

# Shaping an Integrated Force in the Extended Battlespace



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The Williams Foundation Seminar on New Approaches to Air-Sea Integration in the Evolving Extended Battlespace

In this report, the major presentations and discussions at the Williams Foundation seminar on new approaches to air-sea integration held on August 10, 2016 in Canberra, Australia are highlighted along with interviews conducted before, during and after the seminar as well. Interviews with the Army, Navy, and Air Force have been woven into the evolving narrative of joint integration, as well as inputs from the two major foreign guests to the seminar, Rear Admiral Manazir, the Deputy Chief of US Naval Operations for Warfare Systems, and Captain Nick Walker of the Royal Navy.

# Shaping an Integrated Force in the Extended Battlespace

## THE WILLIAMS FOUNDATION SEMINAR ON NEW APPROACHES TO AIR-SEA INTEGRATION IN THE EVOLVING EXTENDED BATTLESPACE

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## OVERVIEW

Beginning in March 2014, the Williams Foundation began a series of seminars and workshops to examine both conceptually and practically ways to build a 21st century combat force, which can prevail in the extended battlespace.

This can be looked at as a force operating in what the U.S. Chief of Naval Operations as kill webs or what an Australian Army General called building an Australian anti-access anti-denial strategy.

What is unique about what Williams has done is to shape a public discussion of the opportunities and challenges to shaping such a force.

And through the seminars, the conversation has evolved and generated more joint force involvement as well.

The first seminars were largely Air Force driven, as the Air Force shaped its Plan Jericho approach to leveraging 5th generation capabilities. Plan Jericho is about transformation as the RAAF adds new platforms, and rather than adding them like Lego blocks it is about interactive platform modernization and overall force transformation.

This theme was taken to Denmark and the Williams Foundation co-hosted a seminar with the Centre for Military Studies in Copenhagen and discussed the way ahead prior to the Danish decision to buy the F-35 and to become a fifth generation enabled force.

This Danish decision combined with Norway's and the Dutch acquisition of F-35s combined with the joint UK and USAF operation of F-35s in the UK means that the fifth generation force can enable the shaping of new collaborative approach in a key region of the world.

During a visit to RAF Lakenheath in June, there was a chance to talk with the 48th Wing Commander, Col. Novotny about the strategic opportunities inherent in the joint standup.

He underscored that unlike setting up an F-35 base in the United States, standing one up at RAF Lakenheath was about putting the F-35 into play with the UK, the Norwegians, the Danes and the Dutch.

"We are not flying alone; but joined at the hip.

"We will be flying exactly in the area of interest for which the plane was designed and can fly together, maintain together, and operate together leveraging the air and sea base for which the F-35 B will fly from as well.

"It is a unique and strategic opportunity for the USAF and for the nations.

"I'm glad that we are the first base overseas, but I see there is great potential for two countries to develop in concert, side-by-side, and to set, set the model for joint operations.

"As we get this right, we can bring in the Danes, the Norwegians and Dutch who are close in geography and the Israelis and Italians as well to shape the evolving joint operational culture and approach.

"Before you know it, you've got eight countries flying this airplane seamlessly integrated because of the work that Lakenheath and Marham are doing in the 20 nautical miles radius of the two bases."

<http://www.sldinfo.com/synergy-and-building-out-extended-nato-defense/>

## Shaping an Integrated Force in the Extended Battlespace

Clearly, the RAAF has something similar in mind as they work with the U.S. and the Asian allies in the region or to operate in Europe or the Middle East.

The Williams Foundation then extended the discussion to the dynamics of change between air and land forces.

Senior Army and Air Force officers presented their thinking to the seminar on air-land integration earlier this year. The terms of reference for the seminar highlighted the way ahead.

“Air forces need to be capable of delivering air and space power effects to support conventional and special operations in the land domain. Air-Land integration is one of the most important capabilities for successful joint operations.

The last decade has seen a significant shift in how airpower has supported ground operations.

With the introduction of systems like Rover, the ability of airpower to provide precision strike to the ground forces saw a significant change in fire support from a wide variety of air platforms. Precision air dropping in support of outposts or moving forces introduced new capabilities of support.

Yet this template of air ground is really focused on air support to the ground whereas with the shift in the global situation, a much wider set of situations are emerging whereby the air-ground integration approach will become much wider in character, and the ability to insert force rapidly, as a precision strike capability, and to be withdrawn will be a key tool in the toolbox for decision makers.

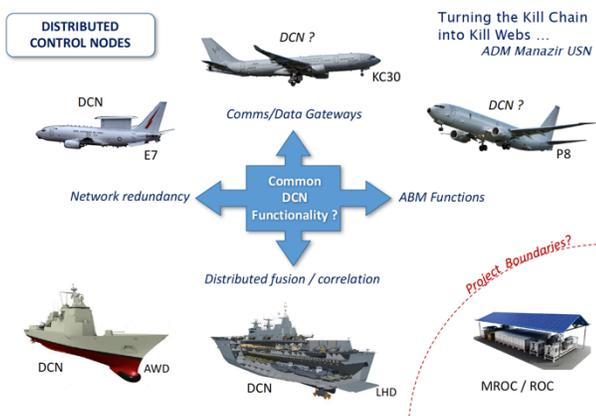


FIGURE 1 DISTRIBUTED C2 FROM THE BLACKBURN PRESENTATION AT THE SEMINAR.

Fifth generation enabled operations will see a shift to a distributed C2 approach which will clearly change the nature of the ground-to air command system, and the with the ability of fifth generation systems to generate horizontal communications among air assets outside the boundaries of a classic AWACs directed system, the change in C2 will be very wide ranging.”

A number of practical ideas as well as conceptual thinking was provided at the seminar which the foundation followed up in additional sets of meetings.

What was clear in discussing with Army officers during the time of the latest seminar is that practical steps have indeed been taken since that seminar which reflects the approach outlined at the seminar.

Two key examples of this are the Army looking clearly to ways to leverage Wedgetail in supporting ground maneuver forces, including having Army officers onboard the aircraft and gaining practical knowledge about the aircraft and becoming stakeholders in the further evolution of the capabilities of the E-7 itself.

Another example is how the new LHDs are being looked at as “magnet” ships drawing together air-sea and land integration.

At Williamtown Air base, the home of the E-7, the virtual Wedgetail system is being used to work with the Army and Navy to prepare exercises this Fall to shape practical ways to work Wedgetail with the LHDs and vice versa. This can then shape a co-modernization strategy for the two platforms, which reflects real joint needs as opposed to an abstract requirements process setting those requirements.

It is also the case according to Brigadier General Chris Mills that the Army is working with Navy to shape a common digital communications system to ensure greater integration between the ship and the ashore force. Again, it is a case of the interactive modernization of capabilities, which is crucial to shaping effective force integration.

With the latest seminar, the Williams Foundation addressed air-sea integration.

What was different about this seminar is that it was Navy-led rather than being primarily air force led. Indeed, there was only one RAAF presentation.

It was clear that the senior Navy officers who presented were looking at the evolution of their capabilities from the broader perspective of how to build more lethal and effective forces in the extended battlespace.

And this perspective was built around cross-modernization of platforms delivering joint effects in the battlespace.

Obviously, exercises and training a key elements of shaping a new way ahead, a key point underscored by Rear Admiral Mayer, Commander of the Australian Fleet.

The three closest allies in shaping new maritime capabilities were represented at the seminar – Australia, the U.S. and the United Kingdom.

The lead speaker was Rear Admiral Manazir, Deputy Chief of Naval Operations for Warfare Systems (OPNAV N9) who provided an overview of the key dynamics of change in the maritime warfare global situation and discussing the U.S. Navy’s kill web concept.

It should be noted that the first allied force, which actually discussed the kill web concept, was the RAAF. Two days after Rear Admiral Manazir had introduced the concept at a Mitchell Institute audience in Arlington Virginia earlier this year, the Air Combat Commander in the RAAF was taking it onboard.

In that interview Air Commodore Robertson argued that there is a three-phase process underway and “we are only at the first step.

“We need to be in the position where our maritime surface combatants are able to receive the information that we’ve got airborne in the RAAF assets. Once they’ve got that, they’re going to actually be trying to be able to do something with it.

That is the second level, namely where they can integrate with the C2 and ISR flowing from our air fleet.

But we need to get to the third level, where they too can provide information and weapons for us in the air domain.

That is how you will turn a kill chain into a kill web. That’s something that we want in our fifth generation-integrated force.

Second Line of Defense

And in a fifth generation world, it's less about who is the trigger shooter but actually making sure that everybody's contributing effectively to the right decisions made as soon as possible at the lowest possible level.

And that is why I see the F-35 as an information age aircraft.

I'm less concerned about the load outs on the F-35. You can give it another ten weapon stations and you would miss the core point.

What's actually important is how the F-35 makes other weapon providers or effect providers out there far better and shape faster reaction times.

A lot of people seem stuck in the old mindset of how many weapons we are going to stack on each aircraft.

That's almost two generations ago.

In some ways, we are going back to the concept of military aviation early in World War I where we are the eyes and ears for the combat force forward operating."

<http://www.sldinfo.com/shaping-the-airpower-transition-the-perspective-of-zed-roberton-commander-air-combat-group-raaf/>

After the opening by Rear Admiral Manazir, there were a number of key presentations by Royal Australian Navy, RAAF and Australian Army officers as well as by the Royal Navy, providing an update on the Queen Elizabeth carrier capability.

Presentations by industry complimented those by the senior officers, as well as closing and opening remarks by senior Williams Foundation officials.

In addition, the final formal presentation of the seminar by John Blackburn of the Williams Foundation who announced the next seminar which will focus on how best to shape a way ahead for more effective integration of the joint force.

It is clear that the Royal Australian Navy is leveraging the LHD coming into the fleet to shape new ways to integrate air, sea and ground power.

It also clear that the coming of the Air Warfare destroyer is seen as an opportunity to expand the sensor shooter relationship as well as shaping ways to task force differently.



FIGURE 2 MAJOR GENERAL MCLACHLAN, HEAD OF AUSTRALIAN ARMY MODERNIZATION, DURING HIS PRESENTATION AT THE SEMINAR.

Indeed, Rear Admiral Stuart Mayer, Commander of the Australian Fleet, made it very clear both in his presentation and his interview, that a key way to understand the way ahead is shaping variable task force concepts and capabilities.

He was clearly looking at a range of ways to operate the force with mix and match capabilities to provide for the kind of maritime power, which was crucial to 21st century operations.

Chief of Navy, Vice Admiral Tim Barrett, made it very clear that he was taking the long view on the development of Australian maritime power and saw the goal as shaping not a joint force but an integrated force.

And in the interview with him, we discussed how he saw the development of the new Australian submarine in the context of shaping an effective way ahead, in terms of an ability to not just to build hulls, but integrated support and effective software upgrades to keep the fleet effective and modern on an ongoing basis.

Indeed, the “one ship” concept is crucial to Barrett whereby 21st century infrastructure was being built to shape the fleet in a way in which sustainment, ongoing modernization and operations would be more effectively conjoined in shaping a 21st century fleet.

Even though this was a Navy led discussion, the Air Force and Army were key elements in discussing the evolution of maritime operations.

Major General McLachlan, head of Australian Army Modernization, discussed and analyzed the evolving role of the Aussie Army in the defense of Australia through what the U.S. Army would call Air Defense Artillery (ADA) or shaping the lower tier to a missile defense system engaged with the power projection forces.

From his perspective, the more effective the territory of Australia could be used to shape effective defenses, the more the Air Force and Navy could focus on extended operations. He characterized this as shaping an Australian anti-access and area denial force.

The key air force presentation was by Group Captain Hombsch, Chief of Staff of the Headquarters of the Surveillance and Response Group. The SRG provides a number of key assets for the joint force to operate in an integrated maritime domain space, such as the Wedgetail and the P-8/Triton dyad coming to the force.

The SRG includes a number of capabilities that in the U.S. would be owned variously by the US Army, Navy or Air Force. But with the co-ownership of a diversity of assets, the SRG is well positioned to be a key element for the force transformation underway in Australia.

It is clear that significant integration is underway, largely driven by service approaches reaching out to the other services.

A key example of this is Wedgetail.

The Wedgetail is often referred to as an Aussie AWACS, but clearly is not. The AWACs is an AIR battle managements system with the customers being largely the fighter community.

The Wedgetail is evolving towards a ground and naval engagement capability with naval and army officers onboard and with virtual Wedgetail becoming part of the officer training for the Army and Navy this process will deepen in the years ahead.

In many ways, what is being experienced with Wedgetail is what the ADF hopes to bring to the process of overall force design and greater operational integration.

Second Line of Defense

John Blackburn in the final formal presentation, indeed, announced that the Williams Foundation was next looking at how to best shape a way ahead to achieve this outcome.

What was clear with the UK and US participation is that the three key powers are thinking along similar lines.

Indeed, in the presentation by Captain Nick Walker on the Queen Elizabeth, he highlighted that the introduction of the Queen Elizabeth carrier was part of a rethink in the UK along the lines of what the ADF is working on as well.

When the seminar was completed, I had a chance to talk with Rear Admiral Manazir about his reactions to his visit and participation in the seminar. That interview will be published in the near future. But I think he captured what the general consensus of the seminar was quite well.

“The Williams Foundation is coalescing around a lot of the issues that we’re trying to solve.

Most often the public discussions are mostly about resources.

That conversation is important but the discussion, which Williams set in motion, is about how to develop a different kind of navy.

The conversation has got to be along the lines of what we had today if we are going to get it right. For this, I thank the Williams Foundation.”

## REAR ADMIRAL MANAZIR IN AUSTRALIA: ALLIED CONVERGENCE ON THE KILL WEB

The lead off speaker at the Williams Foundation seminar on air-land integration was Rear Admiral Manazir.

Rear Admiral Manazir currently serves as the deputy chief of naval operations for warfare systems (OPNAV N9) on the staff of the chief of naval operations. In this capacity, he is responsible for the integration of manpower, training, sustainment, modernization and procurement of the Navy’s warfare systems.

His presentation focused on the strategic context for the U.S. and allied maritime forces and shaping a convergent way ahead. His presentation highlighted both the significance of the maritime domain for commercial operations and the emergence of peer competitors within that domain. The U.S. and its allies are clearly concerned that the freedom of the seas, and rule of law be exercised by the global maritime nations.

Equally obvious is the concern that rival maritime powers are committed to their own interpretation of the rules of the road and are building capabilities to seek to implement their will in the maritime domain. The question is how can the allies shape convergent capabilities to ensure that the global commons remain open, and not controlled by powers seeking to enforce their will against the allied powers?

Rear Admiral Manazir highlighted the kill web approach as a way to shape more effective integration of force and convergence of efforts.

The kill chain is a linear concept that is about connecting assets to deliver firepower; the kill web is about distributed operations and the ability of force packages or task forces to deliver force dominance in an area of interest. It is about building in integration from the ground up so that forces can work seamlessly together through multiple networks, rather than relying on a single point of failure large network.



**FIGURE 3 REAR ADMIRAL MANAZIR DURING HIS PRESENTATION AT THE SEMINAR.**

Later in the seminar, both the Chief of Navy, Vice Admiral Barrett, and Rear Admiral Mayer, Commander Australian Fleet, underscored similar approaches to the one introduced by Rear Admiral Manazir. In his presentation at the conference, Vice Admiral Barrett underscored that “we are not building an interoperable navy; we are building an integrated force for the Australian Defence Force.”

