New Approaches to Air-Land Integration

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A Williams Foundation Seminar on 5th Generation Enabled Combat Operations

The seminar held on March 17, 2016 in Canberra, Australia was the fourth in a series of assessments and discussions of evolving approaches to 21st century combat capabilities under the influence of fifth generation air capabilities.

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A WILLIAMS FOUNDATION SEMINAR ON 5TH GENERATION ENABLED COMBAT OPERATIONS

INTRODUCTION

On March 17, 2016, the Williams Foundation held its latest seminar on fifth generation enabled combat operations, this one focused on new approaches to air-land integration. 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become much wider in character, and the ability to insert force rapidly, as a precision strike capability, and to be withdrawn will be a key tool in the toolbox for decision makers.

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."

This seminar is the fourth in a series of assessments and discussions of evolving approaches to 21st century combat capabilities under the influence of fifth generation air capabilities.

The Williams Foundation hosted a seminar early in 2014, which focused on air combat operations through 2025 and identified key impacts, which the new platforms of the RAAF and the coming of the F-35 would enable in transforming the force.

http://www.sldinfo.com/wp-content/uploads/2014/04/Australian-Special-Report.pdf

In April 2015, the Williams Foundation co-sponsored a seminar in Denmark to discuss the evolution of airpower.

http://www.sldinfo.com/wp-content/uploads/2015/05/Copenhagen-Airpower-Symposium.pdf

And then in August 2015 the Williams Foundation sponsored a seminar where the RAAF could discuss in public its approach and involved a large number of officers debating the way ahead.

http://www.sldinfo.com/wp-content/uploads/2015/10/Plan-Jericho-Report-October-2015.pdf

The latest seminar followed the two-day RAAF Airpower Conference, which addressed a broad range of airpower issues, and during the second day explicitly looked at the RAAF's transformation approach, Plan Jericho.

The former Chief of Staff of the Royal Australian Air Force, Geoff Brown, was the organizer for the event, and provided navigation throughout the day through the diverse presentations, as well as providing significant input to the final event of the day, the panel with senior leaders.

The current Chief of Staff of the RAAF, Air Marshal Leo Davies, provided an overview on the RAAF's approach to transformation and his priority on shaping new approaches to operating with the ground forces. It is not just about having a new fleet; it is about shaping new capabilities for the joint force, but one, which is to be understood as multi-dimensional, and not simply about who is supporting whom in a particular operation.

Several themes stood out from the Seminar.

The first was how significant the rethink on Army's part really is.

The Chief of Staff clearly underscored that the land wars of the past decade are not the template for moving forward and saw the need and opportunity to shape new ways to integrate airpower with ground maneuver forces in providing for more effective capabilities in the contested battlespace.

The second was the reshaping of Army modernization to achieve the force envisaged by the Army Chief of Staff.

Brigadier General Mills, the head of Army Modernization, provided a hard hitting look at the Army and how the evolving force could shape a more distributed operational and decision making force, one which he saw as providing for 21st century ground maneuver forces.

The third was the clear synergy between the USMC and Plan Jericho.

Lt. General Davis, Deputy Commandant of Aviation, provided a comprehensive and hard hitting presentation on how the Marine Corps was evolving under the influence of the new technologies, the Osprey and the F-35, and how the focus of the Corps was upon "equipping the 21st century Marine," rather than "manning the equipment."

Davis highlighted that the Corps was working at the seams of air-land-sea integration, and described how he thought the tiltrotar revolution started with the Osprey would continue. He also provided an update on how the F-35 was fitting into the USMC's overall approach to transformation.

He noted that the young pilots for the F-35 were already pushing the envelope on Close Air Support, and flying the F-35 into Nellis ranges through complicated red threats and being able to come out the other side and provide the maneuver force with various types of support, fires, ISR and C2.

The fourth was a clear response to industry to the Plan Jericho challenge to evolve differently in relationship to the evolution of the Australian Defense Force.

The Northrop Grumman presentation provided a clear look at the evolution of C2 capabilities in line with a transformed force; the Rockwell Collins presentation looked at how the JTAC role will change with new technologies; the L3 presentation provided a look at how commercial technologies could be leveraged to provide for the kind of cost effective and dynamic technological innovation which could support the connectivity needs for the RAAF.

The co-leaders of Plan Jericho Group Captains Jake Campbell and Pete Mitchell underscored that indeed C2 transformation was emerging as a key thread for transformation in shaping a way ahead.

There were other threads to the discussion which included the evolution of training to build a 21st century force, the evolution of the remotely piloted aircraft to work in an evolving battlespace, the challenge of ensuring that we get the right information to the right people at the right time, the evolution of Army force

projection with the new RAAF airlift capabilities, and the future of providing for forward air control from the air in the contested battlespace.

What is clear is that the Aussies are at the cutting edge of the rethink of how to reshape an integrated 21st century force.

In this report, the main highlights generated by the seminar and discussion are augmented by a number of interviews conducted during and after the presentations at either the Air Power Conference or the Williams Seminar. As such, the report provides an overview on how the RAAF and the Australian Army are thinking about the transformation of the joint force.

The emerging perspective from the seminars can be encapsulated in the following graphic, which has been produced for this report to reflect the convergent lines of transformation for the Australian military service upon a more convergent combat capability.

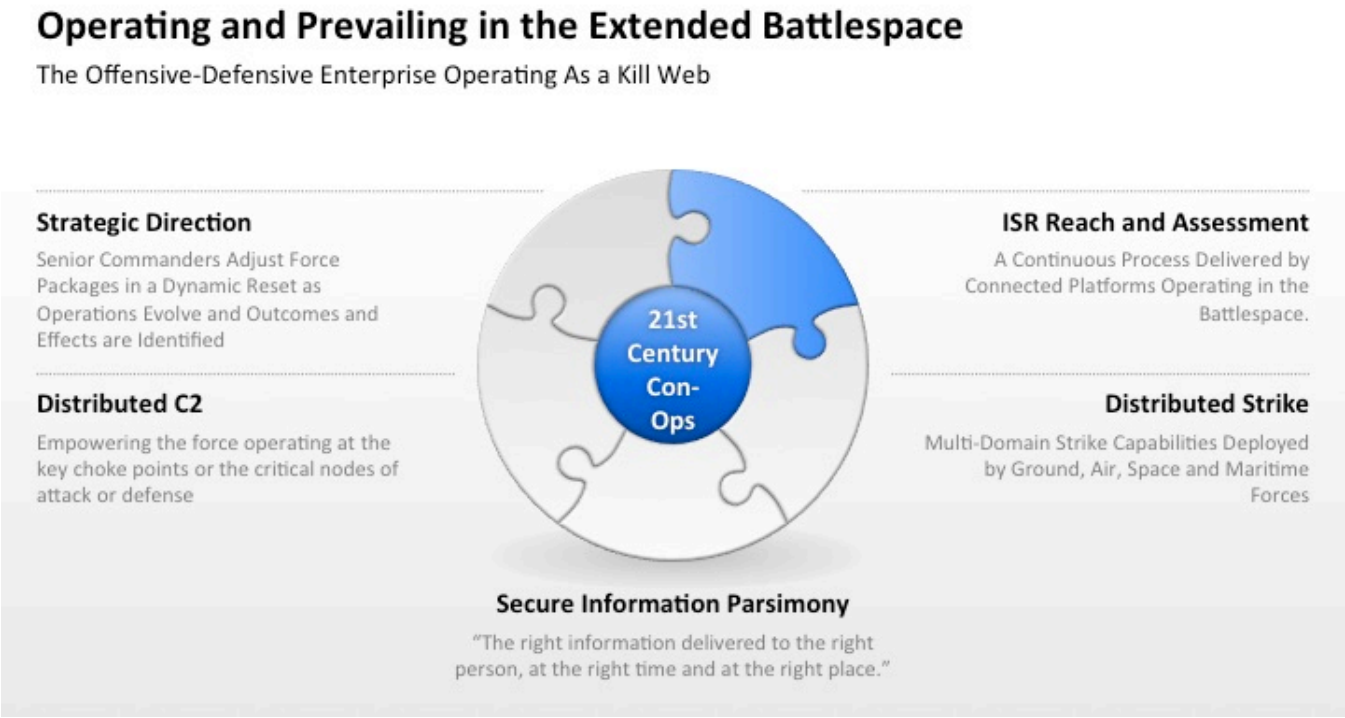

FIGURE 1 GRAPHIC CREDIT: SECOND LINE OF DEFENSE

The report has been written by Dr. Robbin F. Laird, Second Line of Defense, who attended the RAAF Airpower Conference, the Williams seminars mentioned in the report, as well as having conducted the interviews of the RAAF and Army officers.

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THE PERSPECTIVE OF THE AUSTRALIAN ARMY CHIEF OF STAFF

The Australian Army, Lt. General Angus Campbell, weighed in on the future of the Australian Army in the joint environment in two presentations recently in Canberra. The first was during the RAAF's 2016 Air Power

Conference and the second was during the Williams Foundation seminar on new approaches to air-ground integration.

For the Chief of Staff, it about having the "right effect, at the right place and the right time" for the joint ground force, whereby he clearly meant the joint maneuver force. He underscored that the core challenge was the co-evolution of the ground, air and naval forces to deliver a timely capability against the tasks or missions in the area of interest.

He argued that the technology was outpacing our concepts of operations and argued that if Wellington came back to see operations in World War II, he would see a decisive difference in how the ground forces operated in the combined arms context.

But that if one would look from World II to now, although the technology had changed dramatically, the differences in concepts of operations are not as significant as the changes in technology would allow.

FIGURE 2 LT. GENERAL CAMPBELL AT THE JERICHO DAWN EXERCISE, MARCH 18, 2016

He argued that we needed to become significantly more innovative in our conceptual thinking to find ways to better leverage technology and to prepare to better use advancing technologies and capabilities.

Here he saw two great opportunities.

The first is to break the hold of incrementalism and imagine significant disruption driven by dynamics of change being introduced in the man-machine relationship. He argued that we need to think from the future back into our current thinking to shape a better way ahead in the joint arena.

The second is to move from the very divergent data, communications and related systems to shape more convergent efforts, in effect, to shape more effective co-evolution of the key elements of combat power.

And to shape a more effective joint land force it is crucial to determine where the key capabilities might most effectively be placed, throughout the multi-dimensional combat force.

"In some cases, we are looking for the touch points where best to evolve a capability," by which he meant that rather than looking for organic upgrades to each platform, the challenge was to look at the joint force and determine which elements of the evolving capability can perform optimal tasks within the overall force capability.

Second Line of Defense

He argued for the increasingly important role of the small, mobile unit within the ground forces, which can leverage the joint assets and, in turn, can contribute to the other joint forces in shaping more effective fire or situational awareness solutions.

He argued that the evolution of software was a key element in the joint space, and that ways needed to be found to more rapidly evolve software in the joint space to provide for the joint effect.

And the "T" or transformation factor was crucial. Rapidity of operations was a key element of the way ahead, and it was important for the joint land force to be able to function more rapidly, with greater effect and in a variety of situations in which connectivity would be degraded.

"The small group needs to train to operate in degraded situations and to operate with as great a capability to not be detected as possible."

The integration of air, naval and ground power was crucial to the way ahead, and the Australian Army's battle management lab had RAAF officers involved on the ground floor shaping the way ahead.

Clearly, for the Australian Army chief, the Army is an embedded joint force, and with the new RAAF and Royal Australian Navy capabilities coming on line, would become more so.

THE PERSPECTIVE OF BRIGADIER GENERAL MILLS, DIRECTOR GENERAL, MODERNISATION, AUSTRALIAN ARMY

The reshaping of Army modernization to achieve the force envisaged by the Army Chief of Staff was provided as well by Brigadier General Mills in his presentation. He provided a hard hitting look at the Army and how the evolving force could shape a more distributed operational and decision-making force, one which he saw as providing for 21st century ground maneuver forces.

It was clear from Mills presentation that he was thinking beyond the experience of the past decade towards where the technology and new concepts of operations could take the Australian Defense Force.

He emphasized that his background of the past decade was important, but he did not want to be captured by it. We have argued that the approach, which makes sense, is "Harvest the Best and Leave the Rest," which clearly is his approach.

