on an adversary.

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Air Commodore Iervasi: “Does the demonstration or the perception that your force is integrated essentially provide a deterrent effect?”

“That is “I can’t just now attack the land force because I know it’s so interconnected with other things, I don’t know where I’m being attacked from.”

“Or “my ability to dominate has now diminished.”

“Does that actually produce a deterrent effect?”

One might conclude that perhaps the challenge which Aussie integration as well as USMC modernization pose for the broader US force structure could provide a critical lead in point for significant innovation in reshaping C2 able to leverage the kind of force integration which new technologies such as the F-35 pose to the US force structure, as currently operated.

Looking Back at RIMPAC 2018: The Perspective of Air Commodore Craig Heap

During my five years of visits to Australia, I have had the opportunity to meet with and to talk with Air Commodore Heap several times.

As the Commander of the Air Force’s Surveillance Response Group, Air Commodore Heap has had the challenge of leading one of the most diverse, but critical groups in Air Force as the ADF works toward maximizing the integration of its capabilities while transforming into a 5th Generation Air force.

During the last visit [earlier this year](#), Murielle Delaporte and I had the chance to discuss a number of the innovations being worked by Air Force within the ADF and its Coalition partners. Notably, Air Force is bringing on the P-8A/Triton dyad. During the current visit I have had the chance to revisit [RAAF Base Edinburgh](#) and get an update on the P-8A program as well.

Obviously, bringing on the P-8/Triton dyad highlights the importance of the US Navy and its working relationships with Air Force, and the recent engagement in RIMPAC 2018 certainly added to that experience as well.

In RIMPAC 2018, Air Commodore Heap was the Combined Forces Air Component Commander, of an Australian-led CAOC within the exercise.

Exercise Rim of the Pacific 2018 (RIMPAC 2018) is a major United States Pacific Fleet biennial combined exercise to strengthen international maritime partnerships, enhance interoperability and improve the readiness of participating forces for a wide range of potential operations.

The multinational activity, held from 27 June to 2 August 2018 in Hawaii and off the coast of California, is the world’s largest maritime exercise and includes 47 surface ships, five submarines, more than 200 aircraft and 25,000 personnel from 25 countries; Australia, Brazil, Brunei, Canada, Chile, Colombia, France, Germany, India, Indonesia, Israel, Japan, Malaysia, Mexico, Netherlands, New Zealand, Peru, the Republic of Korea, the Republic of the Philippines, Singapore, Sri Lanka, Thailand, Tonga, the United Kingdom, the United States and Vietnam.

The Australian Defence Force has sent four surface ships, HMA Ships Adelaide, Success, Toowoomba, Melbourne, a submarine, HMAS Rankin, one P-8A Poseidon aircraft and more than 1,600 personnel including an amphibious landing force from 2nd Battalion, Royal Australian Regiment.

ADF personnel will exercise across a broad spectrum of scenarios from humanitarian assistance and disaster response to maritime security operations, sea control and complex war fighting. Participating personnel and assets will conduct gunnery, missile, anti-submarine, and air-defence exercises, as well as maritime interdiction and vessel boardings, explosive ordnance disposal, diving and salvage operations, mine clearance operations and an amphibious landing.

For Air Commodore Heap, this was the fifth RIMPAC exercise in which he has participated.

“This is the 26th RIMPAC exercise which has been held to date, which continues to be the largest Maritime exercise conducted anywhere”.

“There were 25,000 people, 46 warships, 200 aircraft, from 25 nations, engaged over a period of six weeks, in a series of phases.

“The initial phase involved getting to meet each other at all levels, building relationships and discussing capabilities during the initial in port harbor phase.

“The Exercise then moved onto the Force Integration Training and Advanced Force Integration training, where a schedule of tactical events of increasing complexity, under the water, on the water, on land and in the air provided the basis for a four-day freeplay phase; all outstanding opportunities to improve tactical skills, individually as units and collectively as Task Groups, while building interoperability with all the multi-national participants.”

“And the Exercise operated across full the spectrum of operations – from Humanitarian Assistance and Disaster Relief (HADR), to Counter Piracy, Maritime Interdiction, Counter Insurgency and Multi Domain Advanced Warfighting.

