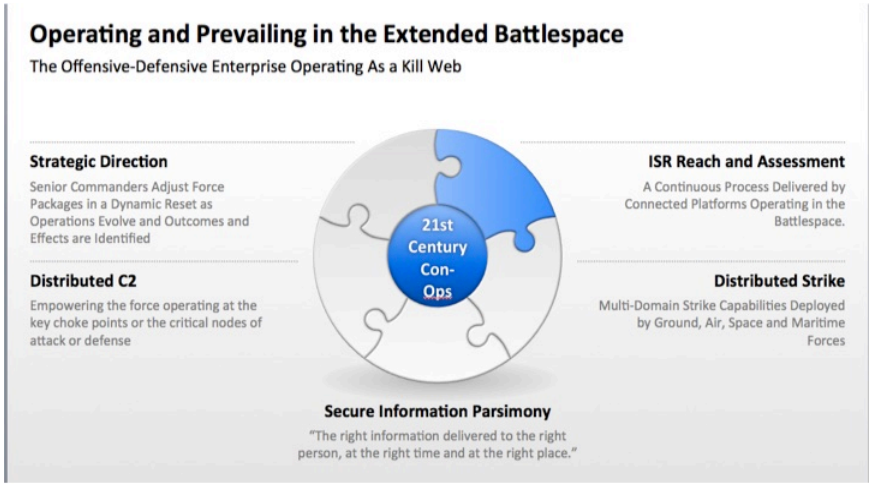
Airpower Modernization and Evolving Concepts of Operations



August 14, 2019

F-35 2.0: The Strategic Significance of Sustained Engagement

08/04/2019
By Robbin Laird

When I worked with a team supporting Rear Admiral George Huchting, the head of the Aegis program in the Navy during the mid-1990s, the challenge was to build upon the Japanese-U.S. working relationship with regard to Aegis to break ground for what we termed the Aegis global enterprise.

The Spanish purchased their first Aegis combat system for their F-100 program in 1996, and this was the first time the combat system went onboard a frigate.

And it is the Spanish frigate which became the nucleus of further sales to Norway and Australia, not an American hull form.

This success, which was not foreordained, for it, was a direct sale not a Foreign Military Sales contract, but with that first step, the ability to proliferate Aegis as a combat system for allied navies was launched.

This global enterprise was built nation by nation as the Aegis combat system was evolving significantly, to the open architecture system it is now, and as it evolved from being essentially a fleet support element to the aircraft carrier to becoming a crucial combat asset in its own right, whereby one can clearly think of the aircraft carrier providing support for Aegis ships.

This global enterprise has led to the global deployment of sensors and C2 systems worldwide able to work together to provide for integrated missile defense capabilities, significantly greater than what the U.S. Navy could do on its own, and with the coming of Aegis ashore, land basing is added to sea basing as the Aegis global enterprise evolves.

The F-35 global enterprise is related to this experience but it is significantly different.

Unlike Aegis, the F-35 program has been designed from the ground up as a global program.

When I had a chance to work with Secretary Wynne in both his acquisition as well USAF positions, he focused directly and significantly on this core strategic goal.

This was human intelligence; not artificial intelligence at work.

And as a global program in which core allies and partners are members of the enterprise even as the U.S. services stand up their F-35 capabilities.

It is not an export program; it is not just about selling airplanes and hope the rest of the force takes care of itself.

It is inherently integratable and drives integration both backwards and forwards, but this will happen as the forces operate the aircraft, and the warfighting centers in the United States and among our allies rethink the capabilities which can be delivered in the near and mid-term and not just navel gazing about the world in 2030.

It is designed from the outset to be a flying combat system, and one which is inherently software upgradeable and as a digital aircraft, can provide the foundation for an integrated global combat force in a way that the Aegis was not originally designed to do.

In an article I wrote in the Fall of 2011 and published in January 2012, I linked the two weapons efforts into what one might characterize as forward leaning integration, that is, the F-35 providing sensors, data, and C2 for the Aegis systems sensors, missiles and C2 as well.

This is clearly a work in progress, but provides a template for what clearly can become a kill web sensor-shooter relationship over the decade ahead.

Interestingly, the draft prepared for publication for the US Naval Institute only focused on the Aegis global enterprise, but when I was given the chance in December 2011 to add additional content, that is when I decided to change the focus to the cross-cutting enterprises.

It was only then that I was able to sneak in the F-35 into the article, for this was supposed to be about the Navy, and the Navy is about the ships they operate and own, right?

I have provided this history only to underscore that the strategic opportunity posed by the F-35 global enterprise is both promising and challenging.

And unlike Aegis it is not an ad hoc post deployment evolution as allied navies bought into the program; the allies and partners consider the F-35 as a key trigger for defense transformation which enhances their national capabilities but builds out a very different approach to global combat innovation and defense industrial working relationships.

It is an air system; not a fighter.

And as such, it is an air system which will receive its full impact only as a multi-domain asset integrated into a nation's fighting force and one which is inherently integrateable with other F-35 nations, and will be leveraged in terms of what Secretary Wynne refers to as "back integration," or the ability in the air domain to provide for fifth generation enablement of an air combat fleet and to drive a shift from battle management to mission management.

But these are inherent opportunities; the F-35 as a combat fleet can achieve these outcomes only if the United States and its allies can work through the various challenges of building organizational structures, and operational approaches which enable such a transition to happen.

And to change the business rules which will govern the development of the global enterprise.

A key contributor to Australian fifth generation transformation efforts has been Vice Air Marshal (Retired) Williams Foundation Fellow, John Blackburn. He has focused clearly in his work on the challenge of reshaping organization structures and capabilities to enable the leveraging of the F-35 global enterprise, which will not lead to the kinds of integrated and innovative changes simply by buying the aircraft.

Blackburn argued that we need to take a broad view of the dynamics of change.

Just buying the platform does not get you where you want to go. We need to focus on a broader innovation by design approach to really create a fifth-generation combat force and this really is a change in the defense eco system.

"When we buy an innovative system, like the F-35, it will not by itself lead to the kind of change which we need. What we need to do is to take a broader look at force design leveraging the aircraft to reconfigure the force.

"If we do not design an integrated force, we are always going to play catch up and do after market integration."

Question: But to do this will require a fundamental change in the defense eco system and how defense operates a procurement and support organization.

How do you view this challenge?

John Blackburn: We are using the business model of the past twenty years when we have acquired standalone platforms and try to figure out how they would work together in the post-acquisition phase.

"But we need to change how the whole organization itself works. The warfighters get what the F-35 drives in terms of change; but this integrative approach is not being replicated on the level of acquisition which is still a stove piped process and world.

"We are preparing to fly fifth generation aircraft in a legacy eco system; this simply does not make sense.

"The design process for the overall force is where significant change needs and can occur.

"What this means is that you look at an effect which you want to create with the overall force and you look at your mix of platforms and determine which can lead the design change to achieve that effect, rather than simply doing additive modernization of every platform.

"You are targeting innovation on a lead platform rather than simply doing innovation by addition.

"The F-35 poses a significant challenge because it delivers weapons, its delivers non-lethal effects, it is an ISR platform, it is a C2 platform, and can itself deliver organic strike or simply delegate to a partner aircraft or system.

"Such a platform simply blows apart the traditional structure and if you pursue integration it is clearly a driver for change; if you don't you will reduce the aircraft to one of its functions rather than leverage it for multi-domain, cross platform integrated innovation and combat learning.

"We need to take the energy evident at the tactical combat level and inject that into the strategic culture at the top which simply cannot tap into effectively the kind of fifth generation innovation we are seeing from operators.

"This is the first major roadblock, namely, the business model."

As the Aussies work out their sustainment approach on the various airbases where the F-35s will operate in normal times as well as crisis times, the F-35 partners of Australia have a significant strategic opportunity — namely, to learn how to do sustained engagement operations working with the RAAF in supporting regional deterrence operations.

The Aussies are standing up a significant support structure in Australia for regional support. As they do so, allies such as the US and Japan can shape an approach to what I would call sustained engagement.

With crises to come in which the F-35s will play a key role, the Australians can provide operating locations for allies, without having to base those allies on a long term basis. This allows Australia its sovereignty but also allows allies like the United States and Japan to gain operational depth, which will be crucial for deterrence in the region.

Because they are flying virtually the same aircraft, stockpiling parts and leveraging an expanded sustainment base with the Australian maintainers leading the way for the USAF to move to a new approach to operations which does not require them to operate like Fed Ex flying in resources to then stand up support in a crisis.

The USAF or the Japanese could fly to Australia and be supported by Australian based supplies and maintainers supplemented by Japanese and US maintainers and could operate rapidly in a crisis, rather than engaging in a significant airlift and tanking support set of missions to stand up aircraft in Australia on a case by case basis.

It is not about just showing up; it is about being able to do sustained engagement with a very light expeditionary support structure to establish and operate from a solid operational footprint.

Lt. Col. David Beaumont, an Australian logistics officer and expert, provided his perspective on how he saw this aspect of the potential for the F-35 program.

"This is the beauty of the program – it supports what we might also call 'theatre setting', or creating logistics (sustainment) and other arrangement s we could conceivably operate in.

"In coalition, we'll effectively be operating a strategic 'hub and spoke' support network for the aircraft where a range of coalition bases (countries) offer hubs for operations, with supply chains between them the spokes. The other advantage is considerable redundancy if the supply chains are interdicted in one area.

This inherent capability within the F-35 global enterprise "makes interoperability among allies a fundamental issue for immediate attention."

One could add that the kind of theater setting, which Beaumont highlighted, would form a key part of deterrence in depth which is critical to shape to our advantage adversary perceptions.

In this article, I am going to focus on the potential advantages, which the F-35 global enterprise COULD deliver, if the business rules are changed, to deliver what I have called sustained engagement.

That is, if one looks at allied operational settings not simply as bases from which a nation might operate its own F-35s, but as places where allied F-35s could fly to the fight as that particular nation might be affected by a particular crisis.

The core requirement here would be to stockpile parts and to ensure that the maintainers of the U.S. services and the allied nations are free to maintain each other's airplanes.

Antiquated US security rules need to be modified to do so, and the recent USAF flight to Orland is suggestive of what MIGHT happen.

But this needs to not be an occasional pick up sticks exercise, but a key part of our new concepts of operations.

This would mean that the U.S. depot structure needs to be recognized for what it is, a legacy of the past perhaps good for legacy aircraft, but certainly not a building block for global operations and sustainability.

The United States can clearly learn from allies in terms of their non-depot approaches to maintenance and how best to leverage, build and understand what regional support centers can bring to a force which flies to the fight rather than flies to the depot.

A key impact of having a global network of regional support centers with cross-national maintenance would be to reduce the time to get to the fight and to reduce dramatically the need for lift and tanking assets to move to a regional crisis.

Not only is precious time saved, but the U.S. is not operating from allied bases, there are flying to places from which to operate during a crisis management period.

Lt. Col. Beaumont added this comment to the above point. "Such an approach also enables the coalition to operate from one another's 'agile bases' – an emerging Air Force concept."

Another key impact of robust regional centers is the question of the management of big data, and innovation.

Because the F-35 is an all-digital aircraft, performance at the point of operation flows as data back into the parts support and manufacturing process.

And allies have a key role in that process, but by unleashing the ability to manage effectively big data from the maintenance side of the equation, the ability to more rapidly improve the production of parts and reworking manufacturing becomes a virtuous circle.

Within this virtuous circle, a number of our allies have very innovative software firms and software solutions.

Given that this is a software upgradeable aircraft, by unleashing the learning curve from big data obtained through the global support process, the ability to engage allied industry in the ongoing modernization process is not only facilitated but enhanced as well.

Such a regional support approach is congruent with an ongoing trend, which will affect defense industries in the liberal democracies, namely, regionalization.

With the strategic shift, the importance of regional conflict, and of regional allies is enhanced within the overall context of full spectrum crisis management.

And with it, the need for enhanced self-reliance of allies as well.

But enhanced self-reliance in the context of dealing with global authoritarian challenges for the liberal democracies, their partners and allies requires a balancing act.

On the one hand, the regional partner or ally requires access to the force capabilities and the industrial underpinnings of those capabilities evident in a relatively small number of defense industrial powers.

And this entails the capability to plug and play between the larger power and the regional partner or ally.

On the other hand, there is a growing need for indigenous industrial support for sustainment and the development and production of selected national or regional defense capabilities by regional partners or allies.

Lt. Col. Beaumont, who was a significant contributor to the last Williams Foundation seminar where the whole question of rebuilding Australian defense industry to support enhanced sustainability for the Australian Defence Force, underscored the importance of this trend within defense industry:

"We have to be very conscious of the defence industry capacity under this model.

"There is a risk that if aircraft are forward deployed in an allied nation and the supply to that nation is cut-off, the aircraft might be 'orphaned' with little support available.

"This is an area for further thinking."

It is not a zero sum game, but does challenge the dichotomy of exporting and importing nations for more advanced equipment.

It is about how the regional partner or ally can shape enough sustainability and defense capability within the boundaries of its nation or regional setting to be able to work with a larger ally who needs to plug and play with the capabilities of that nation.

By putting the F-35 global support effort in play as an engine for change in terms of regional operational support, the United States can put itself on the right side of history.

And the software upgradeable piece of the integration effort, both backwards and forward, is a key part of the way ahead.

The challenge is to change SIGNIFICANTLY the acquisition approach from yesterday's requirements dominated by bureaucrats identified the hoops that the development folks are supposed to jump through prior to having a weapon system put into the hands of the operators, or more to the point with the F-35 global enterprise, a modernization process driven by an ability to gain transient software advantage.

For transient software advantage to become the coin of the realm, the operators need to be working directly with the software code writers without the interference from hierarchically distant acquisition officials and "testers."

Once the platform has been built and software enabled, then the users and the code writers need to be funded to provide capabilities, which the platform as a system can deliver.

Acquisition leadership then becomes strategically sorting through which capability should be enhanced on which platform within the evolving 21st century combat force.

