INTEGRATING INNOVATIVE AIRPOWER

Facing 21st Century Strategic Challenges

INTEGRATING INNOVATIVE AIRPOWER: FACING 21ST CENTURY STRATEGIC CHALLENGES

Introduction

On April 17, 2015, two of our partners, the Williams Foundation (Australia) and the Centre for Defense Studies (University of Copenhagen) hosted a seminar in Copenhagen on airpower innovation. In this Special Report, an overview to the Symposium as well as the speaker's presentations are highlighted and summarized.

There is nothing that focuses one's thinking about defense more than having an immediate and direct threat that is not going away anytime soon.

With the Russian Ambassador threatening to use nuclear weapons against Denmark if they join the NATO missile defense network, or Russians paratrooping into the Danish zone of responsibility for Arctic search and rescue, or telling the Nordics that banding together threatens Russian security, one can not have an abstract conversation about defense and security in a small country like Denmark.

The Danes clearly know this, and have emphasized in various ways their alliance relationships in order to play a role in their own defense *and* also play a role in the broader scheme of Alliance security.

The Danes have coalition leadership and cooperation as part of their defense DNA.

At the symposium, several strands of shaping a way ahead to deal with the threats facing the coalition of democratic states were evident, all converging on the evolving challenge of getting it right to defend against 21st century threats.

One strand was to discuss the Danish approach.

Here three presentations at the Symposium highlighted that approach and characterized the way ahead.

The first presentation along these lines was by the well-known Danish professor, Dr. Peter Viggo Jakobsen.

This presentation provided an overview of why Denmark has been so engaged in alliance expeditionary operations over the past decade, and why that proclivity is likely to continue.

And given the threat overhanging Denmark, clearly the relationship with the United States is a crucial factor in shaping Denmark's thinking about the way ahead or with regard to the acquisition of fighter aircraft.

Dr. Gary Schaub from the Centre of Military Studies, the co-host of the symposium, then looked back at the F-16 program as a prologue to the next fighter acquisition program.

He highlighted a number of lessons to be learned from those efforts. the most central of them was the collaborative nature of the F-16 program and the contributions made by participating in the consortium of European F-16 states in the operation, maintenance, and modernization of Danish F-16s.

Clearly, airpower is central to Denmark and to its coalition efforts, both for direct defense and for expeditionary operations.

And Col. Anders Rex, Chief of the Expeditionary Air Staff of the Danish Air Force, underscored this theme.

Rex coined a phrase "coalitionability" to express his focus on the core requirement of allied air forces and defense forces shaping ways to work more effectively with one another in dealing with 21st century challenges.

The conference then turned to the question of innovation in airpower and reshaping–or as I call it "renorming airpower"–to deal with the 21st century threat environment.

Two airpowers that are unique in that they are resetting their core air platforms within a relatively short period of time – the Royal Australian Air Force and the USMC – are facing a similar challenge: **how best to innovate with the integrated force under the influence of airpower modernization?**

The first panel seen left to right, Dr. Gary Schaub, CMS, Dr. Peter Viggo Jakobsen, Royal Danish Defence College, and Col. Anders Rex, Royal Danish Air Force. Credit Photo: SLD

For both these forces, the central platform impacting on the transformation is the F-35.

For the RAAF, the Chief has set in motion Plan Jericho which is a fundamental rethink and reworking of the fleet to provide for a more lethal and integrated force designed to enhance its capabilities notably when operating in coalition.

For the USMC, the F-35 is a centerpiece of the next wave of innovation which has been launched under the impact of the Osprey revolution.

In both cases, the central challenge is to reshape the operational mind-sets and approaches able to leverage the fifth generation revolution.

The RAAF perspective was provided by the co-host of the Symposium, John Blackburn; the USMC perspective was provided by Lt. Col. David Berke, a unique pilot with F-22, F-35, F-18, F-16, and JTAC experience.

The presentations dovetailed on the core challenge of resetting capabilities and mindsets to deal with evolving challenges.

Group Captain Paul Godfrey from the Royal Air Force explained the RAF approach to modernization and the impact of the F-35 on that modernization.

As a Harrier, F-16, and Typhoon pilot, Godfrey looked at the role of the F-35 in opening up the aperture for Royal Navy and Royal Air Force modernization which comes together in the form of the new HMS Queen Elizabeth carrier.

Although Godfrey did not say this, the reality is that the HMS Queen Elizabeth could well be a key participant in coalition operations to deter Russia in the Baltics and the Nordic region.

Air Commodore Dré Kraak from the Royal Netherlands Air Force focused on the modernization of the Dutch Air Force and ways to work with allies.

The Dutch are transitioning to an all F-35 fleet, and in so doing are working closely with the Italians, who will build the bulk of the Dutch F-35s.

They are also discussing with the Italians the possibility of developing a common training solution as well.

According to Air Commodore Dré Kraak, "The Italians have made major strides in their capabilities to build aerospace systems.

It is really quite remarkable to look at the progress over the past 20 years."

Col. "Jeep" Willi from the NATO Joint Airpower Center, highlighted a number of studies that the Center was conducting. These studies emphasized the challenges and opportunities facing coalition airpower. He also took the opportunity to deliver a message from USAFE Commander General Frank Gorenc to the Danish Air Force, inviting them to join the Center and bring the Danish perspective to bear as they develop NATO airpower concepts..

It is clear with the Russian threat to the Baltics that a well thought through coalition approach is crucial so that even smaller allies can contribute capabilities that can fit effectively into a scalable modular force.

This could be an effective way to think about enhancing the defense of the Nordic and Baltic region.

Deterrence is simply not credible if there is a weak or divided or incoherent allied defense force facing an aggressor the size and proclivities of Putin's Russia.

In my own presentation, I focused on the importance of shaping a 21st century force, and not simply looking backward.

I focused on a way ahead, namely to shape a modular, scalable, and C2 enabled coalition force, in which a regional lead nation could call up and generate forces to deal with adversaries as varied as the probing military powers, like China or Russia, or the pop up threats posed by groups like ISIS.

Ed Timperlake then focused on a number of key technological opportunities facing the allies–as well as strategic challenges that were pressing upon them to actually take advantage of those opportunities.

In the Baltic area right now the Russians were conducting Tron Warfare, and Denmark was on the front lines of this important aspect of 21st century operations, Timperlake noted to the audience.

The symposium was closed by the co-chairs with John Blackburn underscoring that Col. Rex core concept of "coalitionabilty" was at the heart of the RAAF transformation with Plan Jericho.

And Gary Schaub underscored how important airpower really was to effective coalition operations.

Schaub closed with the thought that partnerships are key to enabling a real revolutionary jump in air combat power for joint operations.

A note about Tron Warfare:

EW is a complex subject with many discreet but also connected elements. Over time all things electronic in the military took on many dimensions. Electronic Counter-measures (ECM) begat Electronic Counter-Counter (ECCM) measures, Command and Control (C&C) has grown to C5ISR. Information war in certain applications created a multi-billion dollar domain called ""cyber."

Additionally there has to always be considerations of Electro Magnetic Pulse concerns (EMP) and the counter measures of 'hardening" of electronic components. There are a lot of other EW issues in "tron war," such as Infer-Red Sensing (IR) and always protecting "signals in space" information being transmitted and trying to jam the bad guys "signals in space."

Tactically, it has been said on the modern battlefield — air, sea or land — if not done correctly, "you emit and you die."

EW can include offensive operations to identify an opponent's emissions in order to and fry spoof or jam their systems.

In successful "tron" war, often-kinetic kill weapons can be fired. The kinetic kill shot is usually a high-speed missile designed to HOJ (home on jam). There is also the ability to emit electronic "kill" or spoofing signals i.e. to emit miss signals to an enemy's incoming weapon sensors.

The air engagements between the Russians and the allies in the Nordic and Baltic region include a significant element of Tron Warfare.

Overview

The Russians, the Arctic and the Baltics: Activism in Support of Strategic Re-Positioning

By Robbin Laird

Copenhagen is a lovely city.

The Danes are hearty and friendly folks.

They just don't seem the kind of folks who need to open their mail and a get a greeting from the Russian Ambassador, who after all is a guest in their country, that reads something like this:

I do not think that the Danes fully understand the consequences of what happens if Denmark joins the US-led missile defense.

If this happens, Danish warships become targets for Russian nuclear missiles.

http://www.dw.de/denmark-could-become-target-of-russian-nuclear-weapons-ambassador-warns/a-18332777

So let us reverse the logic – the Danes tell the Russians that they are imperialists who are interfering in European affairs and seizing the territory of free states, reach agreements with states like China to operate on that territory, or that they should act like a civilized state.

Not likely to happen in a small country of a group of islands against a giant land mass with multiple time zones and led by Putin the Great.

To be blunt this is a policy of intimidation which we have seen from Russians before, but this time with the Ukrainian occupation coupled with an assertive Arctic policy and a clear design on the Baltics, it is not just about Denmark.

It is about a significant redesign of the map and putting Russia in the middle of it.

And to add a point to all of this, the Russians decided to paratroop into the Arctic and show their ability to paratroop to support their claims and protect their interests.

Only one small problem: they parachuted into the Danish zone of responsibility for search and rescue in the Arctic without bothering to tell any one. Of course, when one is asserting imperial presence, one need not tell the little guys anything of note.

And as the Nordic states look at this unchecked Russian ballet for regional influence, perhaps dominance, they are working together to sort out ways to better protect themselves.

This is hardly a dramatic and unwarranted reaction, notably in a world of uncertain American policies.

Earlier this month, the Nordic states issued a declaration of intent to work more closely together to protect their interests, which of course does not include invading Russia or seizing St. Petersburg, named for Peter the Great, but perhaps will become Putinburg over time.

According to an April 9, 2015 Reuters story:

Writing in a joint declaration, the defense ministers of Sweden, Norway, Finland, Denmark and Iceland said Northern Europe must prepare for possible crises or incidents because of Russia.

Dmitry Rogozin (in white jacket) went to the North Pole late April 18, 2015 after his controversial visit to Svalbard. The man to his right in red jacket is Russia's Minister of Natural Resources and Environment Sergey Donskoy. (Photo: from the Facebook profile of Dmitry Rogozin.)

"Russia's leaders have shown that they are prepared to make practical and effective use of military means in order to reach their political goals, even when this involves violating principles of international law," the ministers wrote in a joint statement in daily Aftenposten.

"There is increasing military and intelligence activity in the Baltics and in our northern areas," the ministers said. "The Russian military is challenging us along our borders and there have been several border infringements in the Baltics."

The statement comes amid heightened tensions in Europe since Russia annexed Crimea from Ukraine a year ago. With large Russian minorities living in the Baltics, concerns have grown in the region about the risk of Russian intervention.

Finland, which borders Russia, and Sweden are not members of NATO but have increased cooperation with the trans-Atlantic alliance, and the joint declaration has been among their strongest responses to Russia's aggression.

"Russia's actions are the biggest challenge to the European security," the ministers said. "Russia's propaganda and political maneuvering are contributing to sowing discord between nations, and inside organizations like NATO and the EU."

The ministers said that closer cooperation in the Nordics and solidarity with the Baltic would improve security through deterrence as it would lift the threshold for military events

This includes two neutral states, Sweden and Finland, and a clear target for the Russians is making sure that neutrality is interpreted very narrowly and that these two states stay in a clearly defined national territorial defense box, rather than contributing to Baltic and/or Arctic security.

The Russian government completely rejects the legitimacy of such an approach, notably as if the Nordics banded together they have enough capability to make the Russian agenda very difficult to succeed, and even more so as the West modernizes its forces.

Reflective of the Russian stance is the position laid out by Artem Kureev in Russia Direct in a piece published on April 15, 2015.

Kureev is identified as an expert from the Moscow-based think tank "Helsinki+" that deals with protecting interests of Russians living in the Baltic countries. Kureev graduated from Saint Petersburg State University's School of International Relations.

So what needs protecting?

A detailed analysis of the document raises questions as to which parts are declarative in nature and which will actually be implemented. The four areas highlighted pertain to increasing the number of joint exercises, intelligence sharing, military industry, and combating cyber threats.

The mechanisms needed to implement the initiatives in the declaration are lacking at present. Moreover, most of them require permanent cooperation and the establishment of coordination centers in the field of intelligence gathering and cyber security.

Russia's Deputy Prime Minister Dmitry Rogozin posted this photo of himself on April 18, 2015. The photo is taken just outside the terminal building at Longyearbyen airport. (Photo: from Rogozin's tweet.)

Put another way, it is, in fact, a bid to set up a separate entity with its own staff, divisions and, it seems, head office. However, all this requires significant additional outlays and the signing of specific multilateral agreements. Yet such structures already exist within the NATO framework; for instance, Estonia's cherished Cyber Defense Center.

It is more than likely that within the framework of enhanced cooperation all five Nordic countries will start taking an active part in the operations of these structures. However, it is clear that neither Stockholm nor Helsinki wants to play second fiddle to the Baltic countries and both are intent on creating their own agencies in the field of security in conjunction with the rest of Scandinavia. Hence, another cyber center could crop up on Russia's borders within a few years.

It is also quite possible that large-scale military exercises simulating a joint response to an attack from the East could be carried out with the Nordic countries.

Next up, time to assert one's interests against the aggressive Norwegians, for they might launch long boats and end up in Kiev.

So in a story published by ABC news on April 20, 2015, Russia drops in on disputed territory as if it was their own.

Russia on Monday dismissed Norway's protests over a weekend visit to a Norwegian archipelago by a delegation that included Russia's deputy prime minister Dmitry Rogozin.

During a visit to the Arctic on Sunday to inaugurate Russia's new floating research station, the delegation stopped by Norway's Svalbard islands.

Rogozin, who oversees defense in the government among other things and is known for his nationalist views, has been slapped with sanctions barring him entry to the European Union and non-EU Norway over his position on Russia's annexation of Crimea.

Norway demanded that Moscow explain why he visited the islands given the sanctions imposed on him.

In response, Russia's foreign ministry dismissed the accusations as "absurd" and said that the delegation made the stop for "logistical reasons". The ministry also cited a 1920 treaty granting access to the islands to nationals of all signatory nations including Russia.

The Norwegian response: Norway will now consider reinforced measures regarding entry to Svalbard.

"From the Norwegian side we will consider reinforced measures concerning entry, also including Svalbard," Frode Andersen says to BarentsObserver.

First Deputy Chairman of the Russian State Duma Committee on International Affairs Leonid Kalashnikov questioned Norway's right to have Svalbard.

The islands are "not fully under Norwegian sovereignty," he said.

Last year Rogozin become the person who is responsible for Arctic matters. He has been in charge of plans to reopen Russian military bases in the area.

Russia's new focus on the Arctic can be compared with the annexation of Crimea, says Rogozin in a video that was published April 20th."

And Americans out there, Rogozin thinks the loss of Alaska is not acceptable either.

According to this piece in the *Alaska Dispatch News* published on March 27, 2015:

Lurking in the Russian plan for its Far East is a sinister figure who believes that Alaska is a legitimate part of Russian manifest destiny – Deputy Prime Minister Dmitry Rogozin.

It was betrayal, Rogozin believes, that led to the sale of what is rightfully Russia's to the United States. In the forward to Ivan Mironov's book, "Alaska Betrayed and Sold," Rogozin equates the sale of Alaska to another betrayal: Mikhail Gorbochev's and Boris Yeltsin's breaking up the former Soviet Union.

Rogozin is not a crackpot. He's the equivalent of the U.S. Secretary of Defense, and one of President Putin's right-hand men.

He's on the U.S. State Department list of individuals responsible for destabilizing the Ukraine among other nefarious accomplishments intended to reunite the former Soviet Union into the Russian Federation.

And, he's the newly appointed head of Arctic policy for Russia, likely forming a new government entity designed to carry out Putin's militarization and development policy in the Arctic.

If I lived in the Baltics, I would be a bit more than nervous, for as Secretary Kerry has warned us these guys live in the 19th century, and we remember what that century eventually delivered to the world in the 20th.

"You just don't in the 21st century behave in 19th century fashion by invading another country on completely trumped up pre-text," Kerry told the CBS program "Face the Nation."

http://www.reuters.com/article/2014/03/02/us-ukraine-crisis-usa-kerry-idUSBREA210DG20140302

Well unless you do.

Copenhagen Airpower Symposium: Thinking Through the Evolution of Coalition Airpower

By Robbin Laird

On April 17, 2015, a joint symposium on the evolution of airpower was co-sponsored by The Sir Richard Williams Foundation (Australia) and the Centre for Military Studies of the Department of Political Science of the University of Copenhagen.

Both organizations are partners with *Second Line of Defense*.

This was an unusual conference given that it launched an Australian effort to broaden the working relationship with non-Asian partners in shaping new approaches to airpower and was, in turn, the beginning of a broader intellectual outreach by the Danish Centre as well.

It seemed that the Queen of Denmark smiled upon the organizers by having her 75th birthday the day before and greeted Danes and visitors facing her in her royal carriage are her son and her Aussie daughter-in-law, Crown Princess Mary.

In the photo below, the Queen is waving to part of the symposium team while the Crown Princess is sitting in front of the Queen.

It seemed propitious and was.

For the conference launched a significant effort to think through the core problem of coalition airpower as seen from the standpoint of the smaller powers or airforces, or in the case of the United States, the role of the USMC in working through transformation correlated with evolving coalition approaches.

The core presentations were given by operators from key Air Forces which then drove the broader discussion.

It is no accident that one key element of USMC evolution is the working on new approaches to C2 with allies by 2nd Marine Expeditionary Brigade and doing it the way the Marines think about the role of embedded airpower.

The Marine Corps approach is widely appreciated by allies as they think through their own approach to reshaping coalition approaches, notably under the impact of airpower modernization, including the broader use of fifth generation capabilities.