“There was a HADR component lead by a Japanese Maritime Self Defense Force 2-Star, RADM Hideyuki Oban. This ran for two weeks and involved integrating a range of capabilities from the local civilian Hawaiian emergency services to some high-end military capabilities.

“There was a counter-insurgency component to the exercise scenario, which was overlaid with the high-end maritime warfighting.

“The heart of the Exercise was is about building multi-national relationships, which improved understanding, leading to better cooperation and trust in a crisis, which will enable all participants to work together more effectively in the future on any operation.

Question: What was your specific role in RIMPAC 2018?

Air Commodore Heap: I was the Combined Forces Air Component Commander or CFACC.

“This meant that I led a multi-national team with the Combined Air Operations Centre (CAOC), to safely and efficiently command land-based assets under my control, while coordinate safely and effectively, all air assets, including the significant ship-based Carrier Strike Group and land-based Maritime Patrol and Response capabilities.

” Overall we safely executed 3245 sorties over 23 days from 8th through to 31st July. Obviously, that entailed a lot of liaison and coordination from both the safety and training effectiveness points of view.

“During the exercise, we had Marine Corps F-35s, USAF F-22s and F-15s involved as well as a significant multi-national P-8 and P-3 maritime patrol force. Airborne tankers of various sorts supported the air

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refuellable assets, in addition to rotary wing, MV-22 Ospreys and other unmanned aerial vehicles such as the Multi-Domain Task Forces Grey Eagles.”

“I would mention the US Army’s First Corps participation as the lead for the Multi-Domain Task Force, added another contemporary dimension to the capability options available to achieve effects at sea, in port or over land. Essentially, they were experimenting with concepts to potentially reshape their force to support the tactical maritime battle.

“Another highly beneficial component of RIMPAC was the live fire program which was conducted on the Pacific Missile Range Facility, (PMRF) north-west of Kauai. This included two days when specially prepared hulks were made available by the US as targets for a range of live firings by various participants.

“This included the successful first firing by an RAAF P-8A of a Harpoon anti-ship missile against a hulk, the Ex USS Racine.

Question: Your P-8s were clearly at the Exercise, even though they were not under your command in your cAir Component Commander role.

How did they operate with the other P-8s, namely the USN and Indian Navy P-8s?

Air Commodore Heap: Seamlessly.

“We demonstrated the clear capability for the US and Australian Mobile Tactical Operations Centres to work closely together, optimizing synergies.

“The Indian Navy P-8’s were operated from the same tarmac at Hickham, with their operations element collocated next to the USN and RAAF Mobile tactical Operations centre.

“All P-8 teams ended up working very well with each other in the tactical operations space.

“The Indian Navy aircrew and maintenance personnel were highly professional and clearly comfortable with advanced airborne ASW concepts as well.

“RIMPAC also provided a rare opportunity to exercise significant multi-national airborne MPRA assets, P-8s and P-3 from the US, Australia, India, Canada, New Zealand, Japan, and the Republic of Korea, in the conduct of Theatre ASW, (TASW).

“The P-8s in particular are a force multiplier in this piece, the overall objective of which is to deny or deter an adversary submarine force from affecting our friendly forces.

“The TASW element focused upon being able to get ahead of our sea-based task groups, in accordance with the plan or tactical scheme of manoeuvre, in order to search an area, and providing greater assurance that any submarine threat would be deterred or degraded from offensive operations against our friendly surface forces.

“This allowed the surface task force commanders to focus on the closer and immediate self defence of their own task forces.

“What Theater ASW provides is a centralised command construct, with assets to focus beyond the immediate and close defense of surface task forces; shaping the environment to provide decisive freedom of manoeuvre, to prosecute underwater threats at greater distance and range.

“And that is clearly where the P-8s and Tritons come in as major players in the Theater ASW concept.

“As the Australian National Commander as well for the Exercise, I was also extremely proud and impressed by HMAS Adelaide and the 2nd Royal Australian Regiments performance as part of the RAN led CTF176 Expeditionary Strike Group.

“Commodore Ivan Ingham, as CTF176, and the entire ADF team also demonstrated that the ADF’s amphibious capability continues to perform, and indeed grow, providing the Australian government with a broader range of options across the spectrum of operations, from HADR to classical warfighting.”