As General Ellen Pawlikowski then head of Air Force Material Command put it in 2017:

"By the way, once you put it in the hands of the operator maybe some of those requirements you had in the beginning, maybe they don't make any sense anymore because the operator sees how they can actually use this and they change it."

She then went after the way sustainment is thought about for the software enterprise.

"The other thing that we have is this idea that software is developed and then sustained. What the heck does that mean? Software doesn't break. You may find something that doesn't work the way you thought it was, but it doesn't break.

"You don't bring it in for corrosion mitigation or overhaul on the engines. When you're look at what we do in software sustainment a lot of it is continually improving the software."

And the continually improving software piece is not about development to platform to sustainment – the virtuous circle of F-35 development is about BIG data flowing through the system and continuous innovation unleashed by a truly F-35 global enterprise.

We have a long way to get there; but it will not be the fault of the aircraft if this does not happen.

Rather than having yet another seminar on artificial intelligence let us focus on the core importance of changing the business rules which is supposed to fall in the domain of human intelligence.

The featured photo shows F-35 Lighting II maintainers from both the United States Air Force and Royal Norwegian Air Force working together at Orland Air Base, Norway, to turn two American jets after a sortie June 17, 2019. The visit marked the first time American F-35s have landed in Norway, which operates its own fleet of the fifth-generation fighters, and served as valuable training for the Norwegian maintainers. A fleet of F-35s is currently deployed to Europe as part of the European Deterrence Initiative, as as a way of proving the U.S. Air Force's ability to rapidly deploy fifth-generation fighters to European bases. (U.S. Air Force photo by Master Sgt. Austin M. May.)

Editor's Note: In a Mitchell Forum piece published in March 2019, Major Luke J. Harris and Col. Max M. Marosko III, USAF focused on the challenges of building out a fifth generation coalition.

One aspect, which they focused upon, is the significance of working the cross-maintenance capability of a global F-35 fleet.

"With limited U.S. fifth generation aircraft in the Pacific and Europe, and with plans to carry out distributed operations in a major conflict, the U.S. will by necessity have to rely on allies to perform basic maintenance, refueling, and weapons reloading.

"There are not enough U.S. personnel, spare parts, or maintenance equipment to service the expected dispersed flights of F-35s spread out to several bases across either Europe or the Asia-Pacific theaters.

"In order to promote basic integration, Air Force and DOD officials need to remove limitations that would prohibit a non-U.S. F-35 maintainer from performing basic maintenance, refueling, and weapons loading on U.S. F-35s. If this maintenance integration is not practiced in peacetime, wartime implementation will be carried out hastily.

"There is an urgent need for basic integration as the F-35 program expands, and opportunities should be capitalized on in the context of current exercises and deployments.

"Ultimately, the value added through integrated maintenance operations may contribute more to mission success than advanced technical and tactical integration."

An Update on the CH-53K at the Paris Air Show

07/05/2019
By Robbin Laird

On June 18, 2019, the President of Sikorsky, Dan Schultz, himself a former CH-53-E pilot, provided an overview brief on the CH-53K and their offering for both Germany and Israel.

He was joined by John Rucci, Senior Experimental Test Pilot, who was in the Lockheed chalet, working with reporters on the CH-53 K flight simulator and by Beth Parcella, the Director of the International CH-53K program.

The briefing to reporters started with a focus on how the aircraft could perform in brownout and degraded conditions.

The video and the discussion by both Schultz and Rucci highlighted the capability of the aircraft to operate in very difficult operational conditions in a way neither the Chinook nor the E could do.

This is due to the fly by wire system onboard the aircraft and other digital tools which allow for stable flight in a wide variety of operational conditions.

This is crucial for the Marines as they transition from the land wars to operating in all climes globally and flying to the crisis rather than primarily focusing on Middle East operating conditions.

My visit to MAWTS-1 last year in Yuma Arizona highlighted how significant the transition which the Marines are undergoing to deal with the strategic shift facing the United States and its allies, and clearly the K is being relied on as a key piece of the combat capability allowing the Marines to operate and prevail in contested combat operations.

The digital nature of the aircraft was highlighted in terms of how "big data" life cycle support was a key part of CH-53K operations.

Schultz noted that the Sikorsky experience with the S-92 was especially important in terms of providing the kind of reliability through data which the Ch-53K has as well.

The CH-53K has a built in HUMS or health management system which provides real time data on performance and maintainability, which provides the military customer with a significant advance over mechanical systems like the Chinook or the E, and which provide built-in operational and sustainability advantages.

I visited the S-92 global management operation, and clearly, the S-92 has provided Sikorsky with key abilities to understand how to provide global support to operating aircraft in very different geographical situations as well.

Schultz spent some time highlighting the advantages of the K from the standpoint of maintainability or sustainability.

He noted that, for example, even though the gearbox on the K is much more powerful than that of the E, it operates with 40% less parts.

He noted as well that the aircraft was designed to make it more flexible in a number of ways.

He mentioned that because the flight controls are built into the seat, the aircraft adjusts to the pilot, rather than the pilot having to adjust his seat to operate the flight controls.

He mentioned as well the capability of the aircraft be carried by a large lift aircraft like the C-17 and being able to re-assembled much more quickly than a legacy system like the E.

With regard to international partners, the aircraft was very adjustable to the needs of new partners.

It is a digital aircraft with software upgradeability built in, and when I visited the Sikorsky facility in Connecticut last year, I talked with software engineers about the flexibility of adapting software to partner needs.

The offering to Germany provides an F-35 like partnership in which German partners would be providing parts not just to the German CH-53K but to the overall global program.

For Germany, the K clearly would be part of how they might adjust flexibility to the strategic shift facing the liberal democracies in dealing with the Russians.

For example, Germany needs to rapidly reinforce their Baltic brigade or move forces forward to reinforce Poland in a crisis.

Compared to Chinook, the K goes further, faster and brings a significantly greater combat load to the fight rapidly.

And flying with the A400 M or the C-130J, the ability to carry standard pallets means a rapid movement of cargo from an airlifter to the K to move support within an area of interest.

And the K is changing as well the meaning of what a support helo really is.

It is in an information or C2 asset through the nature of the cockpit and how information can be managed within the cockpit or delivered to the combat soldiers onboard the aircraft.

This means that for Germany, the K is already FCAS enabled, or able to operate in a combat cloud in a way certainly neither the E nor the Chinook can do.

In Germany, Sikorsky is partnered with Rheinmetall, a company with demonstrated capability to support ground combat forces, and which is investing in transferring that capability to the helo support domain.

The German MoD is looking for the replacement helicopter for the legacy CH-53s to be part of launch to a new sustainment approach.

The MoD is looking for innovative new approaches to sustainment, and certainly this is something which the US Navy and Marine Corps are investing heavily in, as evidenced by the log demo team operating in USMC Air Station New River.

In short, the US Navy and the USMC working with Sikorsky are making available to our core allies a significant 21st century combat platform, one which is tailored to work the concepts of operations required to support effectively the strategic shift which are forces face when facing 21st century authoritarian competitors.

The USAF Works Adaptive Basing and Fifth Gen Power Projection

07/26/2019

As Europe adds new F-35 capabilities to its combat forces, there is a clear opportunity for U.S Services which fly the F-35 to work a very different approach to providing for enhanced and time urgent combat power.

With a sustained engagement strategy, the USAF, USMC and the US Navy could leverage regional partners sustainment resources, including maintainers and stockpiled parts to ensure an ability to fly to the fight, rather than to have to bring the flying warehouse of C-17s, C-15s, and C-130s and tankers with them.

Three recent events highlight the possibility.

The first is the USAF flying to Orland Air Base

In story published on June 17, 2019, the USAF highlighted this event as follows:

ORLAND AIR BASE, Norway – For the first time outside the U. S., Norwegian and American F-35 Lightning II maintainers worked together on their aircraft June 17, 2019.

A team of five maintainers and four pilots from the 421st Expeditionary Fighter Squadron deployed to Norway for the historic cross-servicing event, during which the maintenance teams received and turned two American F-35As after their arrival from Finland.

The Norwegian air force already operates a fleet of 12 F-35s at Orland Air Base, and plans to eventually employ 52 of the fifth-generation aircraft throughout Norway. The visit was the first time American F-35s have landed in Norway.

All firsts are special," said Royal Norwegian Air Force Lt. Col. Eirik Guldvog, 132nd Air Wing executive officer and chief of staff. "For Norway and our European allies, who are entering the fifth-generation fighter era, it's important to both have the U.S. on board and to train with the other partners around the North Sea.

"To have multinational cooperation within these nations and to have a significant F-35-capable force in the North Atlantic, of course that is important," Guldvog continued. "This is the first step."

While the visit was short, it was an opportunity to practice seamless integration in preparation for future deployments.

"Air operations are often multinational, so it's important that we train together and find every opportunity to interact on a normal basis," Guldvog said.

According to U.S. Air Force Capt. Brett Burnside, 421st EFS F-35 pilot, the entire endeavor felt familiar and without any significant challenges.

"Even though they are from a different country and speak a different language, they are fighter pilots as we are," Burnside said. "We simply connected with them on our F-35 datalink and it was just like working with any U.S. F-35 unit."

Burnside said because Norway is a partner in the F-35 program, it's extremely important to continue to foster this relationship. Additionally, he said Norway's geographic location is immensely strategic as they have a large responsibility in quick reaction alert to scramble fighters to intercept hostile aircraft in the arctic region if necessary.

The now-proven ability of RNorAF's Lightning II maintainers to successfully catch and turn American F-35s is a huge milestone for the country.

"F-35s will be the most important combat element within the Norwegian defense agencies," Guldvog said. "Not just the air force. It will be the most potent offensive capability in Norway."

A fleet of F-35As is currently deployed to Europe as part of the European Deterrence Initiative, which enables the U. S. to enhance a deterrence posture, increase the readiness and responsiveness of U.S. forces in Europe, support the collective defense and security of NATO allies, and bolster the security and capacity of U.S. partners.

The second involves the current Operation Rapid Forge where the USAF has brought F-35s to Poland for the first time. As Poland is expected to buy the aircraft, in the future, Polish hardened air bases defended by their increasingly capable active defense systems can provide an opportunity for the USAF or other European F-35 partners to fly to the deterrent effort if the Russians are threatening the Baltics or Poland.

According to a a USAF story published on July 16, 2019:

U.S. Air Force fighter and mobility aircraft deployed to bases in Poland, Lithuania and Estonia today as part of Operation Rapid Forge, a U.S. Air Forces in Europe-sponsored training event designed to enhance interoperability with NATO allies and partners, improve readiness and sharpen operational capabilities.

F-35 Lightning II fighter jets, F-15E Strike Eagles, and C-130J Super Hercules aircraft arrived at Powidz Air Base, Poland, to conduct refueling and re-arming operations using inert munitions.

F-15E Strike Eagles and C-130J Super Hercules aircraft arrived at Siauilai AB, Lithuania, also to conduct refueling and re-arming operations using inert munitions.

F-15E Strike Eagles and MC-130J Commando II aircraft arrived at Amari AB, Estonia, to conduct refueling operations.

The ability to operate at forward locations enables collective defense capabilities and provides the U.S. and NATO allies the strategic and operational breadth needed to deter adversaries and assure our allies and partners.

The F-35s are deployed from the 388th and 419th Fighter Wings at Hill AFB, Utah. F-15E Strike Eagles are deployed from the 4th Fighter Wing, Seymour Johnson Air Force Base, N.C. Both squadrons of fighter jets are operating out of Spangdahlem AB, Germany. The MC-130J aircraft are from the 352nd Special Operations Wing at RAF Mildenhall, England, and the C-130J aircraft are deployed from the 317th Airlift Wing at Dyess Air Force Base, Tex., and are operating out of Ramstein AB, Germany

The third event occurred in May of this year where the USAF worked new approaches to adaptive basing.

According to a USAF story published on May 14, 2019:

KINSTON REGIONAL JETPORT, N.C. – The Air Force completed the final test of an innovative warfighting concept May 12 that could be a game-changer for future adaptive-basing constructs.

The Combat Support Wing proof-of-concept capstone exercise developed by the Air Force Installation and Mission Support Center and hosted by Air Combat Command's 4th Fighter Wing at Seymour Johnson Air Force Base, North Carolina, tested the ability of three teams of about 30 Airmen each to establish and operate an airfield in an austere environment. They had to defend the base and refuel and rearm F-15E's using multifunctional skills they learned during training events over the past month.

"We've seen monumental improvements in the ability of our Airmen to do things outside of their normal career fields and the speed at which they're able to refuel and rearm jets," said Brig. Gen. Brian Bruckbauer, AFIMSC director of Expeditionary Support and Innovation. Bruckbauer's directorate led the planning and execution of the exercise.

The concept supports National Defense Strategy priorities to evolve innovative operational concepts and enhance lethality in contested environments. If fielded, the CSW concept could give the Air Force the ability to rapidly deploy in smaller, more efficient and agile teams to austere and potentially contested areas. Under the multifunctional construct, weapons loaders could drive a refueling truck, security forces defenders could refuel a jet and avionics specialists could provide airfield security while also performing their primary duties.

CSW is an outcome of the 2017 AFIMSC Installation and Mission Support Weapons and Tactics Conference. The capstone was the final event in a phased rollout of the concept over the past year. It tested the hub-and-spoke operations of a single forward operating base at Seymour Johnson and three forward operating locations at Kinston, Moody AFB, Georgia, and MacDill AFB, Florida.

"We had at least 15 different Air Force Specialty Codes come in to attack the problem of how to conduct integrated combat turns with as few people and the smallest logistics footprint as possible," said Col. Erik Rundquist, commander of AFIMSC Detachment 8 at Langley AFB, Va., who was one of the primary architects responsible for turning the concept into practicable exercise scenarios.

Master Sgt. Jason Knepper, an Air Force Security Forces Center flight chief, joined the CSW cadre in January as a security forces functional lead. He said he's seen "tons" of progress since capstone participants began training in mid-April.