Although a small country, Denmark is one of the most expeditionary in today's Europe and has organized its forces to be able to do so.

In fact, Denmark has a core coalition operational competence, one which is of growing significance as operations become increasingly coalition in character.

Airpower and intervention forces are increasingly modular and scalable.

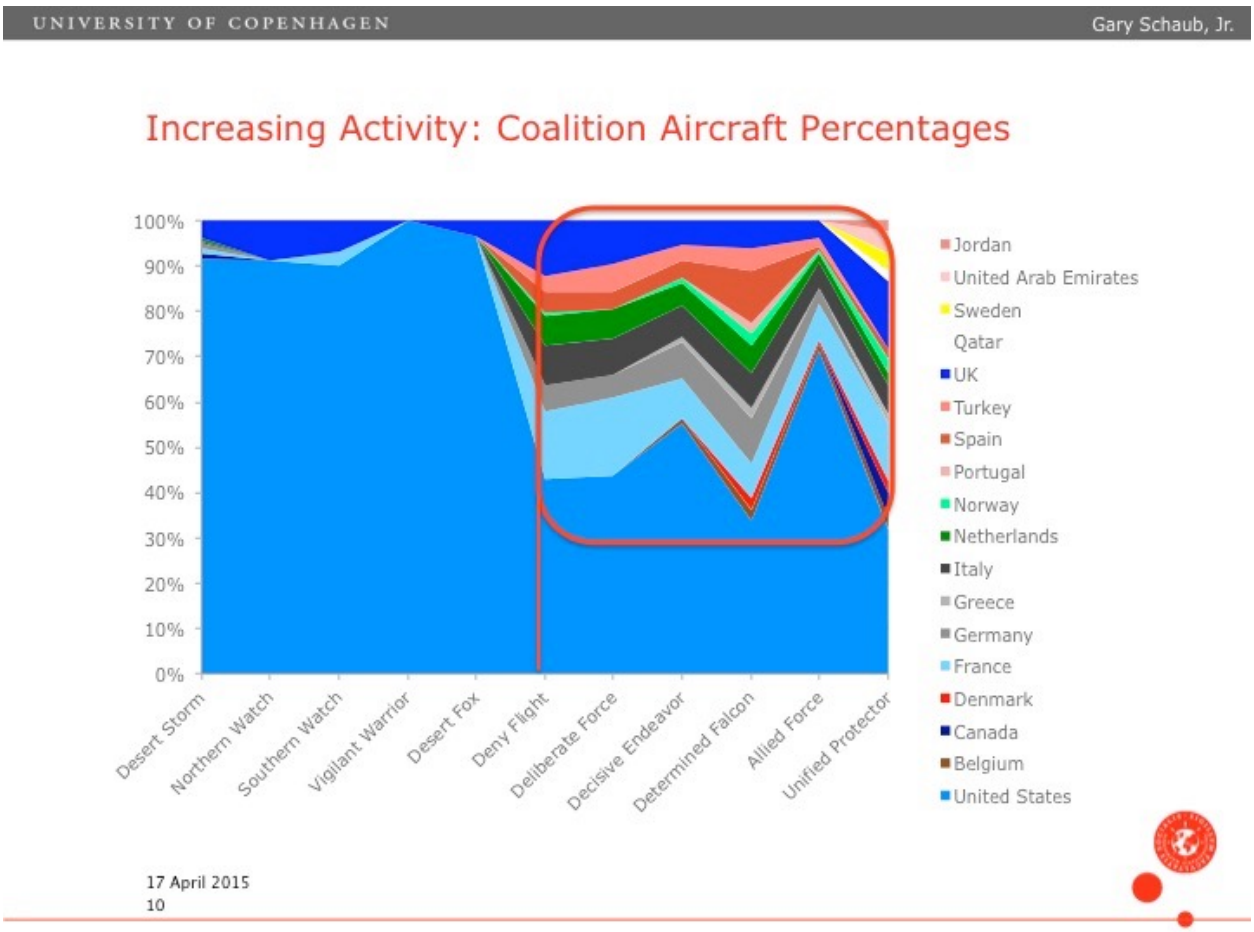
Denmark has modular and scalable forces in its DNA.

The conference was clearly not about applying lessons learned by other powers being applied to Denmark; it was an honest quest to understand how to reshape forces to be more effective as modular and scalable building blocks for future coalitions, notably as capabilities are being reshaped under the influence of new technologies, such as the broad introduction of fifth generation aircraft.

And the trend line highlighted in the opening of the conference by Dr. Schaub underscored the changing dynamics of coalition.

Over time, the numbers of participants has gone up and their engagement as a percentage of operations has done so as well.

The rethinking being done by the Royal Australian Air Force, the Royal Air Force, the Dutch Air Force and the Danish Air Force as well as the USMC were the major inputs to challenging the participants at the Conference to think through the rapidly evolving demands for and reshaping of approaches for successful coalition airpower.



Conference Program

PROGRAM

TIME	SPEAKER	TOPIC/EVENT
08:30–09:00		Registration
09:00–09:30	Dr. Gary Schaub, Jr. (CMS) AVM(ret) John Blackburn (Royal Australian Air Force, Williams Foundation)	Welcome & Opening Remarks
09:30–11:00	Dr. Peter Viggo Jakobsen (Royal Danish Defence College)	The Danish Way of War after Afghanistan: Will the Activism Continue?
	Dr. Gary Schaub (CMS)	Learning from the F-16
	Colonel Anders Rex (Royal Danish Air Force)	Why Small Air Forces are Big in Coalitions
11:00–11:15		Coffee
11:20–13:00	Group Captain Paul Godfrey (Royal Air Force)	F-35 as the Catalyst for Change: The UK Perspective
	Lieutenant Colonel David "Chip" Berke (US Marine Corps)	5th Generation Experience: My Story
	Air Vice Marshal (ret) John Blackburn (Royal Australian Air Force)	The RAAF's Plan Jericho
13:10–14:00		Lunch
14:10–15:20	Air Commodore Dré Kraak (Royal Netherlands Air Force)	F-35 Introduction: A Small Air Force Perspective
	Colonel Bernard Willi (US Air Force, NATO Joint Air Power Competency Centre)	The JAPCC: Helping Small Air Forces Integrate New Capabilities
15:20–15:40		Coffee
15:45–16:55	Dr. Robbin Laird (USAF Association Mitchell Institute, Second Line of Defense)	Air Power in Transition
	Mr. Ed Timperlake (former Director, Technology Assessment, International Technology Security (Office of the Secretary of Defence))	Early 21st Century Warfighting Trends
17:00–17:30	AVM John Blackburn Dr. Gary Schaub, Jr.	Closing Remarks
17:30–19:00		Reception

THE SIR RICHARD WILLIAMS FOUNDATION

UNIVERSITY OF COPENHAGEN

The Danish Perspective on the Way Ahead: Lessons from the Past and Pathways to the Future

The Danish Way of War After Afghanistan: Will the Activism Continue?

Dr. Peter Viggo Jakobsen, from the Royal Danish Defence College, provided an overview of the evolution of Danish defense policy to lead off the Symposium on Airpower co-hosted by the Williams Foundation and the Centre for Military Studies of the University of Copenhagen.

Jakobsen explained that Denmark was a member of NATO from the beginning but circumspect in its operations within NATO.

Indeed, during the Euromissile crisis of the early 1980s, Denmark was not an enthusiastic supporter of the deployment of the new missiles.

Paradoxically, with the end of the Cold War, Denmark has become one of the three expeditionary states in Europe, along with Britain and France.

As Jakobsen put it:

We started out in the first period from 1864 to the end of the Cold War basically, not having anything to do with war.

And then since then we've basically gone to war since the late '90s and not missed any opportunity to do so.

But something strange happened in the 1990s.

The Danes were the most enthusiastic about the Kosovo air campaign among Europeans, and it was also in Denmark that you found the highest level of support for providing ground troops for an invasion if the air campaign did not succeed.

The Danes have accepted the notion that force is legitimately exercised in defense of their values and interests.

We have some 50,000-60,000 cars in Denmark now with yellow stickers on them saying, "We Support our Troops."

That's something you wouldn't find in Denmark 10, 15 years ago.

We have flag days.

We have homecoming parades.

These are things you traditionally associated with the United States or Britain, but we do them now too.

According to Jakobsen, the Danes have been very supportive of the United States and NATO missions and have been engaged in every NATO mission since the end of the Cold War.

Denmark has generated popular war heroes, such Lars Møller or Anders Storrud.

There has been an avalanche of books, movies and TV series in Denmark which deal with war.

In 1994 the Danes engaged in a tank battle against Bosnian Serb forces (Operation Bøllebank[1]).

They defeated the Serbs handily.

This turned out well for Denmark and Danish politicians could leverage that experience to build a case for its effective engagement in coalition operations.

Dr.Jakobsen addressing the Copenhagen Airpower Symposium. Credit: Second Line of Defense

As Jakobsen highlighted:

And it also meant that we began to get a little praise from our allies in NATO, from the United States, and that's not something that we had been used to in the previous decade.

And basically we have constructed a new narrative that we've been able to explain to the Danish public, why it's the right thing to sometimes use force and how you can help make the world a better place and Denmark more secure by doing so.

And at the heart of the Danish approach is going to war with coalition partners.

"Usually we go with our key NATO allies in recent years either with the UK or the US and we've pretty much tried to do so without any national caveats or restrictions on how we can use our forces."

Clearly, the approach is not just about the use of force, but force within a broader security context in the region where force is being used.

There are some anomalies, such as not wanting to take prisoners– and take legal responsibility for them — and here the Danes work with the Brits to sort through that problem in the field.

And the Danes use their own interpreters in the field so they are not held responsible for foreign nationals when the Danish forces leave an engagement.

There is growing opposition to the use of force within Denmark, as there is concern with the results and effectiveness of the interventions over the past few years.

Jakobsen highlighted opponents to the use of force's position as follows:

"Why don't we go back to the good old days during the Cold War when we're arguing peace-keeping and preventing wars and we certainly don't want to do Iraq or Afghanistan again.

And hey, if we go out there and fight and attack in various places then they're more likely to launch terrorist attacks against us."

He concluded:

Who will win the Danish debate?

At the end of the day what will determine it is whether we again will continue to get the phone calls from the DC, from the UN, from NATO, with a UN mandate saying we really need to stop an atrocity or we really need to do something about this crisis and we need your help.

If that happens then I cannot foresee in the foreseeable future any Danish government that would refuse such a request.

So if you keep calling us and provide a UN mandate and a just reason for using force then we'll come.

He also argued that if this stance prevails, then replacing the current F-16s is a logical thing to do and that given the centrality of the United States to Danish defense and security, procuring an American plane was the most logical thing to do.

Coalition Operations are in the Danish DNA: Finding Gold in Coalitions

Colonel Anders Rex, Chief of the Expeditionary Air Staff of the Royal Danish Air Force (RDAF) provided an overview to the RDAF approach to coalition operations at the Copenhagen Airpower Symposium held on April 17, 2015 in Copenhagen.

The Royal Danish Air Force consists of five wings: three air bases, a number of colleges, the Skagen and Bornholm radar stations, and Expeditionary Air Staff. The five wings undertake both international and national roles.

According to Col. Rex, coalitions are about solidarity and burden-sharing in dealing with shared tasks and missions.

Being a good coalition partner takes practice.

We have a core group in the Danish Air Force, which has done several coalition operations, and when we are not doing that we participate in multinational exercises.

Col. Anders Rex, Danish Air Force. Credit: Second Line of Defense

This is a core competence that the Danish Air Force has developed, and as we do so we work to find the gold in each coalition operation.

Clearly, for the 30 operational Danish F-16s in the Danish fleet to have impact they need to work effectively with those of other Air Forces, especially the countries in the region who also fly F-16s.

Of course, the USAF is a much larger force than that of Denmark's.

But Col. Rex underscored that "it's so big that if you look at the rate of coalition training opportunities per airman I'm sure it's a lot lower than an air force like the Danish one."

For the operations which we undertake "It's really important to know and understand how to make the most out of a coalition, how to dig out the gold."

Airpower is the essential element to any kind of rapid response coalition operation.

Look at the Libyan operation as an example.

The Libyan mission was decided and less than 12 hours after the political decision, six Danish F16s took off from Denmark and flew down to Sigonella (in Italy); and less than 30 hours after we landed down there we flew our first combat mission in the operation.

That is fast.

Col. Rex highlighted that the Danes are able to do that because of their rapid decision making cycle.

The Danes have clear responsibilities and a tightly knit force.

One of the good things about being small is that you know everyone, especially when you get to the colonel level, for instance, there's very few of us.

I think there's about a hundred, so it's easy to know a hundred people.

He also argued that coalitions are about diversity and being able to combine different forces that provide different capabilities into an integrated whole.

But of course, to do that you have to train, train, and train together.

A clear challenge for effective coalition operations is releasability of information in a timely manner.

"All the information and all the intelligence is not worth a thing if you don't have a system for disseminating it.

Yet there's an upside to it as well because of coalition diversity where you bring into the operation different people with different experiences and expand the knowledge base.

So the knowledge pool should be a lot bigger as a result of operating in a coalition."

And to highlight the challenge of pace of change, Rex inserted: "We are moving at the same pace that the Brits are going metric, inch by inch."

A key focus of effort among the Allied air forces is clearly upon how to make the most of a coalition and to work more effectively together.

He coined the term "coalitionability" and set a goal for allied and partner Air Forces ways to shape higher levels of "coalitionability."

The Evolution of Coalition Airpower: Lessons Learned from the Danish F-16 Experience

In his introduction to the Copenhagen Airpower Symposium on April 17, 2015 as well in his briefing on his newly released report on the lessons learned from the F-16 experience, Gary Schaub, Jr., the co-host of the Symposium, provided a number of insights with regard to the Danish experience and to the overall evolution of coalition airpower.

In his opening to the Symposium, Schaub provided a number of metrics of change affecting the evolution of coalition airpower.

Put in simple terms, the numbers of assets being flown by the allies is going down and the need to get the kind of mass and capability which one needs from operations can come only from effective coalition aggregation of capabilities.

This is also required because the demand side for operations has been going up as leaders see the utility of airpower as a rapid response capability.

As Secretary Wynne put it in a recent interview with regard to the evolution of the coalition dynamic:

Question: How important is the coalition aspect of operations going to be for the United States?

Secretary Wynne: I think it will be the norm, whether you are following a concept of leading from the front or from behind.

The emphasis on coalition warfare will be the norm and driven by two factors.

The first is the relative equality of the technology across the coalition, as well as the role of bases provided by coalition partners.

The second is the lack of sufficient investment by any of the coalition partners to shape an overall dominant national force structure.

The U.S. and its allies will need to reach out to other nations to have a completely capable dominant force structure.

And over time, the coalition versus US level of activity in coalition airfare has been going up as well.

In his formal presentation to the Symposium, Schaub highlighted key findings from the Centre's report on lessons learned from the F-16 for Denmark.

The full report can be downloaded below, and the overview of the report provides a good highlight of some of its key aspects of the report which Schaub presented to the Symposium.

When Denmark chose to acquire a fleet of 58 F-16 combat aircraft in 1975, it received substantial and disproportionate benefits given the way that investment was made and managed. Buying a common aircraft type together with allies deepened Denmark's ties to its Alliance partners, including deploying in multinational formations with those partners. It enabled multinational cooperation to modernize the aircraft at greatly reduced costs over its lifetime.

Common aircraft also enabled improved training opportunities for Danish pilots and substantial assistance from the United States when pilot shortages threatened to idle 25 percent of Danish F-16s.

Common aircraft did not guarantee that Denmark would be as effective as others in coalition air campaigns, however. This required substantial modernization of the aircraft, acquisition of advanced systems and munitions, reorganization of the Royal Danish Air Force, a change in its organizational culture, and sufficient numbers of pilots.

Once these adaptations occurred, Danish performance in expeditionary air operations garnered Denmark praise from its coalition and Alliance partners. Danish leaders should cooperate with its allies in a similar way to replicate this experience when they choose a replacement aircraft in 2015.

During his presentation, Schaub highlighted many interesting findings from the report but we will underscore only a few of these points here, and encourage our readers to read the full report.

The Royal Danish Air Force (RDAF) acquired its F-16s at a time when the upsurge in expeditionary activity was being generated.

So this means that the F-16 almost by the nature of these operations would need to be coalition capable, which was enabled as well by the commonality of buys of F-16s among states in the region.

And the Danish F-16s began to operate in a period where precision fires became of increasing importance as well for coalition operations, which meant that the F-16 has been the platform for learning to perform precision-fire operations for the Royal Danish Air Force.

As Schaub put the acquisition situation for Denmark at the time of acquiring the F-16:

The F-16 program came from the Multinational Fighter Program. The United States, the Belgians, the Norwegians, the Dutch, and the Danes all agreed to come in together to buy the F-16 in 1974 to 1975.

The great thing about this process for a smaller air force is that it was a large buy. Therefore, the unit price for each aircraft was far less than it would've been for a small purchase individually made.

The first panel seen left to right, Dr. Gary Schaub, CMS, Dr. Peter Jakobsen, Royal Danish Defence College, and Col. Anders Rex, Royal Danish Air Force

The nature of the consortium that bought and operated these common F-16s was known as the EPAF or the European Participating Air Forces.

According to one source:

In the late 1970s, Belgium, Denmark, Norway and the Netherlands started looking for a replacement for the F-104 Starfighter.

These four nations, known as the European Participating Air Forces (EPAF), became the first international customers for the F-16.

Together with the US, they started a unique multi-national development program for the F-16.

Under the terms of the agreement, F-16 Fighting Falcons for the EPAF nations were to be produced locally.