He drove home the point that ADF integration was crucial in order for the ADF to support government objectives in the region and beyond and to provide for a force capable of decisive lethality. By so doing, Australia would have a force equally useful in coalition operations in which distributed lethality was the operational objective.

Vice Admiral Barrett noted that it is not about massing force in a classic sense; it is about shaping a force, which can maximize the adversary’s vulnerabilities while reducing our own.

Rear Admiral Mayer focused specifically on the networking aspect of the kill web and how to make it work. He highlighted that the Navy was returning to a task force concept but one, which was 21st century in character, whereby Navy was tapping into ground and air assets as “part” of the task force, rather than simply focusing on Navy operated assets.

This evolution of the task force, clearly in the mode of what the US Navy is referring to as the “kill web,” will require the evolution of capabilities, both in terms of connectivity, and training. During the seminar he characterized as the network as a weapon system with “no single master.”

It was important to shape a way ahead for the joint force to work within the evolving networks in order to effectively operate in a distributed task force sense. “Each service is underpinning its platforms with elements of a common network. There is increased overlap thereby for the air and sea forces. How should we best develop our joint concepts of operations and joint capability?”

And later in the seminar the perspective of the Royal Navy was provided by Captain Nick Walker, Royal Navy, with regard to the coming impact of the Queen Elizabeth Class carriers.

His presentation highlighted that the impact of the new carriers was joint through and through and was about empowering the British defense force to operate throughout the spectrum of conflict.

It was about not simply adding a new ship, but shaping a networked enabled capability able to operate to serve national interests or to support coalition operations.

Second Line of Defense

Captain Walker quoted the most recent Strategic Defence Review with regard to the Queen Elizabeth Class carriers as follows:



FIGURE 4 SLIDE FROM CAPTAIN WALKER PRESENTATION AT THE SEMINAR.

In short, Rear Admiral Manazir was part of an Australian and Allied re-think about the way ahead.

When asked after the seminar about his reactions to the seminar and his meetings in Australia, he underscored that he found a significant amount of innovative thinking going on generated by the Williams seminar.

“The Williams Foundation is coalescing around a lot of the issues that we’re trying to solve. Most often the public discussions are mostly about resources. That conversation is important but the discussion, which Williams set in motion, is about how to develop a different kind of navy.

The conversation has got to be along the lines of what we had today if we are going to get it right. For this, I thank the Williams Foundation.”

When asked what he thought about the presentations of his Australian peers, Rear Admiral Manazir had this to say:

“I thought the Fleet Commander was very, very good. He understands his trade and he speaks comfortably about his trade. And he understands where the Navy needs to go. What I took from Vice Admiral Barrett was his vision and his passion about that vision. He’s obviously a bold leader.

I see great examples in the Australian Navy of the kind of bold and competent leadership necessary for us collectively succeed.”

When asked about the UK presentation and perspective, Rear Admiral Manazir underscored that what impressed him most was the emphasis on the strategic role which Air and Naval modernization was being accorded by the UK government.

“The new carrier is being viewed as a government strategic asset, not simply a new platform, in and of itself. The British government is clearly investing in the Queen Elizabeth class of aircraft carriers.

And I'm so very happy that we still are committed to an aircraft carrier force; that we don't have to go back and reaffirm our commitment to that force but can move ahead with re-shaping its role and capabilities in the period ahead, in the period of building the kill web."

Finally, he highlighted what he sees as a key leadership role exercised by the Royal Australian Air Force and its Plan Jericho approach and mentality.

"Let me add my admiration of the approach that the RAAF has taken over the last 7-10 years.

"They have bought their platforms with an eye to interoperability inside the ADF, and with coalition partners, with key regard to the United States as well.

"RAAF leaders, energized by Geoff Brown's forward-thinking approach, have already moved past the platform replacement approach and are focusing on capabilities delivered by networked combat power."

## VICE-ADMIRAL BARRETT ON THE WAY AHEAD FOR THE AUSTRALIAN NAVY: DESIGN THE FORCE FOR DECISIVE AND DISTRIBUTED LETHALITY

A key speaker at the Williams Foundation seminar on air-land integration was the Chief of the Australian Navy, Vice Admiral Tim Barrett.

Barrett's speech focused on the opportunities and challenges of the largest recapitalization of the Australian Navy since World War II. New submarines, destroyers and amphibious ships and associated fleet assets are being built in Australia to shape a new maritime capability for Australia.

But this force is being built in the time of significant innovation in the Pacific whereby new force concepts are being shaped, such as kill webs, distributed lethality, and fifth generation airpower.

Barrett made it very clear that what was crucial for the Navy was to design from the ground up any new ships to be core participants in the force transformation process underway.

In his presentation at the conference, he underscored that "we are not building an interoperable navy; we are building an integrated force for the Australian Defence Force." He drove home the point that ADF integration was crucial in order for the ADF to support government objectives in the region and beyond and to provide for a force capable of decisive lethality. By so doing, Australia would have a force equally useful in coalition operations in which distributed lethality was the operational objective.



FIGURE 5 CHIEF OF NAVY DURING HIS PRESENTATION TO THE SEMINAR.

Second Line of Defense

He noted that it is not about massing force in a classic sense; it is about shaping a force, which can maximize the adversary's vulnerabilities while reducing our own.

And he re-enforced several times in his presentation that this is not about an 'add-in, after the fact capability'; you need to design and train from the ground up to have a force trained and equipped to be capable of decisive lethality.

He quoted Patton to the effect that you fight war with technology; you win with people. It is about equipping the right way with right equipment but training effectively to gain a decisive advantage.

The recapitalization effort was a "watershed opportunity for the Australian Navy." But he saw it as a watershed opportunity, not so much in terms of simply building new platforms, but the right ones.

And with regard to the right ones, he had in mind, ships built from the ground up which could be interoperable with JSF, P-8, Growler, Wedgetail and other joint assets.

"We need to achieve the force supremacy inherent in each of these platforms but we can do that only by shaping integrated ways to operate."

He highlighted that the Navy was in the process of shaping a 21st century task force concept appropriate to a strategy of distributed lethality and operations. A key element of the new approach is how platforms will interact with one another in distributed strike and defensive operations, such as the ability to cue weapons across a task force.

After his presentation, there was a chance to sit down with Vice Admiral Barrett and to expand the conversation.

Clearly, a key element in his thinking is how to get the new build of ships right for an age in which one wants to build an integrated, but distributed force.

**Question: It is clear that you are taking the long view of getting the shipbuilding piece of this right in terms of ensuring that ships are not built simply as separate platforms, but as building blocks in an integrated force.**

**How do you do that?**

Vice Admiral Barrett: "I am taking a very long view, and believe that we need to build our ships in Australia to generate naval capabilities integrated within the ADF.

"We need agility in the process of changing ships through life—continuing to evolve the new ships depending on how the threat is evolving.

"This means that we need to control the combat system software as well as build the hulls. We will change the combat system and the software many times in the life of that ship; whereas, the hull, machinery in the plant doesn't. That might sound like a statement of the obvious.

"But it's not a statement that's readily understood by our industry here in Australia.

"We need to organize ourselves to have an effective parent navy capability.

"We need to manage commonality across the various ship build processes.

“That will not happen if we build someone else’s ship in Australia which is designed to operate in separate classes.

“I don’t want an individual class to be considered in isolation. I want to cross-learn and cross-operate throughout our various classes of ships, and notably with regard to software integration and development.”

**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.”

**Question: Wedgetail shows an interesting model, namely having the combat squadron next door to the Systems Program Office.**

**This facilitates a good working relationship and enhances software refresh as well.**

**You have something like this in mind for your ship building approach.**

**Could you discuss that approach?**

Vice Admiral Barrett: “We do and are implementing it in our new Offshore Patrol Vessel program. And with our ‘ship zero’ concept we are looking to integrate the various elements of operations, upgrades, training and maintenance within a common center and work flow to get greater readiness rates and to enhance an effective modernization process as well.



**FIGURE 6 CHIEF OF NAVY, VICE ADMIRAL TIM BARRETT, AO, CSC, DEPUTY CHIEF OF ARMY MAJOR GENERAL RICK BURR, DSC, AM, MVO AND DEPUTY CHIEF OF ROYAL AUSTRALIAN AIR FORCE AIR VICE-MARSHAL WARREN MCDONALD, AM, CSC, SALUTE AFTER LAYING WREATHS AT THE STONE OF REMEMBRANCE. CREDIT: AUSTRALIAN MINISTRY OF DEFENCE**

“We are reworking our relationship with industry because their effectiveness is a key part of the deterrence process. If I have six submarines alongside the wharf because I can’t get them away, they are no longer lethal and they are no longer a deterrent force.

“Again, as an example we have dramatically improved availability by building maintenance towers alongside the submarine—rather than the previous way that it was done, where people arrived into that one gangway under the submarine then dispersed to do their maintenance work—is an example of how we need to work.

**Question: In your presentation, you mentioned working with various air systems.**

**Could you discuss, Navy’s role in Wedgetail?**

Vice Admiral Barrett: “We have Navy officers onboard who already provide a key communication role to the Air Force officers onboard the Wedgetail. They can inform those officers of the decision process on the ship and, conversely, explain later to those onboard the ships, what Wedgetail can do for them.

“Put in other terms, by such a work flow, augmented by the growing engagement of Virtual Wedgetail in navy training, Wedgetail becomes part of the maritime warfare system within the ADF.

“Wedgetail is an example of the way ahead for air-naval integration.”

## THE NETWORK AS A WEAPON SYSTEM: THE PERSPECTIVE OF REAR ADMIRAL MAYER, COMMANDER AUSTRALIAN FLEET

During the Williams Foundation seminar on evolving approaches to air-sea integration, Rear Admiral Mayer, the Commander of the Australian Fleet, focused on the concrete and specific challenges facing the evolution of the Royal Australian Navy as a key element of the joint force. He argued that the Army, Navy and Air forces were evolving in the context of tapping shared networks to empower their platforms to form an extended battlespace.

But the challenge, he observed, was to work through how to most effectively shape, coordinate and execute effects from the networked force while retaining decision authorities at the lowest practical level to achieve speed of decision.

He highlighted that the Navy was returning to a task force concept but one, which was 21st century in character, whereby Navy was tapping into ground and air assets as “part” of the task force, rather than simply focusing on Navy operated assets.

This evolution of the task force effect and the networked approach, clearly in the mode of what the US Navy is referring to as the “kill web,” will require the evolution of capabilities, both in terms of connectivity, and training.

During the seminar he characterized the network as a weapon system with “no single master” and that one of the ADFs challenges was to shape the evolving network in order to effectively operate in a distributed multi domain task force. “Each service is designing its platforms and enabling their potential through the elements of a common network. There is increased overlap thereby for the air and sea forces, at the very least through the access and synergy provided in the network. A fundamental question presents itself; how should we best develop, certify and deploy our joint network that must be cross domain in nature?”

He argued that the Australian Defence Force was on a good track but needed to enhance its capability to work in a joint domain that recognized tactical effects were generated by Services, but operational outcomes were inherently Joint.

In effect, the Services provided the muscle behind the Joint intent.

If the ADF were to achieve its potential it would need to design forces from the ground up that were interconnected to a single reference standard, rather than simply connecting assets after the fact.

But to do so required an open architecture approach to building a joint network that recognized the different needs of the participants.

The role of the network as a weapon system required that it had to be designed, deployed and certified like any other weapon system.



**FIGURE 7 COMMANDER AUSTRALIAN FLEET, REAR ADMIRAL STUART MAYER, CSC AND BAR, RAN AND CAPTAIN MIKE MCARTHUR, RAN AT THE REGIONAL FLEET COMMANDERS' CONFERENCE HELD IN CONJUNCTION WITH EXERCISE KAKADU 2016. CREDIT: AUSTRALIAN MINISTRY OF DEFENCE**

There was a chance to sit down with Rear Admiral Mayer and discuss further some of his thinking about the way ahead in an interview as well.

“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.”

Second Line of Defense

It was clear both from his presentation and our discussion during the interview that Rear Admiral Mayer was focused on how the build out of the Navy in the period ahead would be highly correlated with the evolution of the joint network.

“The network is a weapons system.

“Lethality and survivability have to be realized through a networked effect.”

Rear Admiral Manazir at the seminar focused on the kill web as a weapon system; it was very clear that Rear Admiral Mayer had in mind a similar thought when he discussed the network as a weapon system.

A key element of change for the Australian Navy was evolving a 21st century concept of task force operations.

He noted that the development of the new amphibious ships had come within a decade of work on shaping an amphibious warfare system.

The importance of the LHDs was not just the capability they offered, but the elevation in thinking they drove in Navy over the decade, thinking that moved operational concepts from the platform to the Task Group and affected all of Navy's force elements.

He emphasized throughout the interview that not enough work has yet been done to prioritize the evolving C2 and network systems empowering the platforms in the force, including but not limited to the amphibious force.

He sees this area of development as a crucial one in creating a more interactive joint force able to deliver lethal effect.



**FIGURE 8 HMAS ADELAIDE LHD01 VISITS DARWIN FOR THE FIRST TIME, BERTHING AT FORT HILL WHARF, DARWIN. CREDIT: AUSTRALIAN MINISTRY OF DEFENCE**

“The potential of each of the individual platforms in a network is such that we’ve actually got to preset the limits of the fight before we get to it.

“The decisions on what we’ll do, how much we’ll share, and what sovereign rights we will retain have to be preset into each one of the combat systems before you switch it on and join a network.

“There is no point designing a combat system capable of defeating supersonic threats and throttling it with a slow network or cumbersome C2 decision architecture.

“Achieving an effective network topology is so much more complex in a coalition context in which the potential for divergence is higher.

“The paradox is that a coalition network is much more likely a requirement than a national network, and yet what investment we do make is based on national systems first.

“If we don’t achieve the open architecture design that enables the synergy of a networked coalition force, then the effectiveness of the coalition itself will be put at risk.

“The moment we insert excess command and hierarchical decision authority into the loop we will slow down the lethality of the platforms in the network.

“Before we even get in the battlespace we have to agree the decision rights and pre set these decisions into the combat system and network design; the fight for a lethal effect starts at the policy level before we even engage in combat operations.

“The network and C2 rather than the platforms can become the critical vulnerability.”

“This is why the decision making process needs to be designed as much as the network or the platforms.

“If the C2 matrix slows the network, it will dumb down the platform and the capability of the system to deliver a full effect.”

“The nature of the force we are shaping is analogous to a biological system in which the elements flourish based on their natural relationship within the environment.

“We have an opportunity to shape both the platforms and the network, but we will only achieve the flourishing eco system we seek if each harmonize with the other, and the overall effectiveness is considered on the health of the ecosystem overall.

“For example, an ASW network will leverage the potential of the individual constituent platforms and that in turn will determine the lethality of the system.

“A discordant network connection will, at least, limit the overall Force level effect of the network and at worst break the network down to discordant elements.”

Clearly, a key part of the evolution is about shaping a weapons revolution whereby weapons can operate throughout the battlespace hosted by platforms that are empowered by networks tailored to the battlespace.

And that revolution will have its proper impact only if the network and C2 dynamics discussed by Rear Admiral Mayer unfold in the national and coalition forces.

“The limiting factor now is not our platforms; it’s the networks and C2 that hold the potential of those platforms down.

“When the individual platforms actually go into a fight they’re part of an interdependent system, the thing that will dumb down the system will be a network that is not tailored to leverage the potential of the elements, or a network that holds decision authority at a level that is a constraint on timely decision making.