He highlighted both in the seminar and in the interview after the seminar, the importance of empowering the smaller maneuver group with technology and decision-making capabilities so that the effect, which can be created from joint fires and empowerment, can flow up and down the kill web.

During the briefing, Mills included a slide which would not appear in a typical U.S. Army briefing, for in this slide, the F-35 and naval fire support were prominently highlighted.

Question: You put up a slide, which highlighted a very comprehensive look at joint fires and support to the ground maneuver forces.

How do you view the way ahead?

BG Mills: We need to move beyond the label of air land integration and look at joint integration or multi-domain integration.

We need to focus on the reality of what it looks like at the small team, combat team level, with regard to multi-domain integration with joint effects from JSF or from the Air Destroyer or from overhead surveillance systems.

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.

FIGURE 3 SLIDE FROM BG CHRIS MILLS PRESENTATION TO THE WILLIAMS FOUNDATION SEMINAR ON THE FUTURE OF AIR-LAND INTEGRATION.

So a number of what would be seen as operational effects I think in the fullness of time will transcend all the way down to the small team, combat team level.

Hence, when a combat team commander who is about to attack a city block can potentially compartmentalize all the electronic emissions going out from that block to know exactly where the threat is.

Then he can look at a whole range of joint fires both lethal and non-lethal to support them in achieving their objectives.

Question: What you talking about is shaping the right kind of joint force package designed to achieve a particular mission set in a timely manner?

Answer: The overall challenge is to generate more force, more rapidly, and more effectively when called to do so. That is the joint mission; it is not just about the Army.

Question: In some ways, what you are describing is taking the mental furniture of the Special Forces and applying more broadly to the Army?

Answer: That is a fair way to put it. The Special Forces are generally able to channel a whole range of joint effects for their particular tactical tasks.

They might have strategic effects but the reality is we need to take as you said that mental framework and apply that to what we call the joint land force.

All of those services that are collectively working to fight with Army to engage in the land battle are referred to within the ADF context as the joint land force. That joint land force is by nature purple.

Second Line of Defense

Although it was predominated by army people the reality is it needs to work as a joint organization and I would like to go back to the point you discussed.

Not only do you have to package this small team, but also this small team has to be capable of dynamically repackaging the force on the fly with joint effects. For example, if you now need additional EW, the combat team will able to leverage additional EW from the joint force.

You now need the ability to coordinate direct air land integration fires and you need more F-35 support to deliver that effect.

The reality is that we potentially need to look at as we move beyond this decade of pushing support further down from division level and making it more readily available and more dynamically available to the small group level.

The time responsiveness of an Air Tasking Order that's 72 hours old is really not going to make it.

I would suggest that time line needs to be radically truncated.

The Chief of Army made the point at the Airpower Conference that in many ways we are still using procedures and approaches that go back to World War II for air-ground operations; this makes no sense in terms of technological advances and operational shifts.

We need to shape a 21st century approach.

It is as a said, not about air-land integration, it is multi-domain integration at the small group operating level.

Question: A key question involves C2 and information parsimony. It is really about empowering the maneuver group with in the words of Air Commander Australia, "right information at the right time."

Answer: The importance will be on the filter that can potentially gather up all of this data.

What's the most important time sensitive information I need?

The ability to pull data that's relevant to the combat situation at the time, and to use rapidly is what we need, not vast collections of data to be examined by historians.

That's going to be a key for us because we've got so many senses now that are currently connected to our C2 systems within the ADF we're potentially overwhelming ourselves.

We are reaching the maximum capacity of our processing exploitation and dissemination capability. We need to provide that filter and connect information up to provide intelligence.

Latency is important here. It might be the best bit of intelligence but if it arrives too late it's worthless.

Question: During your presentation at the Williams Foundation seminar, you showed a small UAV which costs around $12,000 which can be used by the small combat group.

You made the point that it was not just about enabling the small group, but opening up the possibility that the close contact picture might be then available to support the overhead or sea-based strike force.

Could you discuss your thinking here?

Answer: When that information stops becoming just important to that squad leader, platoon commander or company, it can become crucial for divisional commanders as well.

Suddenly the squad leader has identified a hot priority target. I've got imagery of a high priority target, hot value target that's time sensitive from the squad commander.

How long does it take currently to pass that information up to the strike element?

This will only happen if the squad leader can jump the net and move directly to the fire cell within division so that that he can talk directly to the divisional asset and potentially the plane overhead, to coordinate the fires.

I think it's this issue to work out the decision loop. You want to connect the key people that need to be involved in a particular joint fire and potentially jump those who need the information but do not need to make a decision.

THE PERSPECTIVE OF THE CHIEF OF STAFF OF THE ROYAL AUSTRALIAN AIR FORCE (RAAF)

Air Marshal Davies opened the two day RAAF Airpower Conference where more than 1,000 attendees from Australia, and the region, the US and Europe participated.

The first day was highlighted by the Minister of Defence and the Service Chiefs providing their perspectives on the challenges and ways ahead for the Australian Defence Force (ADF).

In his opening remarks, Davies highlighted that the RAAF Plan Jericho was dovetailing with similar plans of the other two services. But because the RAAF was in the throes of a significant modernization and with the coming of the F-35, Plan Jericho was a lead element.

According to the RAAF chief, "Plan Jericho is designed to transform the RAAF into a fifth generation enabled force. This is not a singular airpower effort." It is multi-domain and crosscutting with the other services.

During the second day of the Airpower Conference, the focus was upon providing an update on Plan Jericho and progress in the RAAF with regard to the approach and to shaping thinking about multi-domain integration.

The Chief of Staff focused on the increasing demands being placed on RAAF personnel to deal with the challenges of change, and the pace of operations, as well as the coming into the fleet of new capabilities along with newly combat tested assets, such as Wedgetail and the KC-30A.

"The technology maybe cutting edge, but the people in the front lines, and those that create and sustain the effort are those who shape the combat capability."

He followed this presentation the next day with the keynote address to the Williams Foundation seminar on new approaches to air-land integration.

He argued throughout his presentation that RAAF transformation was a key driver for the opportunity for shaping a more effective integrated and joint force but it would not happen by itself and required work across the ADF to ensure that transformation would occur.

In a follow-up interview on March 21, the theme of the intersection between the RAAF and joint innovation was a key focus of the discussion. But what Davies argued was that this is a very dynamic and interactive and open-ended process.

"It is like a jig saw puzzle.
Second Line of Defense

You have these really nice pieces to the puzzle sitting in the container, but until you begin to look at the picture your trying to create through the overall puzzle, you do not know which bit goes where."

With regard to F-35 as an example, Davies argued the following:

"I think Joint Strike Fighter on its own, a fifth generation air combat aircraft, could be regarded as just an air combat aircraft.

If you want to shoot the bad guy down, if you want to defend the battle space for a land maneuver or for a maritime strike, that's fine.

But what we're beginning to appreciate now is that it's not just an air combat asset it is also an ISR node.

FIGURE 4 THE HEADS OF THE RAAF AND THE ROYAL AUSTRALIAN ARMY ARRIVE AT THE JERICHO DAWN EXERCISE, MARCH 18, 2014. CREDIT: AUSTRALIAN MINISTRY OF DEFENCE

If you were to then put two more pieces of your puzzle down and go, "Well that's starting to form a bit of a picture here," in the center of your puzzle. "

What else could I do if it was truly an ISR node?

How do I manage that asset differently than if it was just going to shoot down another fighter?"

Although the puzzle analogy suggested an overall approach what he really was focusing on the interaction between the evolving bigger picture; and relooking at what each piece of the puzzle might be able to do in fitting into a new puzzle big picture so to speak.

"How would you operate the air warfare destroyer differently as you add a Wedgetail, a P-8, a Triton or an F-35 to its operational environment?

And conversely, how could the changes in how the destroyer would operate as you evolve systems on it, affect how you operate or modernize the other pieces of the evolving puzzle?"

Plan Jericho is about opening the aperture on thinking both about the pieces and the various puzzle pictures, which can be created.

Davies saw two key drivers for change as well in terms of the younger members of the RAAF would rethink how the RAAF could integrate more effectively and industry partners helping inform the RAAF about the art of the possible.

This clearly affects thinking about platforms.

The shift from a platform centric world is not about platforms not mattering; they do; but what is crucial is now evaluating how a new platform contributes in a multi-mission, or multi-tasking and specialized effect for the evolving force.

The government as well as the services working more effectively to shape how their particular new platform contributes to both the service's core missions as well as the effects desired for the extended battlespace.

Air Marshal Davies argued that when buying platforms going forward, a key consideration beyond their basic functional contribution or task to determining how "integratable" those platforms might be going forward.

"I know it's a little unfair, but we would probably rethink the combat system on Tiger if we were to buy an armed reconnaissance helicopter tomorrow. Having flown the airplane, I don't have any issue with the airplane that is Tiger. But how do you integrate it? At the moment it is less than ideal in terms of integration."

He argued that it was crucial to have a realistic and broad view with regard to force design in mind as one thinks about adding platforms, and a large portion of that force design needs to revolve around "integratability."

"For example, we are having a long conversation inside Air Force around how would you use a KC-30 better than we currently do?

Well you would integrate it.

So what does that mean for tanker?

It means that we spend a long time in the airspace providing fuel to aircraft. What's it doing in between the refuels?

It's flying racetracks or patterns or getting to the next place that gas is needed airborne. What's it doing while it's doing that? Why can't it collect some form of ISR data to be turned to knowledge? The legacy perspective would be to say: "No it's an in mid-air refueler and a transport aircraft."

The new perspective is to think about how the KC-30 can become a communications node for platforms and systems other than fighters. Perhaps you're able to relay information to soldiers on the ground, or with regard to the new amphibious task force, perhaps you might, from a couple hundred miles off the coast, be able to relay information during the time the tanker is on station.

That makes a lot of sense to me, and a lot of it can happen without the crew having to do one extra bit of work other than provide the node."

Clearly, as the RAAF brings the F-35 into service it views its value as an asset which it wants to wring as much "*integrability*" as they can from the "flying combat system."

"I view the F-35 as a key catalyst of change not just for the Air Force but the entire ADF.

But to get there, we need to focus on our ability to work with the ADF and remain connected.
Second Line of Defense

We can explore; we can provide options.

We can provide core functions for the evolution of the ADF, but we have to make sure that we are able to stay connected, and paced properly."

And the regional side of the ADF operations was increasingly critical as well for the RAAF.

"This is not just about an Australia/US or just about an Australia/UK connected effort.

This is about being able to work with partners in the region such as we are doing with Fiji on HADR. We need to be able to still do all of those pieces."

In short, one needed to focus upon *"integrability"* as the platforms interactively evolved and the missions adapted to threats and technologies.

THE PERSPECTIVE OF THE DEPUTY CHIEF OF STAFF OF THE RAAF

In an interview conducted during the RAAF airpower conference, the Deputy Chief of Staff, Air Vice-Marshal Warren McDonald, discussed how the RAAF was working with Army and Navy to shape crosscutting transformation.

This clearly is a work in progress, and whatever success the RAAF has had in launching their new platforms and enhancing their ability to work with one another was important in and of itself, but also as a foundation for shaping more effective joint solutions.

And by joint solutions, he was not talking about how airpower has supported the ground forces for the past decade in the land wars, but shaping new ways to enhance the ability of airpower to intersect with and to reshape the capabilities of the ground maneuver and naval forces in the extended battlespace.

This meant the next round of modernization needed to focus on ways to configure air platforms to provide for greater interactivity with the ground and naval forces as well as those forces providing enhanced contributions to airpower in terms of achieving the desired combat effects.

Getting to this point has been hard or challenging for the RAAF, as two of the key air platforms, the Wedgetail and the KC-30A, were not easy to bring on line and to become full members of the RAAF.

"Some may disagree, but working through complex problems, such as those encountered with the KC-30A and Wedgetail is crucial learning the skills necessary to find an effective way ahead to deal with next round of complex of problems and challenges."

And he underscored that the way the RAAF has succeeded is how they will continue to work in the future.

"We needed to get the platforms in the hands of the warfighters as early as possible so that we were addressing real needs as opposed to lists of requirements.

And by getting real combat experience, we could determine where our resources for modernization should be applied to get the maximum effect."