Belgium was one of two EPAF nations responsible for the European production of F-16s (the other one being the Netherlands).

The primary Belgian contractor in the F-16 program was the Societe Anonyme Belge de Constructions Aeronautiques (SABCA), responsible for the final assembly of F-16s intended for both Belgian and Danish service.

The F100 engines for the F-16s of all four nations in the European consortium were manufactured by the Belgian Fabrique National (now Techspace Aero).

The Belgian company MBLE produced the F-16 radar for three of the four EPAF nations.

The EPAF consortium funded, developed and produced an initial 348 F-16s, with an eventual total of 524, for their respective air forces. SABCA even produced 3 F-16s for the US Air Force.

Schaub emphasized that the commonality in acquiring the aircraft carried with it significant opportunities for common support and modernization of the aircraft as well, or as one might put, coalition-enabled was built into the joint buy and use of the aircraft.

This enabled a lot better fleet management so you could squeeze more flight hours out of the entire air combat fleet.

Over time, a division of labor for maintenance developed whereby the Danes and the Dutch and the Norwegians focused on different types of maintenance.

If you had a particular type of problem or system problem popped up across the fleet, all those aircraft would go to one of those countries specially focused on fixing that problem.

That was a very nice way of taking smaller capabilities or smaller resource bases and to be able to focus and develop expertise that was deep and that allowed the entire consortium to manage their fleet better.

http://www.f-16.net/f-16_users_article2.html

Parts sharing was facilitated as well and shared modernization was possible.

Agreed upon modernization initiatives were paid for by each country in proportion to the number of tail numbers each had in their national fleets.

"This really enabled the smaller Air Forces to go through quick modernization."

The commonality of the coalition aircraft allowed flexible options for the RDAF as well.

One option was to be able to fly to Red Flag at Nellis and leave the planes at home and to have the Danish pilots fly USAF F-16s.

Another option was when pilot shortages occurred in Denmark, the RDAF could tap into USAF instructor pilots to provide training for the RDAF.

Among the lessons learned by Denmark with the F-16 program with regard to its replacement aircraft include the following:

First of all, and this applies to every candidate in the competition, buy something that everybody else is using.

Partners help significantly.

Secondly, having a big partner helps out an awful lot because you can share parts, modernization and experience and you can get backfills on other things that you might not be thinking of, that are beyond the aircraft itself.

Thirdly, institutionalize that cooperation.

Make sure that there is a structure, a management system in place so that hopefully, at least from the Danish perspective, or from a smaller Air Force perspective, there can be equal say for proportional pay.

That is the key driver that allowed the Danes to have an effective set of combat aircraft today.

Fourthly, managing the pilot cadre is a big issue and having partner pilot training capabilities is important as well.

In short, the acquisition and operation of the F-16 came at an interesting point in Danish history, where expeditionary operations became increasingly important.

And if as Dr. Peter Viggo Jakobsen argues, such operational proclivities continue, obviously the next generation Danish aircraft will be a key enabler for their operations.

Airpower Transformation: Australia, the USMC, the Dutch and the British

The USMC and the RAAF Focus on the Next Generation of Warfare

By an historical anomaly more than strategic planning, the USMC and the RAAF find themselves in similar situations in one key regard: both are undergoing fundamental modernization of their air platforms, and are approaching the re-set not from a platform-centric mentality but a transformation approach.

Prior to the airpower symposium in Copenhagen, we had a chance to sit down with Air Vice-Marshal (Retired) John Blackburn and Lt. Col. "Chip" Berke and discuss with them the way ahead and the challenge of innovation in shaping 21st century approaches.

John Blackburn speaking at the Copenhagen Airppwer Conference. Credit Photo: SLD

Blackburn was the co-chair of the conference and Berke was a speaker focusing on his air operations experience through multiple settings with the F-18, F-16, operating as a JTAC, and then operating the F-22, the F-35 and becoming the CO of the Warlords. Berke is currently studying in Washington DC and preparing for a Pentagon tour.

We started with Blackburn and he focused on what the RAAF Chief of Staff calls Plan Jericho to get a sense of the focus on transformation for the RAAF and the Australian defense forces.

Question: What has been the trigger for Plan Jericho?

Blackburn: The decision to acquire F-35 triggered the rethink.

The significant advances the F-35 offers to the combat force needs to be matched by similar type of advances in situational awareness an the ability to operate as a team across the whole force.

How are we going to use our legacy systems, and those new platforms we are bringing into the force in an innovative way to shape new capabilities and concepts of operations?

From our dealings with the Marines in Australia and elsewhere, it was obvious that they were thinking along similar lines.

The Marines are truly joint in the Australian terms, and like us, they are not waiting for new systems to come into play prior to shaping a new approach to combat innovation.

They are shaping the template as new platforms – in this case the F-35 comes into play.

They have put several years of work into thinking about and doing combat innovations prior to the F-35 entering their force.

This is the way we are approaching the challenge and opportunity as well.

Question: Because of the constant barrage of criticism leveled at the F-35, and that for many people the thinking is about one to one replacement platforms for 20th century forces going into the future, have you find much thinking about a comprehensive reset of combat approaches associated with the aircraft?

Blackburn: Fundamentally there is a huge intellectual void.

We think of the F-35 not as a replacement aircraft but a trigger to a fundamental rethink about the shaping of 21st century approaches to combat and warfare.

Unfortunately, much of the thinking out there is trapped in the 20th century is platform replacement centric and really is not getting on with transformation.

When the Jericho team was first set up earlier this year the fundamental question posed to them was: how do we explore the future concept of operations?

And then another key question: "What is the role of each of the fighting elements in this future combat environment?"

This is not just about an airplane or the air force; it is about the Australian fighting force as a whole.

Question: The Chief of Staff of the RAAF clearly highlighted that you have made your basic platform decisions and it was now time to think about how they work together.

This must mean that a key part of innovation will also go to the enablers?

Blackburn: Exactly.

Industry likes to sell you replacement platforms; they do not often focus on the platforms and the enablers as a system.

How do all the other enabling pieces, everything from training to selection to the supporting elements, the logistics, how is that going to work in this fifth generation force?

The concept is really one of the key things that's being worked right now.

Along with that, we had to have a narrative that describes the 5th Generation force we want to be.

What is fifth generation enabled force?

The definition the RAAF Chief has used is to make sure it means something not just to the Air Force, but also to the Army and to the Navy.

It is that a force with vastly improved shared situation awareness and the ability to operate as an integrated team.

The connectivity and fusion thinking is central to the ability to operate far more effectively as an integrated team.

The Australian Defense Minister used that terminology about two weeks ago in a major speech he gave in Australia.

He wants Australia's Defence force to be a fifth generation force.

Clearly, it is not just about connecting everybody; it is about tailoring the information appropriate to the engaged force and to the decision makers at the appropriate level to lead the force.

Marines with Marine Rotational Force – Darwin and Australian Soldiers with 1st Brigade stand in formation during an award ceremony aboard Robertson Barracks, April 22, 2014. Brigadier Michael Harris, received the Bronze Star Medal with Combat Distinguishing Device from Lt. Gen. Terry Robling, commanding general, Marine Corps Forces Pacific, for his heroic actions in Vietnam while serving as the Australian commanding officer of Delta Company, 1st Battalion, 9th Marine Regiment. Harris was the first non-American to lead Marines in combat during the Vietnam War. Credit: MRF-D, 4/22/14

The RAAF are going to put the enablers through a number of demonstration projects to find what works, and the most effective ways to shape a more effective force, rather than chasing the next platform acquisition.

Question: Chip, you have heard John and what is your sense of the importance of what the RAAF is now focused upon?

Berke: To be honest, it is refreshing to hear the language and the conversation we are having now.

There's a compulsion, when you talk about a replacement aircraft, is to just apply the templates that we're comfortable with and apply the philosophies that we're familiar with and just sort of overlay that on top of the hardware, the equipment.

And with the fifth generation aircraft, this just does not apply.

I think if people don't commit to the idea that the platform is revolutionary, the platform is unique, the platform reveals capabilities that didn't exist before and can transform war fighting, then you're never going to get to the next phase of what does it mean for the overall force.

I think there's a burden of generating commitment that one individual asset can actually be the impetus to change the way the force sees integrative war fighting.

The Marine Corps I think has had a similar experience the Air Force has had with the Raptor and the Eagle, with the V-22.

The V-22 is a replacement for the CH46.

You can make that argument.

You can say that, but I think once you see the V-22, you overlay the CH46 template on it and I think it doesn't take a lot of time to realize that that path makes no sense at all.

I think that's human nature, it's our compulsion, to take what we know and take this new thing and put it together with an older one.

There is a chronological connection between the CH46 and the V-22, but that is about it.

In the time continuum, yes, the V-22 replaced the CH46. That's about where it ends in terms of capability and impacts.

Question: You have flown several legacy aircraft, and the F-22 as well as F-35. How does your CH-46 to V-22 analogy apply?

Berke: The F35 is here but you often here: "Well, we're going to replace the F18 with that, and the Harrier, we're going to replace the F16 and the A10."

For me, that has always been a red flag because of my experience in the Raptor where the Air Force originally acted like it was an F-15 replacement.

It is not.

Lt. Col. Berke speaking at Copenhagen Airpower Conference. Credit Photo: SLD

Benefiting from being in a community that had already come to grips with the idea that the Eagle Raptor replacement was wrong, it is clear the F-35 is not replacing anything – it is a whole new way to operate.

The USAF basically had to start over, sort of admit that they'd spun their wheels for a couple of years and tried to apply the Eagle template.

They copied and pasted Eagle with the Raptor in the Weapons School publications.

The ranges, the way they flew, the way they interacted with everybody else, looked very similar for a while.

At some point, they just cut bait on that and realized it was the wrong way to do it, and they were forced to accelerate the evolution of the airplane once they came to grips with the fact that is was not a step change from the Eagle.

Now we are in a similar position with the F35, but because it sort of looks and sounds and smells like a fighter, there's this compulsion to look at it like a fighter.

One of the things I constantly try to say is that anybody that starts to try a comparison between the F35 and another platform – it's a red flag.

It's an immediate warning sign that they are missing the much bigger picture about the platform.

Once you start going through the metrics of the Eagle and the metrics of the F16 and the metrics of the Hornet, and compare them to the metrics of an F35, you're dealing with someone who's viewing this in sort of that traditional paradigm.

That's not easy to break.

We know what we know.

We understand what we understand, and when all of a sudden, everything you knew about fundamental military aviation is different, that doesn't resonate.

From someone who's been on the inside of it, I know this sense of rupture and generational difference first hand.

Once folks get the exposure to the F35 and say, "Whoa, holy cow, this is different." I think you can get to the second set of questions, which is: "How does this transform everybody's war fighting capability."

Fifty years from now, looking back on the history of the F35, the biggest judgment will be: "How long did it take to finally realize the capability and the potential of the platform as it contributes to war fighting in general."

We're either going to look back in history and say, we realized the potential of the contribution to integrated warfare as a whole in a timely manner, or we did not.

The Fifth Generation Experience: Getting on With Combat Transformation

Lt. Col. "Chip" Berke first met John Blackburn as a guest at the Williams Foundation Seminar in March 2014 on airpower.

When Blackburn was putting together a follow-on event with the Centre for Military Studies in Denmark, he requested early on that Berke provide his insights into what the fifth generation experience is really all about.

There is virtually no one better qualified to do so — which the audience attending the Copenhagen airpower symposium soon learned.

His background is unique in that he has moved from more than 2,000 hours in the Hornet to the F-22 and then the F-35. He then became the first F-35 squadron commander in the USMC. He also had time as a ground air controller with both the Marines and the US Army as well.

For Berke, the F-35 represents a rupture in airpower, not a steady state evolution.

It is not a replacement aircraft, and is no more a chronological replacement for the Hornet or the Super Hornet than is the Osprey a replacement for the CH-46.

It is very different type of airplane and rooted in doing things very differently, and that difference is crucial to mission success dealing with 21st century strategic challenges.

It is more about rupture than continuity and is a key part of the air combat revolution underway.

Berke described the challenge he faced going from being a very successful pilot in 4th generation aircraft to confronting the disruptive change associated with fifth generation.

He faced a situation where pilots with much, much, much less experience than he had were able to excel against him as he brought fourth generation mindsets to the F-22.

I showed up with guys about half my experience, who were just annihilating me in the airplane.

They just understood things way better than I did.

It was a very difficult transition for me.

So much of what you knew as a pilot didn't apply.

It was very frustrating to make fourth generation decisions – my Hornet brain – inside an F-22.

A lot of those times, if not most of the times, those decisions proved to be wrong.

One might note, given the high cost of pilot training and the key role of the combat pilots in the air combat force that learning to fly yesterday's airplanes creates a mind set that actually can undercut the capabilities to use 5th generation aircraft such as the F-35 effectively.

It is not just about wasting time, effort and resources; it is about undercutting the speed with which the F-35 can have an impact upon the combat force.

When he was able to grasp how to think differently as a combat pilot in the F-22, he recovered his ability to perform combat dominance.

You have so much more to offer the three-dimensional world than you did prior to really figuring it out.

When you realize that your contribution to air warfare is about that, and you're doing it much better than you can in any other platform, you start to recognize your contribution on war fighting as a Fifth Gen aviator.

And what made the F-22 different suggests how the F-35 is different.

The F-22 is a very fast and maneuverable aircraft, but that is not where it excels.

It is an information dominant aircraft, a characteristic that the F-35 takes to another level.

"The F-22 is the fastest, the most powerful fighter ever built.

The least impressive thing about the Raptor is how fast it is, and it is really fast.

The least impressive thing about the Raptor is its speed and maneuverability.

It is its ability to master the battlespace is where it is most impressive.

Rather than focus on speed is life and more is better, the Raptor has started the rupture in air combat whereby information dominance in the battlespace is the key discriminator.

Berke believes that the replacement mentality really gets in the way of understanding the air combat revolution that fifth generation capabilities have introduced and that will accelerate with the F-35 global fleet.

He argues for the need really to accelerate the leap into fifth generation-enabled combat forces for the US and its allies.

"When you look back a decade from now, what will the F-16 be in 2025? Or the F-18 in 2025?

The disparity which is already significant now will be even greater a decade out with comparison to the F-35."

It is about the plane in an important sense.

We don't want to find ourselves freaking out in 10 years that we wasted the last 10 years wondering, "Should we?" We should have spent all that time asking ourselves, "How do we?"

The "should we" question is yesterday's news.

If you're asking if we should fly Fifth Generation airplanes – if you're asking if a Fifth Gen fleet is necessary, you are old.

You are behind.

You are late.

And you're going to lose.

Lt. Col. Berke responds to a question from the audience at the Copenhagen Airpower Symposium. Berke is flanked by Group Captain Paul, Godfrey, RAF, and John Blackburn, Williams Foundation. Credit Photo: Second Line of Defense

In another sense it is really about the synergy between the plane and the emerging fleet and the fifth-generation enabled combat ecosystem.

Berke used the iPhone analogy to describe the dynamics of change.

When Steve Jobs introduced the iPhone he said it was revolutionary for it combined a computer, with a music player with a phone.

And he repeated this several times in the roll out presentation.

I doubt that anyone in the audience today would describe their iPhone that way.

The ecosystem, which grew up around the phone and with which the phone itself has matured, is what is revolutionary, not simply the phone.

The same is true of the F-35; it is revolutionary; but the ecosystem which will change and which will inform the further development of the aircraft is even more so.

When we fast forward to 2025, what will be the threats with which we will be dealing?

Berke underscored that we could debate that point from the perspective of 2015 but it would be a debate.

Come 2025, and the threats will be much clearer and need to be dealt with.

We need a platform which can be responsive to those threats and evolve over time.

That is precisely what the F-35 is all about.

The F-35 is designed to evolve…..

Plasticity is about the idea that is inherent in the design, inherent in the DNA of the equipment you buy, is the ability to substitute for other elements as needed.

I understand that the F-35 is built as a tactical aircraft; I get that. The fact that it's designed as well to be flexible to other mission sets and live in other regimes that you'd never ask a tactical platform to do is what give is it that inherent flexibility, that inherent plasticity.

Do we have a platform that's flexible enough to adapt to that changing environment? Fourth generation airplanes simply can't do that.

And in a theme that he introduced in the Canberra conference last year, Berke underscored that the notion of a tactical fighter was undergoing change as the pilot's ability to operate in the battlespace with information capabilities, expands as well.

The burden that the F-35 places on a pilot is much greater, and I understand the information processing is better.

I understand that the pilot interface with the aircraft is a lot better, but the skill set is much broader now because that pilot and that aircraft interact on a much broader capability, and it's much more operational, much more strategic, than any tactical platform that's ever been built because it's resident in the design of the airplane because of the things that it can do.

I can provide information to a general officer sitting in a CAOC.

At the exact same time, I can send information to an aircraft flying ten miles away from me.

That information is relevant to both at the same exact time in two totally different ways.

No other airplane has ever been asked to do that before, let alone have it be natural in its DNA or expect to be able to do that by design.

And to highlight the significant difference between the 4th and 5th generation, one simply can compare what was asked of each when they were launched into operation.

What makes a sensor-collaborator-shooter platform relevant?

That is not the question we asked about a fighter 10 years ago, 25 years ago.

That was not the question we asked in 1975 when we wanted to buy the F-16.

That's not the question that was asked 10 years ago with the Typhoon.

Information development, access sharing, and the ability to integrate security – that's how you measure the F-35.

That's how you measure the fifth generation fleet.

How well does it do that?

You can build and design an airplane, and we have a designed and built airplane, to be able to answer those questions, to be relevant as a shooter, to be relevant as a collaborator.

You have this information.