“The network will determine the lethality of our combined system.”

## REAR ADMIRAL JONATHAN MEAD FOCUSES ON THE WAY AHEAD FOR THE ROYAL AUSTRALIAN NAVY

Prior to attending the Williams Foundation Seminar on air-sea integration, there was a chance to meet with Rear Admiral Jonathan Mead in his office in Canberra to discuss his perspective on the way ahead with regard to the Navy in the overall context of the joint evolution of the ADF.

Second Line of Defense

Rear Admiral Mead is the Navy's joint capability manager and is clearly focused on the cross-cutting dynamics of maritime modernization within the context of the overall evolution of the ADF.

Although the Head of Navy Capability since 2015, Rear Admiral Mead is part of the transition set in motion since April 1, 2016 to shaping a new approach to shaping joint force capability. As he put it:

"The way the department was structured previously was capability development was centralized in a group led by joint three-star.

"One of the recommendations of The First Principles report was to bring those accountabilities from the center back out to Navy, Army, Air Force.

"Whereas previously the services had de facto a third party working it for them, now as of the first of April, it's all come back directly to the services.



**FIGURE 9** ROYAL AUSTRALIAN NAVY OFFICER REAR ADMIRAL JONATHAN MEAD, HEAD OF NAVY CAPABILITY, SPEAKS AT THE CHIEF OF ARMY EXERCISE IN ADELAIDE, SOUTH AUSTRALIA, ON SEPTEMBER 6, 2016. CREDIT AUSTRALIAN MINISTRY OF DEFENCE

"The Chief of Navy is accountable for all naval capability across the board from building to life cycle support to disposal of assets.

"We're only about five months in that transition.

"The services led by the Vice Chief, is now accountable for the investment program and also for the force design and bringing the alignment capabilities of the three services together into a joint force.

"That's where we are today."

With the launching of the White Paper, a significant modernization of the ADF was put in motion with a major build for the Australian Navy, including new submarines, air warfare destroyers and frigates.

This build will unfold within the evolving context of the overall transformation of the Australian Defence Force, which highlights shaping an integrated force able to operate in the extended battlespace.

**Question: A key element of the rethink clearly is with regard to how you are thinking about the new assets in terms of task force operations.**

**Could you discuss the new amphibious ships from this perspective?**

Rear Admiral Mead: “The ship itself provides the government an enormous array of options and flexibility, but we have no intention of deploying the ship by itself. Our philosophy is to deploy in task groups, but in a flexible manner.

“The amphibious ships are clearly going to anchor any amphibious task force, but those task forces will employ a mix and match capability of air, land and sea assets.

“And we are looking beyond a classic understanding of an amphibious task force role for these ships, for they could operate as C2 ships in an ASW effort with embarked helos on board, and integrated with the P-8s, Tritons and other assets as well.

“And that will be true of how we will use the new air warfare destroyers as well, providing C2 and support capabilities for integrated air-land-sea missile defense or be the lead in such an effort.”

**Question: As you build the new submarine and its combat system, clearly there is an interest for that submarine to tap into the information network, which the ASW force can provide for it, such as the P-8/Triton dyad might provide.**

**How do you view that process?**

Rear Admiral Mead: “Obviously, the silent service wishes to operate in such a manner that two-way communication does not compromise its operations.

“But equally obvious, is that the new submarines will operate in such a manner that they can tap into the evolving ASW network and have its combat systems benefit from that data input to maximize its mission success.

“The new submarines and their combat systems will clearly be designed effectively to tap into the maritime warfare network.

“The task will be moving that information around so it won’t duplicate and so there’s no gaps in the coverage.”

**Question: How do you bring coherency to the diverse programs you are managing?**

**Rear Admiral Mead: “It is clearly a challenge.**

“In my front hallway, there is a large diagram — it’s about three meters in length and about one half meters wide — and it articulates all the major capability programs we’ve got on the way now and how they’re connected.

“My job is to try and bring a sense of coherency to that program. I do drill down to individual projects and some have very short timelines.

“But in the main, we are adopting a programmatic approach to navy capability.

“We are looking to maximize efficiencies and to work effectively in partnership with industry to do so. It is a challenge.”

Question: When I visited Williamtown, I was impressed to see the System Program Office located next to the squadron so that that software developers could work directly with the squadron on shaping a way ahead.

I understand the Navy has something similar in mind.

Second Line of Defense

Could you talk to that approach?

Rear Admiral Mead: “We do and we call it the “Ship Zero” approach.

“As we build our new ships, we are going to do so around a common structure, which brings together the sustainment, the training, command and management, land-based test bed, simulation the software development and importantly industry, into a common facility in order to provide the horsepower and genius necessary to support the capability at sea..

“We are trying to bring all the key elements into a building wherein that building is located close to where the platforms we’ll be operating from.

“This is a new concept for us.

“It’s about shaping an approach to proper asset management, maximizing the capability the ships can get through 30 to 40 year life.”

## SHAPING A SUSTAINABLE AND UPGRADEABLE JOINT FORCE: THE PERSPECTIVE OF REAR ADMIRAL TONY DALTON

Prior to the latest Williams Seminar on shaping a 21st century joint force, there was a chance to meet and discuss the challenges with Rear Admiral Tony Dalton.

He is the head of the Joint Systems Division of the ADF’s acquisition and sustainment group and has come to that position having managed the acquisition and sustainment of the helicopter force of the ADF from a joint perspective.

The Joint Systems Division contains five branches, two of which the Rear Admiral referred to as the outliers, namely explosive ordnance (including guided weapons) and electronic and associated types of what we call tron warfare.

“From a divisional perspective, these two outliers do largely independent things across all three of our service domains. Guided weapons include everything from fast jet missiles to solider-based GBAD through to submarine torpedoes.

“At the other end, we have all of the intelligence, surveillance, reconnaissance and electronic warfare systems. Rather than being platform-centric, we’ve put them all into one spot so we can leverage the limited number of “pointy heads” that we have in that space. We cover the whole spectrum of electromagnetic warfare.

“Across the middle are three more closely related branches, namely air and space surveillance and control, communications and critical systems. The latter handles all the software applications of the forces we send on operations.”

Having two of the more dynamic areas of warfare as positioned as “outliers” can allow his team to position itself from cross-domain innovation as well.

Another opportunity comes from sorting out how equipment acquired from FMS or foreign sources can be reconfigured to operate as integrated assets.

He pointed out that although, for example, the RAAF has bought the latest US Navy systems such as Growler and P-8, they don’t have seamless interconnectivity built in, something, which the ADF views as crucial to achieve.

“The data sets are not interchangeable and in fact, in some of them use different tables to look at the same data.

“When we look at, say, local information that we might want to put on a P-8 and the Romeo (MH-60R – both ASW platforms) in terms of water column data, they actually use different formats.

“We have to now format our data in a number of different ways to put them into a joint mission planning system for each of those platforms.



FIGURE 10 MAIDEN FLIGHT OF FIRST AUSTRALIAN P-8 JUNE 2016.

This is a challenge but one which must be met to shape an integrated force.”

He emphasized the broad strategic change in the operational environment facing the ADF and how that requires a change as well in the operation of the ADF as a joint force.

“We’ve done some really clever things in the Middle East. We certainly have a far better protected ground force, but the ability to operate effectively in the high-end warfare scenario is something we need to keep our focus on.

“We need to have more flexible interoperability so that we can have a faster decision cycle. You need to be flexible about how you decide to engage and where you decide to engage.

“These are key drivers for where we want to go into the future.”

**Question: Having viewed the Wedgetail over the years, the software upgradeability part of the equation for new platforms can help with that.**

**Does that make sense?**

Rear Admiral Dalton: “It does. The evolving maturation of the Wedgetail radar is bringing new capabilities to the joint force. And we are looking at other systems, such as the new systems on board our surface fleet, to evolve in a similar manner.

“The locally developed phased array radar onboard our Anzac class frigates is good; but the next generation is on a different planet in terms of capability.

“It’s driving a change in the way we think. It’s not a classic radar at all; it’s a high power, highly sensitive transmitter and receiver array. You can do lots of things with it in the battlespace.

“This is a reforming technology that will reshape the way we think about task groups, how ships communicate, how they operate, where their blind arcs are.

Second Line of Defense

“The next generation of frigates will be electric. The phased array is remarkable technology. It’s game changing technology, especially in the way we think about how we operate at sea.

“We’ll move away from having to worry about the maintenance and the fixed specifications of the radar into a system where you can change the software and change the way the radar behaves.”

**Question: And this approach is being taken across the joint force as well, isn’t it?**

Rear Admiral Dalton: “It is. For example, with regard to Army, we’re on the cusp of moving to a tactical communications network where the network controller will reside in the radios because the radios are software configurable. That’s the next big leap.

“We’re doing the risk reduction studies right now to move from a tactical communications network that has hardware boxes that do the routing into software enabled radios that can do all that in their own network. Our systems, like our decision management tools, will live like apps on the network.

“When you see kids get into our vehicles today, they see a piece of glass, the first thing they do is touch it and wonder why it hasn’t come on. We’ve got to get to the mindset where when they touch it, they get a menu that says ‘what do you want to do today?’ Here’s your battle management system. Here’s your artillery firing system. Here’s your blue force tracker. They can swipe left and right on that and get the result they want and need.”

**Question: And you are going in the same direction with your submarine combat systems as well?**

Rear Admiral Dalton: “We have a cooperative development program with the US Navy which leverages a common core combat management system currently used in our Collins class submarines and their attack submarines and will ultimately go onto their boomers as well.

“With regard to the next generation Australian submarines, they will be part of that software revolution as well.”

## VISITING THE HEADQUARTERS OF FLEET BASE EAST: SHAPING AN INFRASTRUCTURE FOR A 21<sup>ST</sup> CENTURY FLEET

On the Friday after the Williams seminar on air-sea integration, there was a chance to tour the headquarters of the Australian Navy’s Fleet Base East on Garden Island, Sydney. The interlocutor and guide during the visit was Captain Paul O’Grady, Deputy Commander of the Surface Force. After the tour Captain O’Grady discussed several key issues but we focused particularly on one key issue, namely the challenge of shaping an infrastructure for a 21st century fleet.

Chief of Navy, Vice Admiral Tim Barrett, and Commander of the Fleet, Rear Admiral Mayer, discussed at the seminar and in interviews with me, the evolution of the fleet and the challenges of shaping 21st century capabilities. But what is often overlooked is the salience of infrastructure in building, operating and shaping that fleet.

Vice Admiral Barrett discussed the one ship concept and the need to integrate the build, with the maintenance, with the modernization and with the operations of the fleet. He was seeking a naval equivalent to what the RAAF is doing with Wedgetail in Williamstown where the squadron is co-located with the systems program office, which is tasked with the software upgrades of the aircraft.

Earlier this year, at the Air Power Conference, the Australian Minister of Defence highlighted the crucial importance of building the infrastructure, which could support a modernized Australian defense force.

“It is of course not just improved ICT networks and systems and capability that will underpin our future Air Force over the next two decades.

One of the defining features of the 2016 Defence White Paper and Integrated Investment Program is the renewed focus on enabling capabilities.

In fact, 25 per cent of the Integrated Investment Program is allocated to the enabling projects, which help to bind our capabilities – whether it’s our airfields, our bases, our wharves, our ordnance facilities or our logistics systems, just to name several.”

In this spirit, Captain O’Grady underscored the infrastructure challenges: “We have ships with increasingly greater demands for power such as the Aegis ships.

And of course the requirements from an environmental perspective are quite different now to what they were when some of these facilities were originally built.

There’s been a dramatic shift from the facilities which worked in the 1970s and 1980s to what we need now, particularly, operating in an urban environment like Sydney as well.”

During the visit, Captain O’Grady pointed out the new infrastructure being built to support the new LHD ships and the coming Air Warfare destroyers to support Fleet Base East.

To decongest the area, most of the support facilities such are collocated on Garden Island but some are located nearby in the area, such as training facilities.

He emphasized the significance of the shift back from more individual operation of platforms to a 21st century task force concept in which ships deployed from Australia would marry up with other air and naval assets in areas of interest. This meant as well ensuring commonality of logistical support across the fleet to ensure proper force generation to ensure the performance of the given task force up against the tasks given to that task force.

He highlighted the importance of shaping what he called “a logistical node system” to support the distributed fleet. It was important to be able to support the fleet from a diversity of support points to support a distributed task force.

“How we support a task group requires a different set of support networks than supporting individual ships.

“We have to think about the broader task force and its wider support requirements on operations.”

During a visit of the modified Perry class Frigate at the base, the Captain highlighted the advantages of being able to leverage a global fleet of ships. Operating the Perry class has meant that the Australian Navy has been able to support its ships on operations by leveraging the global logistics supporting a fleet of such ships. They have also modified the ship with new technology, which allows it to have new weapons and C2 capabilities appropriate to evolving missions.

This example highlighted the importance of building ships, which are capable of regular upgrades of software or weapons.

Second Line of Defense

Also on base is a significant dry dock for ship repair, originally built to support Allied large deck naval carriers and battleships when built in 1945. It is still in use and the cost of the facility is amortized in part by making it available for commercial purposes as well.

In short, the leadership of the Royal Australian Navy is working the infrastructure side of the evolving fleet hard. But the challenge is a significant one and will require resources, and vision in shaping an appropriate infrastructure for the new classes of ships and the evolving concepts of operations.

## CAPTAIN NICK WALKER PROVIDES AN UPDATE ON THE QUEEN ELIZABETH CLASS CARRIER

Captain Nick Walker of the Royal Navy, who is on the Naval Staff, provided an overview on the Queen Elizabeth carriers and their role in the transformation of the UK forces. Earlier, Captain Walker was interviewed as part of a RN and RAF team discussing the carrier and strike aviation at Whitehall in the first quarter of 2014.

He was then Commander Nick Walker and serving as the Chief of Staff Carrier Strike in the Carrier Strike and Aviation Division within Navy Command Headquarters in Portsmouth.

During that interview, Captain Walker underscored a key point about the new capability for the national decision makers:

**Question: How does this evolving capability affect a possible rethink about the way ahead for the forces?**

Walker: This evolving capability will give the decision maker a lot of flexible tools to respond or prepare for crises.

The Maritime Task Force can be well integrated with land based air but does not need a lot of forward ground presence to generate combat effects.

This can give decision makers significant flexibility with regard to a crisis or to have the ability to move to crises rather than having to generate force build up in a particular place in order to intervene.

Captain Walker certainly picked up on that theme and wove the carrier discussion within a broader emphasis on how it both triggered and reflected the transformation process for the UK power projection forces.

He underscored that both the F-35 and the carrier are being brought into service together, and together they are key definers of the new power projection approach for an information age.

The carrier is being introduced from the ground up as a joint asset, not simply a maritime asset.

“The carrier strike journey is driving significant cultural change in the forces as well.”

He started by focusing on the core point that the carrier is coming into service as part of the overall transformation of UK power projection capabilities. Indeed, the CEPP or Carrier Enabled Power Projection statement of intent highlights the way ahead:

“An integrated and sustainable joint capability, interoperable with NATO, that enables the projection of UK Carrier Strike and Littoral Manoeuvre power as well as delivering humanitarian assistance and defence diplomacy, enabling joint effect across the maritime, land and air environments at a time and place of political choosing.”

He noted that the role of Special Forces has been highlighted since this original statement and will be folded into the revised statement of intent with regard to the role of the carrier within the UK forces.