In closing, Air Commodore Heap reiterated the aims of RIMPAC: relationship building, leading to understanding, translating to cooperation and trust.

He stated, that, “... the USN Commander of 3rd Fleet and Commander Combined Task Force VADM Alexander insightfully stated in the early stages of RIMPAC planning that, ‘you cannot surge trust’.

“One of the truly great outcomes of RIMPAC 18 was that there was clearly a bunch of trust developed between RIMPAC partners which was allowed to begin surging due to their shared RIMPAC experience at every level; a key output from a great exercise.”

Pitch Black 2018: RAAF Perspectives

During my visit to Australia in August 2018, I was in country as the Pitch Black 2018 exercise was wrapping up and will have more on this exercise later.

Very good coverage of Pitch Black 2018 was provided by Jaryd Stock on the website [Aviation Photography Digest](#) and readers are encouraged to read his various pieces to be found there.

From one of his stories, he highlighted comments made by RAAF Air Commodore [Mike Kitcher](#) who is the Commander of the Air Combat Group with regard to what was identified as a “typical mission” from the second week of the exercise.

“As you are aware Pitch Black has been running for a couple weeks now and so far the exercise has been really successful, and during the second week we have managed to launch (From RAAF Base Darwin and Tindal) some big packages and they are some of the biggest missions that ever been launched since I have been associated with Pitch Black.

To give you an insight in how that’s going and give a bit of an idea into the missions undertaken, yesterday (Thursday, August 9th) we flew a mission where we had RAAF Classic Hornets (77 Squadron), RAAF Super Hornets one of which I was flying (from 1 Squadron). We also had Indian Air Force Sukhoi Su-30s (102 Squadron), USAF F-16s (80th Fighter Squadron) also with Indonesian F-16s (3 Skuadran), Singaporean F-16s (143 Squadron) and Thai Gripen (701st Squadron) and a bunch of aircraft that were all designed to escort a couple of transport aircraft.”

A skill set associated with the strategic shift, battlefield extraction, was exercised in this context as well.

In the escort scenario that was played out on August 9th during the second week of Pitch Black 2018, a RAAF C-27J Spartan from No. 35 Squadron at an airfield strip in the Delamere weapons range was tasked to provide extraction for ground forces (35 Squadron were also partaking in humanitarian relief missions during the exercise but due to the complexity of this particular scenario it would suggest the C-27J Spartan and crew seems as though they were operating in the battlefield air-lifter role, with the squadron harnessing their skills to successfully extract ground forces from a conflict battle-space and return to home base safely).

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Clearly, during the exercise the RAAF and the allies were playing through a number of key skill sets which are being highlighted by the strategic shift to higher tempo operations.

Those skill sets were highlighted by the RAAF's official Air Force newspaper.

One of those skill sets which was highlighted was the need to evolve greater capabilities to execute mobile basing.

During our visit with the Commander of the Combat Support Group, [Air Commodore Robinson](#), earlier this year, this skill set was identified as follows:

What mobile basing might mean in today's world is a work in progress, but one which will need to deserve more attention going forward....

The RAAF works closely with the USAF as well both in terms of cross learning with the USAF's [Contingency Response Groups](#) as well as the USAF sorting through the growing demand for supporting mobile basing in the Pacific, in terms of flexibly moving away from an over-reliance on fixed basing in the region in times of crisis.

But as the Air Commodore pointed out, the two Contingency Response Groups in the USAF can focus full time on contingency response whereas the RAAF has to include that capability within the overall force.

We discussed at some length the challenge of rethinking mobile basing in times of crisis, which is a work in progress.

"We are having to reacquaint ourselves with some tasks and challenges which we parked to the side a bit while we were in the Middle East for so long.

"We did not have to worry so much about mobile basing to counter the principal threats in that theatre.

"The mindset is in transition now."

This clearly is an Army and Air Force challenge.

"We are good at supporting maneuver with our tactical transport aircraft and Australia's Army aviation capability, including the Tiger Reconnaissance Helicopter, but what we need to do is move to the next level of support to maneuver the most lethal part of our air power capability across a range of airfield options."

In an article published August 23, 2018, the Air Force newspaper discussed the exercising of these skill sets as follows:

The article was entitled "Takeoff for Airbase".