"We went from individual troops who had their skillset and a vague understanding about what everyone else was doing to now where you've got maintainers manning defensive fighting positions and cops helping refuel jets," Knepper said. "The construct for the multifunction approach is working really well. The people who built those pieces did a phenomenal job and now we're seeing it work."

He said Airmen can execute the concept very well when given the opportunity, training and motivation to see why it's important. One of those Airmen was Senior Airman Darian Betancourt, an aircraft armament systems specialist at the 4th Fighter Wing. He learned how to drive R-11 fuel trucks, palletize cargo, conduct tactical combat casualty care and defend the base.

"It's been different. It's been fun too," Betancourt said. "You gain appreciation for your job and other people's jobs and you learn what they do."

He said the experience was eye-opening.

"There's so much to the Air Force that people don't get to see and doing something like this really shows that," Betancourt said. "If everybody could do this (multifunctional learning), that would be something special."

The AFIMSC Expeditionary Support Directorate will now produce a report for Air Force leaders that includes data on more than 100 measures of effectiveness.

"We'll be able to provide our senior leaders with a very thorough analysis and some very good recommendations going forward on force structure, force presentation and multi-functional training with the goal of using this concept in our operational plans," Bruckbauer said.

The CSW concept will be included in the Rapid Forge exercise taking place July 10-26 in Europe.

The UK and Sweden Agree to Enhance Their Air Combat Collaboration

07/21/2019

In what can only be seen as a logical expression of the current situation in the European defense aerospace landscape, the UK and Sweden have agreed to enhance their collaboration on evolving air combat capabilities.

With the uncertainties revolving around Brexit, and past collaboration between SAAB and the UK, including in weapons development, and with Sweden being the odd man out with regard to F-35 Europeanization and FCAS, working with the UK makes sense as well.

According to a UK MoD story published on July 19, 2019:

Defence Secretary Penny Mordaunt and her Swedish counterpart Peter Hultqvist have signed a landmark agreement to partner on future combat air.

The Memorandum of Understanding (MOU) commits both governments to work on a joint combat air development and acquisition programme, including the development of new concepts to meet both nations' future requirements.

At the MOU signing with her Swedish counterpart yesterday, the Defence Secretary said:

"The UK and Sweden have an enduring defence relationship, with our two industries sharing a rich history of collaboration in air power.

"Not only do we share the same commitment to tolerance, freedom and free trade, we also share the same determination to defend those values, including in Afghanistan, Iraq and today as part of the UK's Joint Expeditionary Force.

"This agreement further deepens this partnership and sees us look to the future with a bold and shared vision of UK and Swedish air power."

Announcing the signature of the Memorandum of Understanding (MOU) at the Royal International Air Tattoo, the Minister of Defence Procurement, Stuart Andrew, said:

"I'm delighted that we have signed this Memorandum of Understanding, endorsing a shared and ambitious vision for future combat air systems which lays firm foundations for future collaboration.

"Today we usher in an exciting new era in which the talents of two great combat air nations will be combined to lift Swedish and British airpower into the stratosphere."

The Defence Minister outlined the UK and Sweden's long partnership on defence, including:

Joint exercises in the Arctic and in Exercise Ramstein Alloy over the Eastern European skies.

Swedish-made chaff and flare dispensers are used on UK Typhoons and Saab's Giraffe radar is a key part of the UK's Sky Sabre ground-based air defence system.

Swedish Gripen aircraft are equipped with radars designed and built by Leonardo in Edinburgh.

The UK, working with European partners including Sweden, has developed the state-of-the-art beyond-visual-range Meteor air to air missiles.

The Swedish Minister of Defence, Peter Hultqvist, confirmed both governments intend to remain at the forefront of combat air.

He stressed the opportunities to put advanced technologies onto Gripen and Typhoon, the world class combat aircraft currently operated by Sweden and the UK respectively, before inserting these technologies onto a future combat air system.

Peter Hultqvist also highlighted the strong industrial base shared by both countries as central to securing future Combat Air power, as well as the existing Gripen fighter systems.

He added that the significant progress made to date was a result of focussing the discussions on practical considerations, recognising the strengths of each party and treating each other as equal partners.

Discussions between industries and governments had been ongoing since the publication of the UK's Combat Air Strategy in July 2018, with common ground identified based on similar future Combat Air requirements, including being optimised for air defence.

Defence Minister Andrew confirmed that other nations were encouraged to join the UK/Swedish dialogue, on the condition that they had similar requirements.

The Air Force Chiefs of both nations addressed the audience at the event, as well as industry. UK industry was represented by BAE Systems, whilst Swedish industry was represented by Saab.

And the Swedish Ministry of Defence published their take on the agreement as follows:

On 18 July, Minister for Defence Peter Hultqvist and the United Kingdom's Secretary of State for Defence Penny Mordaunt signed a Memorandum of Understanding (MoU) in London agreeing to examine the possibilities for joint development of future combat aircraft capabilities and combat aircraft systems.

The MoU is the starting point for the countries to analyse the conditions for deeper cooperation on the development of future combat aircraft capabilities, including future development of the JAS 39 Gripen.

The MoU does not entail long-term commitments between the countries, but is intended to enable future positions. Nor does it prevent the countries from engaging in similar studies and analyses with other partners.

The agreement will be effective for ten years, which is deemed sufficient to carry out the above activities. If and when Sweden decides to fully initiate a bilateral development and procurement project, additional, more detailed agreements will need to be signed.

Sweden's current combat aircraft system, the JAS 39 Gripen, will be the backbone of Swedish combat aircraft capabilities for the foreseeable future. This collaboration offers the opportunity to further insert advanced technologies into JAS 39 Gripen.

Future Combat Air System: A Speed Race Between Data And Fighter

06/26/2019

By Mureille Delaporte

PARIS AIR SHOW 2019

Data fusion and the magic of connectivity have entered the show with a fury this year. Sliding touchscreens and demos at Dassault, Airbus and Thales all make one feel as if one is part of a "Mission Impossible" debrief…

Indeed, many feel that the FCAS (Future Combat Air System), only launched a few months ago, is a Mission Impossible when one focuses on how much money — $4 billion by 2025 is to be jointly allocated by France and Germany.

While Americans are used to spending $1 billion annually here and there on a single weapons program in a single year, the entire German defense budget planned for 2020 is only 45 billion Euros (roughly $50 billion), with France expected to spend 35.9 billion Euros (roughly $40 billion), so almost $500 million a year is a substantial commitment.

With Next Gen Fighters Come Next Gen Engineers

FCAS will be built brick by brick on a five pillar foundation :

1. The fighter will be built by Dassault
2. Airbus and Thales are the prime integrators
3. Drones and missiles will be built by Airbus and MBDA
4. Safran and MTU will probably build the engines
5. Airbus and Thales will handle training and simulation.

The first phase for Dassault is to go ahead with the upgrade of the Rafale towards the F4 standard by 2025 and evolve, in Dassault's view, towards a "Super Rafale". At Dassault, there is a saying that "what is beautiful flies well." Indeed, the model displayed at the Dassault military stand is a true beauty.

The NGF, meant to replace the old Mirages 2000 and early Rafales, but also – it is hoped – the German Typhoon Eurofighters, as well as the Spanish F/A-18, is to keep the Rafale spirit and polyvalence.

It will remain multi-mission, which means nuclear for the French) and joint with the Navy, but with a clear focus on maintaining air superiority in an increasingly contested and anti-denial environment.

The NGF must therefore be more poweful than the Rafale and remain manoeuverable. Hence the choice to keep two small tail fins, a compromise made with the willingness to increase stealth.

Regarding the latter, it is thanks to the research made around the Neuron UCAV program (done in cooperation between France, Spain, Greece, Italy, Sweden and Switzerland) in the past decade that serious progress has been made.

Indeed, Neuron has been an attempt to gather what Europe does best technology-wise : Spain, Greece, Sweden, Switzerland and Italy all join France to find solutions together with just a 400 million Euro budget.

It is also thanks to the Neuron program that Dassault has been able, in spite of all the lean years at the end of the 2000's, to keep its designer and engineer teams intact and to make sure that they are today ready for the future — and FCAS.

The Challenge of Speed

Proposed Future Combat Air System (FCAS)

What is new at le Bourget this year is the awareness that, well, « the times, they are a-changin » and that FCAS is not only about the NGF, but about the connectivity between everything that can fly — the network.

The challenges are many, since the tactical combat cloud must allow the shooter to react faster – or at least as fast as – the speed of the data flow coming to him at an increasing speed.

The other challenge, highlighted by an Airbus source, is to be able to operate in a degraded environment, hence the focus on space and drones, which could be launched from an A400M as a first line of offense to neutralize enemy air-to-air or jamming capabilities.

A system of systems approach is familiar conceptually, but it seems to have finally come to life at this year's show with the display of key elements, such as the Phenix MRTT (the second one that the French Air Force is about to receive and that can be visited in its EVASAN configuration at the Airbus booth).

FCAS does not look like Mission Impossible anymore, as long as the European players do not self-destruct and replay the depressing scenario of the 1980's all over again…

The featured photo shows Emmanuel Macron, President de la Republique, Florence Parly, French Minister of Defense, Ursula von der Leyen, German Minister of Defence, Mararita Robles, Spanish Minister of Defense, and Eric Trappier, President du GIFAS, a and the CEO of Dassault, signing the FCAS agreement at Le Bourget.

This article was first published by Breaking Defense on June 24, 2019.

The Next Phase of Airpower Transformation for the UK: Putting Team Tempest in Perspective

06/17/2019

By Robbin Laird, Research Fellow, The Williams Foundation, Canberra, Australia

At the Farnbourgh Air Show last year, then Defence Secretary Gavin Williamson, highlighted the new UK Combat Air Strategy and with it the launching of Team Tempest.

The focal point of his presentation on July 16, 2018 was the goal of developing a next generation fighter.

The UK MoD story published that day explained the initiative.

The concept aircraft has been put together by British firms including BAE Systems, Leonardo, MBDA and Rolls-Royce, which have joined together with the RAF Rapid Capabilities Office to form 'Team Tempest' to pursue the opportunity.

Team Tempest brings together the UK's world leading industry and sovereign capabilities across future combat air's four key technology areas: advanced combat air systems and integration (BAE Systems); advanced power and propulsion systems (Rolls-Royce); advanced sensors, electronics and avionics (Leonardo) and advanced weapon systems (MBDA).

The MOD will now set up a dedicated team to deliver the combat air acquisition programme.

They will deliver a business case by the end of the year, and have initial conclusions on international partners by next summer – with engagement with potential partners beginning immediately.

Early decisions around how to acquire the capability will be confirmed by the end of 2020, before final investment decisions are made by 2025. The aim is then for a next generation platform to have operational capability by 2035.

The UK is already a world-leader in the combat air sector, with a mix of skills and technologies unique in Europe, supporting over 18,000 highly skilled jobs. The sector delivers a turnover in excess of £6bn a year and has made up over 80% of defence exports from the UK over the last ten years.

Investment in combat air technology, combined with the strengths of UK industry, has resulted in the UK being the only Tier 1 partner with the US on the F-35 Lightning II programme, with British industry delivering 15% byvalue of every F-35 built. The UK has been able to help define the operational capabilities of the aircraft, while reinforcing UK industrial capability, critical skills and supporting wider economic prosperity.

The UK also continues to lead the way in combat air power as one of the four partner nations in the Eurofighter Typhoon programme. With more than 20,000 flying hours on deployed operations to date, the Typhoon delivers world leading capability, unparalleled reliability and proven interoperability with our allies. The MOD will continue to invest in the Typhoon for decades to come, with the best technologies being carried forward on to next-generation systems.

The F-35 Lightning II and the Typhoon are two complementary multi-role combat aircraft that will make up the RAF's combat air fleet, placing the UK at the forefront of combat air technology – with the Typhoon expected to remain in UK service until at least 2040.

The problem posed by having at the vortex of this launch a new combat aircraft is that really the main thrust of the way ahead for the decade ahead is not really about that – it is about evolving new capabilities which flow from the Typhoon-F-35 integration effort and from the work with global F-35 partners on weapons and remotes.

At some point, I am sure a new combat platform will emerge from this, but the focus here is clearly quite different from the Franco-German announcement which focused clearly on the need to launch a new fighter and to use that launch point as the iron magnet to draw together the strands of airpower modernization.

In meetings last Fall and this Spring in London, it became apparent that the British approach to FCAS is very clear – leverage the Eurofighter/F-35 dyad to figure out what to do next in the air combat development area. it is clearly about leveraging the dyad of Typhoon and F-35 to shape a decade or two of innovation and to leverage that UK, allied and partner development process to deliver what is to come next.