CEPP has been maintained within the Ministry of Defence. This is in distinction to most other capabilities, which have been given to the front line commands. This allows joint forces command and the services to focus on CEPP as a joint capability.

The deck of the Queen Elizabeth carrier is 85% of the size (i.e. area) of a Nimitz class carrier; which can carry up to 36 F-35Bs along with a Merlin Crowsnests and a Merlin Mk2 ASW helo. Alternatively, the ship can be used in the projection of land forces from the sea in terms of Marines and helo insertion capabilities as well.

But it is the carrier strike focus, which is definitional for the new carrier.

The ship has been designed from the ground up to support F-35B, in terms of weapons, C2, and ISR integration.

“We have also built from the ground up interoperability, and have worked closely with the USN and USMC with regard to this capability. And we are working on a broader approach to NATO interoperability as well.”

He provided an overview of the timing of the build out of the ship and the process of marrying it with the movement of the UK F-35Bs being prepared and trained in the United States to its permanent location in the UK at RAF Marham.

The initial carrier IOC is projected to be December 2020 with the fully integrated F-35 and carrier having full operational capability by 2025.

Much like the leadership of the Royal Australian Navy focused on in their presentations at the seminar, Walker emphasized new approaches to task forces as key part of their transformation approach.

Clearly, the UK is looking at the evolving impact of introducing carrier strike upon the overall change in the RAF and Royal Navy as well. And a key aspect of this transformation is working the evolving integration of fifth gen upon legacy capabilities.

Captain Walker highlighted the shift from a legacy mindset, which focused on thinking of maritime versus air environments to an integrated information dominance environment.

“A key cultural change is that we are looking at air and maritime as an integrated domain; and we are looking at the interaction among the environmental seams of our forces driven by a kill web approach and capability.”

A clear challenge is reworking C2.

“We need to shape a more mission order vice a directive Air Tasking Order approach to the use of an integrated air-maritime force.”

Putting the new carriers in play completely integrated with the F-35 will provide the foundation for shaping the way ahead for the UK power projection forces.

Second Line of Defense

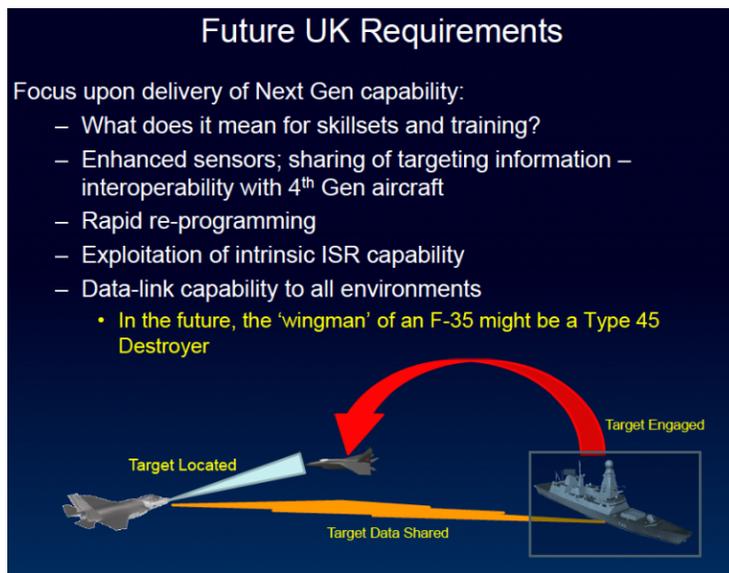


FIGURE 11 SLIDE FROM PRESENTATION BY CAPTAIN WALKER TO THE SEMINAR.

Put bluntly, shaping the way ahead will be defined by the operational experiences entailed in operating and deploying the new carrier strike force and leveraging that capability will be crucial in thinking through future procurement decisions as well.

“We are focused on being more platform agnostic; and ironically, the F-35 can be looked at as a new platform and keep in the old platform-centric approach but we are looking at it as lever of change for next generation thinking and capabilities.

“We are taking the kill web concept very seriously, and examining how best to shape the desired outcome from nodes in the operational force, rather than focusing on specialized platforms.

“How do we generate operational tasks to be delivered from the integrated force?”

“How do we bring the Typhoon which is a key air asset into the kill web?”

“Rapid reprogramming of platforms is a crucial way ahead for sure.

“The ability to exploit the intrinsic ISR capability of the force, rather than simply relying on specialized ISR platforms is a key way ahead as well.

“The ability to deliver effect throughout the force with data-link capabilities such as in the future the wingman of an F-35 could well be the Type 45 destroyer”

In short, Captain Walker saw significant commonality in terms of the Australian rethink about the way ahead for their navy and how the UK was thinking about the transformation of its power projection capabilities.

## RE-CRAFTING THE SURVEILLANCE AND RESPONSE GROUP FOR THE EXTENDED BATTLESPACE: AN INTERVIEW WITH AIR COMMODORE HEAP, COMMANDER OF THE SRG

In an earlier interview, the then Commander of the Surveillance Response Group, Air Commodore Westwood, characterized SRG as a “pre-Jericho” force in the sense that the various ISR and C2 assets within the SRG

were focused on collaborative ISR and C2 to provide both protection for Australia and to enable the expeditionary force to operate more effectively.

But the force was evolving with new platforms entering the force and with the evolution of the RAAF and Australian Defense Force overall in terms of shaping a more integrated force able to operate in the extended operational or battle space.

The new Commander of the SRG, Air Commodore Craig Heap, elaborated on Westwood’s comments in an interview earlier this year. In the interview, he argued that the aperture needed to be opened on what SRG is doing, including evolving the SRG contribution to ADF and coalition partners.

“When we talk traditionally about the SRG mission, we talk about surveillance, battle space management and maritime warfighting.

That is now too limited given the potential of the capabilities we have, and are acquiring.

We need to broaden the mission into wider intelligence, surveillance, reconnaissance, battlespace control and strike roles, across multiple domains, which is where we are evolving along with the parallel evolution of the RAAF and the ADF.

The mission statement needs to focus not only on classical air battlespace management, but control of the battlespace.”

In the interview, Air Commodore Heap discussed the P-8 and Triton coming to the force, but not simply as replacement platforms for the P-3.

Obviously, the P-8 can be considered a replacement in terms of the core mission performed by the P-3, but with the evolving approach towards “integratability,” Heap is focused on how the new platforms can drive further change in how the entire SRG operates and shapes the further evolution of the RAAF, and beyond that to the entire ADF.

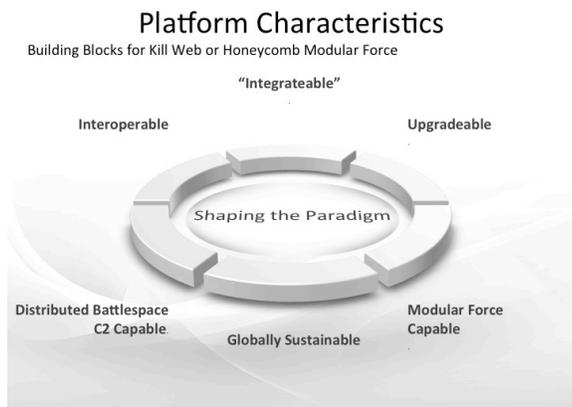


FIGURE 12 PLATFORMS IN AN INFORMATION AGE MILITARY FORCE

Air Commodore Heap sees the platform as evolving in the integrated battlespace and underscored that how Australia was acquiring the platform was central to how it could co-evolve with other key assets.

“With FMS, you are buying a car off of the showroom floor.

Second Line of Defense

We did not do that here; we are partners in the program, which allows us to become de facto shareholders in the program itself.

We are a cooperative development partner.

This puts the RAAF at the ongoing development table for the life of the program, to enable us to influence the capabilities of the platform as it evolves, ensuring that we can get an evolved platform that meets our needs.

For example, we needed the aircraft to perform a search and rescue function, something the USN did not have as a core role; they rely on the USCG.

But we needed a specialist payload to do this, and courtesy of the cooperative program, the USN has agreed to have an interim capability, followed by a fully developed deployable SAR payload built into the program as a priority. The USN as our partner is also interested in using the kit on occasions when long distance maritime search is required.

The USN and your embedded RAAF instructors are currently flying Increment 1 but will Increment 2 will be the version that we will get with the first aircraft. We will initially get a mix of Increment 1 and 2 aircraft, but will be spirally upgraded to an all increment 2, then 3 fleet in lockstep with the USN.

We are deeply involved with the USN as well in designing and working Increment 3.

It is important to understand that what we are talking about is the actual evolution of the platform, and wider weapon system over time, which from our point of view needs to work with Wedgetail, F-35, Growler, Triton, the Air Warfare Destroyer, Special Forces and other core warfighting assets in the battlespace.”

He then went on to make a key point that with the USN is working very hard to integrate its core air assets, the Super Hornet, the F-35, the Growlers, the P-8s and the Triton UAVs, to work together that this would provide an important leg up on the kind of integration the ADF was looking for across the battlespace.

And of course, the SRG flies and operates systems which in the U.S. would be operated by either the USMC or USAF, so this drives the RAAF need to broaden the aperture on integration beyond what classically the USN would do, but there clearly are currently USN leaders who are thinking along the lines of the RAAF leadership, such as Air Commodore Heap articulated in the interview.

He clearly was looking forward to adding the Triton to the fleet whereby the Remotely Piloted Aircraft could do wide area surveillance as an asset, which could allow for better use of manned assets, or to support the initial assessment of HADR scenarios, or low intensity operations.

“What that means for our highly capable Naval surface forces is that before, where they could have an effect based principally on their organic means, which was limited by the range of their sensors and weapon systems, they now can have an effect at much greater distance, courtesy of support from a suite of state of the art RAAF assets in terms of integrated ISR, strike and C2.

As the lead for the Jericho Maritime warfighting program, we will leverage off the key Jericho tenets of maximizing combat effectiveness, facilitating innovation at the lowest level and speeding up and simplifying acquisition.

And then the question will become where is the best place to do the operational C2 in the battlespace, which will vary by mission to be on the ground, at sea or in the air, critically with full, degraded or denied enabling space capabilities such as SATCOM and GPS.

That is where we want to go with the evolving SRG.”

Air Commodore Heap added: “My concept is to seek, acquire and potentially employ decisive, highly protected asymmetric effects across the spectrum of warfare through our people’s, and industry’s great ideas.

We need to have open system architectures with the flexibility to spirally add capabilities at speed, not be hamstrung by a 5-year acquisition cycle. If ISIS has an acquisition cycle, and I believe it does, it certainly isn’t as limited as our previous processes.

Our new FPR capability acquisition processes and Defence structure is designed to correct this issue.

The new Joint Air Battle Management system announced in the recent Defence White Paper will be sourced using this principle, so in 2025 when a developing technology becomes mature, it can swiftly be acquired almost immediately fielded on operations if required.”

And shaping a more effective sovereign integrated force was important for Australia, for its own national defense and to become a more capable ally for its partners.

“We are small but we want to be capable of being a little Tasmanian Devil that you don’t want to play with because if you come at us, we’re going to give you a seriously hard time that will probably not be worth the effort; deterrence in its purest form.”

## THE SURVEILLANCE AND RESPONSE GROUP AND AIR-SEA INTEGRATION

At the recent Williams Foundation Air-Sea integration seminar, the sole Royal Australian Air Force presentation was given by the Chief of Staff of the Surveillance and Response Group, Captain David Hombsch.

The Commander of the SRG, Air Commodore Craig Heap was scheduled to speak so Group Captain Hombsch had the twin challenge of presenting another person’s briefing and inserting his own operational experiences throughout to explain how the SRG fit into the broader air-sea, or multi-domain integration effort.

Group Captain Hombsch drew upon his own P-3 experience to highlight the transition. He noted that he had just returned from RIMPAC 2016, where the Aussie P-3 made its last appearance.

The P-3 has made significant contributions to Australian security, but would fly to the point of interest based on intelligence provided to it and then pick up the tracks on a platform or set of assets of interest.

With the P-8 and Triton, it was a whole new game as the planes operated in the battlespace from take off and were working from the outset with a variety of SRG and ADF assets to shape a maritime domain awareness strike capability which would become pervasive in the extended battlespace.

Indeed, one of the more interesting parts of the briefing was the discussion on strike, because classic ISR is separated from strike in terms of understanding its role, largely understood in terms of specialized platforms informing specialized strike platforms of targeting options.

With the new ISR platforms, not only did they carry strike options, but the strike platforms like F-35 were also ISR platforms, which meant that a significant rethink of how to operate these platforms in an integrated manner was required.

**Strike**

- **Anti-Surface/Anti-Sub**
  - P-8A Poseidon
  - Land-based ASCM (?)
- **Air Interdiction/Strategic Attack**
  - P-8A Poseidon
  - Medium Altitude Long Endurance RPA
- **Electronic Warfare**
  - P-8A Poseidon
  - E-7A Wedgetail
  - Gulfstream ISREW

Enabling and Enabled by:  
F-35  
Growler  
Super-Hornet  
& RAN (DDG/FFG/SH60R)

Surveillance and Response Group 

FIGURE 13 SLIDE FROM GROUP CAPTAIN HOMBSCH PRESENTATION AT THE SEMINAR

Group Captain Hombsch underscored that Link 16 was now present on all key SRG platforms, which meant that they could operate as a connected force.

Clearly, it was important not to just rely on a single network, and indeed he focused on the way ahead in shaping network redundancy and training the operators ways to operate in a multi-domain network environment, including a dark one.

Training was a key theme in which the shift from operating singular platforms supporting singular tasks to multi-tasking missions required new skill sets and new approaches to training. He underscored that the focus was increasingly upon training operators to work in a world of integrated force TTPs.

**SRG Vision**

- *SRG will deliver decisive operational capability to the 5th generation warfighter through comprehensive intelligence surveillance, reconnaissance, and superior multi-domain common picture compilation and fusion, in order to enable decision superiority for the precise execution of kinetic and non-kinetic effects, while preserving the security and safety of our sea and air lines of communication domestically and abroad.*
- *SRG will remain continuously prepared to defend Australia and our national interests on behalf of the Australian Defence Force, the Government of Australia and its people.*

Surveillance and Response Group 

FIGURE 14 SLIDE FROM GROUP CAPTAIN HOMBSCH PRESENTATION AT THE SEMINAR.

Throughout the day, the coming of the new amphibious ships was a background theme on how a new platform could be leveraged to shape a way ahead for new approaches to force integration. Group Captain Hombsch provided examples of how the evolution of SRG was bringing capabilities to the LHDs and, in turn, the LHDs provided a new demand signal for SRG contributions.

One example was how the Triton would provide area coverage and information for an area of interest to where the LHD and related assets would be sent on deployment. The asset could provide key information shaping the picture of the operational environment long before the ship would show up.

Put in other terms, the Triton would become a modular member of an amphibious task force.

In short, SRG is a key part of the transformation of the RAAF and the ADF overall.

Many challenges lie ahead, but the key opportunity of introducing new capabilities like P-8 and Triton and evolving the role of the Wedgetail from an air battle management system to a joint battle management system can be leveraged to shape an effective way ahead.

## THE WEDGETAIL IN EVOLUTION: VISITING WILLIAMTOWN AIRBASE, AUGUST 2016

Prior to the seminar, there was a chance to visit Williamtown Airbase and to talk with Group Captain Stuart Bellingham, the Officer Commanding 42 Wing, about the Wedgetail and its evolution.