It was written by Leut Harley Slatter and focused on the creation of mobile basing.

Constructing an austere airbase over two days at Bachelor in the Northern Territory was a great training platform for our combat support personnel

FLTLT Michael Fox, operations officer No. 382 Contingency Response Squadron, said the location and exercise were ideal to train and showcase Air Force's ability to rapidly set up and steer airbase in Australia is remote north.

"Bachelor proved challenging, given the he significant proximity from infrastructure," FLTLT Fox said.

“Pitch Black gave us the opportunity to verify our actions to deploy at short notice to an austere airfield activate it and receive aircraft.”

FLTLT Fox said the joint effort involved establishing the base as a hub for many complex missions and serials throughout the exercise.

“The Insertion into Bachelor airfield, was done by both road and air. Army assisted greatly by transporting cargo,” FLTLT Fox said.

“We also had security forces and a Contingency Response Group from the US Air Force and Army’s 9th Force Support Battalion working at Bachelor Airfield.”

Once construction was complete these groups, along with the No. 2 Security Forces Squadron, continued to support operations at bachelor during the exercise.

FLTLT Fox said the objective of 382 CRS during Pitch Black was to be capable of receiving C-27 J Spartan aircraft and turn them around in support of the wider operation.

“Our services included an air load team, refueling, a 24-hour-day operations cell and an integrated US Air Force contingent including air traffic controllers,” FLTLT Fox said.

The ability to train in this environment and test themselves was also a great practical benefit for the members of 382 CRS, as a squadron often has to move at short notice.

A second article focused on the air traffic control skill sets which were performed by coalition forces during Pitch Black.

The story was entitled “Tracking Red and Blue in the Mix.

It was published on August 23, 2018 as well.

Exercise Pitch Black’s busy airspace over the Northern Territory gives our air battle managers a chance to work with controllers from the other nations to target, track, and direct friendly and deal with enemy aircraft.

For the first time controllers from India, Germany and Canada joined our integrated fighter control teams.

CO No. 114 Mobile Control and Reporting Unit Wing Commander Brett Risstrom said the exercise provided new opportunities to develop skills with foreign air forces during simulated aerial combat.

“At Pitch Black we have been able to integrate fighter control teams, which helped blue force crews in the air find, track and destroy enemy red force,” WGCDR Risstrom said.

During the exercise air battle managers directed dozens of friendly aircraft from multiple nations at once

Sgt. Ryan McGee of No. 1 Remote Sensor Unit, was put through his paces while working foreign militaries.

He said success meant putting blue aircraft in the right place at the right time.

“We were looking at where the red aircraft were and where they were coming from to ensure we had a safe air picture, or able to dominate the skies,” Sgt. Mckee said

Meanwhile, 114 MCRU operated the Tactical Air Defense Radar System, AN/TPS 77, to provide tactical aerospace battle management and air traffic surveillance during the exercise.

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114 MCRU senior engineering officer SQLDR Mark Wilson said the deployed air defense radar was used for safety of flight and direct aircraft on target during exercise.

“Positioned at Poll Hill, 300 km south of Darwin in the Northern Territory, the radar had 15 technicians supporting it during the exercise,” he said.

“Conditions was harsh but morale was high and the capability had proved itself as an asset to defense.”

Cpl. Martin Larocque, a technician with the Royal Canadian Air Force, visited the remote site to learn about the deployable radar and speak with our personnel about their experiences.

“We have a similar radar but it’s a bit older. It’s been great to see how the Aussies do their job with the radar and how they set up a remote camp.”

Visiting RAAF Edinburgh: An Update on the Aussie P-8 Enterprise

During my visit to RAAF Edinburgh on August 10, 2018, I had a chance to talk with Group Captain Darren Goldie, Officer Commanding 92 Wing.

[92 Wing](#) is described by the RAAF as follows:

Headquartered at RAAF Base Edinburgh, No 92 Wing (92WG) has long been established as the first Maritime Wing of the Air Force.

The Wing is responsible for conducting long-range intelligence, surveillance and reconnaissance missions in support of Australia’s national interests worldwide. 92WG is also responsible for search and survivor supply missions throughout Australia’s region of responsibility.