I have this information.

Let's view that information together, provide each other a much more enhanced picture to make a more intelligent decision while, at the same time, funnel information to other users that can parse out the data that's valuable and relevant to them.

And it is the ability to operate throughout the combat spectrum that is essential as well, and is a core competence of the F-35.

Air warfare is about spectrum dominance.

It's not just enough to say, "My radar is better than your radar," or "My sensor is better than your sensor," or "My capability in this spectrum is better than yours."

I have to be able to move back and forth between spectrums.

I need to figure out where within the spectrum the fight's going to take place, and then layer on top of it as much depth.

That's what Sensor Fusion is by the way….

It isn't just enough for that one airplane to get that information, it's the data link and the multi-functioning capability that all these different airplanes are fusing information together behind the scenes, and handing it to you, so you can now make decisions based on information that another airplane 10 miles or 100 miles away have given you, that you didn't even realize because you don't even have to ask him for information because it's just there.

And then Berke addressed the question of stealth and focused on its important contribution to the plane and its ability to operate and not providing a mystical capability.

Stealth facilitates access.

It doesn't make you invisible; you don't fly around with impunity.

It just allows you to operate in an environment that you could be restricted from or excluded from without it.

You take that with all the other capabilities of the platform, aggregate them together, and you now have a survivable platform that can operate in certain environments that no other platform can.

And clearly, the F-35 is designed to work with core assets throughout the battlespace.

With regard to other aircraft, the F-35 makes other aircraft more lethal and more survivable–and legacy airplanes provide ordinance and battlespace presence which complements the F-35 as well.

"Don't just think that the presence of a fifth gen platform is good to the legacy airplanes.

It's a two-way street, and it's very functional for everybody."

And he warned that if you do not make the jump into the F-35 world, you will have a core challenge of working with everyone else who has.

If you're on the outside saying, "I have this asset that I'd like to contribute to your fight," you put the onus on the recipient and go, "Well, we can use that on this side. Maybe it will fit here.

Can we communicate?

Can we make this work?

Can we make this relevant?

Let me see how you fit in.

For the USMC, the F-35 delivers essential capabilities to enhance the survivability and lethality of the MAGTF.

At the same time, it also allows the Marine Corps to link up more effectively with other forces as well.

Be brilliant for the Marines on the ground, keep Marines alive, support Marines in contact, and support Marine Corp objectives. We can operate any time, any place, anywhere, for any reason, with any other user.

Now you have a force that is relevant well beyond what its mission statement looks like on paper.

That's what the F-35 provides for everybody.

It's a great question to ask, what is it like to be part of that larger ecosystem?

In the Q and A, one audience member asked about the A-10 discussion in the US and Berke had a straightforward response:

As a JTAC the key requirement is that the airplane show up.

The A-10 pilots are amazing; the plane will not always able to show up in the environment in which we operate; the F-35 will.

That is the difference for a Marine on the ground.

Plan Jericho: John Blackburn Explains the RAAF Approach to Transformation

John Blackburn retired as an Air Vice-Marshal in the Royal Australian Air Force in 2008 and has been involved in a number of strategic issues since then in Australia.

He is currently the Deputy Chairman of the Sir Richard Williams Foundation, an Australian think tank focused on Air Power. In his Reservist capacity, he was tasked by the current Chief of Staff of the RAAF, Air Marshal Geoff Brown, to help standup what Brown calls Plan Jericho.

John Blackburn presenting at the Copenhagen Airpower Symposium, April 17, 2015. Credit: The Williams Foundation

He has worked on this effort for the past 12 months, and the Plan has been launched and even more importantly the process to achieve a transformation.

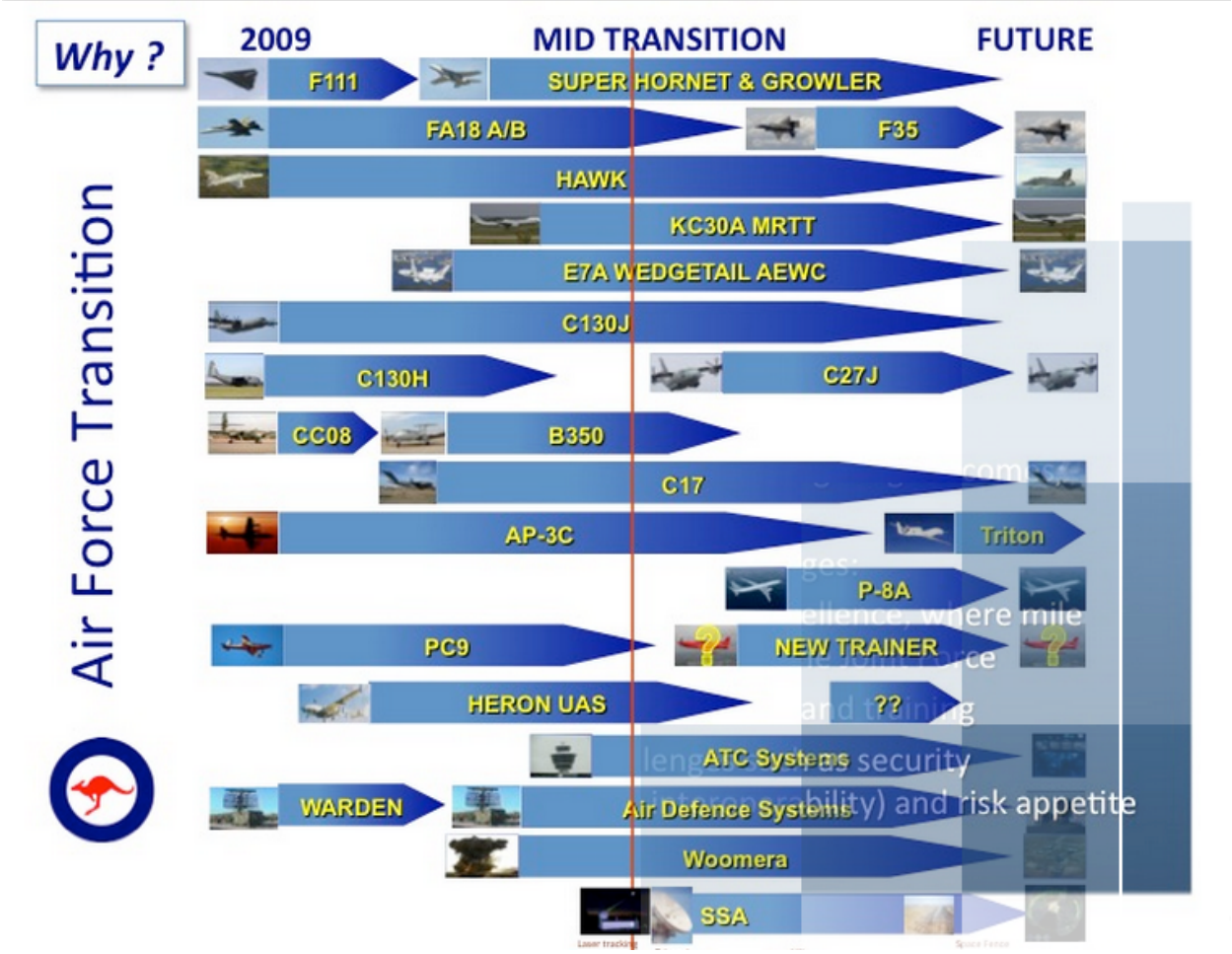
As Blackburn explained at the Copenhagen Airpower Symposium on April 17, 2015, the idea behind the effort is pretty straightforward, namely, to leverage the coming of the F-35 as a trigger for transformation for the modernizing RAAF fleet.

Rather than just waiting for the coming of a fifth generation aircraft, the Aussies are looking to reshape the force to become a more integrated, lethal force enabled by vastly improved, shared, situational awareness and targeted decision making able to operate effectively in the challenging environments in which they operate. It is about a step change in the ability to operate as an integrated team across the Australian Defence Force and in Coalition operations.

The RAAF considers the F-35 in the terms, which Lt. Col. Berke has described, an entirely new type of aircraft, but its impact comes not simply from being a new type of aircraft but providing enhanced situational awareness, decision-making and spectrum dominance.

And the full value of the plane simply will not come by operating by itself as some sort of silver bullet, but operating in an effective manner with the other new platforms and with legacy systems which are themselves becoming shaped for 21st century operations.

In part, the challenge is to get past the replacement platform mentality.



The core air platforms have been or are being replaced but the task is not simply to learn the new platform and prepare for the next one in a narrowly defined functional area – fighter is a fighter, tanker is a tanker, a lifter is a lifter, an air battle manager is an air battle manger and so on down the 20th century species list – but to shape cross platform capabilities and to reshape how battle management, operations and warfare is conducted.

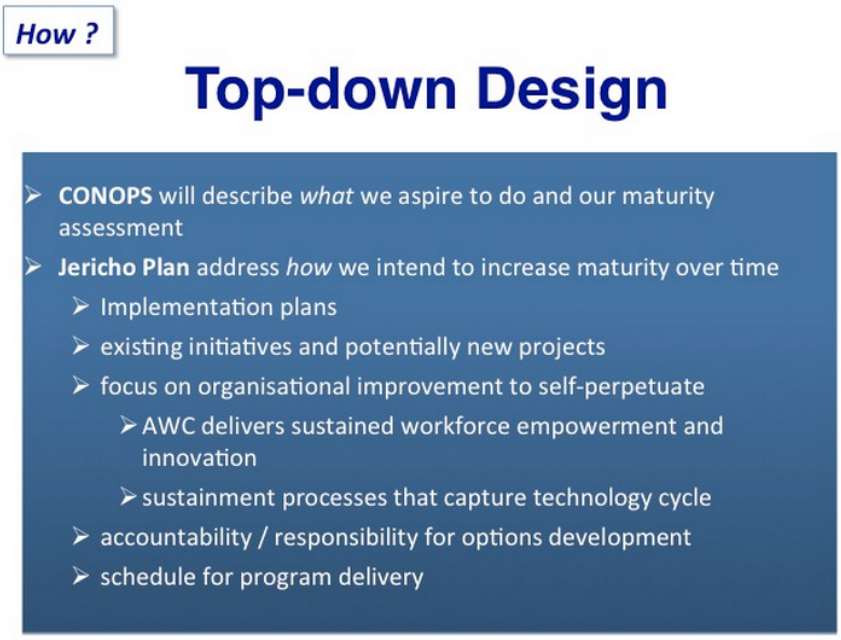
This is challenging for a small air force, which is already taxed in learning how to operate new platforms, and get them into operations.

The notion of preparing for the introduction of the F-35 and cross platform innovation will be evolved by testing new approaches to using other new platforms and leveraging them as well in new ways PRIOR to the F-35 becoming the dominant fighter in the RAAF.

For example, the RAAF Super Hornets operating in the Middle East have changed aspects of how they operate as they worked with F-22s in operations.

Or, the Wedgetail is an innovation battle management platform, but it is not about simply providing a 21st century upgrade on AWACS it is about managing the battlespace differently with various domains in operations, and testing ways to do battle management differently with the KC-30A tanker and the Hornets and Super Hornets.

They aim to find ways to shape distributed operational capabilities before the F-35 a trigger for a new model of 21st century distributed operations.



It is not about waiting for change to occur; it is about transforming with the coming of the trigger force, the F-35, and other key elements as well such as the Triton.

At the heart of the challenge is to shape a narrative, which gains wide acceptance in the Australian Defence Force and resonates with the public.

It is not about adding silver bullet capability for future fights.

Shaping a fifth generation warfare narrative and driving transformation are closely connected.

The narrative is not just an abstraction but describes a universe of innovation populated by cross-platform transformation.

The Chief of the RAAF starts with underscoring how the F-35 impacts on the pilots.

He has identified the following 5th Gen Implications for the pilot:

Sensors require little if any manual manipulation;

Fused picture is presented to the pilot on a single display;

Inter-flight comm is significantly reduced;

Pilot has more brain-space to be a tactician rather than a sensor operator and data fuser

Faster and more accurate decisions

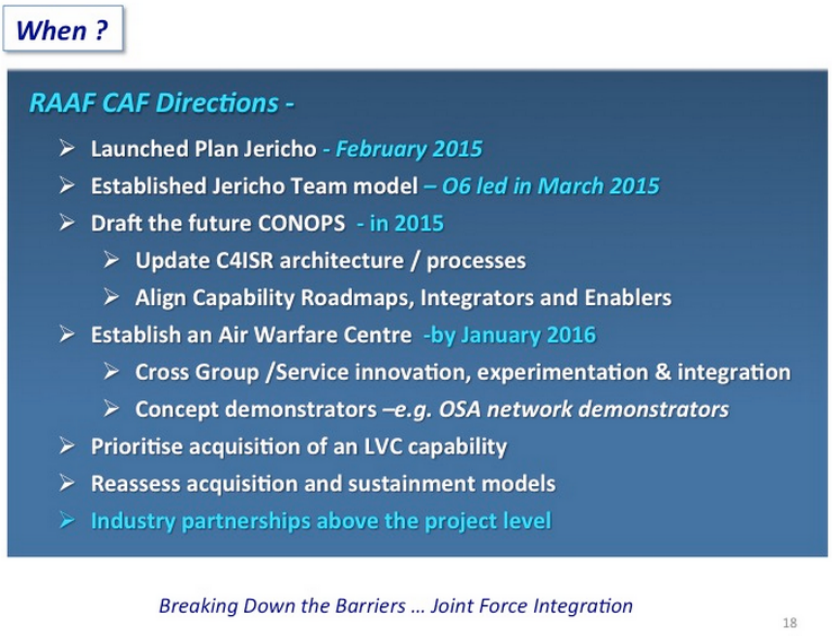
Massive generational leap in Situational Awareness

Ability to forward plan and allocate resources pre-emptively.

He then moves from this and asks about its implications then for the force:

In particular, "the Chief has focused on the 5th Gen Implications for Air Battle Management and has concluded:

We need a generational change in the ISR, network and Comms systems and other capabilities that will support the F-35 is we are to get the most out of the aircraft's capabilities …



We must continue to think about and analyze how we employ all of our air combat systems as a system of systems in our regional security setting and within the rapidly changing technological environment."

For Air Marshal Brown, the task for Plan Jericho is about combat innovation and not just about a new airplane, but what that plane and the innovation in the RAAF associated with the plane might mean for the Australian Navy and Army as well?

The question he posed to launch Plan Jericho is simply: What is a 5th Gen / 5th Gen enabled Force?

For the Chief this is clearly a Force with: vastly improved shared situational awareness, the ability to operate as an integrated team and the term is a lever for joint integration in 21st century combat conditions and adapted to a 21st century strategic environment."

The formal definition of Plan Jericho has been laid out in an official publication earlier this year and the way to understand it is as follows:

"Plan Jericho is Air Force's plan to transform into a fully integrated force that is capable of fighting and winning in the information age.

Jericho Vision: To develop a future force that is agile and adaptive, fully immersed in the information age, and truly joint.

This is not the final plan, but rather the first step to meet our challenge of transformation for the future.

In many ways, the ecosystem which synergistically interacts with the coming and evolution of the F-35 global fleet (as Lt. Col. Berke put it) is what plan Jericho is all about: how do we create an effective 21st century combat ecosystem leveraging the F-35 but within which the other platforms find their proper place in a reset or transformed combat force?

John Blackburn visiting the European Air Group prior to the Copenhagen Airpower Symposium. Credit: Second Line of Defense

The Dutch Air Force focuses on Air Force 3.0; the Marines on the F-35 reshaping the MAGTF, and the Aussies have launched Project Jericho.

It is not simply about buying a replacement aircraft.

It is about changing the mental furniture and reshaping the way the force operates.

This is easier said than done, something Blackburn is acutely aware of having been part of earlier RAAF processes of change.

The focus cannot be simply on top down directives or change, or simply having a transformation office handing out mandates for change.

It has to come from the 06 and O5 leaders and it needs to come from the operators and not just the self-styled strategic thinkers.

It is about unblocking opportunities, which can be found throughout the force; it can come only from the rising generation committing themselves to change and shepherding change throughout the RAAF. It is about defining a vector rather than a detailed plan.

To do so, the Jericho team has been established with two 06s or Colonels who are working the relationships within the RAAF and across the Australian Defence Force to support the Chief's approach.

They have been pulled from operational responsibilities for a period as co-chairs of the effort, and given time to talk to others in the RAAF and to think.

And to assist in the effort, a new Air Warfare Centre is being established to facilitate dialogue on practical opportunities for innovation and change, in part along the lines of the RAF Air Warfare Centre, which means its is about combat operations as much as it is about pure airpower innovation.

Not surprisingly, when the RAAF searched for innovative thinking from allies and industry, not a lot has been easily found.

So the effort itself will need to trigger that kind of change.

In part, that is why Blackburn and the Williams Foundation were in Copenhagen to drive the debate about the future of airpower, and to be able to present with the core partner whom they recognize as going through a very similar thought process, namely the USMC.

To shape a way ahead, Blackburn discussed a four-part process, which is highly overlapping and highly interactive.

The first step is to develop a fifth generation "narrative" to explain the opportunity that the JSF provides as a basis for a 5th generation enabled force concept.

The second step is develop a high level 5th generating enabled air operations architecture with concrete examples for fifth generation concepts of operations, for example a new approach to air battle management.

The third step is to develop individual capability roadmaps based on existing plans that will identify gaps and disconnects with a 5th generation concept of operations.

The fourth step is to identify critical joint integrators and enablers; to identify impact s of delays to integrators and enablers on fifth generational capability and to prioritize integrators and enablers based on capability impacts.

It is clear that the RAAF is providing an innovative challenge to allied air forces, and clearly will be a lever for change across the Pacific, in the United States, Europe and the Middle East.