The Wedgetail is often referred to as an Aussie AWACS, but clearly is not. The AWACs is an AIR battle managements system with the customers being largely the fighter community. The Wedgetail is evolving towards a ground and naval engagement capability with naval and army officers onboard and with virtual Wedgetail becoming part of the officer training for the Army and Navy this process will deepen in the years ahead.

In many ways, what is being experienced with Wedgetail is what the ADF hopes to bring to the process of overall force design and greater operational integration.

It is also part of the new air combat systems, which are software upgradeable and capable of multi-tasking.

During an earlier visit to 2nd Squadron at Williamtown Airbase, the Squadron Commander underscored the challenge of understanding software upgradeability:

“This is a software upgradeable aircraft with a defined launch point (IOC) but no fixed end point (FOC). The system will always be evolving and growing as the software code gets rewritten to reflect events and demands from the squadron.

The squadron works through its experience and shapes change orders, which get sent to the procurement authorities to sort out priorities for the next round of upgrading the aircraft.”

The difference between older and such a new system was outlined by one participant during the visit as follows:

“We have in the same time frame bought a CRC system full up which will look pretty much like it is in 20 years; with Wedgetail it will look nothing like it does now in 20 years.”



**FIGURE 15 AIR COMBAT OFFICERS, PILOT OFFICERS NELSON (FOREGROUND) AND BRAYDEN, AND NO 2 SQUADRON DETACHMENT COMMANDER, SQUADRON LEADER SAMUEL THORPE, CONDUCT A PRE-FLIGHT CHECK IN THE E-7A WEDGETAIL AIRBORNE EARLY WARNING AND CONTROL AIRCRAFT DURING EXERCISE PITCH. CREDIT: AUSTRALIAN MINISTRY OF DEFENCE.**

This process of upgrading means that the software engineers work closely with the operators in shaping the evolution of the aircraft.

This is a very different approach from legacy systems.

As Paul Kalafos, Vice President of Surveillance Systems at Northrop Grumman has put it:

"We are getting significant feedback from the RAAF on deployment and requests to automate tasks where possible to enhanced the capability of the machine part of the man-machine relationship to shape a way ahead.

"A lot of the input is through the ARCS working group, which is a collaborative study environment involving Boeing, Northrop Grumman, MIT/Lincoln Labs, Air Force Life Cycle Management Center (AFLCMC), CEA Technologies, Defence Science and Technology Organisation (DSTO), Royal Australian Air Force (RAAF), and the Common Wealth of Australia (CoA).

"Operational requirements come out of that process and shape the next increment of software development.

"The ARCS is focused on problems and their resolutions.

"These are software updates.

"We get a software refresh out about once a year.

"Six months are spent doing the study to shape the plausible change; and the next six months are spent doing the integration and then getting it out the door.

"We shed the specs in favor of resolving problems, which the operational community identified.

"They can even write recommended change requests as well which provides part of the demand side process."

**Question: During the last visit, Wedgetail you had not operate it in combat. Now you have.**

### **How has it performed?**

Group Captain Bellingham: "We flew to the Middle East and almost instantly began operations. Since September last year we haven't dropped one mission due to systems on the aircraft, and we're at 99 point something percent success.

"It's able to deliver everything plus more to the coalition forces. There's a lot of potential in in the Wedgetail system.

"You've got a twin engine jet, it takes a lot less fuel to keep it over the battle space. We've got 13 crewmembers on board rather than 20 plus crewmembers on board (on an AWACS) who need food and shelter and clothing and sustainment. The footprint comes down.

"And it is very reliable. It's a relatively new jet, so our reliability is high in terms of the green aircraft systems. That may change as it gets older, but right now you turn it on and it works.

"From my perspective, I think not just the US but other nations are looking at E7 going, "You know what? That's working." Whereas where we were four or five years ago it was, "Seems like we've got a bit of work to do."

**Question: It is clearly a system in progress with the capability to evolve into what the US CNO calls a key capability to operate in the electromagnetic battlespace, and to do so for the joint force.**

### **Could you talk about the joint evolution?**

Group Captain Bellingham: "Army and navy officers are part of the Wedgetail crew. We are not just an extension of the air defense ground environment or of what the control reporting units do from the ground. We take our platform airborne and we do air battle space management.

"Recently, in the Army led Hamel exercise, we pushed the link picture down to the ground force headquarters. Their situational awareness became significant, compared to what they have had before.

"And since the Williams seminar on Air-Land integration, several senior Army officers have been to Williamtown to take onboard what we can do and potential evolution of the systems onboard the aircraft.

"We are seeing similar developments on the Navy side. A key example is working with the LHD. My opinion is that the Wedgetail will be critical to making all the bits of an amphibious task group come together. And not just that, but as the P-8 joins the force, we can broaden the support to Navy as well. And the new air warfare destroyer will use its systems as well to pass the data around to everyone, and making sure everyone's connected.

"The E-7 is a critical node in working force integration and making sure we're all seeing the same thing at the same time, and not running into each other, and getting each other space. We're not on a ten second scan. We are bringing the information to the war fighter or to whoever needs it right then."

**Question: During the visit, we have been in the squadron building, the hangar and in the System Program Office collocated with the squadron.**

### **What advantages does that bring?**

Group Captain Bellingham: "It facilitates a close working relationship between the combat force and the system developers.

Second Line of Defense

"We can share our combat experiences with the RAAF-industry team in the SPO and to shape a concrete way ahead in terms of development.

"The team is very proactive in working collaboratively to get to the outcome we're looking for."

**Question: In the SPO facility, you have a Virtual Wedgetail, which is the currently configured Wedgetail systems but located on the ground.**

**How as that worked for you?**

Group Captain Bellingham: "It is crucial for reaching out to the warfighting community. We have plugged into both Army and Navy officer training courses.

"We are using it to work closely with the Army and Navy getting ready for our Fall exercise with the LHD to shape a task force concept of the amphibious ships.

It provides a realistic way for Army and Navy officers to see what we contribute to their warfighting tasks.

"We need a crew in the Virtual Wedgetail to make it work because they have to have the right experience and background to provide that level of reality to the force which then the warfighters can experience what we can bring right now to the fight.

"We are also working with 7th Fleet. We work with the PACAF as well. We sent two planes to Pitch Black 2016 and are participating as well in the current Red Flag Alaska. This allows for Australia and the United States to shape synergies in the force.

"We put three layers of officers into the AOC that was running the Pacific Thunder exercise to ensure the success from our perspective and get people to understand it.

"We've definitely been invited back so we'll be there again beginning of next year doing it again which will be great."

**Question: The software upgradeability aspect of the plane means that you have to inform the broader warfighting community of what the evolving aircraft is now capable of. We saw those concerns when we visited Jax Navy and talked with the P-8 and Trion squadrons.**

**How are dealing with this challenge?**

Group Captain Bellingham: "Until we stop flying the E7, it will keep getting better. The challenge is as you fairly eloquently stated it is making sure people understand the capability as we're progressing.

"It's not just one community, the fighter force, with whom we need to communicate.

"We need to work with and communicate effectively with the joint force.

"Which affects our training as we move ahead as well.

"We must make sure that our communication is effective within the joint force."

**Question: Where is the future evolution of the system likely to go?**

Group Captain Bellingham: "One aspect is the people aspect, namely that Army and Navy officers are not simply replicating what they have done in legacy systems. Once they become that mission commander they

are that all-seeing, all-knowing, joint integrator who is a vastly different person to what they were in the ground system and they know an awful lot about joint integration and how to make that work.

"Another aspect is the evolving technology of the systems, which are clearly moving down the path of providing significant electronic-magnetic warfare capabilities as well.

"We are not just a classic flying radar.

"When we're looking forward ten years from now, that's where we're looking."

**Question: The P-8/Triton dyad is coming to the force.**

**How will that affect Wedgetail?**

Group Captain Bellingham: "Significantly.

"One aspect is that we will be operating a larger 737 fleet with six Wedgetails and 15 P-8s. We can't afford not to look for opportunities in this space."

## AN UPDATE ON AIR-SEA-LAND INTEGRATION FOR THE ADF: THE PERSPECTIVE OF BRIGADIER GENERAL MILLS

During the Williams Foundation seminar on Air-Land integration, a key speaker was Brigadier General Chris Mills, Director General, Army Modernization for the Australian Army. After the presentation, there was a chance to discuss with him his perspective on the way ahead of the Australian Army for the decade ahead.

A key point, which he underscored in that interview, was the following:

"I think the reality is that as we move beyond this decade, those type of joint effects need to empower the small team to achieve tactical success as the array of tactical successes transcend into an operational impact."

After the Williams Seminar on air-sea integration, there was another chance to re-engage with BG Mills and to get an update on developments since we last spoke. I was especially keen to discuss the perspective introduced into the latest seminar by Major General McLachlan, head of Australian Army Modernization.

Major General McLachlan discussed and analyzed the evolving role of the Aussie Army in the defense of Australia through what the U.S. Army would call Air Defense Artillery (ADA) or shaping the lower tier to a missile defense system engaged with the power projection forces. From his perspective, the more effective the territory of Australia could be used to shape effective defenses, the more the Air Force and Navy could focus on extended operations. He characterized this as shaping an Australian anti-access and area denial force.

One development since the last interview was the recent exercise Hamel 2016 which certified First Brigade as ready to meet the Australian Government's requirements as the Australian Defence Force's next 'ready' brigade.

According to Brigadier General Mills: "In essence, First Brigade, was challenged by both our conventional force and a non-conventional arranged force combatant to look at confirming the brigade's ability to conduct tasks from non-combatant evacuation operations, to operations against a non-conventional foe, to a conventional against a conventional plus fore, to a combination of all of those occurring at once.

And really that, that's army's high watermark to ensure that we can conduct the spectrums of task required of, of a small army from our peacekeeping and peace support operations to a conventional war foe.

Second Line of Defense

Exercise Hamel was born out of a concern by army's generals a number of years ago that we had spent too long just focused on preparing and conducting the foes like in Afghanistan. And for us it had been Timor and Solomon Islands and having troops supporting coalitions of the willing both in Iraq and Afghanistan. And there were some growing concerns that for a small army for that level of commitment.

We were eroding the foundational war fighting skills doctrine and capabilities that our army had previously built as our operational norm. We needed to update those skills for 21st century full spectrum operations.

We need to be able to fight continuously in three timeframes - the timeframe of focusing on recovering from the last fight while you've got force elements fighting the current fight, while you've got force elements preparing for the future fight.

And the ability to be able to fight in those three timeframes at once builds tempo. And for a small army like the Australian Army and the Australian Defense Force, we need to be able to look at technology, tactics, techniques, and procedures that enables us to fight across those three dimensions; to minimize the time between transition from the current to the future.

We look to generate combat mass through a rapid tempo or an ability reset or re-tasking capability across the force in a spectrum of operations.

**Question: Major General McLachlan specifically raised the question of the Army's role in integrated Air and Missile defense, could you comment on that?**

Brigadier General Mills: It's in Australia's interest to be prepared to defend our sea and air lines of communication to the north. I think the architects of the white paper very much had a view that they expected more from the army than the past and this includes in air and missile defense

We are looking a system of system's approach where the Army provides the lower level defense and the Air Force the medium level defense but under Air Force overall leadership.

We'd very much like to be able to use in-service air force missiles. The same missiles that potentially will be used on the medium system could be used on the short system.

Integrated air and missile defense capability talked about in the white paper is very much a first for the Australian Defense Force. The army is acquiring as well a long-range land-based rocket system. You're then talking of a land-based long range and the shipping missile capability to be acquired by the army in the foreseeable future.

The collective grouping of the integrated air and missile defense with a new long range land based rocket system for air and naval defense, will provide a mobile anti-access and area denial capability that's significant in terms of the geography to the north of Australia supportive of our national needs and those of our coalition partners.

And by so doing, we are freeing up Navy and Air Force for other tasks.

**Question: How has the air-land discussion proceeded since the Williams seminar earlier this year?**

Brigadier General Mills: The concepts we introduced there are being worked in specific ways.

We have visited Williamstown and continued our work with Wedgetail. There are Army officers on board and see Wedgetail as provided important capabilities for battle management and EW from an Army perspective. Army officers from Seven Signals EW regiment are regular riders on the Wedgetail. They are

there that we can get the best out of the systems that are available on that jet to support land forces. Although it's predominantly designed to support aerial combat, it has functionality that supports the ground forces as well.

Our vision is for the small group commander to be able to leverage Air Force and Navy fire support as well. We are working to provide the combat team commander with an evolving capability to tap into Navy and Air Force firepower to support his operations. That is an ongoing task, which is central to ADF modernization as well.

We are visiting Air Force and Navy commands to shape an effective way ahead on joint fires, surveillance and battle management solution sets.

**Question: Since we last spoke, the two LHDs are operating and becoming a driving force for change in Air Force, Navy and Army.**

**Do you see the LHD as a forcing function for some of the changes, which you are shaping for the Army?**

Brigadier General Mills: We see the engagement with Navy as part of our modernization effort.

Next year we are deploying a joint digital system on the ship able to support the force ashore so that the evolution of the LHD is part of the digital future of the Army as well. In other words, we are putting digital land C4I system onboard the LHDs.

We're a small force. We don't have the luxury of some very large organizations that, that have joint effects within a single service. We don't have that. We, we got a small army, a small navy, and a small air force. We want to achieve large effects. So I think even at the junior officer level, the way we plan and conduct our exercises, the way operations have been conducted in the last two decades, there is an expectation that joint isn't just a word. It's just how we do things now.

We see the LHD being stood up from the beginning as a joint asset. For example, the Canberra has been used to move First Brigade to the Hamel exercise area. We see it providing close air support and air mobility as well for our ground forces.



**FIGURE 16 LEADING SEAMAN AVIATION ROBERT BROOK SAFELY GUIDES AN ARMY CH47F CHINOOK HELICOPTER ONBOARD HMAS ADELAIDE, WHILE ALONGSIDE IN FLEET BASE EAST. CREDIT: AUSTRALIAN MINISTRY OF DEFENCE.**

And more generally, EW for the ground forces particularly in the environment in north of Australia really does rely in the integration of air, land, and sea EW to achieve the effect. And we are looking forward to the coming of the Growler as a contributor to this effort as well.

Second Line of Defense

And I think the LHD over the last five or six years has really driven the idea to start the journey to ensure joint with more than just a throw away word. We are starting the journey of working the sequences of airlift, sealift, overhead support, C2 and the insertion of the ground forces. In what circumstances do we use which assets to put a force ashore and support its operations? LHDs are now part of that and the RAAF changes with the C-130Js and C-17s are as well.

We're a small defense force operating in a very large environment. We very much feel that we've got a requirement to support like-minded countries and play our part in a global rules-based order.

We need to be able to achieve large effects with a leveraged force. Our army wants the air force to be the best small air force in the world, and we want our navy to be the best small navy in the world. Because if they're not, the army's not going to be able to get to where it needs to get to and be sustained in the fight to achieve the desired effect.

Our army looks to achieve effects on the ground. That's what it's been designed to do. To do that, air force and navy must support forces on the ground but from the standpoint of capability to do that while rapidly changing and re-tasking as well. The force must be well protected. And it must be able to sustain itself in austere environments.

One of the benefits of living in a large country with a dispersed population is that the Australian army has grown up on being able to sustain itself in austere environments for long periods of time. If we want to go on exercise, unlike American-only bases that have their exercise area just out the door, we'll more travel 10 hours by road convoy to get to the exercise area. Where the amphibians play a part is they assist us because the reality is we need an amphib capability just to defend Australia or just the force to be projected around Australia.