In the case of the Wedgetail, the ability to work with fighters and to operate in the battlespace is now combat proven; the next round of modification of the software onboard the aircraft really needed to focus on the engagement with the naval forces, or to find ways for naval systems to work with Wedgetail modifications and vice-versa to deliver the kind of joint effect the ADF needed to achieve.

In the case of the KC-30A, with its situational awareness already onboard the aircraft, and with the con-ops being practiced by crews today in combat situations, the way ahead in support of the ground maneuver forces and naval forces was a key consideration for what to put on the aircraft, in terms of ISR, or C2 support.

And working with industry is seen as a key part of shaping the interactive modernizations, which the RAAF and the ADF have in mind.

And in succeeding with now combat proven KC-30As and Wedgetails, has happened as a result of opening the aperture in the working relationship between government and industry.

FIGURE 5 AS COMMANDER OF THE AIR MOBILITY GROUP, AIR VICE-MARSHAL MCDONALD LED THE TRANSITION OF THE TANKER INTO AN OPERATIONAL CAPABILITY. HERE HE IS SEEN WITH THE THEN MINISTERY OF DEFENCE, KEVIN ANDREWS AT THE 2015 AUSTRALIAN INTERNATIONAL AIR SHOW. CREDIT: AUSTRALIAN MOD

This is also a key foundational element in the next phase of shaping combat capability.

McDonald went out of his way to praise what he saw as forward leaning thinking from the Army leadership.

Army work on networks in support of the ground forces, and ways to master them operationally in difficult situations, was a key element of how the RAAF needed to think about the intersection of their own networks with the joint force.

He told the story of the now head of the Australian Army when he was then Major-General Campbell and working in the Middle East, McDonald came into his office, while he was writing up his post-operations report and said "I don't believe I have enough balance in the piece with regard to the air role. Could you please contribute to it?

"He is truly a joint officer, and we in the RAAF can learn from him as we proceed with Plan Jericho."

With regard to the way ahead, McDonald emphasized "the need for army and navy to understand our RAAF systems and ways we might modernize them so we can provide the best input to them.

We need to understand how best to provide support to one another to get the kind of maritime or land strike outcome is required by the joint force."

Second Line of Defense

The F-35 is viewed as potentially disruptive technology, which can be a key part of transforming the evolving joint approach.

"The F-35 for me is a platform on which one can increase the desired capability through software upgrades to enable you to mitigate or get around threats posed to the joint force.

In the past, air platforms simply did not enable you to shape such an approach. It is now an essential element of shaping the spiral development of the joint force itself."

THE PERSPECTIVE OF AIR COMMANDER AUSTRALIA

Air Vice-Marshal Gavin Turnbull is the Air Commander Australia. Air Command is the operational arm of the Royal Australian Air Force. The Commander is responsible for all operational Air Force tasks, and reports to the Chief of Air Force. The Air Commander raises trains and sustains forces for assignment to operations under the Chief of Joint Operations (CJOPS). His position is similar to that of the Commander of the Air Combat Command at Langley AFB.

This means that operations flow into training, and training into operations in a never-ending combat learning cycle.

For the RAAF with its Plan Jericho approach and working to integrate its new platforms into an evolving force, and with the clear desire to be a catalyst and beneficiary of an evolving joint force structure re-design, the Air Commander is focused upon shaping more effective training for the evolving structure of the joint force.

In part, this is why the RAAF has stood up its new Air Warfare Center.

For Turnbull, it is clear that the new Air Warfare Centre is a key asset in shaping a way to navigate the waters of the future.

In his presentation at the 2015 Airpower Conference, which dealt with multi-domain integration, Air Vice-Marshal Turnbull highlighted the role he saw for the AWC as a key player in helping the RAAF navigate the future with regard to effective force structure integration.

As he highlighted in his presentation, the required outcomes of the AWC was as follows:

- Testing of current and proposed Concepts of Operation (CONOPS) against force structure and higher level defense planes;
- Collation of lessons learned through experimentation for inclusion in strategic planning, capability development doctrine development and exercise planning; and.
- An optimized structure promoting the exchange of ideas across the
- ADF; interfacing with coalition partners.

The Air Vice-Marshal followed this presentation with one at the Williams Foundation which focused in many ways on the key venue through which much operational integration occurs and will evolve in the years ahead, namely sensor fused network centric warfare by which he meant how do we get the right information to the right people at the right time?

In a follow up interview, Air Vice-Marshal Turnbull discussed the build out from the integrated task force in the Middle East experience and lessons being learned to shape a more effective integrated ADF.

Question: The deployment of your air task force the Middle East was the first time that you deployed a completely integrated Air Force package such a long distance to engage in coalition operations.

How significant has this been in shaping your thinking moving forward?

Answer: Very significant.

It has been a long period of growth where we have added the capabilities to be able to deploy our own forces to an area of interest for the Australian state. Prior to this, we could take key elements of an integrated force package but needed to rely on others, most often on the USAF, to deploy to an area of interest.

It wasn't good enough that as a sovereign nation in our region, we were reliant on somebody else to actually get off our shores.

But adding our own strategic lift and tanking has created a new situation for us. The deployment to the Middle East has been proof of concept for us with regard to our ability to project power and to provide for our combat support.

The speed with which we deployed and the nature of the capabilities we deployed are a testament to the work we've done to learn our lessons from the past two decades into our current environment.

And now we can build upon this deployment which deployed as individual components into a task group to move forward and to learn how to integrate our force package into a true fused capability.

The focus going forward is that each of those platforms are contributing to the greater whole, particularly with regard to the central focus on how to prevail as a connected force.

FIGURE 6 AIR COMMANDER AUSTRALIA, AIR VICE MARSHAL GAVIN TURNBULL (CENTRE), AM, CHATS WITH OTHER EXERCISE PARTICIPANTS INCLUDING LIEUTENANT GENERAL JON DAVIS (RIGHT), DEPUTY COMMANDANT FOR AVIATION, UNITED STATES MARINE CORPS, AT EXERCISE JERICHO DAWN 2016 FIREPOWER DEMONSTRATION AT PUCKAPUNYAL TRAINING AREA, VICTORIA, ON 18 MARCH 2016.

Question: The deployment of an integrated task force to the Middle East with lift and tanking built in has clearly been a benchmark for you moving forward, but it is also about changing the culture and mindset and innovating towards the kind of joint force which is the core work in progress for 21stcentury force structure.

What is your sense of the culture change challenge?

Answer: It is central.

Second Line of Defense

We are doing that from the headquarters down through the force elements groups. With the Air Warfare Centre across the top, we are turning our Air Force into one that thinks integration from the start.

We need to understand our sister service capabilities from the start and will use the warfare instructors course and the AWC to integrate that understanding across our future workforce.

Question: When we visited your KC-30A test team at Edwards, one of the key points driven home by the team was how important the built-in situational awareness in the aircraft to reshaping their approach to tanking in the area of interest.

How does this illustrate your evolving approach?

Answer: What we have given the tanker crew is what the fighter pilot experienced in the first decade of the 21st century.

We added Link 16 into the cockpit and suddenly they had situational awareness of the battlespace around them and could now work within the battlespace, rather than simply going to a tanker track and acting as a gas station in the sky waiting for the planes to come in to get gassed up.

This has meant changing the skill set for the tanker crew as well.

We need to have smart people with smart situational awareness combat skills rather than truck drivers. They now position themselves where they're next needed.

They're maintaining their awareness and they're moving into the battle space, and the jets are coming off their targets and are surprised about how close the tanker is.

In fact, we're starting to get the reverse complaint where pilots who are coming off targets don't have time to think and reconfigure their airplane before they're on the wing of the tanker getting some more fuel.

Question: You are undergoing the culture change for a more integrated force BEFORE you get what is called a joint strike fighter.

How does that preparation affect how the RAAF can introduce what the plane can do for the entire ADF, and not just for traditional air combat?

Answer: We are reshaping our expeditionary air force capabilities, building new infrastructure, and rethinking how to better mesh decision making at the point of attack with the enhanced situational awareness which allows those at the point of attack to make good decisions.

The F-35 clearly is about decision-making and ISR but we are not waiting for the plane to show up before we reshape our ability to use fused data and to push information to the right people at the right time in order to make the right decisions.

I'm thinking about decision making in the cockpit back to the strategic level, but teaching the JSF pilot how to operate in the decision space where he can be a decision-maker, that's what we need to do as well to shape an ability to get better decisions at the point of attack or defense.

And we are focused throughout the force on how to work the shift forward to the operational level most capable of achieving the desired effect.

We have already purchased secure mobile facilities. We are growing our security forces over the next four to five years up to the required numbers. We have additional personnel that the government is allowing us to have as the JSF capability comes in.

Our combat support group is very highly focused on being expeditionary, containerized, and mobile with regards to standing up expeditionary bases.

And we are working the integration of the IT systems to allow the deployed forces to know exactly what is where and what the base capabilities are and to fuse that into our own space operation center as well.

Question: With regard to Australia in your region, you have acquired or are acquiring a number of pieces of equipment, which your neighbors are buying as well, such as KC-30A tankers, F-35s and P-8s.

How does common acquisition affect your partnerships in the region as well?

Answer: This is a work in progress but flying similar platforms does open the opportunities for more joint work as well, and we have seen this already with regard to KC-30A and P-8.

Once we start operating all of the new capabilities in the region, we will start to see a lot more collaboration.

This falls into what I call the 80/20 split; you buy a good asset that can give you 80% of what you want; what you can do working with allies and partners is share the experience and the cost to get that additional 20% of capability in collaborative framework.

THE PERSPECTIVE OF LT. GENERAL DAVIS, DEPUTY COMMANDANT OF AVIATION, USMC

Quite obviously, the evolving capabilities of the USMC are clearly convergent with the approach, which Williams wished to foster for the future of the ADF.

Lt. General Davis, the Deputy Commandant of Aviation, USMC, highlighted at the beginning of his presentation that when he attended the Avalon Air Show and then head of the Royal Australian Air Force (RAAF) introduced Plan Jericho, it was clear that the Marines and the RAAF were on the same page.

“I went back to the Commandant and said that we need to work more closely with the RAAF because with Plan Jericho they are onto something big with regard to innovation.”

The presentation was hard hitting, comprehensive and clearly on target for the Australian audience. As Air Commodore Steve Roberton, Commander Air Combat Group and a former exchange officer with the USMC, commented, “If you think this was hard hitting, it was mild compared to some Marines.

The Marines are gung ho about the future and shaping new combat capabilities.

They do no like to lose.”

This theme was central to Davis’s presentation – the entire point about combat innovation was to be the best force, which America could deliver to any global crises at any time.

“We want to be the best partner to our friends; and the most feared enemy of our foes.”

Technology is important to this effort, and he highlighted that the Osprey being brought into the force was a generator of “disruptive change,” but the kind crucial to real combat innovation.

Second Line of Defense

"But change is difficult; and the critics prevalent."

He noted that if we held this conference 12 years ago, and the room was filled with Marines we would hear about all the things the Osprey could not do and why we should not go ahead.

"If we brought those same Marines into the conference room now, they would have amnesia about what they thought then and press me to get more Ospreys and leverage it even more."

But it is not just about technology – it is about "equipping Marines, not manning the equipment."

His point was that you needed to get the new equipment into the hands of the Marines at the earliest possible moment, because the young Marines innovate in ways not anticipated when the senior leadership gets that equipment to them.

Davis provided several examples of innovation, but one was about the F-35.

He argued that there was no doubt that the F-35 is the right plane for the USMC.

Now that it is in the hands of Marines, they are innovating in ways which the leadership really did not anticipate and much more rapidly than might be imagined.

He described an event where the Commandant was going witness a Yuma to Nellis scenario in which F-35s would be used to support Marines in the maneuver space.

He went to the Marines working the exercise and asked: "Was everything ready for the Commandant?"

The answer was: "Sir we are not going to do exactly what you asked for and are not ready to do it that way?"

Davis commented: "The Commandant is just about here, what are you talking about?"

The Marine major answered: "Frankly, the scenario you suggested was not tough enough for we wanted to take our F-35s into a more advanced SAM belt to get through and then support the Marines on the ground."

Davis was a bit taken aback, but the innovation already evident by the squadron pilots was rewarded with a demonstrated success on the Nellis ranges.