And certainly the standing up of the global F-35 fleet will provide an important opportunity for proliferating the RAAF innovation effort.

Editor's Note: John Blackburn visited the RAF and the European Air Group while in England prior to the Copenhagen Airpower Symposium.

Another Coalition Airpower Dynamic: Training for Next Generation Aircraft

The Royal Dutch Air Force (RNLAF) has selected the F-35 as its next generation aircraft.

Indeed, the Norwegians and the Dutch are both planning to be an all-fifth generation fleet.

Others might join them in Europe as well in this process.

The Italian and the UK Air Forces will fly a mixed fleet of Typhoons and F-35s are they are working cross integration approaches, with the RAF notably interested in sea- and air-based aircraft integration in operations.

Initial training for all F-35A users — such as Italy and the Netherlands — will be conducted with the USAF at Luke AFB, and currently Dutch F-35s are located at Edwards AFB and are part of the overall roll out of the F-35A into the fleet.

At the Centre for Military Studies-Williams Foundation Airpower Symposium held in Copenhagen on April 17, 2015, Air Commodore Dré Kraak, from the Royal Netherlands Air Force, discussed the way ahead with regard to training for the Dutch Air Force and highlighted an important evolving coalition relationship with Italy.

Not only will Italy build the bulk of the Dutch F-35s, but they are also emerging as a key partner in possible training solutions as well.

And the Air Commodore went out of his way to praise the Italians, who in his words, "have seen dramatic progress in their aerospace production capabilities over the past twenty years."

He started his presentation by highlighting that the Dutch selection of the F-35 was a no brainer.

It was by far the best aircraft in the competition.

Without any doubt, without any doubt operationally, the F35 is the best airplane ever.

And anybody that chooses something else– it's probably a political choice and not a decision being made by a fighter pilot.

Air Commodore Dré Kraak, Project Manager European Aircrew Training Center, Royal Netherlands Air Force, addressing the Copenhagen Airpower Conference. Credit: SLD

There's no fighter pilot in the Dutch Air Force that does not think that the F35 is the best aircraft in the world at this moment.

The globality of the F-35 is important as well to the RNLAF.

"We want a plane that can be maintained worldwide as we don't know where our next operation will be."

Clearly, the Dutch intend to operate their F-35s in a coalition and Air Commodore Dré Kraak emphasized that like the F-16, the F-35 has coalition enablement built in.

The first Dutch F-35s will start arriving in 2019 and the RNLAF is working out how to operate differently as these planes start arriving and operating.

Logistics is part of this and they will build logistics support structures that will be part of the global supply system for the airplane.

But in a vein similar to that of John Blackburn, Kraak highlighted the need for rethinking and innovation within the Dutch Air Force to leverage the F-35.

The Chief of the Dutch Air Force talks about Air Force 3.0 as the need to reshape our approaches and our thinking about how to operate in the future.

We are a small Air Force: 7500 people and 65 fighter pilots.

Obviously, we have to innovate to get best value out of this force with our initial 37 F-35s.

The training side of the picture is rooted in part in the desire to have F-35s involved in operations and not being tagged for training.

What a lot of people don't understand is that if I have less aircraft I can train less pilots.

And it's not about the aircraft.

It's about how many pilots can I use, how many pilots can I get trained.

So, if I have less F35s, I need to find an alternative to make sure that I can train those 65 combat ready pilots good enough.

And this leads to either the acquisition of new trainer aircraft or participating in a joint training program.

According to the Air Commodore:

I'm looking very much to an aircraft that can be very easily used next to an F35; not exactly the F35 cockpit, but for instance the M-346 might be a good choice for the training missions.

Maj. Laurens Vijge, a Royal Netherlands Air Force pilot, dresses in his life support equipment prior to his first flight in the F-35A Lightning II Dec. 18, 2013 at Eglin Air Force Base, Fla. Vijge became the first RNLAF pilot to fly the joint strike fighter and the flight marks the first sortie for the RNLAF here. (U.S. Air Force photo/Samuel King Jr)

Because the USAF will not have a new trainer until the next decade, and its cost undetermined, the Dutch need to look elsewhere.

The program is simply too late for their needs.

He visited Italy last year with the Dutch Chief of Staff and they were very impressed with the M-346.

They are also looking at civilian business training solutions, which could use this airplane as well.

He highlighted cost as a key concern:

It's a cheap airplane for training. It's a very cheap airplane.

Right now it is about 8,000 to 9.000 Euros per hour that includes everything

He is also looking for European-wide solutions and has spoken with a number of European Air Forces about cooperative training possibilities.

Notably, he is looking to the possibility of building on the success of the common European Air Transport Command to come up with a European Aircrew Training Approach to share costs and experiences in shaping a way ahead.

In a bio through 2014, Air Commodore Dré Kraak's background was described as follows:

Air Commodore Kraak started at the Military Academy in the Netherlands in 1980.

He became a fighter pilot in 1984.

Up through 2005 he accumulated a total of 2500 flying hours on the F-16 as a weapons- and flight instructor.

He served as an F-16 flight commander for several years at 311 Squadron and 323 Top Gun Weapons School.

He served there as the commander of the Dutch Weapons Instructor School (The Dutch Top Gun).

After this Air Commodore Kraak was employed at the RNLAF HQ at the F-16 Operational requirements section, responsible for the purchase of F-16 weapons.

He attended the Advanced Staff College in 1996, after which he was appointed as Commander of the RNLAF F-16 Detachment in Italy for operations over Bosnia in the rank of Lt. Col.

From June 1997 until March 2000 Air Commodore Kraak was the Squadron Commander of the 306 Tactical Fighter & Reconnaissance Squadron.

In the summer of 1999 he served as Chief of the Planning Cell at the CAOC in Vicenza (Italy) during the Kosovo war.

In April 2000 Air Commodore Kraak was promoted to Colonel and given the job as Chief of the Fighter Branch at the RNLAF HQ in The Hague.

He attended the NATO Defence College in Rome from Aug 2003 until feb 2004.

After this Air Commodore Kraak was appointed Chief of the Operational Requirements and Policy Branch in the Air Force HQ again.

In March 2005 he was appointed Commander of Soesterberg Airbase, the transport helicopter base in the Netherlands.

In this job he flew Chinook, Cougar and Alouette helicopters. In July 2007 Air Commodore Kraak was promoted to his present rank and installed as Deputy Director for Requirements at the Netherlands MOD.

During 2011 a major restructuring of the Dutch Armed Forces started in which Air Commodore Kraak got the job to reorganize the IT units in the MOD and to form a Joint IT Command.

Since May 2012 he also was appointed Deputy Commander and COO of the IT Command.

http://www.amiando.com/CIOCITY14.html?page=1073718

Currently, he is Project Manager European Aircrew Training Center at Koninklijke Luchtmacht.

The Weapons Enterprise in Airpower Transition: The Royal Air Force Case

By Robbin Laird

The RAF is undergoing two fighter aircraft transitions at the same time.

On the one hand, the Tornado is being retired and the Typhoon is subsuming its missions. On the other hand, the F-35B is coming to the fleet and will be working with Typhoon for the period ahead.

These are three very different aircraft built in different periods of aviation history.

The venerable Tornado has seen a significant evolution over its time; from its initial use as an ultra low-level nuclear and unguided weapons bomber to an ISR-enabled precision strike and close support aircraft.

The Typhoon entered the RAF more than a decade ago as a classic air superiority fighter, but is now being asked to expand its effects and to subsume the Tornado missions.

The F-35B is entering the fleet as the Typhoon is making this transition.

This will mean that the RAF will be managing a double transition – Typhoon becoming multi-role and the F-35B operating off of land or ships to provide the fifth generation capability to the evolving RAF strike force.

The Complex Weapons Enterprise

A key enabler of the double transition is the weapons carried by the aircraft which allow for synergy of effects.

The UK Ministry of Defence (MoD) set in motion in the past decade an approach to shaping a weapons enterprise which is now bearing fruit and proving to be a key enabler of the double transition.

While the platform is clearly important, the MoD has acknowledged that there is no point in placing an aircraft in jeopardy if it can't deliver the effects desired. As such, complex weapons have become a key part of UK integrated air power.

"Team Complex Weapons" has been described as follows on the MBDA website:

Team CW defines an approach to delivering the UK's Complex Weapons requirements in an affordable manner that also ensures a viable industrial capacity with MOD being the architects of the sector strategy.

The first implementation of this approach is through the MOD–MBDA Portfolio Management Agreement, which has been independently evaluated as offering £1.2Bn of benefit to MOD over the course of the next 10 years.

This Agreement aims to transform the way in which CW business is conducted by MOD with its main supplier. At the heart of this is a joint approach to the delivery of the required capability based on an open exchange of information and flexibility in the means of delivery. It is therefore anticipated that the Agreement will be consistent with the future direction of acquisition reform within MOD and is well positioned to respond positively to the conclusions of the SDSR.

http://www.mbda-systems.com/innovation/team-complex-weapons/

At the Farnbourgh Air Show in 2010, I attended a media briefing held by MBDA which provided a good overview on the Team CW approach.

T*he business model is of interest, not only for shaping a key ally's approach to shaping future capability but in terms of being a potential harbinger for how MOD will handle efforts to maintain capabilities in the face of fiscal stringencies.*

Lord Drayson in his formulation of the defense industrial strategy forged a number of initiatives, one of which was Team CW. The idea was to bring MOD into closer partnership with its weapons providers and supply chain to shape evolving capabilities in the industry with an eye to enhanced efficiencies but at the same time ensuring UK operational sovereignty in this key area of future military capability.

The baseline agreement was signed in June 2006 between MBDA, QinetiQ, Roxel and Thales UK as well as other members of the weapons supply chain to work with MOD in shaping development of future weapons. The idea has been to share risk, guide investment and clarify early for MOD what procurement choices are optimal for its point of view.

At the heart of the concept is to try to bridge the gap between industry and MOD in reducing risk and enhancing effective procurement. Obviously there are a number of challenges ranging for Intellectual Property ownership, investment sharing between government and diversity of private sector competitors to the question of the relationship between Team CW, MOD and the companies, such as Raytheon who are outside of the arrangement.

http://www.sldinfo.com/the-team-complex-weapons-business-model/

In other words, a key element of this double transition is enabled by the UK complex weapons enterprise. The UK MoD has created a close working relationship with industry to provide for the complex weapons necessary to enable the strike force.

And the fruits of this effort can be seen in the ability of weapons generated from this effort to empower the entire suite of fighters – Tornados, Typhoons, and Lightning IIs – to be able to reinforce their interactive capabilities.

The Tornado to Typhoon Transition

In this piece, I want to focus primarily upon the Tornado to Typhoon transition and the nature of that transition.

Adding a fifth generation capability is more than just a weapons issue, but the weapons dynamic is a key part of the overall integrative effort but will be the focus of attention in a later piece.

Group Captain Paul Godfrey, OBE has extensive experience of a range of combat aircraft through Harrier, F-16 and Typhoon. A Harrier weapons instructor, he was the first non-US national to fly the F-16 CJ operationally in the SEAD (Suppression of Enemy Air Defence) role whilst on exchange with the USAF and has spent the last 10 years in the Typhoon program with two flying tours including 4th/5th generation fighter training with the F-22.

After his current tour working on the Initial Operating Capability of the UK F-35B, he will become Station Commander RAF Lossiemouth, where two Typhoon squadrons are now located and a third will stand up in 2015. According to Group Captain Godfrey, a key impact of missile modernization on Typhoon will be to expand the effects of Typhoon operations.

"There is a clear need to expand the effects of Typhoon operations and here the enhancement of its weapons package will be an important improvement."

The fast-approaching retirement of the Tornado is driving the weapons modernization program for the Typhoon. To enable Typhoon to assume Tornado's roles, it is being reconfigured to provide an enhanced ground attack capability over and above the platform's Enhanced Paveway II-only integration that was used by the RAF during the Libyan campaign.

First, Paveway 4 is being integrated followed by MBDA's Storm Shadow and Dual-Mode Brimstone missiles, which have been deemed as the crucial elements of the Tornado to Typhoon transition. Thereafter the Typhoon's capability will be supplemented with the turbo-jet powered long-range development of Brimstone, SPEAR 3, which will also be used on the F-35. This will close out the second phase of the RAF's transition strategy.

Interestingly, the integration of the Storm Shadow on Typhoon is being driven in part by Saudi Arabia which wants its Typhoons to have a cruise missile carrying capability, and when married with its new air tanking capability can enhance the strike range of its Typhoon force.

The Dual-Mode Brimstone is designed to operate against maneuvering surface targets on land or sea.

It is a low collateral, close air support and anti-Fast Inshore Attack Craft weapon that has been combat proven by the RAF off Tornado in Afghanistan, Libya and Iraq. Clearly, it will greatly enhance the capability of the Typhoon.

Importantly, in unison with its expanding air-to-ground capability, Typhoon's air-to-air capability is also being enhanced with the integration of the new Meteor BVR missile, which allows for a broader range of offensive and defensive operations. The Meteor is a software upgradeable air-to-air missile with significant range and capability, which is being integrated on several other fourth generation aircraft – including Rafale and Gripen – as well as the fifth generation F-35s.

To gain a further sense of the transitional dynamics, I had a chance to talk with a retired RAF Tornado squadron leader who has been involved as well in the dynamics of Typhoon transition. This material was provided on background so the pilot will not be cited by name, but the key points of the discussion can be highlighted for an operator's perspective is really central to understanding any significant airpower transition, which this one certainly is.

A key element of the transition, which was emphasized in the discussion, is not only the question of migration of missiles but of pilots.

As the Tornado force shrinks, Tornado pilots that move to the Typhoon are taking with them their mindset of how to support land forces, plus their hard-earned air-to-ground weapon experience honed over some 25 years of continuous combat operations.

"This cross-fertilization of ideas will allow the Typhoon force to do the roles that Tornado has always done. The only reason they can't go all the way at the moment is because not all the weapons have been integrated onto the platform. Once the Typhoon weapon integration roadmap is complete, the Tornado can be taken out of service with the knowledge that the Typhoon force can accomplish everything Tornado can now and much, much more."

F-35 BF-17 from the F-35 Integrated Test Force in Formation with RAF Typhoons, Edwards AFB, CA April 4, 2014 F-35 test pilot LtCol Jon "Miles" Ohman performs interoperability testing. Credit: USAF

He also emphasized the cross development of Tornado with Brimstone, which is a key weapon currently in used with great effect in Iraq.

As the Tornado's precision weapon suite has increased, it has been able to play a more valuable close air support role. This change was first implemented in early Iraq operations, but changes brought about by lessons learned in Kosovo ensured that Tornado came of age.

"Brimstone started off as a fire-and-forget millimetric wave-only missile that was designed to destroy armor within a designated kill box. With the development of Dual-Mode Brimstone, which combines a semi-active laser seeker and a millimetric wave radar into a single missile, we are able to very accurately destroy mobile and fast maneuvering targets, as opposed to dropping multiple dumb bombs from altitude where the chances of hitting such a target are slim. The complex weapons that we've now put on Tornado have given that platform a new lease of life."

Another key aspect of the weapons transition is that the Tornado crews are now able to employ a high load-out of mix-and-match weapons depending upon the operation and the expected target sets.

"The beauty of Tornado and its extensive weapon load-out is you can carry three Paveway 4s and three Dual-Mode Brimstones, or one Paveway 4 and six Dual-Mode Brimstones, or nine Dual-Mode Brimstones.

In Afghanistan and Iraq, our preferred weapon load-out is to carry two Paveway 4s and three Dual-Mode Brimstones.

That way, you are equipped to engage effectively whichever target set presents itself.

While we have the Paveway 4 to take out static targets that require a 500-pound effect, the weapon of choice in Afghanistan and now in Iraq is the Dual-Mode Brimstone because there are so many moving targets and targets with collateral damage concerns that demand a small warhead.

Dual-Mode Brimstone-armed Tornados are therefore in great demand, especially so given that even the Americans are having real problems hitting such targets.

It was the same in Libya, where Tornado was the only platform allowed to go "down town" Misrata and Benghazi, and actually hit targets in the urban environment because of its 98% first shot hit rate.

This means that the Tornado force is not only the backbone of the Royal Air Force, but it delivers a unique capability on coalition operations too.

What the RAF is doing in the Tornado to Typhoon transition is bringing these skillsets and capabilities to the Typhoon now, and then expanding its capabilities further with the addition of Meteor and SPEAR 3. In other words, the Typhoon will possess game-changing capabilities that will guarantee its relevance even when the fifth generation Lightning II joins the UK's combat air force mix."

In short, the weapons enterprise is a key part of the Tornado to Typhoon transition which, in turn, will be further enabled by radar and other platform upgrades occurring in the Typhoon modernization program.

And while this transition is unfolding, the F-35 is also coming to the RAF and its closest airpower partner in that transition, the USMC.

The Royal Navy and the Royal Air Force Prepare for Cross-Domain Transformation: The F-35 and the Queen Elizabeth Carrier

12/5/14 by Robbin Laird

During my recent visit to the European Air Group, I had a chance to sit down with one of the Royal Air Force officers in charge of the aircraft's entry into service.

Group Captain Paul Godfrey, OBE has extensive experience of a range of combat aircraft through Harrier, F-16 and Typhoon.

A Harrier weapons instructor, he was the first non-US national to fly the F-16 CJ operationally in the SEAD (Suppression of Enemy Air Defence) role whilst on exchange with the USAF and has spent the last 10 years in the Typhoon program with two flying tours including 4th/5th generation fighter training with the F-22.

After his current tour working on the Initial Operating Capability of the UK F-35B, he will become Station Commander RAF Lossiemouth, where two Typhoon squadrons are now located and a third will stand up in 2015.