Look at where our three brigades are. Our three brigades are at the three ends of the country.

Preparing for power projection is rooted in our ability to even operate in the continent the size of Australia. We need to be joint simply to operate; what we are doing now is looking at the new technologies which allow us to enhance our capabilities to shape an integrated force to get the combat effects which we need in a region as large and diverse as ours is.

## THE WAY AHEAD FOR THE RAAF IN THE JOINT FORCES SPACE AND THE COMING OF THE F-35: THE PERSPECTIVE OF AIR COMMODORE KITCHER

Prior to the Williams Foundation seminar on air-sea integration, there was a chance to sit down with Air Commodore Kitcher and to discuss the way ahead for the RAAF in the joint combat space. He is the Director General of Capability Planning in the RAAF.

Air Commodore Kitcher provided an understanding of how the RAAF was integrating its new platforms into the force, and how opening the aperture from the outset on joint capability was affecting that roll out as well.

**Question: It is often noted in the USAF that 80% of the platforms, which will make up the 2025 force are already here.**

**What is the RAAF's perspective?**

Air Commodore Kitcher: "It is somewhat different from the USAF. And our challenge is also somewhat different. By 2025 our oldest platform will be a C130J, which remains the most modern C130 available.

“In 2025, we’re not going to be operating a platform in the air combat space that’s 20 years old. In Australia, we don’t have to integrate an F35 with an F16, or an F35 with the classic Hornet.

“We will be operating some of the latest and most capable platforms across the air lift, control of the air, strike and ISR roles and our challenge is to get best combat value out of an integrated Australian and coalition force using these cutting edge capabilities.

We’ll retire classic Hornet, and introduce the F35-A which is much more than a replacement for the Classic. Our other air combat asset are our Super Hornets, which are only 5 years old, and both will be supported (amongst many other things) by Growlers, which will arrive in Australia next year.

“If we look at the maritime space, P3s are retiring, P8s and Triton are being introduced. Our first P8 turns up in November this year. If we look in the airlift space, C130Js will be our oldest platform, but they remain contemporary.

“The KC-30 Multi Role Tanker Transport is 4 or 5 years old with both the hose and drogue and boom air to air refueling capabilities being fully realized and another 2 effectively new KC-30 aircraft will arrive before the end of 2019. We also picked up C-17 aircraft #7 and 8 last year. C-27J is being introduced right now and we expect it to reach IOC before the end of this year.

“In the surveillance and control area, the E-7 Wedgetail AEWAC airframe might be 10 or 15 years old. However, the Wedgetail capability is equal to or better than any similar capability in the world.

“You’d have to say Wedgetail is a cutting edge AEWAC capability. There would be some capabilities that Wedgetail has that the new USAF Block 40/45 E-3G AWACS doesn’t have, and vice versa, of course.”

**Question: So your challenge is ensuring that your force, which is a young force in terms of new capabilities, can work effectively together; and for this, you are also working with core allies such as the US, but need to shape a core Australian way ahead.**

**How would you describe the challenge?**

Air Commodore Kitcher: “How do I make my US Air Force ‘like’ F35A work closely with my US Navy ‘like’ Growler and Super Hornet to achieve a mission?”

“Similarly, how do I ensure these aircraft, plus the Australian bespoke Wedgetail can work effectively with the RAN LHD and Air Warfare Destroyer to achieve a Maritime support or strike mission?”

“It’s a good problem to have to ensure that we get the maximum collective capability out of our individual platforms in the Australian context, which means we’ve got to make them work with each other.

“Larger forces, like the US, may not have that same requirement, because they’ve got other assets that can do various specialized missions.

“And we face a major challenge to ensure that our new air platforms work in an integrated manner with evolving Navy and Army capabilities.

“We must shape solutions which support our Australian Concept of Operations.

Our force also obviously needs to be “integratable” and/or interoperable with the US and other allies, but we won’t get there fully by simply buying US C2 and ISR systems.

Second Line of Defense

“Not only do we need to make a particular platform or system work for Australia within our ADF capability context, but we need to ensure that it’s truly interoperable in a coalition as well.

“This is a real challenge, because there are security issues, restrictions and requirements that exist that must be overcome to realize true high-level interoperability.

“However, solving these problems is far better than trying to keep something that’s 30-year-old flying and make it work with the new equipment coming on line.

“To solve these challenges, we are focused on prioritizing and integrating only the things that you ‘should’ to make a more lethal and effective force.

“There is no need for all our capabilities to be fully connected to each other, there are levels of connectivity that will suffice, especially initially. We must priorities and identify what we ‘should’ do, and to what level, vice embark on a program of doing what we ‘can’ do.

“A component of the RAAF Project Jericho involves this kind of thinking and is looking at our Air, Maritime and land capabilities, determining the art of the possible with respect to connectivity, and then suggesting levels and priorities that should be pursued.

“This also includes components in the virtual and constructive areas such that we can also train more effectively in the joint arena.

“Improving our training capacity by complementing live training with virtual and constructive is vital, especially where availability of the scarce live resources necessary to generate a complex training scenario are limited, and security restrictions could inhibit operating live at appropriate levels.”

**Question: You have done a lot of worked to shape a fifth-generation enabled force, prior to the F-35 showing up.**

**How will the F-35 fit into that evolving effort?**

Air Commodore Kitcher: “The F35 introduction’s is catalyst for significant change.

“Although the jets don’t arrive in Australia until the end of 2018, and IOC is not until the end of 2020, believe me, we are right in the middle of introducing the F-35A into service.

“In addition to personnel we have embedded in the overall F-35 program in the US, we have two RAAF aircraft and four instructors at Luke AFB. Our first cadre of dedicated F-35 maintainers and engineers departs for the US in Jan 17, and will be gaining the necessary experience so we can operate the F-35 in Australia from the end of 2018.

“Operating the F-35 will be one thing, but we also need to be able to sustain it, and the methods of sustaining the F-35 are also different to older platforms.

“We have been planning for a while now, and these plans will continue to evolve, but I’m not sure our system fully understands that this significant transition is well and truly underway.

“You can keep flying legacy aircraft forever if you want to spend enough money on them, but they all reach a point where they will become capability irrelevant.

“Our Classic Hornets are doing a great job in the Middle East right now, and due to the raft of Hornet upgrades we have completed, remain amongst the most capable Classic Hornets anywhere.

“However, they will reach a point in the near future, especially in the higher end fight, where their utility will be significantly diminished.

“The F-35 brings 5th generation qualities which will allow for a significant expansion across a raft of ADF capabilities. Air Maritime, Land and most importantly joint

“We’ve chosen, and we have structured it such that the Classic Hornet will run out of effective hours and fatigue life at the point not too far after when the F35 is being introduced. There is a contingency of course but not a lot. We don’t have the luxury simply to reflect abstractly on this problem anymore, we’re in the middle of solving it.

“That gives us a very aggressive F35 introduction schedule.

“For example, we’re planning to change out a classic Hornet to F35 squadron over 12 months. A squadron will stop flying the classic Hornet at the end of December one year, and by the end of December next year they are fully up and running and operational on the F-35. That is a very tight schedule. We’ve got a plan to execute but as you would expect, it’s not without risk.

“However, being a little bit smaller than what other forces might be, we tend to also be more agile.

“And that agility will see us deal with any risks that might materialize, or the other inevitable pop up issues.

“Due to this aggressive schedule, our ability right now to deal with many other things triggered by the F-35 is somewhat limited, we are rightly focused on introduction.

“Fortunately, most of these associated issues, such as the Mission Data Environment, have already been the subject of extensive work. We have been positioning our joint force to both provide the necessary level and type of data to maximize new capabilities such as Growler, Triton and F-35A, and process the vast amounts of data these capabilities will collect.

“There are definitely remaining challenges in this space, we’ve observed them here in Australia and also with our key coalition partners, but there is good work underway in parallel with the platform introductions.



**FIGURE 17 WING COMMANDER DARREN CLARE WITH THE F-35A DURING THE ROYAL INTERNATIONAL AIR TATTOO AT RAF FAIRFORD. CREDIT AUSTRALIAN MINISTRY OF DEFENCE.**

“I’m sure after we introduce the F-35 aircraft we’ll still have a lot of work to do to get us to the point where we maximize the F35 capability across the Australian defense force, and interoperability with the other F-35 forces, but this is natural and will be dealt with in due course.

“There is certainly a lot happening at once.”

Second Line of Defense

**Question: But clearly, you are bringing in the F-35 with the mindset that it is not simply replacing the Hornet?**

Air Commodore Kitcher: “I absolutely agree we are not just replacing the classic Hornet with another fighter.

“And we are looking from the ground up at complementary F-35 capabilities to maximize the F-35 effect across the joint space, such as the missiles we wish to see onboard our F-35.

“For example, we are looking at the Kongsberg JSM, we think that presents a logical option to consider far more seriously for our JSF maritime strike capability, and we’re looking at that right now, as was announced at the 2015 Avalon Air Show.

“Our requirement for a quality maritime strike missile internally carried on the F35 might also be ahead timewise of what the US and other coalition partners might have. It might also be ahead of what the US has programmed. We’re certainly working on the F-35 MARSTK capability and are also developing options, with Australian Industry, that might lead to a dual mode seeker in the JSM.

“But it is clear that just like in the case of Wedgetail and KC-30A, we want to put the F-35 into the hands of the warfighters as rapidly as possible.

“They will make it work.

“I know that despite all our best efforts and intent, we won’t be able to plan the F-35 introduction perfectly from Canberra. We are doing our best job to make sure we deliver the capability to the men and women in the field, as efficiently and positively as possible.



**FIGURE 18 FLIGHT LIEUTENANT (FLTLT) BEN MASON AND SERGEANT (SGT) JUSTIN KELLY IN FRONT OF A DUTCH F-35A AIRCRAFT WHEN THEY ACCOMPANIED THE ROYAL NETHERLANDS AIR FORCE (RNLAf) ON THEIR DEPLOYMENT TO THE NETHERLANDS IN JUNE 2016. NOTE THAT MEMBERS OF THE RAAF ARE SEEN WORKING WITH THE DUTCH AIR FORCE ON THE COMMON COALITION AIRCRAFT AND SUPPORTING THE DUTCH IN THEIR FLIGHT TO THEIR OWN COUNTRY. CREDIT: AUSTRALIAN MINISTRY OF DEFENCE**

“When we throw the F-35 at them, they’re going to do all sorts of stuff with it that we will not have even thought of.

“I look forward to letting our smart young man and women, who have grown up in a different environment to those of us here in Canberra, get their hands on the F-35 and do some amazing things with it. I’m also quite looking forward to getting back out there myself, and see this first hand.

“Our job is to set up the program and set in motion the framework for that kind of tactical innovation to happen, to position them for success.

“We should not get in their way with excessive top down guidance and legacy thinking.”

## RECOMMENDATIONS FOR THE WAY AHEAD TO CRAFT A 21<sup>ST</sup> CENTURY INTEGRATED FORCE

The Williams Foundation seminar on air-sea integration provided an opportunity for both uniformed officers as well as industrial participants to provide some practical suggestions and recommendations with regard to the way ahead to craft a more integrated combat force

In this section, we will focus on the comments made by the final panel, which featured key officers from the Royal Australian Navy, the Royal Australian Air Force and the United States Navy as well as the industry presentations in the seminar.

### Perspectives of the Panel at the Closing Session of the Williams Foundation Seminar

Air Marshall (Retired) Geoff Brown was the moderator for the final session of the air-sea seminar.

He oversaw a panel, which then engaged with the audience and discussed a number of practical challenges, which needed to be addressed to effectively shape an integrated force capable of prevailing in the extended battlespace of the period ahead.

The panel consisted of Rear Admiral Manazir, Rear Admiral Stu Mayer, Air Vice Marshal Warren McDonald, and Rear Admiral (Retired) James Rapp.

The challenge of shaping an integrated force is enhanced in part by an acquisition process, which buys platforms and not capabilities. And acquisition processes which are long and drawn out.



FIGURE 19 AIR VICE MARSHAL WARREN MCDONALD DURING THE FINAL PANEL AT THE SEMINAR.

The focus of the panelists was on leveraging industry to shape fixes to gaps which then allowed broader force structure change, upon non-capital investments which drew upon needed cultural changes which the military leadership could identify and put investments against, and leveraging new opportunities posed by the introduction of new platforms, to shape new joint opportunities.

Rear Admiral Mayer underscored the need to focus on non-capital investments as a way ahead.

Second Line of Defense

“We are focused on platform purchases to solve problems; but many of those problems can be solved with better and more effective ways to work together. And we need to identify them, train to them and operate with them to make a difference in the joint force.”

Air Vice Marshall McDonald highlighted the opportunity to leverage the new capabilities provided by Wedgetail and P-8 to shape a new approach to work with navy.

He also highlighted the opportunity inherent in integrated and air and missile defense.

“I do not meet with industry in this area without an Army officer present, because we are going to work the problem together.”

He added the sage comment that we need to focus on the practical opportunities and leverage points rather than trying to get a full-blown integrated force solution at once.

“We need to build from to in order to shape an effective way ahead.”

Another key theme was working the training area more effectively.

Here suggestions ranged from shaping more targeted training, which focused on key tactical innovations to the use of LVC to train the command elements in ways to actually leverage a joint force in a high-end fight.

And LVC was seen as key to working the training towards the high-end fight, and training warriors in how to do cooperative engagement, to get the kind of sensor to weapons hand offs which the new technologies was generating for the combat force.

A key issue is that of information sharing among national or coalition forces.

Here Air Marshal (Retired) Geoff Brown asked Rear Admiral Manazir if we were making progress in this area.

Rear Admiral Manazir highlighted that in the evolving machine-to-machine relationships, technology was providing a way ahead. For example, targets could be identified and shared without disclosing the source of that information or the classification level.

The practical problem is to move classified data around the battlespace to empower the war fighters without compromising classification methods.

According to Rear Admiral Manazir:

“Machines talking at multi-level and multi-channel encrypted security levels can exchange data without compromising the sources and methods whereby the data has been generated.

“Thereby an F-35 with US markings and an F-35 with Australian markings can share data effectively in the combat space.”

In effect, the broad problem is one of parsing information and solving the problem posed by Air Vice Marshal Gavin Turnbull at the last Williams Foundation Seminar:

“How do we get the right information to the right people at the right time?”

## The Perspective of John Conway, Raytheon Australia: Reshaping the Industrial-Government Working Relationship to Support 21st Century Force Integration

John Conway focused on what he sees as a key role for industry in Australia, namely working with the Commonwealth to ensure that the ADF has sovereign control over its combat technologies.

“Integration should be viewed from the outset as an essential force multiplier in the air-sea domain, with the Australian defence industry playing a fundamental role in supporting the design, building and sustainment of a potent and agile joint force capability.”

Clearly, the latest Defence White Paper and associated documents called for a new working relationship with industry and throughout his remarks Conway underscored the importance of reworking the relationship to achieve greater force integration and cohesion.

“With Australian industry now formally acknowledged as a fundamental input to capability, this places a significant responsibility upon us to synchronize with Commonwealth intent, contribute to the development of effective and efficient time-sensitive solutions, and act as a cooperative and value-adding partner within the emerging framework of the first principles review.”

He highlighted that the addition of the new platforms provides key opportunities for working the partnership towards greater force integration.