92WG commands:

- Two operational flying squadrons: Nos 10 and 11 Squadrons;
- A training squadron: No 292 Squadron;
- An operational detachment: 92WG Detachment A at Butterworth, Malaysia; and
- A number of operational support and development elements.

Operating AP-3C Orion and P-8A Poseidon aircraft, 92WG’s combat roles include anti-submarine and anti-surface surveillance and warfare for which the aircraft are equipped with torpedoes and Harpoon anti-ship missiles.

The AP-3C is being replaced by the P-8A Poseidon and MQ-4C Triton which will perform the vital functions of long-range maritime patrol.

Since that time, new buildings have been put up to support the P-8 operations as well as the main operating hangar and control center close to completion.

[During that visit](#) I had a chance to meet with Wing Commander Mick Durant, Officer Temporary Commanding 92 Wing, Wing Commander David Titheridge, Commanding Officer 11 Squadron and Wing Commander Gary Lewis, Deputy Director P-8 and Triton Transition.

In that meeting, the process of change was highlighted.

We are P-3 operators but the operating concept of P-8 is very different and we are working the transition from the P-3 to the P-8 which is a networked asset both benefiting from other networks and contributing to them as well as a core operational capability and approach.

The changes that are coming are very exciting.

So we're moving from an aircraft, which we've pretty much maximized, to a new one which is called P-8, for a reason.

This is an A model aircraft. So with an A model aircraft comes to the ability to grow.

And we're going to a new world with a starting point, which allows us to grow.

The capacity to integrate, innovate, and talk to our allies and our own services is a quantum leap in what we've had in the past and it will allow us to be able to do our roles differently.

Shaping that change is one of the key missions that we've got.

We are going to innovate and think out of the box compared to P-3 tactics and concepts of operations.

The current visit provided an opportunity to discuss progress and thoughts about the way ahead with the current 92 Wing Officer Commanding.

Group Captain Goldie comes from the C-130 community and he argued that when a new series of aircraft are introduced into a community, in this case a P-8 in what has been a P-3 community, the additional education required (through conversion onto the new aircraft type) is significant whether you have been doing MPA missions or flying very different aircraft. He argued that with a change in the aircraft type, "it's a great opportunity to move some people around the organization, to get a bit of cross-pollination in the force."

There are currently seven P-8s at RAAF Edinburgh.

And with the current training cycle, the RAAF will train their P-8 operators in Australia.

"The last pilots to be trained in the U.S. have just arrived. We're basically using the instructional workforce that has been embedded inside VP-30 for the last few years.

"They're all posted to 292 Squadron, which is located in the adjacent building to us at the moment using the various training simulators and devices we have purchased and set up for crew training."

After the interview, we walked around the maintenance training facility, which is very impressive. The training area includes computer-based virtual training, which is capable of providing very detailed instruction and computer replication on the various aspects of the aircraft.

The virtual maintenance training is complemented by the use of key aircraft components – training devices — to get hands on experience. This includes a 737 which has been modified to replicate a P-8A and painted in RAAF colors, on which crew can train for loading weapons, reconfiguring the aircraft or loading the search and rescue kit.

The Wing is in the process of crossing over from P-3s to P-8s.

"We're right in that cross at the moment. We have roughly the same amount of crews flying each of the types, with four crews each on the Orion and Poseidon.

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“But numbers five, six, seven, and eight are about to get going on the P-8, which means that we’re at the crossing point. So now it’s a case for every mission between now and the end of the year, we will work with the Air Operations Centre at Joint Operations Command to decide which aircraft type is better suited to the particular mission.”

Looking back at the process, Group Captain Goldie underscored that the planning has worked quite well.

“If you were to open the spreadsheet that someone drew up in 2012 or 2013 in terms of capability realization, we are on those timelines. So it’s a testament to buying an aircraft that another international partner, in this case the United States Navy, deployed a couple years ahead of us.

“But it would be remiss of me not to mention that of course there is challenges; it’s a new aircraft, it’s a spiral upgrade aircraft. That brings with it great opportunity in the future, but it brings challenges, as well.”

The Aussies are standing up their mobile operations center to use with the aircraft. They will receive three mobile tactical operations centers with one located at RAAF Edinburgh, with the other two ready to deploy forward to meet operational requirements.