With his range of combat air experience, Godfrey is well positioned to understand the next generation capability which 5th generation aircraft can provide for the Royal Navy (RN) and RAF.

And with the intersection of the RN operating a large deck carrier and the two services jointly operating F-35Bs, the cross-domain transformation is a dynamic one as well.

Godfrey has been involved with Typhoon training with the F-22.

Based on that experience, Godfrey commented:

The F-22 has unprecedented situational awareness.

And working with Typhoon, the F-22 enhanced our survivability and augmented our lethality.

The F-22 functions is a significant Situational Awareness (SA) gap filler for the operation of a fourth generation aircraft."

He underscored that, as good as the F-22 is, the enhanced fusion engine and advanced combat systems of the F-35 are a significant force for overall defence transformation.

"Indeed, the impact of the F-35 will be felt on the total UK defence force; not just on the RAF. It is a force multiplier, and can be used to help transform our combat forces, to do what you have called force insertion."

Photo Above is of the Flight Deck of HMS Queen Elizabeth shot during a visit March 31, 2015 and credited to the Royal Navy. The photo was shot from the end of the ski jump on the flight deck.

Godfrey emphasized that managing the force mix was an essential part of introducing the F-35 into the UK service.

We will be using 4th and 5th generation aircraft for a long time in what we believe will be an incredibly potent force mix;

And on the Queen Elizabeth carriers will be mixing rotorcraft with fast jets and other combat capabilities as well to further enhance our power projection capabilities.

Question: What is striking is how little public discussion has occurred about the cross-domain modernization of the RN and RAF by bringing a large deck carrier with regard to the F-35B.

This clearly is an exciting aspect of force transformation.

What is your take on this cross-domain effort?

Group Captain Paul Godfrey: That is an excellent point, and it's exactly what we're doing at the moment.

I'm attending a maritime warfare conference next week to look at how we would employ the range of capabilities we will embark upon and with the carrier because, of course, it's not just F-35 and the Queen Elizabeth Class Carriers operating by themselves.

I think we (the UK) have a huge advantage as both of these capabilities — F-35 and Queen Elizabeth Class — were designed with each other in mind from the very beginning.

Having visited NAS Fallon with the RN last week, it is clear from the US Navy that live virtual constructive training will be crucial to understand both transformations and exploit the next generation capabilities that they bring.

The USN were very interested in our purchase of DMRT, the deployed mission-ready trainers, essentially a portable full mission simulator, one of which is already in place at Edwards AFB to support our Operational Test and Evaluation effort.

Two containers are will be 'hung' in the hangar deck of the Queen Elizabeth Class Carriers, which allows us to practice any number of scenarios from carrier flying to high-end training to our heart's content on board the ship.

The ability to be able to mission rehearse or even problem solve with this capability is a step into the next generation of warfare.

The next step will be connecting that across to the Typhoon simulators off the ship in order to be able to remotely participate in 4th/5th gen training.

There's work in progress at the moment in terms of connecting a range of different simulators in the UK and not just in the air domain.

We have been very successful with our Air Battle Training Centre (ABTC) at RAF Waddington, a large percentage of which is funded by the British Army due to its ability to train for Joint Fires.

We are currently rehearsing the RED FLAG 2015 missions in there prior to deployment to Nellis AFB training Typhoon and E3-D Sentry crews and other exercises have linked in RN fighter control assets.

We will then next connect to Queen Elizabeth, and then clearly, the ultimate goal of that live virtual construct where the person in the cockpit sees the same things as the man or woman in the simulator, allowing us to train to the absolute high end, if that's what we need to.

Question: The flexibility of the carrier deck where the F-35B can be used to help manage deck space to use a variety of other combat assets is quite impressive. What is your take on the flexibility aspect?

Group Captain Paul Godfrey: Flexibility is the key theme.

The Queen Elizabeth is a moving airfield, and with the F-35B we can load up on combat aircraft, or offload them to land bases created on necessity not having to stand up a permanent base.

We shaped various concepts of operations for the Harrier in the 1980s and 1990s which we can employ with the F-35B in terms of leveraging air bases created on need or in terms of enhanced survivability of the aircraft, being able to operate from a diversity of launch points.

This allows us to employ other combat assets aboard the ship.

And being a ship we can move to the objective area, and move from objective area to objective area based on need and the need identified by the Commander.

And the flexibility of the ship is that it can support a wide variety of operations from Humanitarian Aid and Disaster Relief (HADR) to high-end combat.

Question: How will F-35 work with Typhoon?

Group Captain Paul Godfrey: The F-35 has unprecedented situational awareness and ability to provide information dominance.

It can handle the 360-degree battlespace and manage the gaps which the Typhoon may not see.

It is also a question of the ability to manage information, which the F-35 excels in doing.

The F-35 is designed to be able to show the pilot situational awareness in a large single display, which is essentially the single version of the truth, if you like.

Clearly, other aircraft have different displays that show you what's out there, and a certain level of fusion, but there are always gaps; I think it's key that we use the F-35 to fill those gaps.

As demonstrated with the Typhoon/F-22 synergies, we will be able to get closer to the threat with the F-35 and to enhance the probability of kill for the entire combat air fleet.

Question: You are moving forward with F-35 as a key piece for UK defence transformation, but to look at much of the aerospace literature one would think that the F-35 is a tentative program?

Group Captain Paul Godfrey: There are 115 F-35s flying now.

We are focused on how we are going to use the capability, not whether it will exist.

There is a huge gap between the users of the aircraft and the broader puzzlement over the future outside of the warrior community.

We are just getting on with it.

We just need to encourage thinking that isn't tied to whatever we've done in the past.

The F-35 fleet is different and can be used for force transformation; unless you don't.

We are lucky in that we have a pooling agreement with the US Marine Corps, the service at the leading edge of operationalizing F-35 and they clearly get it.

When they hit IOC, those Marines are off and running. and I think we'll see some revolutionary methods of bringing high-end combat forces together.

The Marines understand the importance of the aircraft for the warrior on the ground and it's role in revolutionizing 21st Century warfare.

We are talking with the British Army based upon our joint lessons within the ABTC because there is little doubt that the SA, which this aircraft possesses and can be used to enhance the SA of the soldier, battlefield commander or general and will therefore be a crucial element for the British Army to transform the way they operate.

Because the Marines work on the sea, the ground and in the air and work to integrate their capabilities, we see distinct parallels to the way ahead as we combine Queen Elizabeth with the F-35B and use it as a catalyst to transform UK Defence over the next decade.

The Royal Air Force and the F-35: Shaping An Airpower Transition

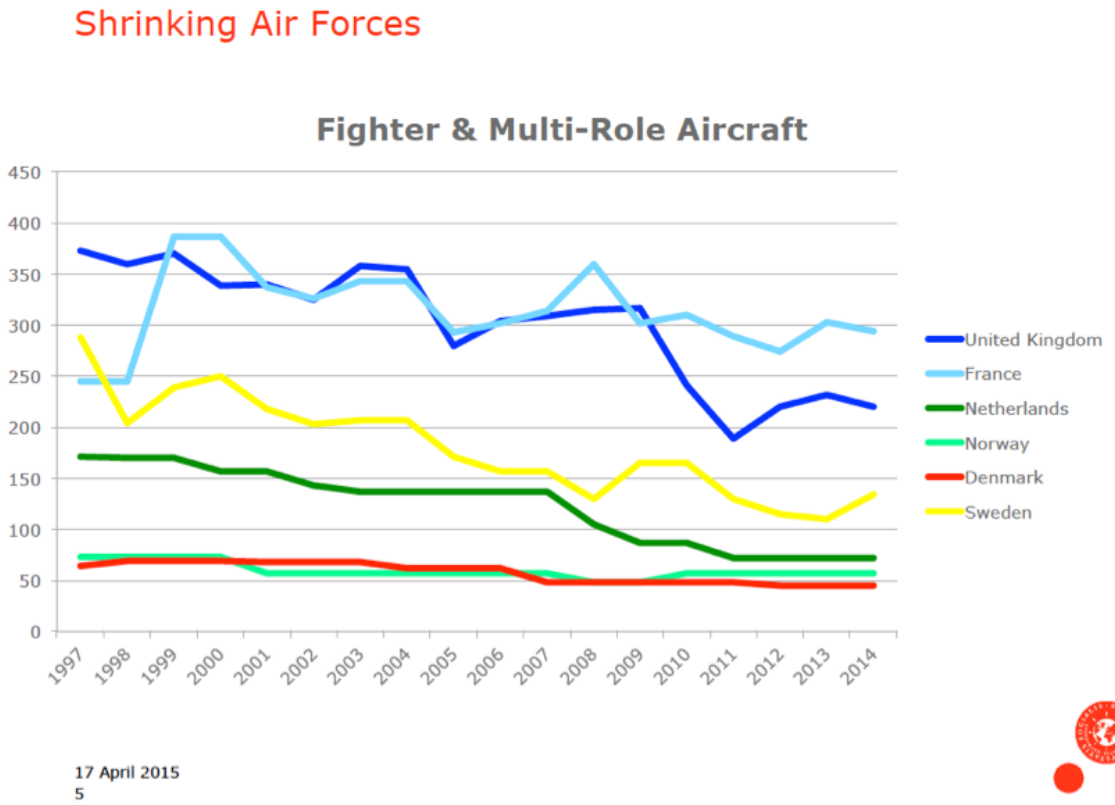
At the Copenhagen Airpower Symposium on April 17, 2015, Group Captain Paul Godfrey, OBE, Royal Air Force, focused on the transformation of the Royal Air Force. Group Captain Paul Godfrey, OBE has extensive experience of a range of combat aircraft through Harrier, F-16 and Typhoon.

As a Harrier weapons instructor, he was the first non-US national to fly the F-16 CJ operationally in the SEAD (Suppression of Enemy Air Defense) role while on exchange with the USAF and has spent the last 10 years in the Typhoon program with two flying tours including 4th/5th generation fighter training with the F-22.

After his current tour working on the Initial Operating Capability of the UK F-35B, he will become Station Commander RAF Lossiemouth, where three Typhoon squadrons are now located.

With his range of combat air experience, Godfrey is well positioned to understand the next generation capability which 5th generation aircraft can provide for the Royal Navy (RN) and RAF and as such entitled his presentation as "F-35 as a Catalyst for Change."

It is clear that the RAF is suffering from the same fiscal challenges which translate into reduced numbers which Gary Schaub, Jr. highlighted in his introduction to the conference.



But what is not widely realized that the RAF has been able to put a template for transformation together, which can allow it to play an effective joint and coalition role.

At the heart of the RAF approach is necking down from a larger type model series of aircraft to a smaller set of multi-mission aircraft which can provide for a more effective integrated role.

The sustainable reach part of the RAF is seeing the introduction of the new A330MRTT tanker, and the introduction of the A400M along with the C-17.

In terms of fighter aircraft, the RAF is undergoing a double transition with the Typhoon via weaponization and combat system upgrades taking on the Tornado roles along with the introduction of the F-35B aboard the new carrier.

This means that not only are the dynamics of different generations of aircraft – Typhoon with F-35 -- to drive change but from the outset the RAF is working new approaches for the integration of sea-based and land-based air in a variety of new scalable, modular combinations under the influence of innovative C2 solution sets.

And they will be doing this with among others, the USMC, which is of course focused on pathways to do much the same thing as the RAF envisages with the introduction of the F-35B into the RAF.

Group Captain Godfrey highlighted throughout his presentation that the capabilities of the F-35 to work with other coalition F-35s via the "global fleet" of fifth generation aircraft was a significant enhancer of the combat effectiveness of the RAF itself.

Clearly, the aperture of collaboration is opening up for the RAF to work with Air Forces like the Norwegian and the Dutch who will fly F-35s as their core combat aircraft. And already, these F-35 partners are broadening discussions with one another about how to deliver collaborative convergent combat capabilities in key areas of strategic interest.

Prior to the F-35, the Norwegians and the Dutch flew F-16s which the RAF did not, which limited the level of collaboration among these Air Forces. Now the F-35 as a platform as well as a way to rethink and redesign combat innovations is a catalyst for change, to use Group Captain Godfrey's phrase.

And with the Italian Air Force as well as the RAF working the double transition of modernized Tyhoons along with the introduction of F-35s (in the case of the IAF this includes both F-35As and F-35Bs along with the Italian Navy F-35Bs aboard their carriers as well), the RAF can work effectively with a core European ally in shaping new approaches to integrated air operations as well.

An important theme of his presentation was that it was crucial for the RAF to prepare for the F-35 from the standpoint of recognizing its strategic impact, rather than simply thinking of it as a replacement aircraft. The RAF did NOT do this with regard to the Eurofighter, which has delayed the ability of the RAF to get maximum utility from the introduction of that aircraft.

Part of the problem was the lack of certainty about the numbers of the aircraft and their introduction into service, but with the 1998 Strategic Defence Review, there was a clear commitment to Eurofighter numbers and to the new missiles as well, Brimstone, Storm Shadow and Meteor.

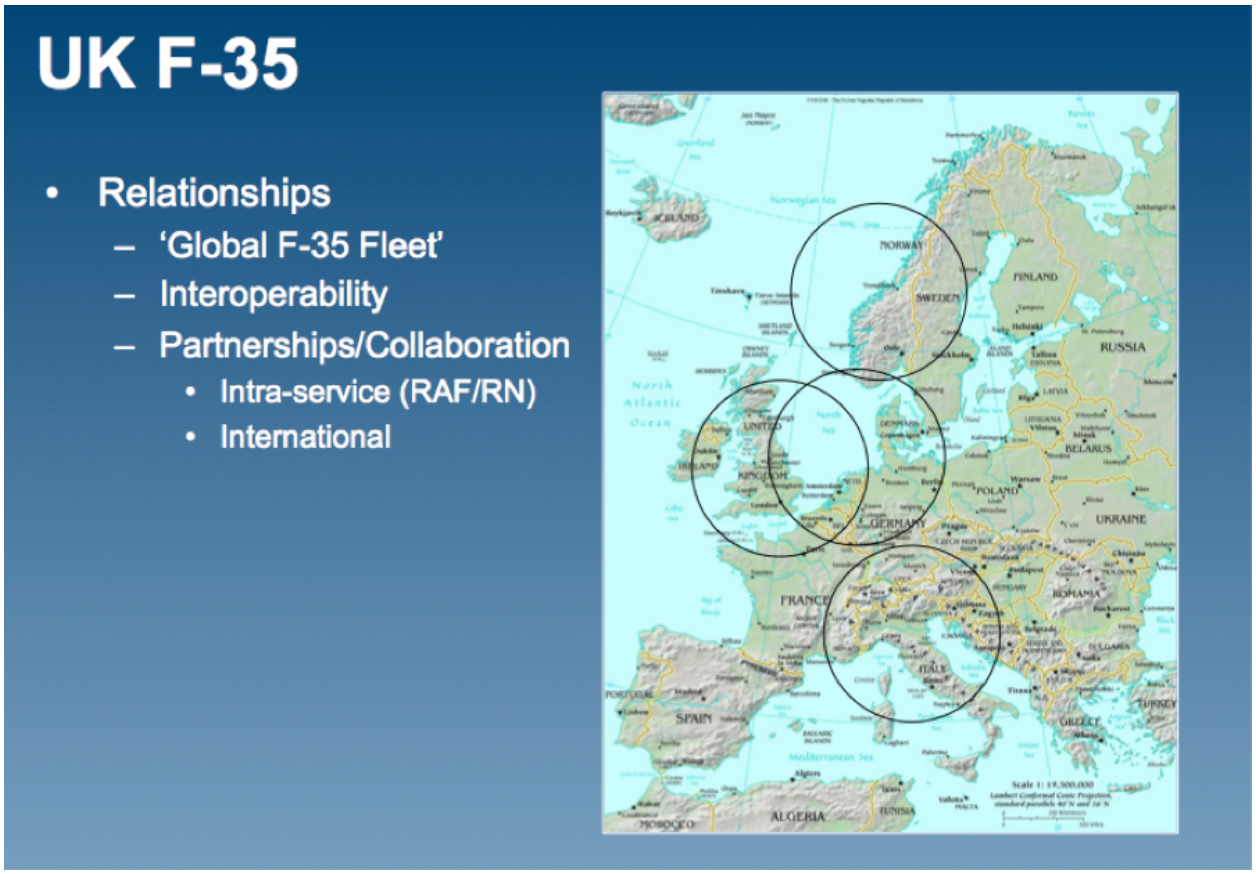
Godfrey emphasized that the Eurofighter entered the fleet as a fourth generation aircraft with a third generation operational mentality and this meant that it was not really appreciated in terms of the scope of its new capabilities

"There was no visionary approach to the Typhoon entering service which meant that only an incremental approach was taken, rather than thinking through what significant changes could drive the evolution of the airfleet from leveraging the new aircraft."

Godrey argued that this did not need to happen with the coming of the F-35. In part this can be driven by the convergence of training and operating the new aircraft three years prior to the aircraft becoming operational aboard the new carrier

"We can use these three years, to prepare the ship for the aircraft, and the aircraft for enabling new approaches as well to operations."

An important area where the F-35 was a catalyst for change is in the rethinking of training, and training not just for the F-35 but for the Typhoon as well as the rest of the operational fleet. Notably, there was an expansion of simulation and synthetic training as well as expanding the battlespace within which training would take place. Over time, live virtual constructive training would be put in place correlated with the impacts and effects of the F-35, but, of course, this would affect the entire fleet and its training and operations.



Group Captain Godrey concluded his presentation this way:

Although we're flying the airplane along with the US Marine Corp, and they are declaring their initial operating capability this year, in the UK we're not doing so for another three years.