The Commandant was impressed, and although a ground combat Marine, he argued "we need to get that plane into the hands of Marines as fast as we can."

The DCA noted throughout his presentation that the RAAF focus on bottom up innovation with the Plan Jericho processes was what the Marines felt was central to real combat innovation.

And shaping the way ahead was really about leveraging the new platforms, shaping key enablers and then ensures that whatever follow-on platforms are bought that they build upon but push the innovation envelope.

He saw the tiltrotar experience as a crucial baseline and saw the future of Marine Corps rotor wing as tiltrotar.

He saw the Cobras, Hueys, and Yankees replaced over time by a new generation tiltrotar aircraft.

He favored developing one, which would be two seaters, and able to be either manned or unmanned to provide for the kind of flexibility which the Marines would want to reshape the capabilities and approach of the assault force.

His version of the Plan Jericho approach to building a more integrated assault force was as follows:

Every platform a SENSOR, every platform a SHOOTER, every platform a SHARE/CONNECTOR, and every platform an EW NODE.

And throughout he highlighted that the Marines were preparing for the high end fight and enhanced capabilities to operate throughout an expanded maneuver space, and able to operate from land, and sea sequentially, concurrently or jointly as the mission demanded.

With regard to equipping that force, he saw the need to build on fifth generation capabilities, multi-mission everything, spiral develop everything and leverage bottom up combat innovation.

He concluded that he saw a great opportunity to work with an ADF in transformation as the Marines went down a similar path.

THE JERICHO DAWN EXERCISE, MARCH 18, 2016

The discussion about shaping new ways to integrate air and ground forces was not just words; for on the day after the Williams Foundation seminar, the ADF held an exercise illustrating new approaches in a joint exercise.

According to an Australian Ministry of Defence press release on March 21, 2016, the exercise was described as follows:

The Royal Australian Air Force (RAAF) and the Australian Army, with support from Northrop Grumman, have successfully conducted a firepower demonstration and a combat team quick attack demonstration at Puckapunyal Military Area in Victoria as part of Exercise Jericho Dawn to display the powerful effects of integrated air and land operations.

The live fire exercise allowed RAAF and Army operators, together with Defence and industry representatives, to observe the combined air and land capabilities in two scenarios.

The operators demonstrated the current capabilities, before trialling new ways to improve air-land integration, including the way that aircraft and vehicles connect and translate information through different communication networks.

Chief of Air Force Air Marshal Leo Davies AO, CSC, said that the demonstration showcased existing air-land operations technologies and processes, and the operational gains that have already been achieved through better integration of systems and information.

"Through today's demonstration we were able to provide a visualisation of the effects of some of the Australian Defence Force's capabilities," Air Marshal Davies said.

"The lessons identified from the activity will help shape Defence's future capability decisions and improve existing training activities.

"Demonstrations such as today are an important means of testing and displaying joint effects.

"We are building on the Air Force's international reputation for being good at what we currently do, and asking important questions about taking Air Force's contribution to joint operations even further.

Second Line of Defense

"If this kind of training exercise shows us something we can do that would help Air Force, Army and Navy fight better as a team, then that's what we will pursue."

The Australian Army's Head Modernisation and Strategic Planning, Major General Gus McLachlan, AM, said that greater air-land integration is an important step towards the Army and the ADF working in a joint, combined and interoperable environment.

"Our Army is focused on two key areas to ensure improved air-land integration. The first is to deliver better communication systems to ensure an agile, efficient and timely response to an intelligent, well-armed and motivated adversary," said Major General McLachlan.

"The second is to advance how we plan and conduct air-land operations to deliver the right effect, at the right place, at the right time.

FIGURE 7 THE TIGER ASSAULT HELICOPTER AS SEEN IN THE JERICHO DAWN EXERCISE. ONE OF THE TASKS IN THE EXERCISE WAS TO FIND WAYS TO INTEGRATE THE TIGER INTO THE JOINT FORCE. CREDIT PHOTO: AUSTRALIAN MINISTRY OF DEFENCE

"The demonstration highlights how we can better harness the strengths of our team by digitally connecting air and land platforms.

"This increased connectivity enhances awareness and communication. It gives a common operating picture, so we are better able to plan and execute joint operations into the future."

Chief Executive Australia, Ian Irving said Northrop Grumman has unparalleled expertise developing and deploying airborne gateways that ensure resilient communications of disparate networks and enable a fully networked battlespace.

"We've applied this key capability for more than a decade in numerous operational programs, exercises and demonstrations and have seen how effective and transformational networking a diverse force of assets can be," said Mr. Irving.

"Northrop Grumman congratulates Air Force and Army on their initiative in undertaking this technology demonstration and we look forward to continuing to support the ADF as it builds interoperability in its current and fifth-generation force.

"As demonstrated during the Jericho Dawn exercise, the ability to share information and situational awareness from various sources across diverse platforms and domains is critically important in facilitating joint and coalition operations."

Capabilities involved include RAAF's C-17A, AP-3C, KC-30A, E-7A Wedgetail and FA-18 Hornet aircraft, as well as the Army's air-land enablers from the 16th Air Land Regiment, Tiger armed reconnaissance helicopters from 1st Aviation Regiment, and vehicles and equipment from the Combined Arms Training Centre."

THE PERSPECTIVE OF THE CO-HEADS OF PLAN JERICHO

During the Airpower Conference hosted by the Chief of Staff of the Royal Australian Air Force, the co-leaders of the Plan Jericho project, Group Captains Andrew "Jake" Campbell and Peter Mitchell, provided an update on the Plan Jericho effort.

And the approach permeated the discussion at the Williams Foundation seminar on new approaches to air-land integration, notably because there has been a significant effort to better align the airlift and support sector with the evolving approach of the Army and its approach to ground maneuver warfare.

But what highlighted in many ways the approach and the way ahead was seen on Friday after the Airpower Conference and the Williams Seminar, namely in a Jericho Dawn exercise which focused on ways to provide better situational awareness for the ground maneuver force.

At the end of the Williams Foundation seminar and the following week AFTER the Jericho Dawn exercise the co-leads of Plan Jericho were interviewed about the exercise and its place and significance within the Plan Jericho effort.

The exercise involved changing how the air and ground communicated with one another in the maneuver space. As such, the exercise could seem to be a look at new technologies to connect the force.

But this would miss the real point of the effort, which is the reshaping the concept of operations and the co-evolution of the ground and air forces.

And the reshaping effort requires an ongoing operational training regime to understand what further changes are required to ensure that the air-ground maneuver forces work in an effective manner.

It is about technological enablement, but changing the culture and approach of the forces as they work the new technology into new approaches.

The key to understanding what happened is to focus on the two situations being tested.

The first was using the current methods, which rely on voice communication and a ground controller operating as a human switchboard, which means that this person must work deconfliction of assets, which cannot see one another.

The second was to rely on an air based "translator" or "machine switchboard" aboard a gulfstream aircraft where the Tiger system (Eurogrid), could be translated into Link-16 and the various ground-air systems able to see one another in the battlespace.

Although important, this shift actually underscored the crucial choke point which is the C2 system. If the key assets on the battlespace can see one another, and the key units at the point of attack can see how best to attack the adversary, why are they reaching back in the battlespace for a "mother-may-I" general officer?

Even worse, training to absorb data in a fluid battlespace and to react quickly to the right data is a skill set, which one needs when one is not being directed by voice command as well.

Second Line of Defense

"The tactical elements now have better situational awareness, but their command and control network needs to be able to support the decision speed that those linkages now enable.

We now need to make sure that the ground commander can make his decisions in a quicker manner to allow the enhanced situational awareness (SA) to be beneficial."

They pointed out that in the second phase of the exercise that the exercise director actually had to slow down the exercise because "the call to fires done via the link systems so reduced the time it took to deliver the effect that it was becoming to fast for the VIP observers to be able to see clearly."

This is probably a good metaphor for what the future holds for the old C2 structure!

But to be clear, the Jericho co-leads emphasized that working through new C2 concepts of operations within the overall transformation of the RAAF was a central lynchpin for change.

"The C2 system itself will need to be as flexible and agile and adaptive as the forces that we put out to deliver the localized tactical effects.

And this is especially true in a contested environment because when the forces lose a particular node, cannot sit around waiting for it return.

They will need to be reactive and adaptive.

We are talking about decentralized C2 as a centerpiece of the evolving force structure.

We need to start focusing on our tactical C2 layer this year and think about how that will interact with our strategic C2 layer.

We'll be doing a lot of work on this challenge, which is a central one to the way ahead."

As Group Captain Campbell added: "The C2 system is the potential handbrake in a modern networked force.

Some would argue that C2 has always been the handbrake to ops.

However, in modern warfare, fast and effective C2 will be the difference between winning and losing."

THE PERSPECTIVE OF INDUSTRY AT THE AIR-LAND SEMINAR

The C2 theme, which the co-heads of Plan Jericho highlighted in their interview, was the theme of the first industrial presentation. Major General Stephen Goldfein, USAF (Retired) from Northrop Grumman.

In his presentation, Goldfein highlighted not just the technologies but also the training necessary to achieve the kind of decision-making superiority, which had been highlighted in the Australian White Paper, released earlier this year.

His briefing provided an overview of the projected approach to be tested in the Jericho Dawn exercise from which he provided the audience with background on the (then) upcoming exercise.

Next the representative from Rockwell Collins provided a perspective on the evolving technologies to better enable the Joint Tactical Air Controller. Here the speaker highlighted that the trick to providing JTACs with operational Situational Awareness is the fusion of multiple data streams, from link-16 for the air picture, the ground picture via VMA and the video picture via a video downlink receiver.

The challenge as to provide a more convergent operational picture for the warfighter via a gateway which can provide a solution that provides seamless interoperability between two or more different datalinks. And where the gateway provides translation and forwarding to these networks taking into account the different speeds of the networks.

Second Line of Defense

Rockwell Collins

Networked Tactical Gateway

- ✓ Connectivity to Link-16 network (for air picture)
- ✓ Connectivity to V/UHF and EPLRS network (for ground picture via BMS/TMS and AFATDS)
- ✓ Connectivity to JARN for air support requests
- ✓ Connectivity to SATCOM and HF network (for BLOS sharing)

THE SIR RICHARD WILLIAMS FOUNDATION

The third presentation was by Ken Loving from General Atomics Aeronautical Systems and highlighted the evolution within the remotely piloted vehicle world, in which new tasks and capabilities are emerging which can compliment the other elements of the joint force. He underscored how those evolutions can expand the reach, sensor awareness and lethality of the manned air combat force as well.

He also highlighted the emergence of a new capability, namely directed energy systems which are being tested by General Atomics currently. Clearly, lasers have a significant advantage over conventional ordinance, in terms of cost, sustainment, and availability, and as such will become a high priority capability when available to the combat fleet.

Directed Energy

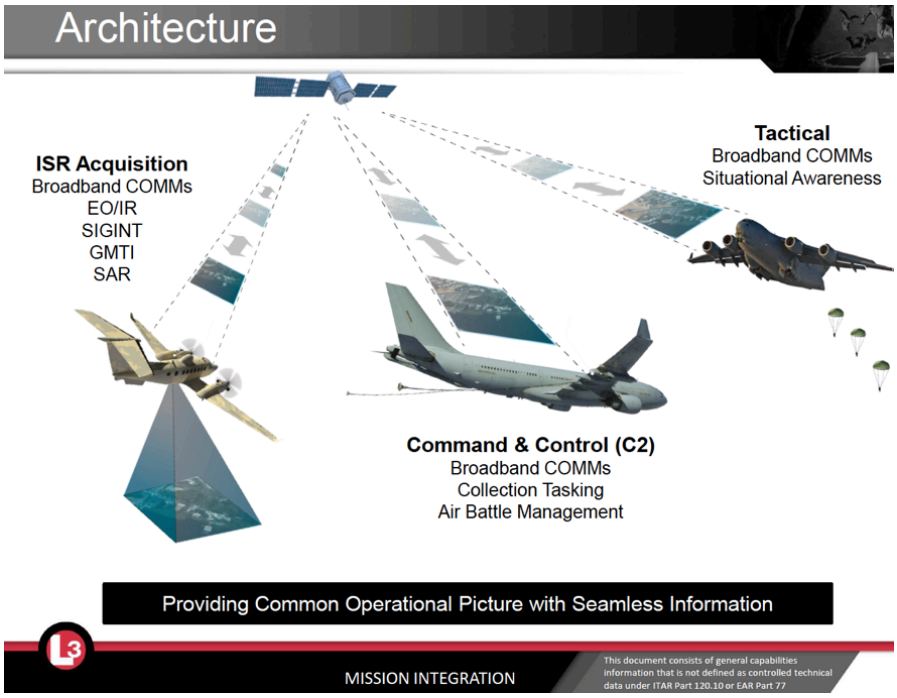
- 150kw class system
- Designed to counter rockets, artillery, mortars; counter cruise missiles; counter aircraft; defend against surface to air missiles
- Testing in progress

Approved for Public Release. This presentation does not contain technical data per ITAR 22 CFR parts 120-130.