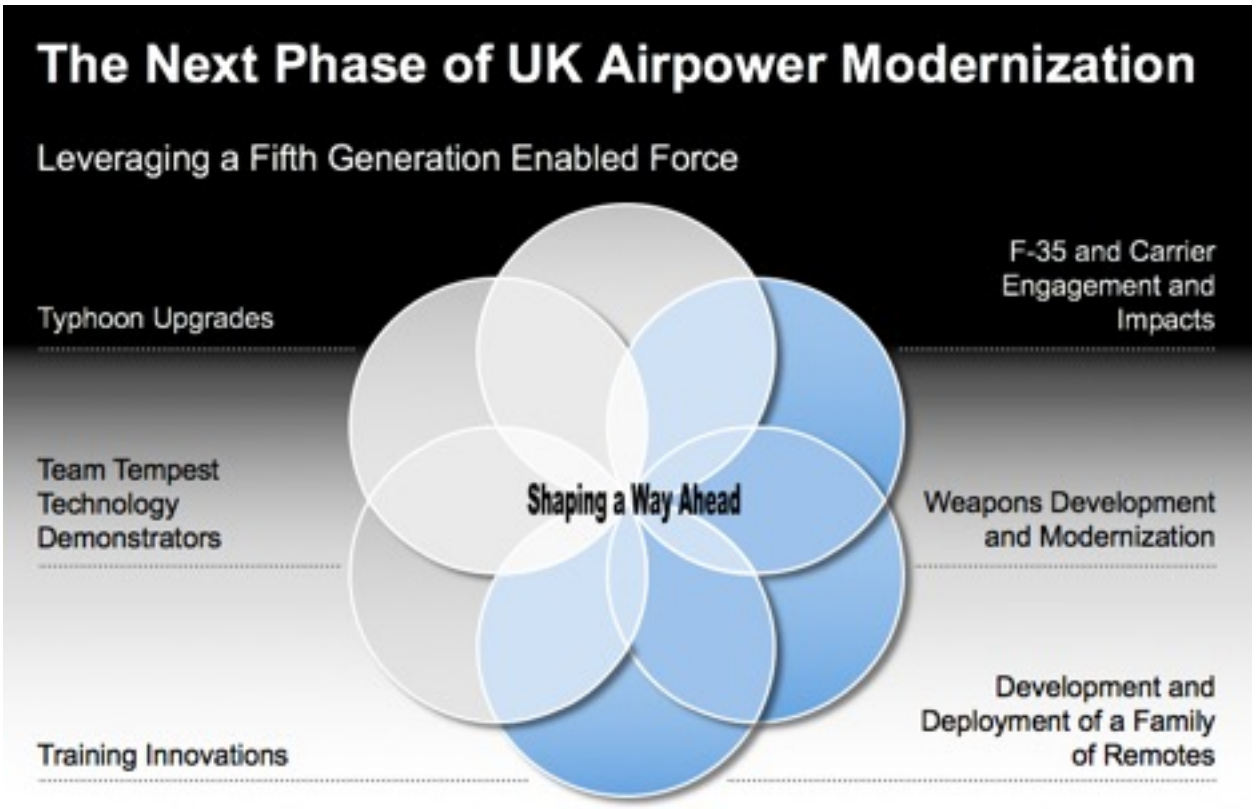
It was pointed out in private meetings that the UK was following what they saw as the USAF lead whereby the USAF was not committing itself to a sixth gen aircraft but to leveraging fifth gen with unmanned with the legacy fleet and weapons modernization to sort out what comes next.

The Brits with whom I met underscored that Team Tempest was not necessarily targeting a new build combat air frame, but really trying to leverage the innovations of the next decade to position UK industry to build, shape and craft the capabilities needed in the 2030s and 2040s.

Rather than having a clear commitment to a future combat fighter, it was a commitment to building out air combat capabilities to the point where new platform decisions could be taken.

But these decisions would be taken as the only Tier One partner in the F-35 with a 15% stake in the global program. This is a very different approach being proposed by France and Germany and allows Britain as well to work with the very significant F-35 global community, which might well join in a broader leveraging strategy with the RAF.

In my view, the core thrust of UK efforts to shape a way ahead are a function of six interactive efforts or dynamics which can be seen in the graphic below.



I will focus on each of these key aspects in separate pieces, but start in reverse, namely by looking at the Team Tempest dynamic.

TEMPEST PROGRAM SPONSORED TECHNOLOGY DEMONSTRATORS: THE NEED FOR A UK PLAN JERICHO

In effect, Team Tempest is focused on generating effective technology demonstrators from UK defense industry working closely with the government. Although identified as focused upon replacing Typhoon at some point, the reality is that leveraging the Typoon-F-35 dyad is really the point.

And the evolution of the effectors flowing form this dyad in my view will define what comes next in terms of a fighter aircraft. The potential advantage which the UK has comes through its two, coalition developed and operated aircraft.

On the one hand, Typhoon allows for reachback into the continent and working relationships with Italian, German and Spanish industry. And provides ways to work with the Franco-German FCAS imitative.

On the other hand, the F-35 global enterprise fits much better the "Global Britain" thematic which comes out from the Brexit dynamic.

As sense of what Team Tempest is about was provided by an announcement of a Team Tempest Industry Day in Farnbourgh.

Companies from across the UK defence industry came together in the first opportunity for suppliers to engage with the Government and Team Tempest partners over the future of Combat Air System development in the UK.

The event in Farnborough was launched by Minister for Defence Procurement, Stuart Andrew, and saw 300 delegates including SMEs and technology-led organisations attending to build connections and take part in a series of briefings outlining the capabilities and skills needed to shape the future of Combat Air System delivery in the UK.

The Tempest programme aims to harness and develop UK capabilities that are critical for Next Generation (NextGen) Combat Air capability and to retain the UK's position as a globally competitive leader through understanding of future concepts, technologies and capabilities.

Hosted by Team Tempest (a co-funded technology initiative bringing together the Royal Air Force Rapid Capabilities Office, Dstl, DE&S, BAE Systems, Rolls Royce, Leonardo and MBDA) and facilitated by ADS, the event offered a briefing for UK industry to better understand the Tempest programme and its role in supporting the UK MoD's Combat Air Strategy and was followed by a separate, classified briefing.

The Tempest programme will directly inform the UK's acquisition programme to succeed Typhoon. Representatives of the acquisition team were on hand at the event to explain their programme and how it interacts with the Tempest programme.

ADS Chief Executive, Paul Everitt, said: "The UK's future Combat Air capability is essential for our national security and the long-term health of the UK defence industry.

"It is great to see Team Tempest reaching out to the wider UK industry and ensuring this important project is a genuine national endeavour. The UK has world leading capability and a diverse range of businesses with the experience and expertise to support this important work."

Obviously for a post-Brexit Britain, the financial and working relationships necessary to achieve a broader global success will be challenging.

And the launch of Team Tempest around a next gen fighter model was nice, but I would argue also perhaps a bit ahead of itself.

I would argue that the Typhoon-F-35 dyad and leveraging that dyad through innovations in weapons, remotes and training will be the key definer of the way ahead.

This would suggest that perhaps complementing or supplanting Team Tempest might be a UK focused Plan Jericho.

The brilliance of the Aussie Plan Jericho launch was precisely because it was NOT technology centered. It has been focused on how to build a fifth-generation force; how to build an integrated, fifth generation enabled force. It is con-ops oriented interactive with considerations of technology and organizational innovation.

The danger is that the defense industrial base will drive the options, rather than the UK force transformation necessary for the force driving what one would want from a defense industrial base undergoing significant change with the twin impacts of Brexit and the F-35 global enterprise underway.

Precisely because the carrier is a disruptive technology and seriously challenges the UK's ability to integrate air-sea and insertion forces, and certainly raises fundamental questions with regard to how the civilian leadership will use such a capability in a crisis, the focus needs to be on how to manage a way ahead with the 0-5 military or rolling FYDP as the military builds near term capabilities which prepare it fight more effectively rather than more graphics or mock ups on what the next generation fighter might look like.

The blunt fact is that the next two decades of leveraging the F-35 global enterprise will be a key driver in whatever comes next.

And frankly, neither I nor anyone else really knows where the successes and failures will be and the openings which will have to be filled in real world combat.

Indian Navy Air Acquisitions: Looking Ahead

08/04/2019

By Gulshan Luthra and Shweta Sehgal

Vice Chief of the Naval Staff Vice Admiral Ashok Kumar told *India Strategic* on the sidelines of a seminar that a tri-Service process for acquiring Predator drones from the US General Atomics was in motion and that while he could not speak for the Army or Indian Air Force, the Navy was firm on getting 10 SeaGuardians. Other aircraft in the Navy's sight are an additional number of Boeing P8-I Long Range Maritime Surveillance Aircraft (LRMR) as well as deck-based combat jets from whoever can supply them.

The Navy had initially planned for 22 SeaGuardians, but then the other two Services jumped in and indications are that they have also put in requirements for 10 each in discussions with the Ministry of Defence.

Vice Admiral Ashok Kumar said that the Navy as well as the other Services periodically update and revise their requirements to mix and match the capabilities coming from various assets, and that helps maintain a balance in the required strength and numbers.

The Vice Chief was here to inaugurate a seminar on India and the Indian Ocean: Dynamics of Geopolitics, Security and Global Commons organized by The Peninsula Foundation, where he pointed out that India juts a thousand nautical miles in the Indian Ocean, and with two island territories of Andaman & Nicobar in the East and Lakshadweep and Minicoy to the West, "our EZ (economc zone) totals 2.02 million sq km. That is a huge responsibility for the Indian Navy.

The Navy has a Maritime Capability Perspective Plan (MCPP), and various proposals to move forward in terms of Long range, Medium Range and Short Range assets are progressed appropriately.

The Navy also has a plan to acquire 10 more Boeing P8-Is, in addition to the eight delivered and four more ordered. In due course, this will also get progressed, he pointed out adding that while MoD clearance for a project may come within a couple of months, the actual process for securing deliveries takes time. "The process of getting approval can happen within a couple of months" but the "normal procedure" has to be followed.

“Numbers are always based on the responsibility we are tasked with, the area we need to cover, induction of different types of aircraft,” and then the rationalization of all these inputs. “It’s always a mix of assets to meet our entire requirements. If one goes up, another may come down to equalize that.”

For instance, the Navy is also inducting eight new HAL-made Dorniers which have all the newer technologies available in the market, like an EW system, Radar, Glass Cockpit, and so on.

The Vice Admiral also spoke about the next aircraft carrier, Vikrant, saying that the plan right now is to use the 45 Russian Mig 29K aircraft, but there is a proposal to acquire more deck-based combat jets from whoever operates them and makes them. We are inviting all of them.

The Navy has alsready projected a requirement of 57 aircraft.

INS Vikrant, being built indigenously, is due for delivery in 2021 and will add a huge capability to the Indian navy’s reach. Notably, an aircraft carrier moves with its own flotilla of frigates, destroyers, submarines and an assortment of aircraft for detection and \deletion of hostile targets.

The Navy wants twin-engine fighters, and according to industry sources, besides the Russian Mig 29K, the other two on offer are US Boeing F 18 Advanced Super Hornet and French Dassault Rafale. All these aircraft are in production and deployment with their home countries and others.

Vice Admiral Ashok Kumar observed that the Indian Navy wants peace and stability in the Indo-Pacific region, like everyone does, to ensure free trade for all in the Global Commons. And for the neighbouring countries particularly, the Prime Minister has already issued a directive: Neighbourhood First.

The Indian Navy has been there to help every neighbor in the recent years, from the 2004 Tsunami till now, when it was the first, and only, Navy to reach Mozambique for disaster relief in the March cyclone tragedy, saving lives of some 200 people and giving relief to many others.

The admiral pointed out that historically, navies have not always been deployed for combat, but also for goodwill and friendships. “An overseas deployment always has a foreign cooperation element.

The Indian Navy has responsibilities to ensure peace for maritime trade in the region and it has given support not only to Indian ships but to those of some other countries also. There is an Indian Navy ship always near the Gulf of Aden for instance to escort any vessel from any country, and in this effort, many other countries are also contributing and cooperating.

This article was first published by our partner India Strategic.

French Air Force’s Renaissance

06/14/2019

By Mureille Delaporte

As the Paris Air Show gets ready to open its doors next week, one can only welcome the long-awaited sense of reconstruction the French Air Force is championing right now.

After decades of losses and base closures in the name of post-Cold war peace dividends and public policy optimisation, the sense of hope is palpable as defense budgets have been a bit steadier, while a neo-gaullist political support allows French Airpower to project itself in the XXIst Century with confidence.

Political Boost

The Future Air Combat System (FCAS) is of course at the center of the vision of the French Chief of staff of the Air Force, General Philippe Lavigne.

If such a project failed in the past to mature as a Franco-British cooperation one, the hope has been under President Macron to federate it at a European level with a Franco-German pillar as the foundation.

Since the letter of intention about the FCAS signed a year ago by French and German ministers of defense, Florence Parly and Ursula von der Leyen, several milestones have been completed.

The highlight occured last February with the granting of a joint contract for Dassault and Airbus to conceptualize the global architecture and the signing of an agreement between Safran and MTU to design a common engine for the next generation fighter.

Facing the F35 competition among European partners, the fact that Spain is being interested in joining FCAS is good news for the project, not only because of the political dynamics it embodies, but also because with a minimum of three partners, funding for parts of the long-term project can be triggered as part of the European Defence Fund.

Of course, we all know with European cooperation that the devil lies in the details, and only the future will tell what concretely comes out of the current political good will, given the recent European elections, the change of political actors and a slow economy.

However. no matter what happens over the course of the next twenty years when FCAS is supposed to be completed, the FAF trajectory – or "Flight Planning" as the French Chief of staff has labeled his strategy – is crystal clear and is on its way to reach a new scale.

Changing Scale

Like other advanced Air forces in the world, this « change of scale » is enabled by various "bricks," with space resiliency as a sine qua noncondition for such a system of systems to operate.

Connecting the next generation fighter, first-line combat and/or jamming UAVs, missiles, various combinations of tankers and transport aircrafts, as well as ground and sea-based assets requires space-based reliance and autonomy as well as other non-space based communication and ISR redundant means.

The other crucial brick is the role of the new generation tanker, the one some French officers nicknamed the "Rolls Royce of all tankers," i.e. the Phenix A330 MRTT.

Having already being tested by the FAF through various exercises (such as last year's Pitch Black 2018 held in Darwin), exchange of pilots and on the battlefield in the Middle-East with her British and Australian counterparts, the new tanker is now part of the "31e Escadre aérienne de ravitaillement et de transport stratégiques (EARTS)" at Istres Airbase and is to be delivered to reach a full fleet of fifteen aircrafts by 2028.

Such an upgrade has been designed over the past years within the context of the French airbone nuclear component modernization, as the French tanker force is traditionally dedicated to the French Strategic Air Forces Command (CFAS for "Commandement des forces aériennes stratégiques").

But with the new tanker comes far more than a mere replacement for a forty year old fleet of C135. It actually kills three birds – or should we say "three enemy targets"–with one stone – flight – !…

It is meant to replace the French strategic transport fleet of A310 and A340 ; it is meant to replace the C135 ; but thanks to the cockpit configuration and hyper-connectivity revolution, it can also welcome aboard not only ISR experts (transferring in France from the world of Mirage F1 /Rafale reconnaissance aircrews), but also a true C2 capability.