“The Mobile Tactical Operations Centers will be operated from deployable shelters in the future, although at the moment, we are using tents.”

With both P-8 and now with Triton, Australia is in a co-operative program with the US Navy, which allows them to participate in co-development.

This essentially means Air Force is an equity partner in the aircraft, allowing influence and the sharing of resources for future upgrades.

“Through a co-development program we can participate in R and D for our aircraft through a partnership which leverages the size and technological capabilities of the US.

“For example, with regard to our search and rescue stores drops for the P-8, it was tested by the US Navy’s VX-1 squadron initially, before the conduct of OT&E within Australia.

“Our OT&E results were then fed back to the USN, with the procedures published in our shared document suite.

“Ultimately, the ballistics and checklists will be included in our training system as well.

“We have done the tests for Air to Air refuelling the P-8A with the (RAAF) KC-30A which is crucial for us but gives the US Navy a capability to leverage the global A330MRTT fleet as well.

“You can imagine the United States Navy would not place air-to-air refueling with the Australian KC-30 at the top of their list of priorities, but it’s close to the top of our list.

“Essentially, the US Navy gets a new capability by working with us.”

The P-8A uses jet propulsion jet and we discussed how using a jet versus a P-3 turboprop has changed maritime patrol.

“Firstly, an aircraft that can fly around at Mach 0.8, can get to an area of interest much more quickly.

“Given that it is designed to operate as a family of systems, the Triton will provide persistence, and the P-8 will become the response asset.

“If the Triton sees or senses something that is of value that needs closer investigation then of course the P-8 can respond, but I also see the P-8 as a strategic response asset.

“We are not easily going to be able to move the Triton around in the first few years; it will have a complicated basing structure, heavily reliant on its infrastructure for launch and recovery.

“In contrast, we can operate the P-8 on a variety of bases in the region. The P-8 can base in various locations through our partnership agreements within the region.

“An example of that might be operating with Seventh Fleet in Japan. So an endgame to me would involve taxiing our P-8 in on the ramp in Japan, downloading the aircraft media into the USN disk drives, which is then processed, exploited, disseminated into the intelligence enterprise.”

“The traditional model of a P-3 or similar maritime patrol aircraft, includes transiting to an area, and using its sensors to find something. It then needs to localize the threat of interest. The process relies on that aircraft being a self-contained gatherer and disseminator of all of that. It needs to find it, it needs to collect it, it needs to decide what to do with it.

“It comes back with the information onboard, and it lands at home base. Someone pulls a disk out and sends the information for processing.

“Whereas with the P-8 plugged into a global satellite-enabled network meaning the information is readily available.”

The core point is that the template being shaped by the Triton/P8 dyad is laying a foundation for further innovation, innovation clearly visible in the weapons, sensor and remote platform areas.

Reshaping the Australian Air Force Cadets Program: A Key Element of 21st Century Defense Infrastructure

When one thinks of defense infrastructure, a key element is the people in the force and the infrastructure, manufacturing, science, technology, and engineering that support it.

But clearly, having a dedicated committed and capable pool of recruits both into the support structure and the force is absolute central.

But this part of the effort – working with the youth and preparing them for the careers crucial to national security – receives considerably less attention in the defense press than it should.

During my latest visit to Australia in August 2018, I had a chance to talk with Air Commodore Gary Martin, whom I first met with and interviewed when he was in Washington DC as the air attaché for the Australian Government. Previous to that he was the Air Mobility Commander in the RAAF.

<https://sldinfo.com/2015/02/the-raaf-and-culture-change-building-sustainable-reach/>

Martin is now in Canberra where he is Director General Cadets – Air Force, which is the first time the program is under the direction of a permanent one star that indicates the growing attention being paid to shaping a more effective set of approaches to preparing the kind of work force and support structure the ADF needs in the future.

According to a Department of Defence article on their website, the ADF Cadets program is described as follows:

Second Line of Defense

The Australian Defence Force Cadets (ADF Cadets) is a personal development program for young people, supported by the Australian Defence Force in cooperation with the community. The program benefits the nation by developing the capacity of Australian youth to contribute to society, while fostering an interest in Defence Force careers and developing ongoing support for Defence.