GENERAL ATOMICS AERONAUTICAL

The final industrial presentation was by Victor King from L3, the company which had provided the RAAF with the 360 View system in the C-17 which was enabling a better connected ground combat force, when coming into the objective area. King focused on the opportunities to leverage commercial technologies to be able to have high bandwidth time critical information to operate in a dynamic tactical environment.

King looked at some of the key RAAF airborne assets which could benefit from available commercial technologies to obtain a more capable common operational picture with seamless information.



THE ROLE OF LIVE VIRTUAL CONSTRUCTIVE TRAINING FOR THE EXTENDED BATTLESPACE

Air Vice-Marshal Malcolm Brecht, Chief of Staff Capability, the Royal Air Force provided a look at the core role of synthetic training in preparing to fight and win in the extended battlespace. The RAF and the RAAF have not flown the fighter aircraft for some years, a situation which changes with the entry into service of the F-35. This is also true of the USAF working with the RAF as well.

The relatively limited training ranges in the UK also require the RAF to enhance their extended range training capabilities via synthetic needs or in terms of what is being called Live Virtual Constructive training. A key element of the evolving training is in training for operations in a complex electronic magnetic threat environment.

Brecht is looking for enhanced capability to link various simulators to shape a more effective training environment to operate in the extended battlespace. New systems such as the F-35 have embedded training technologies built into the aircraft. But going forward, the ability to link the various aircraft, and other combat assets, in terms of simulation will allow for advanced combat training.

For example, attacking an advanced air defense system in a training environment will be an important element for shaping the tactics and concepts of operations to deal with the evolving threat environment.

Second Line of Defense

It should be noted that the themes highlighted in Air Vice-Marshal Brecht's presentation are being played out at places like Fallon Air Base, where the US Navy is moving from a classic Top Gun training environment to one where the simulators for the key elements for the NIFC-CA or Naval Integrated Fire Control—Counter Air battle network solution are being put in place to train combat pilots to become decision makers in the battlespace.

The need for LVC is clear, as the forces need to work in a joint environment to deal with the extended battlespace as well or in a world where "Aegis is my wingman."

FIGURE 8 AIR VICE-MARSHAL BRECHT OF THE ROYAL AIR FORCE PRESENTING AT THE WILLIAMS SEMINAR.

As Rear Admiral Manazir, the head of US Naval Warfare put it with regard to LVC:

LVC will enable us to train in a more robust environment than we are on our current ranges that are geographically constrained, and currently do not have the full high end threat replicated.

LVC will allow us to train to the full capabilities of our platforms across a variety of security environments and do so without exposing our training process to an interested adversary.

http://www.sldinfo.com/the-sea-services-prepare-to-prevail-in-the-extended-battlespace-an-interview-with-rear-admiral-manazir/

In this area, a close working relationship between industry and the forces will be crucial as the technology needs to adapt to the evolving concepts of operations but at the same time, reshaping those concepts of operations will drive technological requirements and technologies as well.

Training in a complex joint combat force evolution becomes more not less important. It is about having a new training paradigm, where a mix of experts, and synthetic tools can work with warfighters to evolve warfighting doctrine in a forward leaning manner.

"If legacy training stovepipes are not overcome, we will not succeed. Live virtual technologies are part of the solution to shaping a new paradigm, and will be a key part of the rethink of airpower."

THE PERSPECTIVE OF THE COMMANDER OF THE AIR MOBILITY GROUP

A key part of the dynamic of change for the evolution of the Royal Australian Air Force's force package has been with regard to sustainable lift.

The first shift was when the C-17 entered the Air Mobility Group.

As Air Commodore Gary Martin, now the air attaché for the RAAF in Washington DC, but previously the Air Lift Commander, put it about the impact of the coming of the C-17:

I took over in late 2010 and was confronted with a set of demanding humanitarian support situations ranging from support to Tsunami relief in Japan to the earthquake in New Zealand and a fairly serious moment at Christmas Island.

We were in the process of shifting from a C-130 centric mind set to a C-17 mind set by which I mean shifting from thinking in terms of days to support an operation to hours.

The initial cultural change was on the part of the Australian Government.

Government suddenly realized that they had the speed and capacity to make an Australian flag appear anywhere in the South Pacific region within 12 hours. And then have a revisit capability within the next 24 hours or less if you're utilizing two or more aircraft. This was a shift from a three to four day process to one of 12 hours.

The Prime Minister realized that the Government could have an immediate effect, and they could make a decision the night before, by 3:00 pm the following day an aircraft will be on the ground, with a load of whatever was required. And then can present to the Australian public the initial results on the 6 PM news.

This was a fundamental change to National power for Australia.

This changed us at ALG from being a tactical airlift Group to strategic airlift Group.

The next cultural change came with the KC-30A tanker, which led the Airlift Group to become the Air Mobility Group.

Here the KC-30A with its own reach and range, enabled the entire RAAF to deploy at great distances and speed, a change seen dramatically as the air task group arrived in the Middle East for the fight against Daesh.

The head of Air Mobility Group and now the Deputy Chief of Air Force in the RAAF, Air Vice-Marshal McDonald has highlighted the impact of the KC-30A as follows:

Question; On April 1, 2014, your command changed its name from Airlift Group (ALG) to Air Mobility Group (AMG).

You have gone from the Caribou/C-130 package to now a more comprehensive mobility package of C-130Js, C-27Js, C-17s and KC-30As which clearly is the material foundation for shifting the name, but how best to understand the transition?

Air Commodore McDonald: The shift was motivated in large because of the reintroduction of Air-to-Air Refueling (AAR) through the KC-30A and the growing maturity of this platform.

The shift also highlights the expansion of AMG capabilities of roles within the RAAF.

Second Line of Defense

Renaming the Group signaled an important change to the focus of AMG and the way ahead. The name change also aligns us with naming conventions of both the RAF and USAF Air Mobility commands.

The current AMG Commander, Air Commodore Richard Lennon has become the head of AMG as the RAAF moves forward with Plan Jericho to look beyond the RAAF and its integration to helping shape a more effective integrated Australian Defence Force.

This is reflected in part by the dual hat which Lennon now wears as Commander of AMG and lead on air-land integration within the RAAF itself.

This means that each of the AMG assets, which have a core lift or tanking function, is being looked at in terms of how it can operate in the battlespace to shape more capability to work with the ground maneuver forces.

Last August, Air Commodore Lennon was interviewed in Canberra and discussed the role, which he saw AMG playing in the Plan Jericho effort.

There is a concerted effort to augment the ability of the RAAF to go with ground forces to support operations, rather than just take them to operations.

In part this is about technology – adding communications and ISR links – but much more broadly a change in the concepts of operations and training, about which my meetings at Richmond with the C-130J squadron provided more details.

It is also about changing the role of the lifters and tankers in terms of how they will be equipped and operate in the battlespace.

They can function as nodes, IT transit elements, C2 enablers or repositories, but more generally, the question is how to use the real estate on the tanker – both outside and inside – to expand its role in the battlespace?

With regard to the shift from transport to force insertion support, this is a RAAF and Australian Army/Special Forces joint effort.

It is about adding SATCOM, ISR, and C2 assets to RAAF C-130Js, and C-17s.

What was discussed last August has become a core priority for Lennon in his command efforts. And this priority was discussed both in during his presentation to at the Williams Foundation seminar on new approaches to air-land integration as well as in the interview conducted during the week of the Airpower Conference and the Williams Foundation.

The technology is crucial to allow for an expanded working relationship between ground and air forces, but Lennon highlighted both in his presentation and the interview, the key role which exercising, deploying and thinking through together was for the integrated force.

“A group of people who are integrated need to operate as a team. You are not replacing each other’s key task or function.

But you have to understand each and every other person’s role in that team. You have to respect it.

You have to trust each other.

You have to know how you’re going to work together.

Because if you don't have that trust, respect, knowledge of what everybody on the team is meant to do and when they're supposed to do it, then you won't be effective.

You certainly won't win the championship.

When we talk about Air-Land Integration, air force and army need to get together and, and plan how we are going to roll out these new capabilities.

We have to deliver what the army needs, and the army needs to understand what we can deliver. And the only way you can do that is to get together on a regular basis, not on exercises, well before the exercises.

Talk.

Build confidence in each other.

Build trust in each other.

Get to know each other.

Become friends and develop that team mentality."

During the presentation at Williams, Air Commodore Lennon went back into history to highlight key moments during World War II where airpower was able to play a decisive role in shaping the battle, including the ground battle.

At the presentation he highlighted noteworthy moments, such as the battle for New Guinea where air and ground operations were mutually supportive in the defeat of the forces of the Empire of Japan.

Lennon quoted the noted Australian historian of World War II events Lex McAulay and reminded the audience that "the Battle of Bismarck Sea was a battle for land forces, fought at sea, won by air."

He argued that although the technology is changing, the approach to innovation rested on what was evident in the successes of World War II, namely cooperation among capable forces, which can operate effectively together.

He highlighted as well that maneuver forces were crucial then and are crucial today, and such maneuver forces operate most effectively when ground and air work collaboratively and innovatively together over distance and with speed.

"As an air force we do not exist for ourselves.

We operate to create an effect in the multi-domain battlespace or operating environment."

These themes were discussed further during the interview.

With regard to airlift, a key part of the effort is to deliver the ground forces to the point of interest as the "precision strike" weapon.

To do so, a core effort is to provide better situational awareness to the ground forces in transit.

Similar to what the USMC is doing for the ground combat element flying in the back of the Osprey, the Aussies are doing with regard to their C-17s, namely providing satellite communications in the back of the aircraft to support the ground forces on the way to their insertion mission.

Second Line of Defense

"What I'm doing is talking to all the stakeholders in the army and, and other support groups such as communications and information organizations, to ensure that everything is working in harmony.

At the technical level we're going out to our users and saying, well, what do you need? And they say, well, we need a long-range forward air refueling capability. Okay. Well, how about we look at using a C-130 as a flying fuel tanker?

And so now we've developed a forward area refueling capability using the C-130s with the Blackhawks.

We've tried it in exercise. It works.

And now we're just concluding the project by ensuring that logistics and the support required to maintain that system in the field."

Air Commodore Lennon highlighted that the challenge of getting ready for Humanitarian Assistance and Disaster Relief missions was a key test of being able to get ready rapidly for unexpected contingencies and operating in remote and degraded areas.

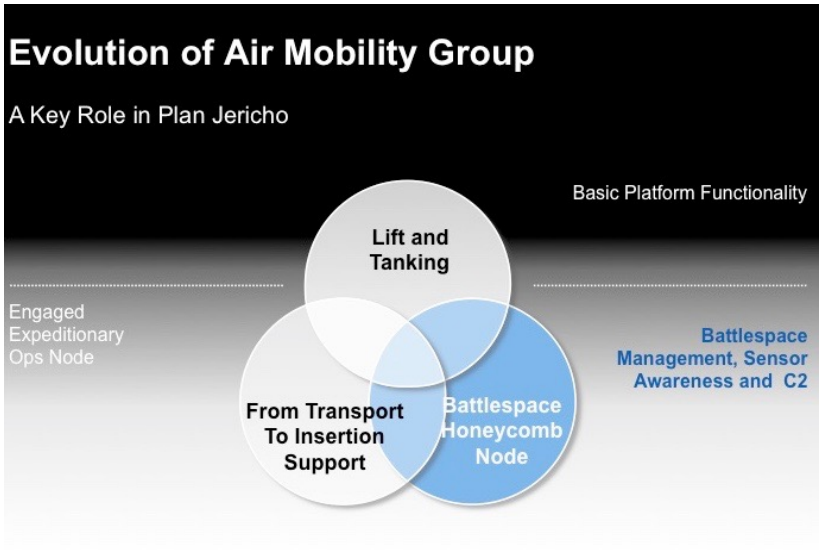


FIGURE 9 RETHINKING THE ROLE OF AIR MOBILITY IN THE TRANSFORMATION OF THE JOINT FORCE. CREDIT GRAPHIC: SECOND LINE OF DEFENSE

As such, it was a preparation for the more demanding situations where an active enemy was added to the mix.