This allows us to look at how we transform the way that we're going to do things, notably with the new carrier.

However you characterize fifth gen, the F-35 definitely requires a different approach to realize its benefits. And the F35 definitely has been the catalyst for change in the UK.

American Perspectives on the Way Ahead for Coalition Airpower

The F-35 and the Fifth Generation Warfare Ecosystem

Ed Timperlake, editor of the *Second Line of Defense Forum*, was the last speaker of the day prior to the wrap up of the Danish airpower symposium.

The title of his briefing was "Early 21st Century Warfighting Trends: Technology, Training and Tactics," and focused on the intersection of the coming of the F-35 with the evolving warfighting environment for the US and its allies.

In effect, he provided a look at the synergy of what John Blackburn discussed through Plan Jericho between the F-35 as a trigger for change, and the evolving approach of the RAAF or what Lt. Col. Berke referred as the disruptive change associated with the F-35 and the evolving eco system associated with fifth generation warfare.

As a Marine Corps pilot engaged in both close air support and air-to-air missions, Timperlake completed his flying career as Commanding Officer of VMFA-321 with over 3000 hours of tactical flying.

Timperlake was looking forward from the perspective of the way ahead for performing the mixture of missions pilots would need to deliver in the coming decade.

A core element of working the evolving future is understanding that even with a disruptive change platform like the F-35, it is intersection of the training and tactics for the platform with the overall capabilities of the force which will drive change, And it is the squadrons and the squadron pilots who are the heart of shaping innovation.

As Lt Col. Berke had highlighted, change was a significant part of what the F-35 was all about for the pilots and their roles.

Timperlake underscored that in visits to the core warfighting centers in the United States associated with airpower – Nellis, Fallon and MAWS-1 – the warfighters had embraced change and were working across the services and with the allies in shaping new combat approaches.

As one who had met John Boyd and sat through his lectures a couple of times, Timperlake focused on how the famous OODA loop was being re-shaped with the coming of the F-35 fleet whereby the "Decide-Act" part of the OODA loop was increasingly important.

The ability of the pilots to share situational awareness across the fleet, and to support one another's operations over significant distance in compressed time meant that the force would have significant capability to deliver kinetic strike either by itself or from other platforms.

And the passive sensing capabilities of the F-35 would introduce innovations in kinetic and non-kinetic strike as well.

One way to understand the evolving eco system associated with fifth generation warfare is the S-cubed revolution.

Stealth, speed and sensors are an interactive dynamic and underlay the emergence of fifth generation warfare.

The sensor-shooter revolution sees as well the emergence of the offensive-defensive enterprise.

Sensors, stealth and speed enable the air combat enterprise to find, kill and respond effectively to the numerous adversarial threats that global powers and pop up forces can present to the US and its allies.

Ed Timperlake addresses the Copenhagen Airpower Symposium, April 17, 2015. Credit: SLD

The strategic thrust of integrating modern systems is to create a honeycomb that can operate in an area as a seamless whole, able to strike or defend simultaneously.

This is enabled by the evolution of C5ISR (Command, Control, Communications, Computers, Combat Systems, Intelligence, Surveillance, and Reconnaissance), and it is why Secretary Wynne has underscored for more than a decade that fifth generation aircraft are not merely replacements for existing tactical systems but a whole new approach to integrating defense and offense.

By shaping a C5ISR system inextricably intertwined with platforms and assets that can honeycomb an area of operation, an attack and defense enterprise can operate to deter aggressors and adversaries or to conduct successful military operations.

The F-35 global fleet will help shape the new ecosystem and live off it. Synergy in shaping evolving capabilities to deal with the reactive enemy will be an essential part of the innovations associated with the offensive-defensive enterprise.

Timperlake argued that the warfighting centers were interactively working together and with allies to shape the way ahead.

Each center has an evolving special focus that will carry forth innovation across the entire warfighting enterprise.

MCAS Yuma, MAWTS-1, VMX-22 and the F-35 squadron, were working together to shape an innovative approach to 21st century close air support within which the cockpit display gave the pilot a constant read of the AA and GA threats and in which electronic warfare was part of the CAS capabilities of the aircraft. And with the integration with the Osprey and with the MAGTF, the Marines were shaping a whole new approach to assault forces.

Visiting the Warfare Center at Nellis, Timperlake learned of the central importance of shaping a fleet wide mission data set correlated with the F-35 sensors in shaping wide ranging SA and engagement force decision making. With Red Flag exercises the USAF was leading the way in shaping the intersection of the F-35 with other combat assets to shape an air combat revolution that will help reshape an ecosystem that would evolve with the F-35 fleet.

At Fallon, the Navy is looking to lead the way on shaping a live virtual constructive range which will allow the complexities of a modern battlefield to be both inclusive and wide-ranging.

He saw the new carrier air wing evolving under the influence of the F-35 extending its reach and expanding the capabilities of the maritime force to deliver distributed lethality.

This is an open-ended learning process, but to use Lt. Col. Berke's language, one which needs to be accelerated and to get on with it.

The systems making up the F-35 cockpit provide convergent capabilities but are driven by separate R and D paths to shape new 21st century capabilities. In other words, the F-35 and its evolving ecosystem are both inherent to change within the aircraft and synergistic with change in the entire air combat force.

The future is in the hands of the squadron pilots across the services, and the allies and change driven by any one service or F-35 nation will be part of the overall dynamic of re-shaping the eco-system.

This is a key advantage that the US and its allies can leverage to shape a more effective combat future and to position themselves effectively against adversaries like Russia, North Korea and China.

He concluded that "countless evolutionary and revolutionary aspects of 21st century combat will be in the hands of the squadron pilots – as it should be!"

Enhancing NATO Coalition Airpower: The JAPC and Thinking Through the Ways Ahead

At the Copenhagen Airpower Symposium hosted by the Centre for Military Studies and the Williams Foundation on April 17, 2015, Col. Bernard "Jeep" Willi, Combat Air Branch Head of the NATO Joint Air Power Competency Centre (JAPCC), provided an overview of the role and current work of the JAPCC.

The JAPCC is a NATO center of excellence for the study of airpower with the aim of enhancing the capability of the coalition to work together effectively.

http://www.japcc.org

According to the JAPCC publication Fast Facts:

The Joint Air Power Competence Centre (JAPCC) was formed on 1 January 2005 to provide a strategic level proponent for Joint Air and Space (A&S) Power that was missing in NATO.

Soon thereafter JAPCC was accredited as NATO's first Centre of Excellence (CoE) and, as such, is charged with the development of innovative concepts and solutions required for the transformation of A&S Power within the Alliance and the Nations.

JAPCC_Fast_Facts_Nov-2014

The Director of the Centre is General Frank Gorenc, Commander, U.S. Air Forces in Europe; Commander, U.S. Air Forces Africa; and Commander Allied Air Command.

Col. Willi highlighted the various activities of the JPAC and focus research areas.

Among current studies are examining the challenges for remotely piloted aircraft systems for operating in contested environments and how the shift from operating in Afghanistan to a more robust combat environment will affect their viability and usability.

The center is also looking at challenges such as disinformation campaigns against the use of NATO airpower, a study that recognizes the information war aspect of 21st century operations.

Col. "Jeep" Willi addressing the Copenhagen Airpower Symposium. Credit Photo: SLD

The impact of new systems, like the A400M, the F-35 and the tanker will also have their impact on coalition capabilities and operations are will be undoubtedly a key focus of attention for evolving studies by the JAPCC.

At the previous Airpower symposium hosted by the Centre for Military Studies in November 2014, Lt. Gen. "Freek" Muelman of the Royal Netherlands Air Force discussed the JAPCC's largest project to date, the Future Vector Project: Air and Space Power in NATO.

The project examined the "paradox" that political leaders in NATO have been increasingly willing to call upon airpower to achieve their objectives but have been unwilling to invest in replacing old and increasingly obsolete airpower platforms and systems, and, indeed, have seen reducing the size, scope, and sophistication of their air forces as a means to pay the bills for operations in Afghanistan within their defense budgets and to soften the impact of the 2008 financial crisis on their social welfare systems in general.

Highlighting these sorts of problems and giving them the imprimatur of NATO is among the JAPCC's unstated functions.

In short, the JAPCC is a resource that smaller and larger air forces can use to help sort out ways to enhance the congruence of operational capabilities.

The Evolving challenges for Coalition Airpower: Secretary Wynne Looks at the Way Ahead

In preparation for the Copenhagen symposium, *Second Line of Defense* interviewed Secretary Michael Wynne in late March 2015 about his perspectives on the evolution of coalition airpower.

Earlier, Wynne laid out a wide-ranging perspective on the evolution of airpower in his article entitled: "Airpower in the Next Two Decades of the 21st Century: Secretary Wynne Looks Ahead."

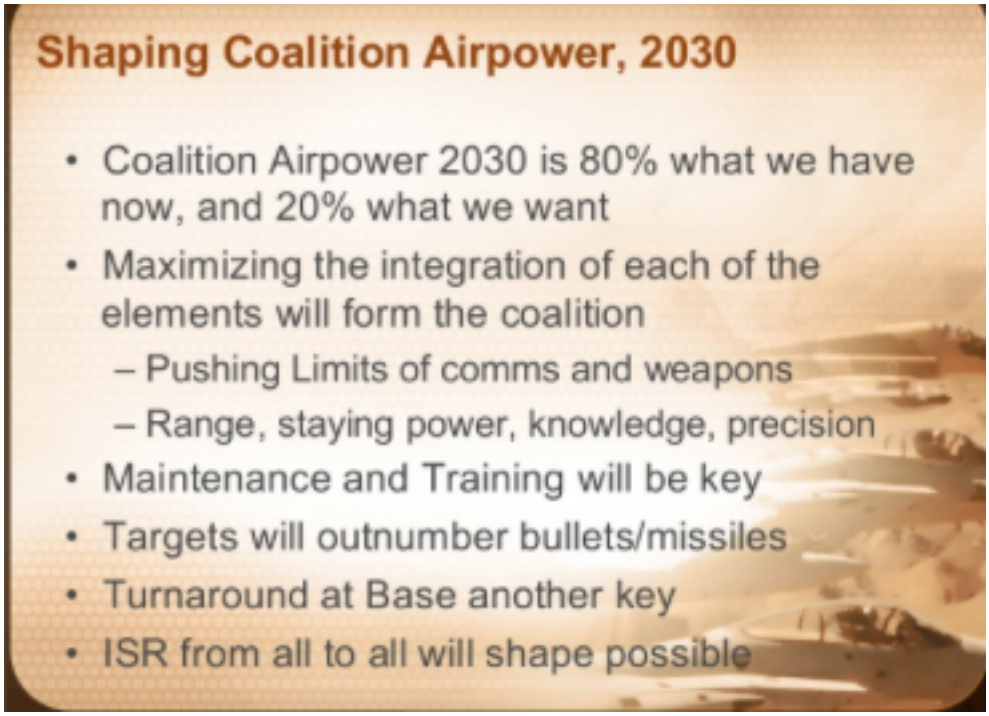
That article addressed in Wynne's words the following:

Globalization may have brought the world closer together in terms of collaboration, but the United States remains a singular continent that can now be reached by the forces of military globalization, missiles and nuclear weapons.

Without air superiority, we can neither defend our land nor project power abroad.

If we rest our assumptions of superiority on an aging stock of proud yet outdated airplanes, we can never hope to prevail in the face of rising and adventurist powers like China and other modern adversaries.

I would like to examine a way forward in understanding how we can recapture air superiority and the enthusiasm necessary to build and sustain it.



Quite clearly, coalition capabilities are evolving as well, and a key challenge is how best to mesh U.S. and coalition developments to shape forces appropriate to the 21st century missions facing the democracies.

In this interview,Robbin Laird and Ed Timperlake discussed with Secretary Wynne his thoughts on the nature of the challenge and ways to shape an effective way ahead.

Question: How important is the coalition aspect of operations going to be for the United States?

Secretary Wynne: I think it will be the norm, whether you are following a concept of leading from the front or from behind.

The emphasis on coalition warfare will be the norm and driven by two factors.

The first is the relative equality of the technology across the coalition, as well as the role of bases provided by coalition partners.

The second is the lack of sufficient investment by any of the coalition partners to shape an overall dominant national force structure.

The U.S. and its allies will need to reach out to other nations to have a completely capable dominant force structure.

Question: In other words, the U.S. and allies achieve mass only by connectivity and convergence of capabilities?

Secretary Wynne: That is a good way to put it.

A challenge, which we face, is the perceptions, which core competitors have of the United States.

Namely, the Russians and the Chinese clearly perceive US forces to be exhausted and stretched thin.

Our peer competitors see an advantages in increasing their leveraging power and capabilities to pressure those U.S. and coalition forces as well.

Question: The Russians are pushing hard on the Baltics and the Nordics.

How can their reactions help shape a response to provide a deterrent strategy?

Secretary Wynne: The recent threat articulated by the Russian Ambassador to Denmark clearly is an Article Five issue for NATO.

But solid defense modernization and regional cooperation of the Baltic republics with the Nordics is crucial for shaping any effective credible deterrent strategy, as the Russians would see it.

And with the coming of the F-35 to the region, the coalition partners can shape new capabilities to deter the Russians with which we can interact and work with effectively as well.

In fact, the coming of the global F-35 fleet will enhance overall coalition capabilities and provide the U.S. with an opportunity to provide some key enablers for enhanced coalition effectiveness as well.

Each member of the coalition will now bring a specific set of expertise.

And in that bringing of expertise, we're finding ways to integrate older technology into the newer systems.

And what we bring really, although we are very good at increasing the technology level of our weapon systems, we are really good at increasing the command and control technologies.

Our coalition partners are going to require that aspect of our own improvements and so I would say we will be drawn in first by our command and control expertise.

And I think then by our weapons systems and then by the commonality that we have, should there be a need, augment the coalition force.

I see us as offering to support and essentially provide command and control throughout wherever the theater develops.

Question: You have several points in your briefing about the opportunity to leverage legacy forces and make the point that 80% of what the coalition will have in 2030 already exists.

In highlighting command and control going forward how do you view the challenge of re-shaping the force?

Secretary Wynne: You have new forces coming in the airpower arena, which allow you to redesign a lethal C-2 extended force.

The new systems enable transformation but the older platforms need to be reworked to ensure that they can actually play the role of an effective operational reserve.

And in shaping a lethal C-2 extended force, the role of exercises with the allies is a crucial element of force modernization and concepts of operations innovations.

Question: We focused in earlier work on the role of the 12th Air Force in working with the Dominican Republic to provide the C2 and ISR which enhanced the effectiveness and lethality of the Super Tucano force against the drug lords operating in their airspace.

C2 can be a tool as well working with allies and how does this affect you sense of the coalition approach going ahead?

F-35 BF-17 from the F-35 Integrated Test Force in Formation with RAF Typhoons, Edwards AFB, CA April 4, 2014 F-35 test pilot LtCol Jon "Miles" Ohman performs interoperability testing. Credit: USAF

Secretary Wynne: The current ACC Commander, Hawk Carlisle, put it well: as allies bring capabilities to the forces; the goal is to fit it into a coalition operation and capability as appropriate to the agreed upon coalition mission.

Question: The Russians are stepping up their engagement in the Baltic region and beyond. Do you see what there doing as part of what we have called tron warfare, namely probing Western defenses to see how they respond electronically?

Secretary Wynne: I would say it this way.

We are being probed, and in those probes the Russian are seeking to gain domain knowledge.

We should assume that the Russians bombers are accepting the trons being pinged at them and retrainsmitting them to analysis station, rather than carrying bombs.

Why carry bombs?

That's dangerous.

Why not carry electronic equipment so the Russians can learn with regard to how sophisticated the West has become?

That's far more useful information than simply being escorted out of allied territory by Typhoons.

Question: And speaking more generally, clearly the Russians are engaged in probing operations across the board and pushing the political-diplomatic-military envelope to achieve objectives where effective resistance is not operational.

If you take the probing warfare point coupled with the perceived exhaustion of US forces, don't you end up with an effort by the Russians to essential seek to open gaps in NATO and other bilateral relationships to seek to expand Russian power?

Secretary Wynne: You do.

And we are not far from a tipping point which could parallel the Pueblo incident.

There we pulled back from seizing the Pueblo to avoid a major confrontation with North Korea.

But what would happen if a Russian bomber or escort fighter crashes or is shot down over Western territory.

What would the Russians do then? When the probability of warfare increases from the captivity of a foreign force, what happens then?

We were restrained this time, but *'Remember the Maine.'*

Question: A major challenge facing the democracies in dealing with probing warfare is the timeline whereby democracies make decisions. Another is how non-democracies play into democratic ideals and use them against us.

How do you view this challenge?

Secretary Wynne: We clearly in a period of lawfare whereby our adversaries use our own concepts of law against us.

The ISIS declared themselves a state in order to be subject to international law with regard to prisoners of war.

They have no intention themselves to abide or be limited by international law, but know that the West will self deter.

And more generally, our non-democratic adversaries are leveraging the forms of legality as tools in their warfare kit.

Putin did not seize territory in Ukraine; rather plebiscites of concerned Ukrainian citizens voted themselves out of Ukraine.

Our own self-deterrence is a key challenge facing the US and its coalition partners in meeting the challenges of the period ahead.

For Secretary Wynne's Briefing see the following:

http://www.slideshare.net/robbinlaird/secretary-wynne-on

Re-shaping American 21st Century Airpower: The Coalition and Partnership Dimension

By Robbin Laird

November 10, 2013

Frequently peppering American presentations about the evolution of military strategies, approaches and capabilities are references to the central importance of coalitions and of partners.

But what is not often realized is HOW fundamentally the situation has changed over the past thirty years.