The ADF Cadets 'enterprise' comprises three Cadet organisations administered by the Navy, Army and Air Force, and a newly established ADF Cadets Headquarters, which is tasked with the governance of common elements of the three organisations' programs.

Approximately 26,000 cadets are currently enrolled in the three Cadet programs; 3,200 officers and instructors of cadets and 'approved helpers' supervise and support the young people engaged in the programs; and there are 508 ADF Cadets units across all states and territories. Cadet units occupy facilities in Defence establishments, Defence-owned or leased buildings, schools, and buildings leased by individual units.

And with regard to the [RAAF Cadet program](#), the Department of Defence posting noted:

The Royal Australian Air Force (RAAF) is providing increased opportunities for members of the Australian Air Force Cadets to gain exposure to aviation activities through its aviation program for cadets.

The RAAF has purchased a fleet of 22 gliders, and is leasing eight powered aircraft, to facilitate the aviation program. Australian Air Force Cadets flying training is being reviewed, with consideration of a 'flying continuum' that includes advanced flying to a recognised level of competency, which could be recognised for civil or military training.

According to Air Commodore Martin:

"What we do is that we work with a civil volunteer force, about 2,000 adults and approximately 7,500 Air Force cadets, between the ages of 13 and 18. The Army has 17,500 students and the Navy has about 2,500. In a size comparison, the AAFC is approximately half the size of the RAAF permanent force numbers.

He described the shift in direction of the program as the ADF looks to expand the aperture on preparation for the future.

"The program is shifting from citizen preparation as a primary task to shaping a construct where we are building from that to a broader focus on an employment or career path.

"We are aiming to help the cadets focus on the broader skill sets which the country and the ADF needs.

"By assisting them in this way we should see cadets finish their schooling, entering the right universities and/or getting the right qualifications to support the overall national effort for the defense of Australia.

"And obviously, engineering and science and technology are key skill sets from this point of view."

Question: How are you doing that?

Air Commodore Martin: By pursuing a variety of activities that give our youth a picture of the opportunities that actually exist in our working environment.

"These range from gaining knowledge of drones, to seeing engineers at work or what Air Force is doing when the cadets come to the Avalon Air Show.

"We are intending to take them to the major aviation engineering facilities in Australia that Air Force already has working partnerships with.

“When we bring them to Avalon for the Air Show, we are arranging to take them backstage to talk with Boeing, Lockheed Martin, Rolls Royce and Northrop Grumman engineers and trade show exhibitors to get a taste of what they do and get a sense of the excitement of building the future and their potential roles in that effort.”

Question: So you are taking the broader and long range view of what support to what the ADF might mean?

Air Commodore Martin: We are.

This is a really important area of our youth development.

“We are focused on ways to get them aware of what Defence and our national aerospace industry is doing in the broader sense; what they could do in Defence or what they could do in the defense industry sector in support of a national effort by Australia in the defense of our nation.”

Question: You also participate in an international program as well.

Could you describe that?

Air Commodore Martin: We have the international program where 17 nations get together annually to plan on how to have over 500 Cadets travel to host countries to expand their horizons by experiencing their cultures and where possible visit their defense forces.

“During their international travel the visiting cadets engage in a two-week intensive course of what’s going on in that country.

“They go and visit that particular country’s Cadet’s establishment, to see Cadets in operation and meet representatives to understand more of the approach that country is taking to enhance that nation’s national power.

“The program was initiated in 1947 with an exchange of 46 students between Canada and the UK .

“As our world environments are now more closely linked together and our nations share so many common issues and challenges, by conducting these visits our cadets can get a much deeper appreciation of the realities that those nations are actually facing.

“Our youth need to get that broader international perspective.

“For example, at a recent event in Australia, a Norwegian cadet got a call from home and learned that he was going to become a pilot in the Royal Norwegian Air Force and he shared that event with the other visiting national cadets that we were hosting and our Australian Cadets.

“Discussing what that meant to the Norwegian Cadet and the opportunities that now offered that young man meant a lot for his Australian and other nation cadet counterparts.

“In effect, this level of international relationship is both about shaping a broader understanding of what defines each nations’ national support, and provides the opportunity for visiting cadets to understand the international context within which the Australian defense force operates and evolves.”

Second Line of Defense