"A HADR mission is essentially a no-notice activity, so it's come as you are. It tests your readiness to the extreme and you're operating in an environment with lack of information.

You're going forward into an area that's largely destroyed depending on the nature of the disaster that beset the area.

It's a real test of your ability to respond quickly in a degraded situation. HADR is a good test of your readiness to respond."

The RAAF AMG is working closely with Army Aviation, as there is an effort to find ways to better work together, which is often done in the same battlespace.

This is effort is unfolding as the Chief of Staff of the Australian Army is undertaking a major review of the future of Army Aviation, which certainly will be informed by the joint working efforts of the RAAF and its assets with those of the Army.

This was seen as well in the Jericho Dawn Exercise, which was held the day after the Williams Seminar as well. Here the RAAF working with the Australian Army compared its current system of operations with one where assets such as the Tiger could be connected in such a way as to operate more as a joint asset.

As Air Commodore Lennon put it with regard to the Tiger helicopter:

"The Tigers are a great example because the Australian specifications were set many years ago before the F-35 was approved and we really weren't as an air force even thinking in that fifth generation space.

We were just looking at getting the aircraft as an Army platform, not one that can operate as both a force within and a contributor to the joint battlespace. It was basically procured as an army asset as opposed to a joint asset."

In effect, what Lennon was discussing throughout was shaping a join workspace within which the Army as the ground maneuver force was thinking through and operating with the Air Force as the diverse provider of core capabilities, air superiority, strike, ISR, C2, lift and tanking, in terms of how best to work together to shape the desired effect.

And this was not a rear mirror look, but forward leaning with regard to working with Army and Navy.

An example of this was our discussion of the intersection of the new amphibious ships with the Air Force tanker.

"The KC-30A is very likely to be operating in the same area of interest as the amphibious ship.

What can the tanker provide for the ship in terms of various types of support?

We have the opportunity to think about this at the same time as we introduce the one and evolve the other."

Shaping a more open ended look at communications links and how they could affect concepts of operations is a key part of the Plan Jericho thought process.

"The whole idea of Jericho is that the assets will work together. We're actually discovering capabilities on radios that we didn't know they had, such as the ability for some radios to automatically do retransmissions.

So when the aircraft is just flying along, it can be retransmitting signals from the ground.

This gives us other opportunities to use those capabilities to support ground forces after you have landed those forces."

And the situational awareness built into the KC-30A is allowing the tanker crew to expand how they operate and think within the battlespace.

"We have the ability to broadcast and receive data with low probability of intercept communications.

We can see where each other are so we don't need to stay in one point.

If we move, our receivers can see where we are and, and vice versa.

So we have always tried to reduce the distance that the receiver has to fly because that gives him more time on the station.

Second Line of Defense

But equally, when it comes off the tanker, we want to be closer to where that asset is going.

Whether it's on station or back to base, there's no point in dropping them off at the wrong end of the orbit because then they're just going to burn all the fuel flying all the way back again.

With our C2 and related capabilities we can now do this more effectively."

There was a dramatic case of where the KC-30A moved to an aircraft in trouble over the skies of Iraq.

A USMC Hornet lost an engine, and was in danger of going down in an area where it might not be good for the pilot to land or bail out.

The KC-30A came to the Hornet and supported it as the aircraft had to fly down in a cascading pattern to get back to base.

"Link 16 can tell you where the assets are and the fuel status of the air combat force. But it cannot tell you about intentions.

You get that from listening to the chat.

In this case, the pilot was listening to the chat and discovered a problem.

He then flew to the problem.

The Marine Corps Hornet had lost an engine and could not stay level at the refueling speed, so they set up a descent pattern to work the problem.

They could not do that until they were outside of the core combat area.

They set up what is called a toboggan where you just slow the descent so the Hornet could keep up his speed to get refueled.

And of course as he transferred fuel, he got heavier which in turn made it more difficult to keep your speed up, but the tanker adjusted to the need for the Hornet."

With regard to tanker, the RAAF is thinking about the future modifications of the KC-30A and clearly doing so from the Plan Jericho perspective.

This means not simply from an air-to-air perspective but from a joint perspective.

"We're getting lots of ideas obviously from all quarters.

And it's not just army in terms of Air-Land Integration.

It's from air force itself and, and it's from different quarters of the organization.

In that process we'll start to prioritize what we need.

The number one priority might actually take three years and a lot of money to implement but we will look for low-hanging fruit as well which can be implemented and funded in a much shorter period of time as well."

Air Commodore Lennon highlighted an important development, which Airbus was working on for the tanker.

"They are working hard on building an autonomous boom where the boom will actually work out where the receptacle is and fly itself into contact.

This will ease the workload for the tanker crew, and provide significant capabilities to fuel new assets coming to the tanker, such as UAVs. It would be an important step forward.

If you have a good reliable autonomous system, then the boom operator is not tiring as quickly and so you can stay on station longer and enhance your persistence in the battle space."

THE PERSPECTIVE OF THE COMMANDER OF THE SURVEILLANCE RESPONSE GROUP

Last August, I had to chance to visit the SRG and discuss its mission, platforms and evolution with Air Commodore Westwood, and members of his team.

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 torch has been handed to the new Commander of the SRG, Air Commodore Craig Heap.

I had a chance to discuss his thinking about the way ahead for the Royal Australian Air Force's SRG, including the coming into the force of the P-8 and Triton and their impact and roles within that further evolution of the SRG.

Air Commodore Heap became the Commander of the SRG as of December 2015.

He has a long history in working Maritime ISR and Response operations in a variety of operational settings, including an appointment as the Joint Task Force 633 Air Component Commander in the Middle East in 2010, and command of the multi-national Air Task Group during the search for the missing Malaysian airliner, MH370.

In our discussion, 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."

This comment fits in well with several of the other interviewees I have had with the Australian forces which really are concerned with how the ground, air and maritime components can co-evolve and shape a 21st century concepts of operations.

Second Line of Defense

This affects very much as well how the RAAF thinks about any new platforms it adds to the force as well.

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," to use Air Marshal Davies' term, 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.

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.

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 a 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 though 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, were going to give you a seriously hard time that will probably not be worth the effort; deterrence in its purest form."

THE PERSPECTIVE OF THE COMMANDER OF THE 42ND WING

During my visit to Australia in March 2016, I was able to follow up earlier discussions with 2nd Squadron with the new head of 42nd Wing to focus upon Wedgetail, its role in the integrated task force in the Middle East, and evolving the capability as the RAAF reached out beyond its air-to-air battle management role to expand the aperture to encompass needs in the maritime and land domains.

The RAAF through its Plan Jericho approach is expanding its thinking and approach to operations to shape a 21st century multi-domain role.

Although connectivity is a central tissue of the effort, the Jericho approach should not be reduced to the question of enhanced connectivity.

It is about operations, and the training for operations to shape an ADF more capable of engaging with a force, which is modular and can be tailored to the mission.

Second Line of Defense

This means that the C2 they are after is strategic in the sense of being able to make the right decision about the force package to send to engage the mission, as well as pushing the level of operational decision making down to the right level.

And the challenge is not simply to connect everything with everything to collect loads of data, but in the words of Air Commander Australia, "to get the right information, to the right people and at the right time."

This is about information parsimony and about an ability to distribute information as appropriate and as needed.

Clearly, the Wedgetail is a key asset in this effort, and has already demonstrated its ability to contribute to the RAAF's air combat capabilities, by adding battle management to airlifting to strike in an integrated force package.

During the visit to Williamtown on March 6, 2014 to 2nd Squadron, the Squadron Commander highlighted a key aspect of the Wedgetail: it is software upgradeable.

"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 in the roundtable 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."

The Commander of 42nd Wing is tasked with managing the current fleet of Wedgetails and shaping a way ahead for the capability within the extended and integrated airspace.

But to do so, requires an overall understanding of the operational evolution of the ADF and its way ahead.

Put in blunt terms, the RAAF because it is small has developed operational leaders who have a much greater diversity of experience than a larger Air Force like the USAF, which means that an AWACs officer can become stovepiped into that experience.

Whereas with the RAAF, Wedgetail experience is part of the broader evolution of the ADF and that will drive the demand side for where the RAAF will want to take its software upgrades.

The new 42nd Wing Commander has a rich and diverse background which he brings to the task.

According to Air Marshal (Retired) Geoff Brown, Group Captain Stuart Bellingham, was a key officer involved in bringing the JTAC experience to the RAAF and bringing a perspective into the RAAF understanding the Army's needs and approaches to combat, which clearly is important in shaping a way ahead for a more integrated force approach.

The Group Captain indicated that the core thing, which he focused on initially, was "joint fires and forward air control, and JTAC experiences. This got me heavily involved with the special forces and the ground forces, more generally."

This is not really what you would hear from the typical AWACs commander in the USAF.

He then went to Iraq and was involved as an air liaison officer for the second Gulf War, 2003. He then was involved with the Wedgetail but when the program hit substantial difficulties, he transitioned out and did another "three years in joint fires as the joint fires integration director."

He then became Commanding Officer of 4 Squadron, which put him at the heart of further evolving his command knowledge of the joint fires domain.

According to the RAAF, No. 4 Squadron is to be understood as follows:

Number 4 Squadron supports a diverse range of Australia Defence Force (ADF) capabilities and operations on a domestic and international front.

To achieve this effectively, 4 Squadron consists of three flights, as well as maintenance / logistics sections and a small administrative team.

The three flights are broken down into A Flight which comprises of aircrew responsible for operating the Pilatus PC9/A Forward Air Control (FAC) variant aircraft.

B-Flight personnel employed as Combat Controllers integrate and control the elements of air and space power to enable precision strike and advanced military force operations.

C-Flight members train students undertaking ADF Joint Terminal Attack Controller (JTAC) course as well as facilitating the continual development and assessment of current ADF JTAC qualified personnel.

4 Squadron supports ADF and multinational operations and exercises. Combat Controller Teams (CCTs) are regularly tasked to support operations throughout the world.

Aside from the training ADF JTACs, the unit also directly supports No. 2 Operational Conversion Unit (2OCU) twice a year, 76 SQN through Close Air Support (CAS) during Initial Fighter Course and all ACG frontline fighter Squadron CAS training with the provision of CCT and FAC/A

Combat Controllers from B FLT 4 are currently deployed on a rotational basis in the Middle East.

http://www.airforce.gov.au/About-us/Structure-of-the-RAAF/Air-Command/Air-Combat-Group/No.-82-Wing/No.-4-Squadron/?RAAF-KIY1qKx9otX0oDRS/4M9ZvVqsJePmMLM

4 Squadron regularly deploys aircraft and personnel in support of Air Force and Army operations, including:

- *Pitch Black*
- *High Sierra*
- *Southern Frontier (US Marine Corps support)*
- *Travelling Boomerang*
- *Black Dagger*
- *Faru Sumu*
- *Red Flag*
- *Sharp Dagger*

During these exercises, PC9/A (F) aircraft fly FAC/A and CAS profiles, with CCT providing Terminal Control and battlefield airspace management. 4 SQN pilots utilise smoke grenades as weapons to represent high explosive ordnance used by fast jet aircraft.

Second Line of Defense

This enhances the training realism and complexity for Joint Terminal Attack Controllers (JTAC).

Smoke grenades are also used to assist pilots of fast jet aircraft visually acquire ground targets. Releasing smoke grenades in the vicinity of a target provides strike aircraft with an easily identifiable visual feature, assisting them to positively identify their target.

This enhances their ability to employ weapons accurately and efficiently and is a key element of Forward Air Control.