When coalitions and partners were used in the late 20th century it really referred to allies in alliances which provided basing or capabilities which could **SUPPLEMENT or COMPLIMENT** American naval and air power.

But all of this has changed with this decade of the 21st century and the decade ahead.

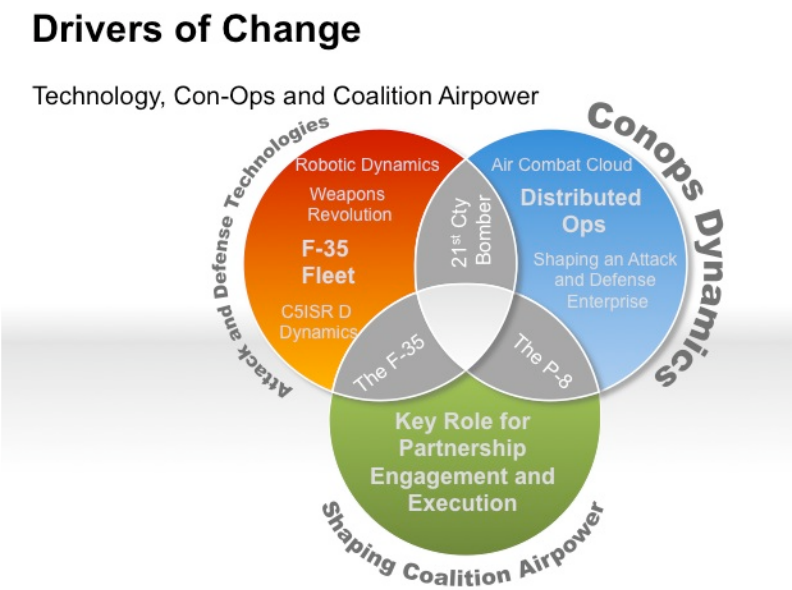
It is now about coalitions and partners as the ENABLERS for American naval and airpower, not merely by supplementing or complementing but providing core elements for engagement and execution of military operations.

The significant drop off in the numbers of air and naval platforms certainly have created the situation within which the American ability to provide for global reach is significantly curtailed.

This means that global reach is a function of the ability to not just work with allies but to shape convergent concepts of operations and convergent or complimentary capabilities.

And this will occur in a world where US defense industry's ability to provide the equipment for the US-allied operational world will go down, as European and Asian providers expand their reach as well.

There is another aspect to the partnership and coalition transformation as well.



The United States is rolling out key elements of its 21st century military technologies at the same time as they enter into service with core allies.

The roll out of the F-35 fleet as a front line fighter for the USMC, the USAF and the USN (in that order) is occurring simultaneously with the roll out of the F-35 fleet by European, Middle Eastern and Asian partners.

This is an unprecedented roll out of convergent capabilities and rethink of coalition concepts of operations.

Associated with the roll out of the F-35 fleet is a global production system ranging from Europe to the US to Asia and the shaping of a global sustainment system which provides parts and combat support worldwide.

This will require a significant cultural shift in the thinking of the US services and of allies in understanding what globality will mean to their individual or coalition operations.

As Lt. General Preziosa, the Italian Chief of Staff of the Air Force has underscored:

"Australia, Japan, Italy, the UK, the U.S. and others will share their production and sustainment capabilities for the F-35 and learn how to apply lessons learned from the use of a coalition aircraft in dealing with the evolving 21st century problems. This is not yesterday's aircraft being applied to the challenges of the next 30 years; it is about reshaping concepts of operations for coalitions meeting the evolving new challenges and operational requirements."

He emphasized that the presence of Australia in Afghanistan demonstrated that a country far from a geographical area moved force into deal with a threat identified by a coalition with which it worked. And airpower has been central to Afghan operations.

"We use airpower for virtually everything to support the guys on the ground. They rely heavily upon airpower to deliver the ordinance to protect them and to engage the enemy."

He argued further that: "We will discover the new dimension of airpower using this type of aircraft."

The coalition quality of the aircraft is built in was a key theme of his discussion.

"Interoperability is built into the aircraft; we use the same combat systems; we fuse data the same way; we have the same symbiology in the cockpit. It will be up to the new generation of pilots and squadron leaders to figure how to maximize these inherent advantages."

Another example of the concurrent roll out of new systems by the US and a key ally is the case of the P-8 with the Indian and American navies.

The concurrent introduction of the P-8 into the Indian and American navies provides an opportunity to share experiences with how to shape 21st century approaches to maritime security, whether done separately or together. In effect, the P-8 will be part of the evolving naval collaborative framework between the Indians and the U.S. as well as with other allies.

What makes the P-8 an especially interesting platform is that it is a shared platform between India and the U.S. with others (such as Australia) likely to join in and this sharing of a platform can provide a tool for enhancing collaboration in the daunting task of shaping effective ISR for 21st century maritime missions.

The opportunity is inherent in the technology; the challenge will be to shape the collaborative approach and shared concepts of operations.

In effect, the partnership aspect is inherent in re-crafting fundamental American strategies.

With regard to the Pacific, we have argued in our new book that the allies are always forward deployed.

We need to shape a scalable force, which is capable of reachback to bring assets as needed to missions as appropriate.

This means shaping an effective working set of relationships with allies so that they have capabilities with which we can plug and play and that they, in turn, have confidence that we can bring RELEVANT capabilities to the fight, rather than just piling on with legacy equipment and concepts of operations.

It is not about a linear system of projecting power FORWARD; it is about an ability to distribute forces that can be aggregated effectively with those of allies or to converge on required national missions as well.

We have already seen in the Libyan and Mali missions, the glimmers of the future. In Libya, allies shaped a baseline of objectives and used air and naval power to bring down the regime. The US term for this was to "lead from behind" but what it really was a transition from the US determining the objectives and leading the operation to one where the US engage in the operation with its assets to shape a coalition outcome.

In the Mali case, the French led the operation; and the US supported. Full stop. This was not about the US support being indispensable to the definition of the mission; it was about the US providing missing assets to facilitate a French run operation.

But what they do show is that learning how to shape support or to lead with allied approaches to support is crucial to re-shape American military engagement policies for the period ahead.

These are not simply 20th century partnerships; they are building blocks for real coalition capabilities and operations.

And systems like the F-35 and the P-8 are part of this future, and not simply repetitions from the past.

Airpower in Transition: Meeting 21st Century Strategic Challenges

Dr. Robbin Laird was part of the last panel for the Copenhagen Airpower Symposium hosted by the Centre for Military Studies and the Williams Foundation on April 17, 2015.

In his summary presentation, he looked at a number of changes affecting the evolution of airpower.

One challenge facing airpower is that the decade ahead is that the context that it will face is neither repeat of the past decade nor of earlier ones.

The probing threats from Russia, China, and others, the establishment of new rules of the road for the second nuclear age, and the need to respond to pop-up states and threats requires the agility and lethality which airpower can deliver.

At the same time, naval, sea, and land-insertion power are being recrafted along modular, scalable lines to allow for even greater agility, flexibility, and lethality against growing capabilities from adversaries who are building larger numbers of air and naval platforms.

The democracies face a fundamental challenge: how to shape a concept of operations to protect the interests of the democracies in an uncertain and unsafe world.

It is not just a question of innovation by the military; the strategic and political elites need to recognize that they need to have decision making systems that are adapted to the new modular, scalable forces.

Having detailed Rules of Engagement for distributed military forces will make little sense.

Reworking what political leadership and accountability with the emergence of fifth-generation enabled warfare is a key challenge facing the democracies.

Shaping a Way Ahead for Baltic Defense

By Robbin Laird

With the Russian approach to Ukraine as defining a threat envelope, the question of Baltic defense has become a central one for NATO. And deterrence rests not simply on having exercises and declarations but a credible strategy to defeat the Russians if they decided to probe, push and dismember the Baltic republics.

How can NATO best shape a credible defense strategy which meets the realistic performance of the key stakeholders in defense and security in Northern Europe?

It is no good talking in general deterrence terms; or simply having periodic exercises. The exercises need to be part of shaping a realistic engagement and defense strategy.

As one Russian source has put it with regard to characterizing with disdain NATO exercises:

The West keeps accusing Russia of aggression towards neighboring countries and this is largely bluff in order to make it appear strong, Alexander Mercouris, international affairs expert, told RT.

He suggests it's a dangerous game because it does bring NATO troops very close to Russian borders.

RT: We're seeing this massive build-up in the Baltic states, while another NATO member, Norway, is also holding massive military exercises on Russia's borders.Is the US-led bloc preparing for war?

Alexander Mercouris: No I doubt they are preparing for war, I doubt anybody seriously contemplates war with Russia which is a nuclear power, and it will be a suicidal idea. What I think we are seeing is a show force basically to conceal the fact that Western policy over Ukraine is falling apart, and all sorts of Western politicians and political leaders who made a very strong pitch on Ukraine now find that they have to do something to show that they are still a force to be counted on.

RT: How justified are these claims by some Western officials that Russia could be preparing to test NATO's resolve by invading a member country?

AM: There is no justification for that whatsoever. Russia has never attacked a NATO-state. It didn't do so when it was a part of the Soviet Union. There is no threat from Russia to do so, and this whole thing is completely illusory. I'm absolutely sure that everybody in the government, in the West, in NATO knows that very well.

http://rt.com/op-edge/239201-us-nato-troops-baltic-states/

Source: BMI Research

And providing token forces as symbols of intent are not enough as well. When the secret cables about NATO planning for Baltic and Polish defense were released in the WikiLeaks scandal, a Polish source characterized what he thought of symbolic measures:

Earlier this year the US started rotating US army Patriot missiles into Poland in a move that Warsaw celebrates publicly as boosting Polish air defenses and demonstrating American commitment to Poland's security.

But the secret cables expose the Patriots' value as purely symbolic. The Patriot battery, deployed on a rotating basis at Morag in north-eastern Poland, 40 miles from the border with Russia's Kaliningrad exclave, is purely for training purposes, and is neither operational nor armed with missiles.

At one point Poland's then deputy defense minister privately complained bitterly that the Americans may as well supply "potted plants'.

http://www.theguardian.com/world/2010/dec/06/wikileaks-cables-nato-russia-baltics

The Russians with the advantage of having significant Russian minorities in the Baltics can play a probing game similar to Ukraine if they deem this necessary or useful.

The probing certainly is going on. As a piece written by David Blair and published in the Daily Telegraph on February 19, 2015 put it:

The trap was laid with meticulous precision. The target was a senior officer in Estonia's version of MI5 and the bait was supposedly vital information about organized crime. Eston Kohver was lured to a meeting in a lonely woodland at 9am on a Friday.

Lest the spy be thought foolish or naive, he went to the assignation with a posse of bodyguards.

Yet his erstwhile contact was accompanied by an armed snatch squad from Russia's FSB intelligence service. Mr Kohver's escort was swiftly neutralized with stun grenades; for good measure, their communications were also jammed. Then the spy was spirited at gunpoint across the Russian border five miles away.

This brazen abduction of an intelligence officer from his homeland took place on September 5 last year, only two days after President Barack Obama had visited Estonia to offer reassurance about America's commitment to its security. Mr Kohver was later paraded on Russian television and charged with subverting the very state that had carried out his kidnapping.

http://www.telegraph.co.uk/news/worldnews/europe/russia/11423416/How-do-we-protect-the-Baltic-States.html

Deterrence is not just about arming and occupying the Baltic states in ADVANCE of the Russians doing something and given the geography such actions seem unlikely at best.

As a landpower with significant Baltic sea assets, it is difficult to imagine the Russians providing a long period of warning for the USAF to deliver significant US Army forces to the Baltic states to deter Russian attack. This is not a US Army led operation in any real sense.

And building up outside forces on the ground in the Baltics takes time and could set off Russian actions which one might well wish not to see happen. This latter point is crucial to Balts as well who would not like to be viewed by the Russians as an armed camp on their borders in times of crisis, and not only the Russians living in Russia, but those in the Baltic republics themselves.

Credible defense starts with what NATO can ask of the Baltic states themselves. In the 1980s, there was a movement in Western Europe which called for "defensive defense," which clearly applies to the Balts. Greater cooperation among the three states, and shaping convergence of systems so that resupply can be facilitated is a good baseline.

Add to that deployments of defensive missile systems designed for short to mid-range operations, and the ground work would be created for a stronger DEFENSIVE capability which would slow any Russian advance down and facilitate the kind of air and naval intervention by NATO which would mesh very nicely with the defensive capabilities of the Baltic states.

In a piece by Thomas Theiner called "Peace is Over for the Baltic States," he looks at what kinds of actions by the Baltic states make sense in terms of collaborative defense within the bounds of realistic expectations. The key is not simply to wait for NATO's so-called "rapid reaction force" to show up in time to view the Russian forces occupying the Baltic states.

Most importantly, the three Baltic nations need a modern medium range air-defense system and tanks. The air-defense systems currently in service, namely RBS-70, Mistral, Stinger and Grom man portable air defense systems (MANPADS) , do not reach higher than 4-5km and have a range of just 6-8 km. The three Baltic nations do not need a high-end long-range system like the SAMP/T or the MIM-104 Patriot.

http://euromaidanpress.com/2015/04/03/the-baltic-states/

What the core Nordic states (Sweden, Denmark, Norway and Finland) can do is create a more integrated air and naval defense. If the Russians believed that the Nordics most affected by a Baltic action could trigger what other NATO nations can do, there is little incentive for them to do so.

This means leveraging the Baltic Air Patrol to shape a Northern region wide integrated air operations capability that the US, France, Germany and the UK can work with and plug into rapidly. It is about modular, scalable force with

significant reachback that would kill a Russian force in its tracks, and be so viewed from the outset by the Russians. And because it is not based in the Baltics, but the air controllers could well be, it is part of the overall defensive defense approach.

Naval forces are crucial as well, not only to deal with Russian naval forces, but to support the Baltic operation as well. Modern amphibious forces are among the most useful assets to provide engagement capabilities, ranging from re-supply, to air operations, to insertion forces at key choke points.

By not being based on Baltic territory, these forces are part of the overall defensive defense approach, and not credibly part of a forward deployed dagger at the heart of Russia argument that the Russian leadership will try to use if significant NATO forces were to be forward deployed upon Baltic territory itself.

Shaping an effective defensive template, leveraging collaborative Baltic efforts, with enhanced integrated air and naval forces will only get better as Western naval and air transformation occurs in the period ahead.

There are a number of key developments underway which can reinforce such a template.

The first is the Dane's acquiring the missiles to go with the sensors aboard their frigates and to position their frigates to provide area wide defensive capabilities which can be leveraged in the crisis.

The second is the acquisition of the F-35 by key states in the region whose integrated fleet can lay down a sensor grid with kinetic and non-kinetic capabilities, which can operate rapidly over the Baltic states by simply extending the airpower integration already envisaged in the defense of the region.

The Norwegians, the Dutch, and possibly the Danes and the Finns will all have F-35s and a completely integrated force which can rapidly be inserted without waiting for slower paced forces has to be taken seriously by Russia. There is no time gap within which the Russians can wedge their forces, for Norway and Denmark are not likely to stand by and watch the Russians do what they want in the Baltics. With the integrated F-35 fleet, they would need to wait on slower paced NATO deliberations to deploy significant force useable immediately in Baltic defenses.

The third is the coming UK carrier, which can provide a local core intervention capability to plug into the F-35 forces in the region and to add amphibious assault capability.

The fourth is that the USN-USMC team coming with F-35B and Osprey enabled assault forces can plug in rapidly as well.

The fifth is the evolving integration of air and naval systems. The long reach of Aegis enabled by F-35/Aegis integration can add a significant offensive/defensive capability to any reinforcement force, and the Norwegians are a local force that will have such a capability.

By leveraging current capabilities and reshaping the template for Baltic defense, the coming modernization efforts will only enhance the viability of the template and significantly enhance credible deterrence, rather than doing what RT referred to scornfully as "US troops drills in Baltic states is more a political than military show."

A key advantage of the approach is that it is led by the Nordics and gets away from the Russian game of making this always about the US and the "US-led" Alliance. Putin and his ilk can play this game, but European led capabilities are crucial to reshaping Russian expectations about how non-Americans view their aggression as well.

And what might be the implications of not having an effective defense of the Baltic states on the US and NATO?

In a piece published by Yoel Sano Head of Political Risk, BMI Research, the implications are projected as follows:

Russia's triumph over the most powerful military alliance in the world could prompt several Eastern European countries in the EU to reach some sort of accommodation with Moscow.

Meanwhile, Azerbaijan, Kazakhstan and Uzbekistan would probably accept Moscow's hegemony in Eurasia. A victorious Kremlin could then press the US and EU for some sort of formal division of Europe into rival spheres of influence.

Europe would be set for a multi-decade new Cold War, although this would not be global in scope, because Europe's economic importance has declined substantially since the 1980s. Also, there would be no ideological dimension to the new struggle.

In Russia, the president would bask in the success of re-establishing control of the Baltic republics, and patriotic fervour would surge, but the economy would be devastated by major Western sanctions. Given rising economic pressures, the president could steer Russia towards formal authoritarianism.

Elsewhere, the unreliability of collective security treaties would encourage Japan and South Korea to bolster their defences against China and North Korea respectively, probably by developing their own nuclear arsenals. Similar trends would play out in the Middle East, where Saudi Arabia and several of its neighbours fear the consequences of a nuclear Iran.

http://blogs.ft.com/beyond-brics/2015/03/23/guest-post-will-russia-make-a-play-for-estonia-latvia-and-lithuania/

Also see the following:

http://www.sldinfo.com/the-nordics-and-baltic-and-arctic-defense-a-discussion-with-the-head-of-risk-intelligence/

http://www.sldinfo.com/european-defense-the-arctic-and-the-future/