“The possibility of adding complementary networked sensors, targeting systems, kinetic and non-kinetic weapons to as many of these new platforms as possible adds significant density and resilience to the ‘kill web’ described earlier by Admiral Manazir.

With a strong Australian industrial base, enabled by efficient international supply chains, we are able to integrate these new systems swiftly into our environment, as well as keeping their important training systems in lock step.”

## The Perspective of Patrick Winter, BAE Systems, Australia: Reworking Systems Integration to Shape an Integrated Force

Winter focused on ways to enhance the integration of forces, with among other approaches shaping a more open systems architecture approach.

“From an industry perspective, open systems architectures, support to collective air and sea training, and enterprise level C4ISR capabilities are the key areas where we can really make a significant contribution to air and sea integration and interoperability.”

He underscored that it was important for platform builders to buy into the new approach so that “industry can deliver a sensor as a service across a platform and the wider integrated air/sea enterprise.”

But to achieve integration there have to be agreed upon standards with regard to data exchange and security. “We need a continued focus on consistency in our data links and communications in contested environments, our multi-level security and data exchange systems, and this is where industry and the services need to work together to define and agree to approaches to interoperability in Australian and coalition environments.”

And although he did not use this term, he focused on “Big Data” management challenges to get to where integrated forces can achieve operational advantages and superiority.

“We need to finally embrace the technical and security challenges posed by large volumes of data being collected, processed and disseminated in Australia and in deployed environments. We need to work with Defence to identify innovative solutions to ensure data is available when, where and in the form it is needed.”

He sees approaches such as the use of system integration labs as ways to shape more effective integration.

“Our approach is to work as an industry team to deliver the outcomes needed by Defence through initiatives such as our systems integration labs – housed at BAE Systems, but used by RAF, other UK services and our broader industry partners.

And this is a model which we believe the ADF could adopt for future platforms and systems.”

He hammered home the point that a new industry-government working relationship was crucial to achieve the force integration possible in a software development and data-sharing world.

“The depth, breadth and unrivalled global access of the major defence primes will be critical to Defence achieving the best air and sea integration outcomes – and we would like to work more closely and more collaboratively with Defence in the planning phases.

“It’s great to see First Principles, the Defence Industry Policy and the White Paper address this very issue – but we need to ensure we maintain momentum and truly work together in a partnership moving forward.”

## The Perspective of Rob Slaven, L-3 Communication Systems, Australia: The Challenge of Data Security in Coalition Operations

In both Williams Seminars this year on force integration, first on air-land, and the second on air-sea, L-3 has provided solid presentations on the communications side of the challenge.

At the air-land seminar earlier this year, Victor King, L-3 Mission Integration, provided an overview on ways to shape seamless situational awareness.

In that presentation, King talked to the question of how to balance substantial government investment in existing military systems designed to remain operational for decades with rapidly changing technology?

His answer focused on three key elements:

- Integrated commercial technology and standards with current military systems;
- Allow the market to drive technology and provide infrastructure;
- Utilize both military and commercial networks for an end-to-end solution.

In the air-sea integration seminar, Captain Rob Slaven, DSM RAN (Retired) and now from L-3, provided a look at the communications side of the challenge for shaping and operating an integrated force.

Slaven’s briefing was entitled: “Joint Force Information Exchange and Data Integrity in a Coalition Environment.”

He emphasized that coalition operations are essentially come as you are warfare and requires working the interoperability piece is very challenging.

“For a Coalition finding a common cause is hard, speaking one language is harder, whilst using common systems and equipment configurations would seem to be the hardest challenge of them all.”

As difficult as the challenge is, it needs to be addressed for coalitions to be effective. He focused on a multi-step approach to sorting through a solution.

“Internationally agreed interface standards and programming languages are a first step. A next step is to initiate a cyber secure program environment from project initiation.”

Clearly, one would like to get to the point of having a shared common operational picture.

But there is a broader problem raised by Slaven’s presentation, which needs to be addressed.

Which allies for which coalitions for which tasks and solutions? The countries which have core security and data sharing arrangements such as the US, the UK and Australia can seek ways to share data, that will not simply work within a broader political coalition environment.

How to best two tier solutions but with reasonable commonality as well? And this will clearly affect the training and exercise side of the equation, a subject addressed in part by the CAE briefing.

### **The Perspective of Rear Admiral (Retired) Rapp, Senior Naval Advisor, CAE: The Crucial Role of LVCT in the Crafting of an Integrated Force**

Rear Admiral James Rapp is Senior Naval Advisor to CAE. His final operational appointment in the Royal Navy was as Flag Office Sea Training. Employing a staff of 600, he was responsible for the operational sea training of all the Royal Navy’s hips, submarines and auxiliaries, and ships from 19 other foreign navies.

Rear Admiral (Retired) Rapp focused on the increasingly dynamic and transformative role of training systems in shaping the way ahead for the joint force.

Live Virtual Constructive Training would see a greater role in the evolution of the joint force as it forged greater opportunities for force integration.

In addition to reviewing the advantages of LVCT, he underscored how essential it was in terms of operating in a training environment where security can be maintained for the fifth generation-enabled force.

He argued that “security constraints are a key barrier to integration” and highlighted ways in LVCT could assist in providing practical ways to seek solutions rooted in the training environment.

He used the example of CAE’s support to the UAE Navy as an example of how an integrated training solution can provide benefits both to industry and the client in terms of enhanced training capabilities, and learning curves.

“In the UAE case, having a single training systems provider has reduced costs, risks and enhanced the training schedule as well.”

He presented a clear case for an effective industry-service partnership in the training area to get efficiencies, flexibility and effectiveness in the training domain.

### **The Perspective of John Thompson, Northrop Grumman: Shaping Capabilities to Prevail in the Electronic Magnetic Warfare Maneuver Space**

Second Line of Defense

John Thompson is director of business development for the Force Protection business unit in Northrop Grumman's Mission Systems sector. As the senior business development representative for the Mission Systems sector's electronic business area, Thompson leads the development and acquisition of advanced electronic warfare programs.

His presentation focused on the way ahead in the non-kinetic warfare area and its implications for full spectrum maneuverability in the air-sea battle space.

He started by focusing on a Growler being flown by an Australian pilot firing an anti-radiation missile. He saw that pilot as a node in the network, rather than simply seeing it as a plane. He saw that pilot both as a supported and supporting element in a combat network.

He suggested resetting the electronic warfare approach to understand that it is really about connectivity within the network and the ability of the network to function.

It is part of the operation of the network, rather than being a stove-piped functional capability.

He highlighted as well the CNO's concept of operating in the electronic maneuver warfare space. And a key goal of the attack side of such operations is to create chaos in the adversary's operational space.

He argued that it was crucial as well to shape redundant systems to be able to defend against electronic threats as well. For combat success, agility is crucial for the forces, and in that regard EW is a crucial capability, which needs to be built into the integrated force.

How do I engage at range?

In the example cited by Captain Walker of the Type 45 destroyer as the wingman for an F-35, the task is highlighted whereby target identification then pushes the choice of weapon to the appropriate capability in the battlespace.

"How will I generate a weapons quality track at range and distribute that track to the best available shooter?"

## The Perspective of Lowell Shayn Hawthorne, Mitre Corporation: Evolving Approaches to Integrated Air and Missile Defense

The Mitre executive started his presentation by articulating how he saw the Australian situation:

- The future will find Australian Defence Forces (ADF) conducting global operations
- In a variety of environments from low intensity up to Anti-Access Area Denial (A2AD) conditions
- Requiring IAMD to protect joint forces.

His presentation then went on to discuss the evolving threat environment, which requires more flexible and enhanced integrated defense.

He argued that the strategic direction of the effort needed to ensure that "every asset is part of the IAMD net."

The rest of the briefing set out how he thought this goal could be achieved or put differently, what needed to happen in order to achieve this objective.

He noted, "All systems must work together to achieve common goals in coalition and sovereign operations."

This might well be a too hard to do issue, and perhaps can happen for a small subset of states but more difficult across coalitions.

Indeed both Chief of Navy and the Commander of the Australian Fleet, both highlighted the importance of sovereignty operations and the need to shape their integrated force obviously with close connections with the United States.

Where best to fit in IAMD into the Australian picture?

The background of Lowell Shayn Hawthorne highlights in many ways the nature of the presentation.

Mr. Shayn Hawthorne has served as the Technical Director of the OSD/MDA Program Division since March 2014 where he has developed excellent relationships with his two Portfolio Directors and Division Leadership while leading the Division through significant workforce shaping activities and helping both Portfolios achieve significant growth.

Previously, Shayn led the Missile Defense Agency (MDA) Space Knowledge Center as the Technical Director, which performs independent technical assessments and evaluates experiments related to MDA space programs currently being executed. There, Shayn worked with MITRE, other FFRDCs/UARCs, and the MDA to achieve mission success. In previous MITRE work efforts, Mr. Hawthorne has been by-name requested to lead Advanced Development efforts for Air Force space situational awareness, missile warning, and missile defense sensors, as well as Command and Control (C2) systems and correlator/tracker systems.

The US built a missile defense agency, precisely to do missile defense. The problem is that in a warfighting sense dealing with an adversaries' missiles is even more of an offensive challenge than a defensive one, and clearly what is on offer is shaping an offensive-defensive enterprise that engages to kill adversary forces, with whatever means are necessary.

In an interview conducted in Hawaii in 2014 with the then head of Army ADA, the point was underscored as follows:

"The General discussed the role of ADA within Pacific defense as part of the support to airpower and to strategic decision-making.

He emphasized that the capabilities of ADA helped provide time to determine how to both generate more air power and how to use airpower and provided the national command authority time to determine how best to respond to a crisis.

There are three ways to deal with an incoming missile defense.

There is passive defense, but there is only so much hardening and dispersal one can do without degrading your combat capability, and their many soft targets, which cannot be hardened.

You can use air strikes to take out the adversary's missile strike force, but you may not wish to do that right away or have not fully mobilized your capability.

The role of having active defense or an interceptor force is to buy time for [Lieutenant] General [Jan-Marc] Jouas (7th USAF Commander in the Pacific) or General [Hawk] Carlisle (the PACAF Commander) to more effectively determine how to use their airpower.

It also allows the National Command Authority to determine the most effective way ahead with an adversary willing to strike US or allied forces and territory with missiles."

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This is very close to the view articulated by the head of Australian Army Modernization, Major General McLachlan, concerning how he saw the evolving role of the Aussie Army in the defense of Australia through what the U.S. Army would call Air Defense Artillery (ADA) or shaping the lower tier to a missile defense system engaged with the power projection forces.

From his perspective, the more effective the territory of Australia could be used to shape effective defenses, the more the Air Force and Navy could focus on extended operations. He characterized this as shaping an Australian anti-access and area denial force.

Clearly, integrated air and missile defense for Australia was really not that; they are too small a force to execute the mission in these terms.

They need to shape a capable integrated force, which can execute seamlessly operations in an offensive-defensive enterprise.

They will never have enough defensive capability to deter the most likely adversaries; but with potent extended reach with some integrated defensive capabilities, they can provide for deterrence.

The way Air Commodore Heap put the goal: “We are small but we want to be capable of being a little Tasmanian Devil that you don’t want to play with because if you come at us, were going to give you a seriously hard time that will probably not be worth the effort; deterrence in its purest form.”

What Australia does in the air and missile defense regime will flow from this strategic goal and not provide for an independent capability. The American solution cannot be easily morphed to Australia.

Hawthorne’s excellent presentation introduces a number of key elements for a solution set; the question is how Australia can best leverage some of his suggestions?

## PROGRESS AND THE WAY AHEAD IN THE TRANSFORMATION OF THE ADF: AN INTERVIEW WITH FORMER RAAF CHIEF OF STAFF, AIR MARSHAL (RETIRED) GEOFF BROWN

After the air-sea integration seminar, there was a chance to discuss with Air Marshal (Retired) Geoff Brown his look back and forward on the process of transformation and his take on the seminar as one of the key hosts.

**Question: Looking back, how do you view the progress so far on force modernization and transformation?**

Brown: I am pretty pleased with the progress so far.

When we were able to add the JSF as a key piece of the evolving RAAF, we then could open the aperture and start to think more directly and fully about what a fully modernized air force not only would look like but also could achieve for the ADF.

**Question: You have been intimately involved with the Wedgetail project from the beginning. It is clear now that this air battle management system is evolving into a joint battle management capability.**

**Indeed, for both Army and Navy it is seen as an Air Force platform which is fostering the kind of cross service transformation which is desired across the force.**

**But such a development was not all that evident at the outset, was it?**

Brown: Not at all.

But being a small air force, means that we don't have the luxury of having specialty platforms; we are not going to have an AWACS, a Joint Stars, a Hawkeye, etc.

We have to leverage our platforms as multi-mission and with a fifth generation focus right from the start.

The ability to multi-task all of our platforms is the key to producing the required combat power.

Wedgetail has very much given us a very different capability that certainly has appealed to the Navy as a force enhancer to the fleet but I think Army's starting to see what it can do for them too, as well.

And we have taken the same mentality with our C-17s and C-130s in terms of adding ISR and C2 capabilities to the airlift fleet, and this really is a work in progress for the joint force.

**Question: The Army presentation at the Air-Sea presentation clearly was good statement about progress in the public discussion as well.**

**How do you view that?**

Brown: The statement by the head of Army modernization about the intent and focus on Army's role and approach to integrated air and missile defense clearly is a statement of progress in how we are thinking about the way ahead.

His focus as well on how Army capabilities can then unleash other capabilities for Air Force and Navy was a clear statement of the kind of joint leadership we need for the ADF to get the force transformation, which we need, for Australian defense.

**Question: It is not always clear to folks that what you are focused on is not simply a new variant of network centric warfare.**

**How would you describe the difference between then and now?**

Brown: We are a long way away from network centric warfare.

NCW was focused on getting the platforms simply more connected.

I think the difference is now that we have connected the platforms; we're actually exploring the possibilities of that connected force.

I believe that's the difference and it provides the foundation for the next phase which is building an integrated force from the ground up.

We've still got to work towards more open architecture designs in all our platforms that allow the sort of flexibility with what I'd call the app application.

The ability to make small changes that actually give you significant combat power differences via apps on top of the software architecture and then to proliferate that app across the force where appropriate.

## MOVING FROM A CONNECTED AND LAYERED FORCE TO AN INTEGRATED ONE: THE PERSPECTIVE OF AIR VICE MARSHAL (RETIRED) JOHN BLACKBURN

Second Line of Defense

The initial focus of the seminars, which have become best labeled as the transformation of the Australian Defence Force was upon discussing, analyzing and explaining fifth generation aircraft and what they could bring to the force.

This meant in part discussing two platforms, which are described as fifth generation, namely the F-22 and the F-35. This could descend into a platform discussion in which the focus would be upon contrasting legacy (i.e. platforms which came before) and the latest combat aircraft.

Over the past three years the Williams Foundation has conducted a series of Seminars that explored the opportunities and challenges afforded by the introduction of 5th generation air combat capabilities.

Topics that have been explored to date included:

- Air Combat Operations – 2025 and Beyond;
- Battlespace Awareness – The Joint Edge;
- Integrating Innovative Airpower (held in Copenhagen);
- Training for an Integrated ADF: Live, Virtual and Constructive;
- Design-Led Innovation;
- New Thinking on Air-Land;
- New Thinking on Air-Sea.