These procedures provide training not only for the ground personnel and the strike aircraft's crews, but also for the 4 Squadron aircrew practising in the CAS and FAC/A role.

Local 4 Squadron operations centered around RAAF Base Williamtown mainly focus on supporting CCTs and JTACs.

Additional operations aim to train and enhance the skills, techniques and qualifications of the Pilots within 4 Squadron.

http://www.airforce.gov.au/About-us/Structure-of-the-RAAF/Air-Command/Air-Combat-Group/No.-82-Wing/No.-4-Squadron/?RAAF-KIY1qKx9otX0oDRS/4M9ZvVqsJePmMLM

So what did Group Captain Bellingham do next?

Naturally, he went to another command position where he dealt with among other things missing Malaysia Airlines aircraft somewhere over the Pacific.

He became the Director of the RAAF Air and Space Operations Center, which is part of the Joint Operations Command Headquarters.

And while there, Operation Okra or Operation Inherent Resolve was launched into the Middle East.

And that operation would become the next focal point for Bellingham as he would become the third commander of the air task force and do so in the last part of 2015.

He discussed his experience and that of the task force in a presentation to the Air Power Conference.

One of his slides was a good prelude to his next command.

"I remember one conversation in particular with my Senior INTELLO, during which he remarked upon the fact that no scriptwriter could have dreamed up the level of complexity and daily 'excitement' in which we found ourselves."

He has come back to take command of 42nd Wing.

"I came back to Wedgetail after it had progressed from in your words "a troubled to a trailblazing program" and after having seen it perform in Iraq. I went for a fly a couple of times over Iraq in the E7 and what a phenomenal capability it is.

And we're just come back from Red Flag where we sent the E-7 and crew across to Red Flag Nellis there in January."

Question: What reactions did you have from the US and the partners to the new capabilities you brought to the operation in the Middle East?

Answer: The coalition partners bring different capabilities to the fight.

Obviously, the USAF is a key player.

When you walk into the CAOC there are 18 nations represented in the operation.

Around the table we discuss what we bring to the coalition.

The approach is based on mutual respect and making sure that we work effectively together in operations.

We're a pretty small force, but I think we've done a reasonable job in supporting the coalition.

Question: That being said, what about your unique capabilities?

Answer: Wedgetail is highly valued and highly regarded within the coalition.

It is a combination of what the weapon system brings to the fight and how the crews use that weapons system and drive forward innovation.

With regard to the technology, it has a powerful combination of tools, the radar and electronic surveillance capabilities.

With regard to the training of the crews, which is evolving, we are focused on our ability to use the weapon system in a complex combat environment.

And exercises like Red Flag are important to the evolution of our training and our evolving combat approach.

We like to think of ourselves as coming to the fight with something different, but complimentary and fusing straight in to support the coalition.

Question: Your background is a core asset as well for the evolution of the Wedgetail as the RAAF leadership looks to evolve the aircraft along with the evolution of the Navy and the Army.

Indeed, the goal in some ways is to co-evolve the software onboard the Wedgetail with those on core Naval and Army systems, notably as new capabilities get added to the force.

How do you see the way ahead?

Answer: It is about co-evolution.

We are looking at battle management across the air, sea and land spectrums.

We are looking to expand our reach beyond the purely air battle management role into a joint role.

For example, the coming of the new amphibious ships provides a wonderful opportunity to support Army and Navy at the same time.

We are looking to work closely with them on the amphibs and later this year look to exercise with them to shape a joint approach.

As the air warfare destroyers enter the force we will be working hand and glove with them in blue water operations to support their effects equally.

It is a two-way street.

Second Line of Defense

We are looking to support them; and we are looking for them to support the combined operations in the air-sea battlespace.

It's a really good environment to be in, in the joint space right now with the capabilities that each of us are bringing and shaping how we're going to work together.

Question: How are thinking about working with the amphibious ships?

Answer: We will provide surveillance for the amphibious force and through the process of inserting and supporting force on the ground.

Obviously the role will vary with regard to whether it is a contested environment or not, but will provide electronic support and coordinate the various are and surface assets in the area.

Our role will be to fuse everyone together and then plugging that into our ampbhious task group, which may or may not have a destroyer with them.

We will bring the whole team together and make sure that everyone as the highest possible situational awareness within the operational space.

THE COMMANDER OF THE AIR COMBAT GROUP FOCUSES ON THE WAY AHEAD

Air Commodore Steve "Zed" Roberton knows about airpower transitions.

He led the transition in the Royal Australian Air Force (RAAF) from F-111 to Super Hornet, Commanded the RAAF's initial Air Task Group to the Middle East, where for the first time the RAAF took an integrated air package which included lift, strike, tanking and airborne C2/ISR, and operates from the key fighter base which will be a key home to the F-35.

This transition for Roberton is about shaping airpower for integrated operations in the information age; it is not about staying in the 20th century world of disaggregated air from maritime from ground forces.

It is about shaping an integrated force driven by the new fifth generation approach.

And for the RAAF, this approach is crucial because unlike the USAF or the USN, the RAAF does not have a large force of specialized aircraft to operate in an evolving approach to integration; the RAAF with the Navy and the Army need to lead a process of force structure integration shaped by a key driver like the F-35.

As Roberton put it in an interview at Williamtown Air Base on March 24, 2016:

"The Australian Defense Force is in a different position than the U.S. Navy or Air Force, in that we are largely being air asset-led.

Our aviation assets are out ahead of where we are with development of our surface combatants.

For Australia, the F-35 is not just about making everything else in the battle space better and more effective.

It's more about providing options for commanders to accord them the right time to choose how to deploy force so that the right asset can be where it needs to be to get the desired effect.

Increasingly, for us, that's going to be both kinetic and non-kinetic.

The F-35 is going to provide us a level of temporal control that we haven't really had but this will only happen if we get the information sharing right.

But, we're still in a position where we are waiting for some of the other force structures to become more effectively integrated in the way ahead."

He highlighted that working with the U.S. transition was crucial as well, but recognized a gap which had to be addressed.

"We need to have enough influence with the U.S. that they understand that the maritime domain really is important for us as an Air Force.

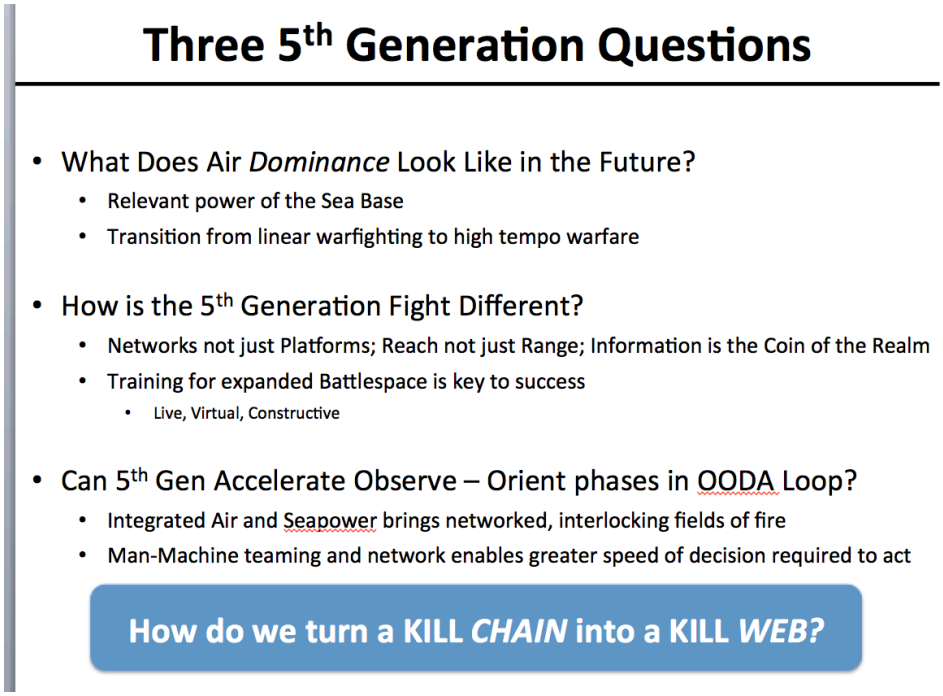


FIGURE 10 AS PRESENTED BY REAR ADMIRAL MANAZIR, HEAD OF AIR WARFARE IN THE US NAVY, AT HIS PRESENTATION TO THE MITCHELL INSTITUTE, MARCH 22, 2016.

The U.S. Navy with their surface fleet, with the Super Hornets and Growlers, has meant that, although, the F-35 is an important program for them, it's not fundamental for them like it is for us.

I would argue the U.S. Air Force has never shown the level of interest and fascination at integrating with maritime forces that we need. We've got to be able to influence the shift that we think is necessary."

We discussed briefly the concept of the kill web which Rear Admiral Manazir had introduced at his presentation at the Mitchell Institute earlier that week in Arlington, Virginia and Roberton readily embraced the idea of shift from a linear kill chain and hub-and-spoke operations to one of an distributed force contributing to capabilities across the integrated battlespace.

(Note: My colleague Ed Timperlake had attended the Mitchell Institute session and communicated the results in time to discuss with Air Commodore Roberton).

As Air Commodore Roberton sees it, there is a three-phase process underway and "we are only at the first step.

Second Line of Defense

"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.

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."

Clearly, the approach discussed by Air Commodore Roberton meant that his own job was in transition as well.

"In ten years time, my successor in this job will be dealing a lot more with other elements within the ADF, with other government agencies and leveraging information management and decision making.

Shaping and keeping the link or connectivity services dynamic will be a key capability not just focusing on the individual platform."

During his presentation at the Williams Foundation seminar on new approaches to air-land integration, he focused on the crucial importance of pushing decision making to the key point of attack or defense in an operation.

In the presentation, he made the case that the airborne forward air controller was going to become more important in the evolving battlespace, and needed to be empowered to work with the deployed force to execute rapidly in the fluid battlespace as well.

And last year, he provided an excellent overview on his experience with the first deployment of the integrated air task force, and this transition is a crucial one as the RAAF shapes its future as well.

"We managed to self-deploy. It was and remains a fairly modest, but very important, contribution.

The fact is, I don't think the RAAF could have done this, at this scale, and this packaged level, ten years ago."

This experience along with his work on transitioning from the F-111 to the Super Hornet are key building blocks in his leadership for the next transition, namely the fifth generation enabled air combat force.

CONCLUSION: RETHINKING THE ROLE OF PLATFORMS IN THE EXTENDED BATTLESPACE – SHAPING A WAY AHEAD

The need to operate at greater distance and to deal with a growing diversity of threats has highlighted the importance of ensuring an ongoing modernization effort to enhance that the industrial democracies have the capabilities to fight as a an integrated team in that battlespace.

This requires capable platforms, which can perform their core missions but to do so with greater effect by being more capable through the connectors or enablers for a more integrated force.

The recent Australian Defence White Paper and associated materials provide a useful look at how to do this.

The analysis recognizes the importance of key platforms, such as how the Royal Australian Air Force has been rebuilt with a number of core assets, such as Wedgetail, the KC-30A and the coming of the F-35.

Each of these platforms has a set of core functions, yet their impact is enhanced by inter-connectivity and determining how best to operate those platforms in ways which enhance the overall capabilities of the force.

Building on existing capabilities, the ADF of the future will feature decision-making superiority, and enabled, mobile and sustainable forces with potent and agile offensive response capabilities

The breadth, complexity and interrelated nature of all defence capabilities and enablers led to the development, in the Force Structure Review, of a new framework to adequately explain the link between strategy and capability.

The six capability streams in the framework are used in the Integrated Investment Program to better represent the key force elements – how they are typically employed and their planned enhancements.

This was a deliberate move away from describing our capability investment plans in a stovepiped structure.

These six capability streams also support building a clearer picture of the link between capabilities, systems and their supporting enablers in creating key Defence outputs: Intelligence, surveillance, reconnaissance, electronic warfare, space and cyber

Key enablers:

- *Air and sea lift*
- *Maritime and anti-submarine warfare*
- *Strike and air combat*
- *Land combat and amphibious warfare.*

The relationship between the key attributes of the future force and planned enhancements across the six capability streams is outlined in the Table below (page 13, Defence Integrated Investment Program).