As early as next year and with the delivery of the third Phenix, the new "Standard 2" which includes the L16-JRE constitutes a first step towards the future connected FAF and FCAS.

The simultaneous arrival of long-awaited tactical capacities on new generation air assets, such as the A400M, change the con-ops for the French Air Force.

As the Commander of the 31e Escadre, Colonel Sébastien, explained in my interview with him : "With the current developments under way (such as HD SATCOM), new ConOps can be imagined by playing for instance on the complementarity of the A400M as a "tactical tanker" and the MRTT as a "strategic tanker". (…)

But these new capabilities can also allow the President to be directly in contact with the pilots during a long-range, long-endurance raid.»

Such an evolution – whether for an expeditionary raid (such as in Mali in 2013 or Syria last year) or ultimately a nuclear one – gives the political authority the option of reversibility, which is in itself a game changer in terms of credibility, and in the end, as far as the ambition for French sovereignty is concerned.

Talk about shrinking the OODA loop !

The featured photo shows a Rafale involved in the 2018 Pitch Black exercise.

An article published by the French Embassy in Australia last year highlighted the FAF involvement in Pitch Black 2018:

From the 27th of July until the 17th of August 2018, the French Air Force will participate to an Australian Biennial exercise called "Pitch Black". To get to the Oceania region, three Rafale of the French Air Force have covered more than 14,000km to arrive in Darwin, North of Australia, on Tuesday 24th of July. Recap of a four days journey.

D-Day: Departure from Al Dhafra

Arrived on the 20th of July on the Air base 104 of Al Dhafra in the United Arab Emirates (EAU), and escorted by a French C-135 tanker aircraft from Istres, the French Rafale started making their way to Singapore on the 22nd of July in the morning.

The crew formed of 4 pilots from Mont-de-Marsan Air Base & 8 pilots and navigators from Saint-Dizier Air Base were ready to leave. The other 40 airmen, in which, mechanics, commandos, logistics specialists, accompanied by a doctor traveled in an Australian KC-30 MRTT landed the night before on the Emirate Air base.

In the framework of a long-term co-operation between Air Forces of both nations, Australia has assigned a tanker aircraft to the French crews to participate to the travel of French Rafale from the EAU to the air base of Darwin where airmen of 16 different countries will train together.

At 6.30am (local time), the OK is given to the aircraft to take off. An early morning departure explained by technical reasons: "In the case of a long distance travel such as this one; the departure time is decided depending on the outside air temperature and the petrol carried in the tanker" explained Group Captain Arnaud Brunetta, Commander of the French contingent inside the "Pitch Black" exercise.

In total, more than seven and a half hours of flight have been necessary to the crew to reach Singapore. Carrying 5 tons of air freight and 44 military personal on board, with extreme temperatures, the KC-30 MRTT demonstrated an incredible endurance. In spring 2018, the Air Force will welcome its first MRTT which Operational Capability is schedule in 2019. This aircraft will replace the C135.

During the travel, three air-to-air refueling were successfully realized by the pilots of the 4th & 30th fighter squadron, the last one being realized in the Indonesian air space and a total of 31.5 tons distributed to the fighter aircrafts. It was a first! "In the past, Rafale have realized hundreds of air-to-air refueling on the Asutralian KC-30A, but only during war missions inside the Joint Operation Area of the Middle East and not as part of a convoy mission" explains Colonel Brunetta.

In order to ensure the safety of the flight and the smooth air-to-air refueling, the Commander Antoine, pilot of the Rafale and chief of the French detachment "fight" during the exercise, was supervising the manoeuvres side by side with the Australian crew in the cockpit, by being in constant radio contact with the French pilots.

Arriving in the Australian Territory

Tuesday 24th July: Last step of the convoy mission: from Singapore to Darwin. After an important briefing between French & Australian crews which allowed to determine different procedures.

It's 9am when the Rafale depart from the civilian airport of Singapore, followed by the KC-30 MRTT. "It's during this briefing that air-to-air refueling amounts are calculated, depending on potential alternates (landing site planed in case of emergency) and of course the safety procedures are reminded to everyone", added Captain Thomas, Rafale pilot.

At 10.10am happened the symbolic crossing of the equator. After a four and a half hour flight without issues over the Indian Ocean, the airmen landed on the Royal Australian Air force Base in Darwin, North of Australia. Only 2 air-to-air refueling were necessary to the aircraft to reach the Australian continent. They joined the CASA CN235 of the transport squadron 52 "Tontouta", of French Armed Forces in New-Caledonia also deployed for Pitch Black as well as other airmen who have arrived before in order to prepare for the exercise.

This article was first published on Breaking Defense on June 13, 2019.

As Australia Establishes the Loyal Wingman Program: Is There a Role for a Sea-based variant?

05/20/2019

By Duncan MacRae and Chris Walter

Boeing's 'loyal wingman' unmanned combat aerial vehicle (UCAV) is a fine example of Australian industry and defence cooperation, and its promoted ability to project power and keep manned platforms out of harm's way is seductive. However, there's a curious absence of advertised thought on wingman as the impetus for assessing a requirement for Australian UCAVs as sea-based weapon and sensor platforms.

HMAS *Melbourne*'s decommissioning in June 1982 marked the end of Australian sea-based fixed-wing aircraft operations. Responsibility for airborne defence shifted from the Royal Australian Navy to the Royal Australian Air Force and allied partners.

But the strategic objectives outlined in the 2016 defence white paper involve more maritime-centric operations and envisage missions far from our shores. Nearly four decades of hindsight, a changing strategic context, new threats and advancing technology suggest it's time to revisit the navy's air combat capability.

Australian maritime capability is increasingly significant, with the commissioning of the landing helicopter docks *Canberra* and *Adelaide* and the Hobart-class destroyers, and the Hunter-class frigate project due to cut steel in 2020. The MH-60R helicopter is mostly mature in the Australian context. The RAAF is rapidly consolidating operational capability of its P-8A Poseidon maritime patrol aircraft, and the MQ-4C Triton and MQ-9 Reaper drones are coming. But what of air support for maritime forces? There's a clear gap which a UCAV could fill.

Generally UCAVs, as opposed to unmanned aerial vehicles (UAVs), carry weapons and are approaching the performance of manned fifth-generation fighters. The US Navy is paving the way with the development of the MQ-25A Stingray unmanned aerial refuelling platform, which demonstrates a clear intent to field sea-based autonomous air combat capabilities, and

through the pending release of its analysis of alternatives for replacing the F/A-18E/F Super Hornets and EA-18G Growlers, which will include unmanned options. The F-35 is likely to be the last manned fighter operated at sea by the US.

A UCAV could provide combat capabilities traditionally ascribed to manned fixed-wing aircraft. It can be designed to overcome the limitations of its host vessel such as deck ratings and launch and recovery methods, or the cost barriers of other sea-based options such as the F-35B.

With a UCAV, a maritime force would be capable of a greater breadth of missions such as protecting dislocated force elements, conducting offensive strike operations or providing its own comprehensive air defence—all preconditions for successful maritime power projection.

Loyal wingman sets the conceptual example for what could be achieved with a sea-based UCAV. As advertised, it's designed to protect assets such as F-35s or E-7 Wedgetails and for power projection in a highly networked environment, with a level of autonomy not yet realised by existing platforms. Translating the wingman capability to a fight in the maritime environment reflects a more realistic view of future operations likely to be conducted far from our coastline.

The purchase of the Hobart–class destroyers and the significant increase in tonnage of the Hunter-class frigates compared with their predecessors demonstrate an acceptance of this strategic reality, and a seeming preparedness to deploy maritime assets in higher-risk areas. These surface warships and our submarines may be pre-positioned in the battlespace and are likely to be our first active combatants. The combination of Aegis combat system-equipped ships and UCAVs would give the ADF comprehensive power projection at the start line.

We acknowledge the probable engineering constraints preventing naval deployment of a wingman. If such an aircraft is designed for operations in the maritime environment, those issues can be overcome and the unnecessary challenges of earlier air projects whose use at sea exposed their critical lack of adaptation for maritime operations can be avoided.

Both the US and China field UCAVs at sea at varying levels of capability, and more development is underway. Through the MQ-25A Stingray project, its earlier involvement in the UCLASS program and now the loyal wingman, Boeing in particular, but not exclusively, has a bank of knowledge to support the Australian development of such an aircraft.

The RAN has experience in operating UAVs such as the ScanEagle—and from vessels like the Armidale-class patrol boat that aren't usually associated with operating aircraft. The more recent purchase of the Schiebel S-100 Camcopter shows a commitment to unmanned assets which bodes well for the design and development of a UCAV. The general history of naval aviation shows that a range of methods have been used to launch aircraft from a variety of ships.

While some historical launching methods were decidedly 'one way', a derivative of wingman might be launched by an offshore patrol vessel, supply ship, frigate or destroyer and recovered by an LHD. That would add complexity to adversarial targeting; increase UCAV numbers, distribution and redundancies; and improve the outcomes of operational modelling based on Lanchester's square law. Taking advantage of a networked environment and leveraging a capacity for autonomous operation, tactical control of the UCAV at sea could be provided by RAN flight controllers.

To fully appreciate the value of a sea-borne UCAV, we need only consider the payload of the navy's Camcopter. Its 50-kilogram payload won't buy much combat capability, but it can still provide significant information-warfare materiel, such as electronic support, electronic attack or GPS signal disruption, or inventive deployment of infantry ordnance. Loyal wingman's advertised capabilities build on this significantly, and the multi-mission support concept marries with the flexibility of naval platforms and operations.

Combinations of sensors could enable a UCAV to act as an intelligence, surveillance and reconnaissance platform, extending a fleet's access to imagery and enhancing its understanding of the electromagnetic spectrum. The inclusion of offensive jamming and deceptive payloads would provide a step change from the navy's current capabilities. Payloads could be developed to provide an early warning radar capability and augment existing assets or potentially provide command-and-control nodes or relays for communications networks.

A force's offensive capability would be strengthened through development of a weaponised UCAV. Armed UCAVs could provide counter-air protection for a fleet or for smaller, detached mission elements such as rapid environmental assessment, mine warfare and mine clearance teams, or special forces.

Given that wingman's endurance is projected to be significantly greater than that of current platforms, it represents an enormous increase in capability. An armed UCAV could attack targets in an anti-submarine or anti-surface mission and provide a more flexible and deliberate land-strike capability than the ADF's current options.

A fast and manoeuvrable UCAV would be able to evade or deal with direct threats, increasing its survivability. Traditionally, due to smaller support infrastructure and limited replenishment opportunities compared with land-based aircraft, sea-borne air assets have generally been assigned to missions with lower risk levels. This restriction would be eased significantly with a UCAV that's an organic part of a maritime force, enhancing tactical and operational flexibility.

Fielding a UCAV as a sea-based weapon and sensor platform makes sense. The ADF is unlikely to have ready access to forward bases for its current aircraft to conduct persistent operations in the initial phases of a future conflict. As the ADF prepares for that future fight, its growing confidence and experience in UAV and LHD operations show that sea-based UCAVs are a logical evolution of those capabilities and present an excellent opportunity to start filling a gap in maritime airpower.

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This article was first published by ASPI on May 9, 2019.

Poland and the F-35: First F-35s Land in Poland as Part of Rapid Forge Exercise

08/01/2019

Four U.S. Air Force F-35A Lightning II aircraft, deployed from the 388th and 419th Fighter Wings, Hill Air Force Base, Utah, landed at Powidz Air Base, Poland, July, 16, 2019.

This is the first time that U.S. Air Force F-35A Lightning II aircraft have landed in Poland.

With the arrival in an exercise in Poland of F-35s, clearly the question is as well of not only the acquisition by Poland of F-35s, but building the infrastructure for operating F-35s and shaping an infrastructure to facilitate as well allied operations of the F-35 fleet operating by both the United States and allies in Europe and the Middle East.

The image of the plane operating from Poland is one thing, but the core capability of an integrated fleet would be its ability to shape an ISR, C2 and strike and defense belt over continental Europe.

This is an inherent potential of the F-35 fleet, a potential that will only be realized by the United States and its allies working through security and other challenges to unlock the inherent potential of the F-35 to operate as an integrated not interoperable fleet.

In a Mitchell Forum paper published in March 2019, Major Luke J. Harris and Col. Max M. Marosko III, USAF addressed the question of US and Allied F-35 interoperability.

We would go further that **there is a unique historical chance facing the United States and its F-35 partners — namely to forge an integrated force.**

This possibility is inherent in the technology, but will not happen without the political will, organizational reform and reworking of who the United States and its allies approach the broader security challenges.

As Harris and Marosko III concluded their paper:

There are few DOD programs better postured than the F-35 to improve allied warfighting capability and overall relationships. However, an F-35 pilot will only be an effective force multiplier if F-35 aircraft systems can communicate seamlessly with other F-35s, and other aircraft.

Future F-35-equipped coalition forces must operate with common TTPs and a shared mental model achieved through high-end training and tactics disclosure.

The United States has accepted a higher level of risk by selling advanced U.S. stealth and sensor technology to other nations, and trusting our allies not to disclose these capabilities. That trust is built on the mutual understanding that it is in our allies' national interest to protect these capabilities.

The United States, likewise, needs to trust our allies with the intelligence, information, and proven best tactics and practices that were previously not releasable, so they can optimally employ the F-35 and provide value-added combat capability.

With American F-35s dispersed worldwide, the U.S. is absolutely dependent on regional allied capacity and capability to succeed in future combat operations.

To optimize allied F-35 interoperability, the U.S. must remove the security and policy barriers that inhibit this objective and smartly share intelligence, technical information, tactics, techniques, and operating procedures with our allies.

Only by doing this will America see the true potential of the F-35 as a revolutionary combat capability.

Clearly, the addition of Poland to the F-35 global enterprise would expand the fleets operational reach in a way that would make it central to deterrence in the neighborhood.

In an article we published last month on June 22, 2019, we discussed the potential acquisition of the F-35 by Poland.

During the recent visit of the Polish President and a high-ranking Polish delegation, many key defense issues were discussed with President Trump and his Administration.