The range of seminars has cast the net much broader to discuss what a fifth generation enabled force will look like.

The latest seminar of the Williams Foundation really brought out into the open the core challenges understood from a maritime warfare perspective. The senior Navy leadership – US, UK and Australian – all focused on a 21st century concept of task forces, modular capabilities, and shaping the network as a weapon system.

We have successfully connected key platforms in shaping a more effective “joint” force in which air, sea and land capabilities can be mutually supportable.

But the fifth generation perspective is not that; it is about operating key force structure elements in terms of interactive, interconnected, and integrated operations.

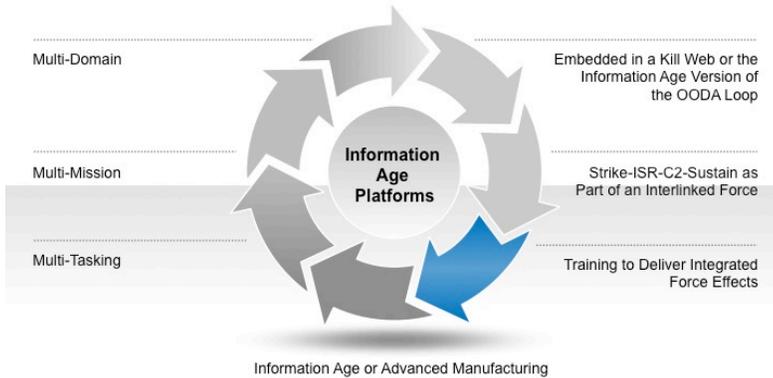
It is about C2 built into the force, which allows the force elements closest the area of interest to provide lethal effect and for the strategic leadership to assess that effect and reconfigure force up against strategic objectives.

Put in other terms, we can assume we can connect platforms and operate as a “joint” force. But that simply gives us layers of connected support to lead forces or platforms.

That is not enough for where information rich platforms such as the F-35 are headed – it is about taking a first generation information dominant platform and welding it into a broader transformation which the US Navy calls the kill web, that is how interactive and integrated task force elements can be welded into survivable clusters of capabilities which can deliver lethal effect.

## Focus of Militaries Focused on Crafting An Integrated Force

Building from a Connected Force to One Which Can Deliver Distributed Lethality



**FIGURE 20 PLATFORMS IN THE EVOLVING INFORMATION AGE MILITARY**

It is what Chief of Navy in Australia called creating a sovereign Australian Defence Force capability for lethal effect executed in coalition in terms of distributed lethality.

It is what Commander of the Fleet calls enhancing the vulnerabilities of the adversary whilst reducing our own.

In the last formal presentation of the Williams Seminar on air-sea integration, John Blackburn, the former Deputy Chair of the Williams Foundation and a past Deputy Chief of the RAAF, addressed the challenge of building from the ground up a truly integrated force.

To do so, requires more than the significant efforts the services are each doing working to shape cross modernization; it required a new approach to force structure design.

He then announced that on 6 March 2017, the Foundation will run a one-day Seminar on the topic of Integrated Force Design, stepping beyond the focus on airpower, sea power and Land power to one of integrated power. He also announced the Foundations plan to run a case study Integrated Air and Missile Defense (IAMD) in order to explore how Australia could achieve an Integrated Force Design.

In an interview after his presentation, there was a chance to talk with the former Air Vice-Marshal who was also a key participant in shaping the Plan Jericho effort of the RAAF.

**Question: Clearly, the services are making progress in what one might call interactive modernization.**

**But this is not enough to get to a truly integrated force, which can operate with the flexibility the senior navy leadership discussed earlier in the seminar.**

**What needs to be done to get there?**

Blackburn: “What we’ve seen in the last decade is the services focused on each doing their transformation or modernization programs in their individual domains.

“There have also been significant efforts to address force integration of existing force platforms or systems. However, such integration is primarily an “after market “activity.

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“In other words we are trying to integrate force components after they have been designed or acquired as single service assets. Integration after the fact means that we are always in lag of the threat. As any fighter pilot will tell you, you win by “pulling lead” on the target, not by following in “lag.”

“Whilst this approach may have served us well to date, the changes in technology afforded by 5th Generation capabilities present a unique opportunity to integrate the future force in the design phase of force definition and acquisition.

“A force integrated by design would be far more operationally effective than one integrated after acquisition. Given the threats that we anticipate over the next decades, we have no choice but to take the integrated approach if we are to win.

“The benefits from integration at the design level are becoming more and more evident. However, teaming the three services to work together in the design phase is not in our DNA.

“We are born and bred in single service cultures and, whilst we fight in a joint force, most people don’t think of that integrated force design as being about war fighting, they refer to it as a “process.”

“It’s not a process, it’s about a change in mindset, it’s a change in culture, and it’s all about teamwork before we get the equipment and go to war with it.”

### **Question: How has the Plan Jericho experience highlighted the importance of this shift in effort?**

Blackburn: “The problem became clearly evident when I talked to officers involved with bringing on line the new platforms, such as P-8 or JSF. When I spoke to them I asked them a question, “Okay, you’re working on your project, it’s coming along, and it’s looking pretty good.

“How will your capability affect the other parts of the defense force, and what could you do in your area to make sure that your capability is more effective supporting other elements of the force or becoming more integrated with them in operations?”

“The general answer I got when I asked this question was, “Listen, I’m just too busy managing the acquisition of the new platform, we will worry about that once we have it ... we have to make sure we get our project right.”

“What I saw was a work pressure and cultural issue: there is no imperative in people’s mind to say, “We’re spending billions of dollars on this capability; how do I talk to my peers who are looking at other projects and make sure collectively we achieve the best results?”

### **Question: The next Williams seminar is being crafted to deal with this challenge.**

#### **How are you going to go about it at Williams?**

Blackburn: “What the integrated force design seminar is intended to do is to explore with Defence and Industry people the reality that the technology will enable a very different way of building and fighting the future force.

“By “designing” a capability as a team, we will have a far more effective integrated war fighting capability. This is about war fighting and reducing operational risk, and that is a mental change, it’s not just a technology change.

“My premise is that part of the problem of the integrated force design is a cultural and behavioral one.

Williams Foundation March 2017 Seminar  
"Integrated Force Design"

The hypotheses the seminar will explore could include:

- If we don't "design" the integrated force we are committed to "after-market" integration
- We can't build and operate an integrated force using business models developed for acquiring stand-alone, stove-piped capabilities.
- If we over-complicate the "design" process we will stall our efforts and get the same results we have had over the past 20 years – stove-piped capabilities.
- "Design" is about more than just platforms and systems ... it is about how we design, acquire, operate and sustain an integrated force in a more complex interconnected global context.
- **We have to change ... and operate as an integrated team – if the "Strategic Centre" fails in this arena, we all fail and incur unnecessary operational risk in future operations ... It is about the combat outcomes we must achieve.**

FIGURE 21 SLIDE FROM AIR VICE MARSHAL (RETIRED) JOHN BLACKBURN PRESENTATION TO THE SEMINAR.

"We want to explore this opportunity by selecting a capability such as IAMD, a capability that requires Army, Navy and Air Force and the Joint Staff to sit down together with industry and with academia to explore how we can shape a new capability for Australia.

"The Americans have been there for a while, but this is going to a new space for us.

"What it requires us to do is to sit down and say collectively, "How we're going to take all the assets that we have, and those that are coming in the future, and make sure we're going to produce an integrated force with a superior war fighting capability in the extended battle space that will result in lower operational risk."

"We will explore a new way of working together at the integrated level and we intend to some analysis with force characteristics of this future integrated force. We aim to help the project officers think beyond their own projects to design in greater capability to leverage one another from the outset, from the design level.

"In fact, the challenge is to ensure that the aperture is wide within individual projects to have the kind of interactive dynamic developments which a joint force design process can unleash.

"Unfortunately, many projects often narrow the aperture to a replacement mindset in order to save time.

"We want the project officers of individual projects to be able to say: "Okay, in my project as well as replacing what I had today, I've got to make sure that the capability I'm designing be a part of the future kill web rather than a force component networked or connected in an after-market after thought.

"We see that as the main challenge and the opportunity to design the future force, integrated at birth."

## TERMS OF REFERENCE FOR THE CONFERENCE AND PRESENTATIONS MADE AT THE CONFERENCE

The terms of reference for the conference were as follows:

"The Royal Australian Navy has had the ability to network and share situational awareness amongst the fleet for many years and the P-3s has been the only RAAF platform capable of being part of that network.

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The RAAF's journey of networking its capability journey started more recently with the Hornet Upgrade Program and has accelerated with the introduction of capabilities like Wedgetail and Vigilante. All of the RAAF's fleet is now capable of linking into and contributing to an Air Layer of the Joint Battle management system.

With the advent of 5th Generation capabilities like the JSF and the new combat systems on the AWD as well as the design and development of the new combat systems for the Australia's future frigates, Offshore Patrol Vessels and Submarines, the ADF has a unique opportunity to influence and design in an unprecedented level of integration into the RAN's and RAAF's new platforms. That unprecedented level of integration should drive new thinking on the integration of air and sea power effects. The seminar is about examining the challenges and possibilities of the combat power in that future integrated force.

Air Force and Navy need to not only remediate existing deficiencies but also take advantage of the transformative nature of fifth generation technology. The seminar aims to explore the art of the possible in future Air-Sea operations."

For the presentations made at the seminar, see the following:

<http://www.williamsfoundation.org.au/seminar-presentations>

The author of the report was Dr. Robbin Laird, *Second Line of Defense*.

<http://www.sldinfo.com>

## APPENDIX: THE DEFENCE WHITE PAPER ON MARITIME SYSTEMS

What exactly does the 2016 White Paper say with regard to Government commitments to new maritime capabilities?

The following is taken from the 2016 Defence White Paper with regard to the general discussion on the way ahead with regard to maritime capabilities:

*Highly capable and versatile naval and maritime forces are vital to our defence strategy.*

*Australia's naval and maritime forces must be able to undertake a wide range of activities in support of the Strategic Defence Objectives and operate across huge distances.*

*The area of Australia's maritime zones, including our Exclusive Economic Zone, is one of the largest in the world, with a total marine area of around 10 million square kilometres.*

*Australia is also responsible for covering one of the largest search and rescue areas in the world, some 53 million square kilometres of the Indian, Pacific and Southern Oceans.*

*Our naval and maritime forces deploy around the world for training, exercises and to participate in coalition operations to support the rules-based global order.*

*Modernising our maritime capabilities will be a key focus for Defence over the next 20 to 30 years.*

*Our maritime forces will become more potent through the acquisition of more capable submarines, ships and aircraft and better integration of combat and supporting systems across Defence. These forces will help to protect our maritime borders, secure our immediate northern approaches and proximate sea lines of communication and*

*enable us to project force in the maritime environment. Increasingly, these capabilities will provide an ability to undertake anti-submarine warfare throughout the maritime environment.*

*Defence's ability to contribute to border protection will be enhanced with the introduction of larger, more capable offshore patrol vessels with greater range, endurance and improved carrying capacity and a new large-hulled multi-purpose patrol vessel, the Australian Defence Vessel Ocean Protector.*

*The Government will invest in enhancements to multiple layers of the maritime surveillance system including new manned and unmanned aircraft.*

## **Submarines**

*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 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.*

*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*

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*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 future submarine program is the largest defence procurement program in Australia's history. The Government has already committed to maximising Australian industry involvement in the submarine program, without compromising cost, capability, schedule or risk. The Government will announce the results of a Competitive Evaluation Process in 2016*

*The Government will also continue to make appropriate investments in the existing Collins Class fleet, including priority capability enhancements, obsolescence management and fleet sustainment, to ensure Australia's potent and agile submarine capability is maintained until the introduction of the future submarine fleet. This will include upgrades to the Collins Class communications and sensor capabilities.*

*This investment will build on recent improvements to Collins Class availability. In 2011–12, Collins Class availability was about half that of the international benchmark and in the past there had been up to three submarines undergoing long-term maintenance. Following the 2012 Coles Review and implementation of a comprehensive and innovative transformation plan, there has been a major improvement in the availability of the Collins Class, and Defence is on track to reach the international benchmark for submarine availability by mid-2016.*

*By mid-2016, the submarine HMAS Farncomb will have completed the first two-year full cycle docking in Adelaide – a maintenance activity that formerly took over three years to complete. From then onwards only one Collins Class submarine will be in Adelaide for full cycle docking. Defence will continue to work closely with industry to implement reforms to optimise Collins Class availability, reliability and capability.*

## Surface Vessels

*Surface vessels will continue to play a critical role in protecting our sovereignty, maintaining presence and projecting force into the region and beyond. They are an important component of our joint force and will operate as a highly integrated part of our force with enhanced situational awareness, communications and data sharing between maritime, air and land-based systems.*

*Our surface vessels must be capable of independent Australian operations, as well as operating in coalition taskforces. They must also contribute to a wide range of whole-of-government priorities, including border security, search and rescue, and humanitarian assistance and disaster relief operations.*

*Key elements of new naval capability will include 12 major surface vessels. The three Hobart Class Air Warfare Destroyers to enter into service in the early 2020s will provide Australian or coalition maritime task groups with defence against air and missile attack. The Hobart Class will be equipped with new advanced surface to air missiles to enter service by the middle of the next decade. Nine new future frigates optimised for anti-submarine warfare will be introduced into service from the late 2020s to replace the existing fleet of eight Anzac Class frigates, with construction to start in 2020.*

*The Government will acquire 12 new offshore patrol vessels that will provide greater reach and endurance than the existing Armidale Class patrol boat fleet. The new vessels will be capable of undertaking several different roles including enhanced border protection and patrol missions over greater distances than is currently possible with the existing patrol boat fleet, with construction to start in 2018. All 12 offshore patrol vessels will be delivered by 2030. The Armidale Class will be supplemented by additional patrol craft as required until they are replaced by the offshore patrol vessels, to ensure there is no gap in Navy's border protection capability.*

The mine countermeasures and military hydrography capability will be updated to support the future force. The life of four of the current Huon Class mine hunters will be extended while new technologies are developed to counter the threat of maritime mines. Defence will seek to replace the hydrographic capability with an efficient combination of military and commercial hydrographic and oceanographic survey capabilities.

### Capability Priorities

Eight P-8A Poseidon maritime surveillance and response aircraft will be introduced in the early 2020s, with seven additional aircraft to be acquired in two tranches to bring the total to 15 aircraft by the late 2020s. These aircraft have a range of over 7,500 kilometres, and can be refuelled in the air by Australia's KC-30A air-to-air refuelling aircraft, extending their range even further. In addition to being able to undertake sophisticated surveillance operations at great distances, the P-8A can undertake offensive operations against submarines and ships, as well as supporting search and rescue operations.

To complement the surveillance capabilities of the Poseidon, the Government will acquire seven high altitude MQ-4C Triton unmanned aircraft from the early 2020s as part of the Intelligence, Surveillance and Reconnaissance capability stream. The Triton is an unarmed, long-range, remotely piloted aircraft that will operate in our maritime environment, providing a persistent maritime patrol capability and undertaking other intelligence, surveillance and reconnaissance tasks. Short-range maritime tactical unmanned aircraft will be acquired to improve the situational awareness of our ships on operations.

Currently entering into service, 24 MH-60R Seahawk naval combat helicopters will enhance the anti-ship and anti-submarine warfare operations undertaken by our destroyers and frigates. Navy will also employ MRH-90 utility helicopters, and will work closely with Army for amphibious operations.