Table 2: Future force attributes mapped to capability streams

Key Attributes	Defence Capability Streams
Decision-making superiority	Intelligence, surveillance, reconnaissance, electronic warfare, space and cyber
Enabled, mobile, and sustainable forces	Key enablers
	Air and sea lift
Potent and agile offensive response	Maritime and anti-submarine warfare
	Strike and air combat
	Land combat and amphibious warfare

FIGURE 11 TABLE 2 FROM DEFENCE INTEGRATED INVESTMENT PROGRAM, AUSTRALIAN MINISTRY OF DEFENCE, FEBRUARY 2016.

To get to where the ADF wishes to go with regard with an integrated force, key decision making superiority is a crucial capability delivered throughout the integrated battlespace.

In other words, all attributes are not equal.

To do so means appropriate information needs to be generated and delivered to the appropriate decision maker at the point of need.

It is about effective C2 in the battlespace operating at the various points of attack or defense;

It is about generating and distributing information appropriate to those decisions;

It is about information parsimony not simply doing an NSA approach to collecting as much as one can;

It is about focusing on where the decision makers are in the battlespace, allowing them to make decisions at key points of attack or defense and to shape a realistic and effective secure information approach within that battlespace.

Clearly, cyber needs to be built in as well as learning how to fight cyber war within the integrated battlespace.

To ensure our forces can operate effectively and safely in our region and globally, they need a comprehensive picture of what is happening around them.

They also need to be able to operate effectively in a contested electronic environment. This requires analysis, fusion and dissemination of information to support decision makers at all levels (page 14, Defence Integrated Investment Program).

And the Defence White Paper highlighted the kind of force which Australia needs to build as well:

To ensure our forces can operate effectively and safely in our region and globally, they need a comprehensive picture of what is happening around them.

They also need to be able to operate effectively in a contested electronic environment. This requires analysis, fusion and dissemination of information to support decision makers at all levels (Defence Integrated Investment Program, p. 14).

This analysis then is really about the interaction among platforms, enablers, C2 modernization, and secure information tools to deliver the effects appropriate to the mission.

It is not that platforms are not important; they are; but they now must be placed in the context of their contribution to the effects desired by the integrated force.

In making future platform selections, a key decision point is how they contribute to the ultimate desired effect, and how they contribute to decision-making superiority and enhanced information security and dominance.

In other words, the shift from a platform centric world is not about platforms not mattering; they do; but what is crucial is now evaluating how a new platform contributes in a multi-mission, or multi-tasking and specialized effect for the evolving force.

There will be more emphasis placed on the joint force – bringing together different land, air, sea, intelligence, electronic warfare, cyber and space capabilities so the ADF can apply more force more rapidly and more effectively when called on to do so.

A new permanent future force design function in Defence will strengthen Defence's capacity to deliver joint and integrated capabilities.

As well as investing in high-end warfighting equipment, the Government will increase investment in the vital enabling capabilities that bind military capabilities together to maximise Defence's operational effectiveness.

Key enablers include ADF bases, logistics systems (including fuel and explosive ordnance facilities), upgraded training and testing facilities, health services and information, communications and technology equipment.

The Government will recognise the fundamental input to defence capability provided by Australian defence industry to ensure it delivers the support Defence needs (page 84, Defence White Paper).

For this to work, the purchase of platforms requires a new working relationship between industry and government as well as the services working more effectively to shape how their particular new platform contributes to both the service's core missions as well as the effects desired for the extended battlespace.

For example, the Wedgetail clearly provides for air battle management, and will change as the F-35 is added to the fleet, and air dominance is the core mission, but how best to provide for the decision making superiority through other parts of the force structure, and to ensure the kind of combat effects the integrate force could deliver?

This requires shaping information sharing approaches that make sense in the contested and permissive battlespace, and shape information parsiomony to deliver information to the decision maker at the point of attack or defense in the air, on the sea or on the ground.

Another example is how the ADF might address Tanker 2.0.

They have already acquired the advanced A330MRTT and are using it in the battlespace and bringing the tanker to the point where it can support the entire fleet.

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The RAAF has already modified their concepts of operations of how to use the tanker, having shifted the tanker from the classic tanker track approach, to one where the crew is connected to the battlespace and determines how best to support the air fleet.

And in shaping the way ahead for what might be called Tanker 2.0 the question is how to get full value out of the operational capabilities of the tanker.

Lifters and tankers are not simply functioning as transportation and fuel off loaders, but are operating in the battlespace and their role can expand as the concept of operations is shifted via additions of appropriate technology to allow them to shape greater capability within the integrated battlespace.

As Air Commodore Lennon put it in an interview last year:

There is a lot of real estate inside and outside of the KC-30A.

How we use that real estate needs to be determined by evolving concept of operations, not simply applying a technology solution set offered by a prime contractor.

From a support perspective, software-enabled systems of the sort prevalent in today's C2 and ISR systems, are almost throw away systems within five years.

We need to build in cost effective systems, which do not go on forever and are not expected to be repaired beyond a certain period but simply replaced by new, better and cost effective technologies.

http://www.sldinfo.com/the-evolution-of-the-raafs-air-mobility-group-its-contribution-to-plan-jericho/

Here the basic shift is one where Air Mobility Group functions largely as a garage storing tanking and lift assets which transport and fuel assets to its engagement in a much broader role in the battlespace and with it its ability to engage with and support ground, air and naval forces.

Thus, when one approaches the acquisition of new platforms, a key consideration needs to be what does a new platform bring to the battlespace?

- How can its organic capabilities enhance the capability of the force to provide for an integrated effect?
- How can the platform contribute to the multiplier effect of its operation within the battlespace?
- How can the force best survive and prevail and how do new platforms contribute to that effort?
- How upgradeable is the platform with regard to the other key capabilities operating in the battlespace?
- How can the central role of software upgradeability best be recognized and supported in building out an information secure, decision dominant force?
- How to measure cost effectiveness in an integrated battlespace world?
- How do new approaches to sustainability built into 21st century systems get recognized as cutting edge ways to have a more effective and sustainable force, rather than being audited to death by 20th century practices and thinking?

The most expensive acquisition could well be one that is the cheapest up front in terms of initial price tag, but is not an effective member of or contributed to an integrated battlespace.

Such platforms might only contribute to a narrow function without any real capability to evolve with the forces shaping a way ahead to reshape capabilities to achieve key effects in the evolving battlespace and within that battlespace shaping an open-ended force integration process.

In other words, the rethinking process to which the Williams Foundation seminars are contributing will affect not only concepts of operations, but also how procurement of new platforms will be done going forward.

For Air Force and Navy, a key opportunity lies in the co-evolution of the new software upgradeable air platforms – Wedgetail, F-35 and P-8 – with the combat systems and weapons coming onboard the surface and subsurface fleet. But this will not happen by happenstance; rather a joint force structure design is essential.

A harbinger of things to come can be seen onboard the Wedgetail flying today. Each Wedgetail crew has a Navy integration controller onboard; and this officer then posts to a ship after his duty onboard the Wedgetail.

It is about the people and the technology in reshaping the concepts of operations going forward.

But without an effective and practical approach to shaping a 21st century concepts of operations, we are left to debate the way ahead as in the Platonic cave, where the experts in understanding the shadows can not face the light, because that is not their domain of expertise.

It is not just about being proficient and training to yesterday's technology and problems; it is about anticipating 21st century solution sets, and training to those solution sets and leveraging and folding in the new technology. This much easier said than done, but the harsh reality of combat is that winning or losing here is not a beauty contest. It is about life or death.

As the Air Commander of Australia put it bluntly:

"Lethal is the world we live in and people need to keep their eye on that fact.

We don't play games and we're here for a reason."

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APPENDIX 1: THE PROGRAM FOR THE WILLIAMS SEMINAR, MARCH 17, 2016

Thursday 17 March 2016

Time	Topic	Speaker
0830-0900	Registration	
0900-0905	Welcoming Remarks	AIRMSHL (Retd) Errol McCormack AO Sir Richard Williams Foundation
0905-0910	Introduction to Seminar	AIRMSHL (Retd) Geoff Brown AO Sir Richard Williams Foundation
0910-0930	Land Force Current Perspective and Aspirations	LTGEN Angus Campbell DSC, AM Chief of Army
0930-0950	Air Force Current Capabilities and Aspirations	AIRMSHL Leo Davies AO, CSC Chief of Air Force
0950-1020	Next Generation Air Surface Integration – Land Perspective	Lt Gen Jon M. Davis United States Marines
1020-1050	Break–Morning Tea	
1050-1110	Sensor fused Network Centric Warfare (how we get the right information to the right people)	AVM Gavin Turnbull AM Royal Australian Air Force
1110-1130	Cross Domain Decision Superiority (C2, Network & Comms requirements)	Maj Gen Stephen Goldfein, USAF (ret) Northrop Grumman Mission Systems
1130-1150	Enhanced Decision Making for the Digital JTAC	Mr Jim Walker AM Rockwell Collins
1150-1215	How will the ADF deliver on the Vision of Air Land Integration	Brigadier Chris Mills Australian Army
1215-1300	Break–Lunch	

Time	Topic	Speaker
1300-1320	Modern Synthetic Training to enhance Joint Operational Capability	AVM Malcolm Brecht CBE Royal Air Force
1320-1340	The Future of Unmanned Aerial Systems in Air Land	Mr Ken Loving General Atomics Aeronautical Systems
1340-1400	Army Force Projection with new RAAF Airlift	AIRCDRE Richard Lennon CSC Royal Australian Air Force
1400-1420	The future of FAC(A) and JTAC (How will technology impact on integrating Joint Fires)	AIRCDRE Steve Roberton DSC, AM Royal Australian Air Force
1430-1500	Break–Afternoon Tea	
1500-1520	Seamless Situational Awareness	Mr Victor King L-3 Mission Integration
1520-1550	Panel Session	Chair: AIRMSHL (Retd) Geoff Brown AO Sir Richard Williams Foundation
1550-1600	Formal Close	AIRMSHL (Retd) Errol McCormack AO Sir Richard Williams Foundation

APPENDIX 2: THE RAAF AIR WARFARE CENTRE

The Air Warfare Centre exists within Air Command and is critical to establishing the RAAF as a modern and fully integrated combat force that can deliver air and space power effects in the information age.

The AWC is supported by an integrated workforce which includes Air Force, Army, Navy, Public Service and Defence Industry personnel.

The vision of AWC is: "Excellence in Integrated Air Warfare for optimal Joint Effects".

Its mission is to: "Deliver Integrated Air Warfighting solutions for superior combat effectiveness".

The goals of the AWC are to provide:

- A focal point for bottom up innovation at the tactical and operational levels;
- Coordinated and integrated tactics and procedures development across all AF platforms using live, virtual and/or constructed (LVC) environments;
- Coordination of Science and Technology (S&T) and Research and Development (R&D) effort across AF;
- Testing of current and proposed Concepts of Operation (CONOPS) against force structure and higher level Defence plans at the operational and tactical level;

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- Collation of lessons learned through experimentation for inclusion in strategic planning, capability development, doctrine development, and exercise planning;
- Exchange of ideas across the ADF and the Coalition.

The AWC is comprised of the following:

- HQ AWC – responsible for the coordination and implementation of common and integrated functions across the AWC IOT meet the AWC Mission;
- Test and Evaluation Directorate – the ADF service provider to AF and Army for specialised flight T&E, aviation medicine support, aeronautical information products, stores clearance and aviation systems engineering support;
- Information Warfare Directorate – centralises the AF's tactical information warfare elements and provides the wider RAAF with an integrated and tailorable operational support capability drawn from across the Intelligence, Electronic;
- Warfare and Information Operations domains. It enables the coherent development and management of the RAAF's Information Warfare capabilities;
- AF Ranges Directorate – I the primary provider of Air Force Air Weapon Ranges and Live, Virtual and Constructive (LVC) simulation to enable the testing of war materiel and the training of AF capabilities in order to deliver more effective warfighters;
- Tactics and Training Directorate – focuses on the development of multi-discipline high end integrated tactics and training across the AF through a combination of training, education engagement and integrated exercises.

http://www.airforce.gov.au/About_us/Structure_of_the_RAAF/Air_Command/Aerospace_Operational_Support_Group/?RAAF-6wujD/tHUBRNDsmm3O+YcYIPvAth9Dmq