Among those issues was the potential purchase of the F-35 by Poland.

According to an article published on the Polish Ministry of Defence website, this prospect was discussed.

"Soon Poland will join the elite group of states whose air forces have the most modern F-35 aircraft. I want this process to proceed quickly and effectively," said Mariusz Błaszczak, the Minister of National Defence after meeting the command of the Eglin Air Force base in Florida and the F-35 pilots.

On June 10, the head of the Ministry of National Defence began his visit to the USA and visited the Eglin Air Force Base, where, among others he became acquainted with the F-35 development program – the latest – 5th generation aircraft.

"We are advanced when it comes to the process of acquiring this state-of-the-art equipment – F-35 fighters. This is a big breakthrough in the combat capabilities of Polish Air Force.

"This is a challenge, but it is such an element that will certainly deter the potential aggressor," the head of the National Defence Ministry said.

The minister reminded that at the end of May this year Poland has sent letter of request regarding the purchase of 32 F-35A aircraft.

"We are already in the process, we as MoND have placed the letter and there have been several meetings between experts from the Polish and United States Air Force. So, we are talking, I am happy that we will finish this process quickly," added the head of the National Defence Ministry.

As the minister pointed out, the era of post-Soviet equipment used by the Polish Air Force ends, and era of the fifth generation equipment and therefore the most modern one, begins.

The minister added that he wanted the Polish pilots, who belong to the world's leaders, to have effective and safe equipment.

"The planned purchase of F-35 fighters fits into the creation of the entire system that deters a potential enemy. Earlier, I signed contracts for the purchase of Patriot and HIMARS systems," said the head of the National Defence Ministry.

The UK Launches its Loyal Wingman Program

07/31/2019

In our recent report on Australian and UK defence transformation, we highlighted the opportunity for the two nations to collaborate on a number of efforts, one of which is a remote platform or family of platforms to worked with manned platforms, notably in the Australian case with its loyal wingman flying with the F-35.

We noted in that report, that the loyal wingman program was part of the Australian effort as well to ramp up their indigenous development and manufacturing capabailities.

Part of the defense rethinking going on in Australia involves finding ways to enhance a sustainable fifth generation force. Building out a lethal and effective offensive-defensive force, which can expand the perimeter for the defense of Australia and provide for allied extended deterrence, is a core focus of ADF modernization.

To do so in a crisis management situation needs a serious look at how long Australian operations could be sustained if a determined adversary sought to disrupt imports into Australia to support a modern society and a modern combat force.

The sustainment issue could be solved in part by enhanced domestic manufacturing capabilities and sustainment approaches, such as the projected shipbuilding effort or the F-35 regional support hub.

But clearly, there is an opportunity as well to build out manufacturing in Australia and with the ranges and potential workforce augmentations, missiles and unmanned air vehicles would be a clear area of interest, not just for Australia but for its partners as well.

As a member of the F-35 global enterprise, there is a clear global partnering opportunity whereby the Australians could do "a Konigsberg" and build missiles or related capabilities for themselves but in a way that makes them a natural partner with other key F-35 partners.

The recently announced "loyal wingman" program could be a case in point.

To be clear, the amount of money being discussed at the program launch at Avalon makes it, in the words, of a senior Australian strategist "a PR stunt."

What he was focusing on was a key reality – the money being proposed could hardly achieve a program of record.

But one way to look at it might be to see an Australian effort to leverage their position geographically and in terms of training ranges to provide a foundation for several partners to come and to build out an Australian-based test, development and manufacturing capability.

It is clear that already fifth generation led training in the United States is extending the range of training – quite literally – and it will be virtually impossible for European and Asian F-35 partners to do such training without the geographical scope that Australia provides.

If we take a look at the proposed loyal wingman program, a key element is affordability and the expectation that these are assets which can be consumed in a combat scenario, more like weapons than airplanes.

And to get a low cost, it is clear that the wingman will not be an organic festival of advanced sensors, C2 or other features.

It will be a plus up in mass for what Secretary Wynne has called for in terms of 'the wolfpack."

But some of the analyses surrounding the proposed program suggests that this will be an asset which can provide the tip of the spear into contested airspace or fly with legacy aircraft in a way whereby the legacy combat asset somehow has thinking capabilities which they simply do not have.

Clearly, as a low-cost wingman is developed modifications to systems like Wedgetail or to tanker could occur to make them adjuncts to an operation, and as one considers the range of combat scenarios they could complement.

But the management capability onboard the mother ship so to speak is a key consideration of what will fly with it to make for an effective combat team.

One Australian enthusiast for the program highlighted what he sees as the contribution of this program to Australian sovereignty.

"We should now concentrate our efforts on breaking down barriers between further technological and industrial co-operation so we can build a sustainable sovereign defense industrial capability."

Makes sense, if you are willing to invest significantly greater money in the program; but if it is a leveraging effort, then it is certainly conceivable that American, Japanese, and European F-35 partners would invest.

But it is also crucial to keep in mind the program's limitations if it is to be a disposable lower cost asset.

The Australian analyst made a core point which he then seems to forget later in his analysis.

"The idea is that F-35s will be tasked with entering dangerous environments, relying on stealth and electronic warfare capabilities to survive, while spotting targets for lower-tech unmanned systems, like the new RAAF-Boeing drone, and non-stealthy fighters that remain outside the range of adversary defences."

This statement is good up to a point; but the F-35 is a multi-domain air combat system with a brain big enough to work combat teaming with "slaves" in the wolfpack.

This is not true of 4th generation aircraft.

"This "loyal wingman" will be paired with fourth-generation manned aircraft such as F-18s and will likely act as decoys, scouts and communication relays. Eventually they may play a "bomb truck" role, carrying additional missiles and ordnance for both air-to-air combat and other strike missions.

"The largest benefit of these systems will be to beef-up its mass, or the amount of presence and firepower it will be able to project across the region against large numbers of adversary aircraft.

"A single F-18 with four to six autonomous wingmen in tow would be better able to survive, while being more lethal and numerous, multiplying its impact."

The problem with this is that a legacy aircraft like the F-18 will have a difficult enough time to survive without trying to manage "slaves" in tow.

If we return to the sovereignty bit, it is clear that if the loyal wingman program is a trigger to investment and engagement by the USAF and the RAF and others in leveraging the test ranges and future training facilities in Australia, this could well be a viable program.

But certainly not one for the amount of money being put on the table currently.

The demonstrator is being developed under the Loyal Wingman Advanced Development Program, which is being supported by A$40 million ($28.5 million) over four years in Australian government funding and by Boeing as part of its A$62 million investment in research and development in Australia in 2018.

The other limitation is clearly the current industrial capacity in Australia.

Boeing Australia has a modest industrial footprint in Australia, which might be considered seed corn but clearly not the kind of workforce and industrial facilities which will require a significant investment and build out.

Put in blunt terms: the loyal wingman could be part of enhanced Australian sovereignty and a trigger for global industrial partnering with Australia as a launch point rather than an importer.

As one senior Australian analyst highlighted:

"The price quoted is only for the development of the first three prototypes.

"Boeing has what was left of the Commonwealth Aircraft Corporation (CAC) and the Government Aircraft Factories (GAF) which produced their own designs in the 80s and early 90s.

"It's now Boeing Aerostructures.

"BAE have the autonomous brains to the system, which they produced for Tarinis, and there are no hydraulics in the system only electrics.

"And they are designing it to a price point."

Dr. Alan Stephens, the noted Australian military historian and a research Fellow at the Williams Foundation, in his discussion of a Plan B approach to Australian defense policy going forward, underscored the importance of the Australian loyal wingman program for shaping a way ahead for the next round of airpower modernization, leveraging the foundation which is being currently put in place.

"Channeling their inner Sir Richard Williams, the Air Force's senior leadership appears to have redefined Australian air power through the agency of Project Jericho. Described as a "marriage of minds and machines", Jericho implies a transformed organization based on artificial intelligence, robotics, machine learning, manned-unmanned teaming, networks, and innate intellectual flexibility.

"Concurrently, and channeling their inner L.J. Wackett, the Air Force, the Defence Science and Technology Group and the Boeing Company have announced the cooperative development of a stealthy unmanned combat air vehicle under the rubric of "Loyal Wingman". This is the most exciting initiative undertaken by the Australian aerospace community since World War II. If the project succeeds, the implications are profound."

And with regard to the UK we drew upon interviews during a May 2019 visit to highlight thinking about the way ahead with a remote-manned aircraft pairing:

As MoD focuses on future airpower developments, a key opportunity rests with regard to how the carrier could work with their version of loyal wingman. With the capabilities built in to the F-35 to manage the battlespace, a loyal wingman with significant range could add the strategic bomber function to the fifth generation enabled carrier. The reach of the carrier is significantly enhanced as data flows into the

carrier-based F-35s to provide targeting solutions at longer range which can then be passed onto a loyal wingman as a targeting solution…..

Recently, we discussed with a well-placed UK defense analyst, the potential UK approach with regard to remotes going forward.

In this discussion, he argued that at the heart of an effective remote development and deployment strategy was leveraging the F-35. The F-35s fusion engine and ability to do C2 at the tactical edge provided significant opportunities to expand the effectors.

And with a loyal wingman approach one could build a relatively simple and relatively cheap wingman for the F-35 led force.

But the concept of a wingman was greatly expanded and different with a fifth-generation fighter.

One saw this as the F-22s started to sort out the distances and which they flew to support one another and with the F-35 and its fusion engine and low observable data transfer system, the notion of the wingman is migrating to other platforms, other assets and a much broader diversity of ways to provide a targeting solution.

With a longer-range loyal wingman – a modular remote with a data link and an ability to be directed by the F-35 and its interactive networks – can operate from a variety of air launch points which provides for the kind of airbase mobility and flexibility necessary to deal with an adversary which is prioritizing strike on fixed bases and targets.

The UK analyst argued this was a way to give the RAF back a capability for de facto strategic bombing as well as providing for much more flexible employment of the existing force. And with modularity, one could envisage a wide range of potential payloads, which could evolve with technology and with the evolving weapons mix required for diverse missions in a crisis environment.

Such an approach could open the window significantly for partnering for the UK forces and industry, which this analyst felt was crucial to a post-Brexit environment. This could tap into a much broader F-35 enabled market place, much like the weapons manufacturers are doing as well as provide entry points as well into working with initiatives like FCAS. And obviously, there is a natural point here for collaboration with the Australians.

And we concluded with regard to UK and Australian collaboration on the capability the following:

a clear focus of common interest would be variants of the loyal wingman.

The British can bring relevant industrial capacity to the challenge along with Boeing Australia capabilities which can then leverage Australian test and development areas to shape a range of loyal wingman, some designed to fly with the F-35 and its fusion sensor enabled C2 capability and some designed to work with differently configured manned systems.

Now the British have officially launched their loyal wingman effort.

In an article by Andrew McLaughlin published by ADBR on July 23, 2019, the launch was highlighted.

The UK's RAF Rapid Capabilities Office (RCO) and Defence Science and Technology Laboratory (Dstl) have announced the awarding of preliminary design contracts for the RAF's Lightweight Affordable Novel Combat Aircraft (LANCA) concept.

Under a technology demonstrator project known as Mosquito, the Phase 1 contracts were awarded to Blue Bear Systems Research, Boeing Defence UK, and Callen-Lenz (a partnership of Team BLACKDAWN, Bombardier Belfast and Northrop Grumman UK).

The Phase 1 contracts will produce preliminary system designs for unmanned air vehicle, and will assess the key risks and cost-capability trade-offs for an operational Loyal Wingman concept. It is hoped these studies could lead to initial flight trials of demonstrator air vehicles as early as 2022.

The LANCA program was initiated by the Dstl in 2015 to develop and better understand innovative future fast-jet air combat technologies and concepts, and was subsequently brought under the RAF RCO as part of the Future Combat Air System Technology Initiative (FCAS TI).

LANCA aims to explore the utility and feasibility of unmanned capability adjuncts to existing and future Fast Jet aircraft, specifically those that offer substantial reductions in traditional cost and development timelines. Project Mosquito has two planned phases. After Phase 1 which is scheduled to run for a year, Phase 2 will select up to two solutions to further mature the designs, complete manufacturing of the technology demonstrator and conclude with a limited flight-test program.

With Boeing Defence UK involved, it is possible that company will offer a variant of its Airpower Teaming System (ATS) concept currently under development by Boeing's Phantom Works for the RAAF's Air Force Minor Program DEF 6014 Phase 1 requirement for a Loyal Wingman demonstration.

Glimpses of RAF Modernization: July 2019

07/19/2019

The RAF is in the throes of a modernization process, which involves becoming fifth generation enabled, with legacy upgrades to its Typhoons, and the return to ASW operations with regard to introducing its new P-8 as well.

And recently, it was announced that the RAF would add the unique battle management asset, the Wedgetail as well.

This month we are seeing glimpses of the modernization process.

First, the second lightning fighter jet squadron has arrived at RAF Marham.

In a story published on the UK MoD website on July 18, 2019, the event was underscored.

The arrival of 207 Squadron will see all training on the next-generation jet conducted in the UK for the first time.

Minister for the Armed Forces Mark Lancaster said:

"The arrival of 207 Squadron represents another milestone in the progress of this world-beating aircraft.

As we welcome 207 Squadron home from our US allies, the transatlantic military relationship continues to be the strongest and deepest of any two nations in the world."

Air Chief Marshal Sir Stephen Hillier, Chief of the Air Staff, said:

"I was delighted to see the second squadron of the most advanced and dynamic fighter jet in our history arrive today at RAF Marham.

Being able to train our pilots in the UK is another great leap in our sovereign capability and will ensure the Royal Air Force and Royal Navy can train our pilots to fight and win with these extraordinary jets, which will sit at the heart of our country's globally deployable forces."

Since 2013 Royal Air Force and Royal Navy personnel have trained alongside US Marine Corps counterparts at Marine Corps Air Station (MCAS) Beaufort.

Six of the cutting-edge aircraft took the 10-hour flight from MCAS Beaufort in South Carolina. The formation included the UK's 18th Lightning fighter jet, demonstrating the UK's progress towards meeting the projected order of 138 aircraft over the life of the programme.

207 Squadron will formally stand up on 1 August 2019 and the first F-35 pilot course at RAF Marham is due to commence in early-September.

Engineers are already trained at RAF Marham's Integrated Training Centre, part of a £550m investment in the Station which has also seen the resurfacing of runways and the addition of new landing pads to allow the jets to land vertically.

Wing Commander Scott Williams, Officer Commanding 207 Squadron said:

"After experiencing the excellent training offered by our US allies and achieving a good level of experience and knowledge across our instructors, the time is now right to move 207 Squadron from the USA to the UK.

We are thoroughly looking forward to being based at RAF Marham and training our F-35 pilots here in the UK."

This is the third tranche of F-35s to arrive in the UK; 617 Dambusters Squadron arrived at their new permanent home last year and completed their first operational mission in the fight against Daesh in June. The F-35 is the world's largest defence programme and has already generated $12.9Bn worth of orders and at peak production will support thousands of British manufacturing and engineering jobs.

The UK is providing 15% by value of every one of over 3,000 F-35s set for the global order book. In addition, Sealand Support Services Ltd – a MOD and industry joint venture based at MOD Sealand in North Wales – recently won £500m worth of assignments to repair the aircraft's components and avionics systems.

The UK is preparing for operations from Cyprus this Fall and is part of shaping its air expeditionary capabilities for its F-35s going forward.

In an interview last May, Group Captain Ian Townsend, the RAF Marham base commander noted that the deployment to Cyprus puts them into an environment where the F-35 global collaboration comes into play with USAF, and USMC or USN, Italian or Israeli F-35s operating in the region as well.

"This comes back to the significant opportunity of operating a common fifth generation platform provides for the UK.

"We will have a significant opportunity to cross-learn and cross operate as the F-35 ramps up in deployed numbers in the region as well.

"Somehting which s being repeated as well in Northern Europe."

The cross learning was highlighted as well by the arrival of USAF F-35s at RAF Marham as well.

According to a story posted on the RAF website on July 18, 2019, the arrival was noted as follows:

A pair of US Air Force F-35A Lightning fighter jets have visited RAF Marham to allow RAF, Royal Navy and USAF ground crew to conduct joint training. Usually based at Hill Air Force Base, Utah, the 421st Fighter Squadron, Black Widows, are currently deployed to Germany.

This was the first time the A model of the F-35 had landed at Marham, the permanent home of the UK fleet of B model Lightnings.

Ahead of the arrival of the American aircraft a team of maintainers from the 421st Aircraft Maintenance Unit had arrived at the Norfolk station to work with Marham's Visiting Aircraft Servicing Section, led by Master Sergeant Tyler Berry who said: "We're training the RAF Team on how to hot refuel our F-35As to improve interoperability with our NATO allies."

Hot refuelling sees aircraft refuelled with engines running, a process aimed at keeping aircraft on the ground for the shortest time possible. USAF maintainers refuelled one aircraft shadowed by RAF personnel before swapping places for the second Lightning.

Wing Commander Colin Feeney, OC Engineering Wing, RAF Marham said: "This breaks the ice for interoperability ahead of RAF Lakenheath receiving its first F-35As in the coming years. Keeping the links between neighbours strong is highly important for when we'll both operate 5th Gen air systems."

Colonel Mark Ciero of USAF Europe was also on hand to observe the training. He said: "This is the first great step toward full maintenance interoperability. It's a good day for the USAF and RAF as we experience our first integrated hot pit refuelling with our newest and most capable fighter aircraft.

"The proximity of RAF Marham and RAF Lakenheath and the future of our mutual 5th Generation capability demonstrates our two nations shared approach to the defence of Europe."

When Brigadier General Novotny, currently at Nellis AFB as the 57th Wing Commander, was the base Commander at RAF Lakenheath he highlighted how the F-35 was a foundational capability as an air system for enhanced US and coalition combat capabilities in the region:

"I did two OT assignments and we worked to get into Red Flag when we could to do joint training. Here we can do that virtually every day. We reach the Dutch training airspace, and can work with the Dutch, with the Brits, with the Germans, with Typhoons, with F3s, with the NATO AWACS

"We take off and we fly 30 minutes to the east and we make it happen.

"It is Red Flag as regular menu; rather than scheduling a gourmet meal from time to time.

"Most of that learning is done after the sortie. Face-to-face interaction, the conversations that are happening in the squadron vaults that happens at Red Flag three weeks out of every two years.

"We will have the opportunity to do that regularly here.

"There is such a unique opportunity here compared to any other place.

"Because every other place which is s going to get into the F-35 program in whatever capacity is going to eventually attempt to develop a little bit of a stovepipe. It happens.

"This is the only place where it's not the case.

"There's no other place where we have a maintenance officer who's run into an issue on Monday at Lakenheath and decides to get in the car and drive 35 minutes to Marham and talk to them and see what they've figured out face-to-face.

"Learn to listen.

"Have a bite to eat.

"Be back here by 2:00 in the afternoon with the solution that came from another country."

And the final vignette from this month highlighting RAF modernization involved the P-8.

According to a July 13, 2019 story published on the RAF website, the UK's first Poseidon aircraft has taken flight.

The first of Britain's new fleet of nine maritime patrol aircraft has taken to the skies. The flight of the Poseidon MRA Mk1 (P-8A) was completed successfully at the hands of Boeing test pilots.

Following this first test flight, the aircraft will transfer from Boeing Commercial Airplanes to Boeing Defense, Space and Security to be fitted out with the Poseidon-specific military systems. The aircraft is scheduled to be delivered to the Royal Air Force, initially at Naval Air Station Jacksonville, Florida, in October 2019 and is due to arrive in the UK in early-Spring 2020.

"It has been fantastic to meet with the Boeing team who build the Poseidon aircraft and to see our first Poseidon aircraft, ZP801, take to the skies on its inaugural flight. We look forward to the aircraft being delivered to Royal Air Force ownership in October."

Air Commodore Richard Barrow, Senior Responsible Owner for the Poseidon Programme, said:

"The first cadre of RAF engineers and aircrew have been trained on the P-8A Poseidon which marks the resurgence of the RAF's long-range maritime patrol capability. The Poseidon MRA Mk 1 will enhance the UK's maritime patrol capability with advanced, state-of-the-art, Anti-Submarine Warfare and Anti-Surface Warfare sensors. This is an exciting time for the Royal Air Force especially for those based at RAF Lossiemouth"

Poseidon ZP801 will also carry the name Pride of Moray. This name celebrates the Maritime Patrol Aircraft heritage of Moray as well as looking forward to the Poseidon's future home in RAF Lossiemouth, Moray, Scotland.

The RAF will procure a total of nine Poseidon aircraft which will be based at RAF Lossiemouth from Autumn 2020. The Poseidon will provide a globally deployable fifth-generation maritime patrol capability; specifically, the Poseidon will work side-by-side with the Royal Navy in securing the seas around the UK and abroad.

Visiting the Paris Air Show, 2019: A Retrospective

07/19/2019

By Robbin Laird

The challenge of visiting a large exhibition like the Paris Air Show is a bit like the challenge of visiting the Louvre. It is so big, and so diverse that unless you focus on some core aspects, the panorama overwhelms you.

You come away with a blur more than enhanced understanding of what is significance to the evolution of the industry and of defense capabilities.

For me, this means making a determination of those areas, which you think might yield the most significant insights in the defense domain.

I ended up focusing on four key aspects of the show, which highlighted what I believe are important ways ahead.

The first was clearly the most dominant at the air show, which was the French response to what they perceive as the threat to their military aerospace business, namely, the growing numbers of F-35s already in Europe, or coming to Europe. Already, the UK, Italy, Belgium, the Netherlands, Norway, Denmark have bought or are operating F-35s, with Finland and Switzerland as prospective customers as well.

Poland has recently announced its decision to join the F-35 global enterprise as well.

This F-35 onslaught as the French see it poses two challenges.

The first is that the French Air Force clearly will fly with and need to integrate with the F-35.

And the modernization of the Rafale along with effort to make the aircraft a software upgradeable aircraft through the F-4 software modernization program is designed to do that in part.

And as an operating force, the main focus of the FAF is clearly upon reshaping the force to operate in a more connected manner akin to what USAF leaders have called the "combat cloud", and the near term candidates for such integration is clearly the A330MRTT which is known as the Phénix in FAF parlance.

At the Air Show, the French government held a signing ceremony with Spain and Germany to underscore the launch of what they refer to as the Future Combat Air System.

At the show, several European aerospace companies were highlighting their potential contributions, notably SNECMA for engines, MBDA for weapons for the "combat cloud," with other companies not formally identified as FCAS partners such as Thales indicating their inevitable engagement.

This highlights the second challenge, namely, the need to protect European "sovereignty" and "industry."

MBDA focus on building weapons for the "combat cloud" highlight the dynamics of change in the missile business. In blunt terms, this means building weapons for fifth generation aircraft, notably, the F-35, as well as legacy aircraft and for any fighter aircraft that will replace Eurofighter or Rafale.

The core companies are identified as Dassault as the lead platform builder with Airbus to play the "systems of systems" role, although how that will play out is not all that clear. The challenge facing the FCAS program is significant as the defense environment is fluid and dynamic and the target date for having a new fighter in the 2040s long after the innovation which fifth generation aircraft are already introducing into Western fleets.

But FCAS is a breakthrough of sorts in any case, as it is clear recognition of the need for a very different level of integration for air systems within a multi-domain operating environment. This is a very positive step forward, and one, which a leading French defense analyst, Murielle Delaporte, has underscored as a key part of the FAF's renaissance. And it is the operational evolutions of the FAF, which are the key indicators of transformation, not simply signatures on an FCAS launch document.

A second aspect which I followed at the show was the Sikorsky/Lockheed CH-53K which was the key air platform being highlighted at the air show by the company. The CH-53K is being offered to Germany and Israel and is the new heavy lift helicopter for the USMC.

On June 18, 2019, the President of Sikorsky, Dan Schultz, himself a former CH-53-E pilot, provided an overview brief on the CH-53K and their offering for both Germany and Israel. With regard to international partners, the aircraft was very adjustable to the needs of new partners. It is a digital aircraft with software upgradeability built in, and when I visited the Sikorsky facility in Connecticut last year, I talked with software engineers about the flexibility of adapting software to partner needs.

The offering to Germany provides an F-35 like partnership in which German partners would be providing parts not just to the German CH-53K but to the overall global program. For Germany, the K clearly would be part of how they might adjust flexibility to the strategic shift facing the liberal democracies in dealing with the Russians. For example, Germany needs to rapidly reinforce their Baltic brigade or move forces forward to reinforce Poland in a crisis. Compared to Chinook, the K goes further, faster and brings a significantly greater combat load to the fight rapidly.

And flying with the A400 M or the C-130J, the ability to carry standard pallets means a rapid movement of cargo from an airlifter to the K to move support within an area of interest. And the K is changing as well the meaning of what a support helo really is. It is in an information or C2 asset through the nature of the cockpit and how information can be managed within the cockpit or delivered to the combat soldiers onboard the aircraft.

This means that for Germany, the K is already FCAS enabled, or able to operate in a combat cloud in a way certainly neither the E nor the Chinook can do. In Germany, Sikorsky is partnered with Rheinmetall, a company with demonstrated capability to support ground combat forces, and which is investing in transferring that capability to the helo support domain.

I had a chance to interview Mike Schmidt, head of Aviation Services, Integrated Electronic Systems of Rheinmetall. He highlighted that Rheinmetall was supporting the project on three levels.

The first level is with regard to simulation and training for pilots and maintainers in Germany. Rheinmetall has a deep history and experience in this area and has supported the German Army for many years in this area. More than a decade ago I flew a Tiger simulator at a Rheinmetall facility, and certainly the simulator worked but I proved not an adept Tiger pilot for sure. My ability to crash the Tiger was probably unprecedented in the program's history.

The second level is to provide the digital documentation necessary to operate and support a digital aircraft. Here Rheinmetall Technical Publications has a long history of providing for support to the Bundeswehr with regard to technical documentation.

The third level is MRO or maintenance and sustainment. The company has many years of experience in support to the German Army and has provided innovative performance-based logistics solutions for the Army, notably in the area of military trucks.

Because MoD is looking for innovative solutions, a merging of what the USN-USMC-Sikorsky team is doing at New River with the innovative solutions which Rheinmetall has provided in other areas for the

Bundeswehr, provides a significant opportunity for innovation both on the level of the company and for the German forces.

“We are not looking at legacy solutions, nor is the MoD. We are working to provide solutions to support the operational force rather than having the operational force to be forced through the sieve of legacy defined maintenance base or facility.”

It is clear that in both the cases of the FCAS program and the CH-53K, that the Germans are looking to reshape their operating forces in way to become more effectively integrated and able to operate within a “combat cloud.”

The third aspect which I found interesting is the continuing evolution within the global defense landscape of the effort by states which have been largely importers of equipment from producing states to become much more capable of both supporting those assets within their own forces as well as building an enhanced capability within country to build and service new combat platforms. “Made in India” has its own dynamics and challenges, but there are a variety of representations of “Made in India” occurring worldwide in the importing states.

Saudi Arabian Military Industries (SAMI) has come to its first major air show by having a chalet at the 2019 Paris Air Show. The vision for SAMI is as follows: To be among the top 25 military industry companies in the world by 2030, combining the latest technologies and the best national talent to develop military products and services at par with international standards, and achieve the Kingdom’s self-sufficiency in military industries.

And the mission is described as follows: To develop cutting-edge technologies, manufacture world-class products, and provide high-quality services to scale up the military industries sector and secure necessary supplies for our clients

I attended a major event involving SAMI in which they signed a keystone agreement on June 18, 2019 with L3 to work together on developing joint capabilities with Saudi Arabia. The SAMI officials at the ceremony highlighted the importance of the agreement and also the incremental approach to working on building out local capabilities in conjunction with L3.

In a press release, SAMI highlighted the event as follows:

“We are pleased to partner with L3 as we move towards our goal of creating a Center of Excellence in the Kingdom,” said H.E. Ahmed Al-Khateeb, Chairman of SAMI.

“As we continue to support objectives tied to Saudi Vision 2030, this long-term partnership with L3 will help grow the sensor and mission systems industry while creating a comprehensive through-life support structure for our military customers.”

The fourth aspect of the show was totally unexpected and highlighted a key aspect of defense, which is often overlooked when watching airplanes flying overhead, namely, what is happening on the ground. Modern societies are becoming highly concentrated on urban centers rather than being capable of operating in a more dispersed landscape within which rust belts and rural society can become much more effective parts of a national system.

Dispersion and disaggregation not only can make for more pleasant lives for more people, but also provide for much greater redundancy and resilience for societies when dealing with the stress which security or military shocks can provide to the system.

The development of new approaches to rapid ground transportation which could use existing public right of ways to more effectively link diverse geographical regions.

Such a technology was on display at the Paris Air Show 2019. When passing various Chalets and Static exhibits, and parked in a corner of the Air Show, there was an odd-looking platform known as the Spacetrain. After visiting the exhibit on my first day at the PAS 2019, I went back later in the week to discuss with Charlotte Jurus, the Public Affairs Officer, for the company and learned that the platform on display actually is the prototype.

According to the company, "Spacetrain is a shuttle running on air cushions on an inverted T track and propelled by linear induction motors. All its electrical systems are powered by hydrogen fuel cells. The objective of the Spacetrain project is to commercialize its first shuttles by 2025."

This is a French start-up company based in Paris and in the Orleans region, where the first prototype is being belt and tested. They are looking to use part of an abandoned monorail project, former test track of the engineer Jean Bertain, for the initial tests of their full-scale model and those tests are planned for 2021.

Jurus underscored that the company is leveraging the infrastructure left behind in the Orleans region for a competitor in the TGV project of the 1960s, which in a way, highlights one of the advantages of the project, namely, an ability to leverage what has already been built but abandoned. That project was abandoned in 1974.

The train would operate at a much lower rate of sound generation than the current TGV as well. he project would allow for the creation of a train able to move 250 passengers on a hydrogen fueled vehicle with the train operating on an air cushion.

The "track" would be a concrete bed with the sensors necessary to operate the train at speed and is designed to operate autonomously.

Of course, the system could be used to move freight as well providing for an energy efficient system to reshape the supply grid for a region or a nation. An operational system of Spacetrains clearly could operate using already established public right of ways and lay down a relatively inexpensive infrastructure on which to operate.

Obviously, it could be of great significance for urban transportation, but even more importantly, could connect the regions which have no TGV in France or in countries like Britain or the United States where rail systems have simply disappeared leaving behind forgotten cities and regions, the possibility could be opened to reinvigorate a much wider variety and range of regions in the national economic space.

According to Spacetrain their technology is based on "a unique energy management strategy, consisting of a smart subsystem. This multi-source energy system (composed of hydrogen fuel cells, lithium-ion batteries and super capacitors) is totally autonomous thanks to its own algorithm to management hybrid resources in real time."

In short, almost everything interesting from the defense side of the business on display at the 2019 Paris Air Show was on the ground, and not in the air, but that may be increasingly important as innovation in defense drives new concepts of operations as well.

The challenge now being posed by the coming to airshows of the first fifth generation airplanes such as the F-35 is a significant one. The F-35 is a harbinger of fundamental change in terms of the concepts of operations for airpower, in which a multi-domain aircraft pilot is able to make decisions with the help of his onboard computers and with shared data far out at the tactical edge. A great deal of what makes the plane effective is radio waves, radar and software, not hardware. While the F-35 is hardly the end of history with regard to air combat, it is a page turner.

What is required now is that when visiting the chalets, pavilions or corrals of manufacturers building missiles, UAVs, or C2 systems you need to look not just at the cool capabilities the piece of equipment provides, but focus on how that capability can be used in combat as part of a larger force. This is a much more significant challenge for the visitor, but it is crucial to understanding the way ahead of the world's air combat forces.

The UK Prepares for F-35 Expeditionary Operations

07/18/2019

By Robbin Laird

Last year, the Dambusters squadron flew from Beaufort Marine Corps Air Station to RAF Marham and began its operational life in the UK.

I have had the chance over the past few years to visit both Beaufort MCAS and RAF Marham as well as RAF Lakenheath and seen both the preparation for and the standup of USMC and RAF/RN squadrons as well as the coming of the USAF F-35s as well.

Already there are more F-35s operational worldwide than the current USAF F-22 fleet.

This means that finally the fifth-generation transformation can be accelerated and pilots and maintainers part of what I have referred to as the "renorming of airpower."

One of my key guides to the process of change in the UK has been Group Captain Townsend, now the base commander at RAF Marham but also given the transfer of Air Commodore Bradshaw to MoD London, the operating F-35 commander as well.

In earlier discussions with Group Captain Townsend he highlighted the preparation of the UK for the coming of the F-35.

In a visit to the UK in 2015, Group Captain Townsend explained the approach to bringing the F-35 into the UK's defense force.

Question: You are working the task of bringing the F-35B to the UK in 2018 and preparing for its integration with the Queen Elizabeth.

What role does your engagement with the Marines at Beaufort play in this process?

Group Captain Townsend: We have a pooling implementation agreement or PIA with the Marines.

The PIA formalizes how we're going to work alongside them. We currently have 14 maintainers at MCAS Beaufort but, by the end of 2018, we'll have about 242 maintainers.

They are all operating under the U.S. Marine Corps regulations and will be ready to come back to the U.K. and operate F-35 independently in late 2018.

Question: And concurrently, you are building your own infrastructure in the UK to then support your F-35s in the UK?

Group Captain Townsend: That is correct.

It is a massive effort to put in place the UK infrastructure but we are learning significant lessons from other F35 partner nations.

We are conducting developmental test flying, operational test flying and frontline flying all at the same time, something we call concurrency.

We've never done that before.

If we hadn't taken that approach, none of the F-35 operators would be where we are right now.

The Marine Corps wouldn't be IOC, if they haven't taken that approach.

And we certainly wouldn't be thinking about IOC in 2018 if we hadn't taken that concurrency approach.

Then during a visit to RAF Marham in 2018, we continued our discussion of his perspective on the standup of the force at RAF Marham,

The base at RAF Marham is being rebuilt to operate the F-35 and to shape the transition from Tornado to F-35 as well.

But the challenge is not simply to put in place a 21stcentury infrastructure and to introduce a new aircraft, it is about shaping an integrated base operational system which enables the F-35 to become a multi-domain combat system driving innovation throughout the force.

Group Captain Townsend noted that he was travelling to France shortly and to view the Maginot Line alongside a group of RAF senior leaders.

The point of this was to focus on getting the right warfighting strategy to go with the right technology to deal with 21stcentury adversaries.

"The French built the Maginot Line and the Germans built a force which simply operated around that capability.

"The French had a concept of warfare in 1940 that did not meet the reality of the war they had to fight.

"In the past two decades our airpower has been dominant.

"But we do not want to introduce the F-35 as a replacement aircraft operating within the constraints of the legacy system.

"We need a multi-domain capability to ensure that our adversaries do not simply work around a classic airpower template.

"The challenge is to exploit the F-35 as a lever for broader multi-domain combat innovations.

"What we need to make sure is that people don't use multi-domain to go around our combat air advantage but rather to evolve our combat air advantage and make it a core part of our own cutting edge multi-domain capability.

"What we need to be thinking about is F-35 being able to work with any system within a multi-layered combat operation, whether it's airborne, maritime or land-based."

Few of the British military have ever seen an F-35.

The pilots and crew for the RAF and the Royal Navy are well regarded in the United States are at the head of their game.

But coming to the United Kingdom will start a process, not simply of operating the aircraft, but generating change across the combat force.

"While 617 Squadron will come to this Station as a formed unit, the rest of the Station is still not yet F-35 savvy.

"In addition to the physical set up of the base to support F-35, there is a broader conceptual development requirement as well.

"The whole station needs to understand why F-35 is different, so they can become part of that supporting team.

"They are key to F-35 2.0 becoming a reality."

This is especially true when one adds the question of the new carrier and the way the Brits are approaching the pairing with the carrier, a subject which I discussed at length with the Royal Navy when in Portsmouth, which I visited later in the same week in early May 2018.

As the RAF stands up the F-35 at its base at RAF Marham, Group Captain Townsend is clearly focused on F-35 2.0 – how best to leverage the coming of the new system to drive change across the RAF and the UK forces over all.

"We should not overly focus on 4th-5thair systems integration.

"That is too focused on airplanes.

"We need to focus on driving innovation across the combat force as we introduce the new air system."

And standing up the base at RAF Marham for the F-35 is part of a broader transformation of the RAF.

For example, with regard to building the systems to ensure security for the F-35 as an air system is a trigger to a broader set of considerations concerning 21stcentury security in a cyber conflict age.

"We need to just take a step back and understand what security means in the next generation of capabilities."

During a visit to the UK in May 2019, we discussed the next phase of integrating the F-35 into the force, namely, preparing for the deployment of F-35 as a an expeditionary force.

Here his focus in earlier interviews on both security and sustainability were highlighted as key elements for its coming deployment to Cyprus and for operating onboard the Queen Elizabeth carrier as part of the preparation for its 2021 initial operating tests.

Recently, senior officers announced this coming deployment to Cyprus in the Fall.

Chief of the Air Staff Air Chief Marshal Sir Stephen Hillier said:

"It is great to see 617 Squadron, the modern day Dambusters, flying the most advanced and dynamic fighter jet in the UK's history and about to start their first overseas deployment.

"I have no doubt that this short deployment will offer many tests, but likewise I am confident that our highly trained and skilled personnel will rise to the challenge and confirm our ability to deliver truly formidable capability."

Admiral Sir Philip Jones KCB ADC DL Royal Navy, First Sea Lord and Chief of Naval Staff said:

"This first overseas deployment of these world-beating British F-35B aircraft to RAF Akrotiri, together with their embarkation in HMS Queen Elizabeth for the first time in the Autumn of this year, are important milestones to prove their readiness for deployed operations anywhere in the world in defence of our national interests."

Group Captain Townsend highlighted that the focus on deployment on Cyprus was not just about getting the air system ready for deployment, but in place an expeditionary eco system capable of supporting the operations of the aircraft.

"While we have moved our planes from Beaufort to Marham we have not moved the MCAS to Marham.

"This means we are undergoing significant learning as we integrate the air system into the UK operational environment. We are learning from the ground up how to support the aircraft,

"In a way the deployment is a bit of a pipe cleaner.

"The deployment is deliberately designed to ensure we can learn the lessons associated with deployability before we're called upon to go and do it for real.

"And the genesis of this deployment was 3 1/2 to 4 years ago, when r Air Commodore Smyth and I were in the office worked the approach that shortly after initial operating capability we would like to try and get this airplane on an exercise overseas to try and test the sustainability.

"And that's exactly what we are doing."

He highlighted two main areas where they are focusing significant attention.

The first picks up on the theme which we discussed last year, namely, the security piece.

"My cyber support squadron are an integral part of a deployable air system.

"We have deployed classified systems abroad before, but the F-35 is a bit different and we are focused on the cyber security required to support the data systems integrated into the F-35."

The second is the sustainment approach which is built around the ALIS (Autonomic Logistics Information System) or the IT system which supports F-35 sustainment.

The squadron has been focused on integrating ALIS within the UK's sovereign operational systems as well as working on ways to ensure that it can operate effectively in supporting sustainment. And the cyber support squadron has been a key part of this effort as well.

He noted that they are taking their deployable tactical trailers to Cyprus to provide for the IT support for the ALIS system.

He argued that "I think ALIS is an incredibly malleable system if you understand the system.

“That’s again the work we’ve been doing over the last 12 months.

“We’ve got some deployable infrastructure that we’re going to take with us and use for the first time.”

Townsend argued: “We need to make sure we can protect F-35 in the right sort of way and as you’ll be aware this is a challenge that we haven’t done before in the same sort of way.”

The Brits are treating RAF Marham as the supply hub to resupply F-35s during the Cyprus operation, but in future they could tap into other F-35 supply hubs in the region as well.

The deployment to Cyprus puts them into an environment where the F-35 global collaboration comes into play with USAF, and USMC or USN, Italian or Israeli F-35s operating in the region as well.

“This comes back to the significant opportunity of operating a common fifth generation platform provides for the UK.

“We will have a significant opportunity to cross-learn and cross operate as the F-35 ramps up in deployed numbers in the region as well.

“Somehting which s being repeated as well in Northern Europe.”

And this expeditionary deployment precedes the 2021 deployment onto the Queen Elizabeth.

“The Dambusters will deploy onboard the Queen Elizabeth as a squadron for the first time this Fall, during operational test period 1.

“How can we best exercise our sovereign operational capabilities with the aircraft onboard our carrier?”

“Last year’s operational tests onboard the carrier were heavily supported by the US Navy and USMC.

“This deployment will be British.

“We will need to operate ALIS onboard our carrier and to ensure an effective ops tempo.

“The ship needs to understand how it’s going to integrate with the air system.

“We need to make sure we get the networks right.

“We need to make sure we get the information flow around the ship working properly.

“And we need to understand the security aspect of the operational eco system.”

Group Captain Townsend sees the flow from the Cyprus deployment to that of Queen Elizabeth as parts of the same learning process.

“There are going to be some similarities and some differences operating in the embarked environment.

“This is true particularly on the maintenance.

“And it won’t surprise you to know that because there are not a large number of people in the UK with F-35 expertise, quite a lot of my people from Marham are going to go onto the ship and try and de risk that first operational test period this Fall.”

He emphasized that the cyber support squadron was a key part of the air system deployability not just in terms of ALIS but in the mission systems area as well.

The aircraft is a unique aircraft in terms of how it handles data, and the squadron needs to be structured in a way that is symmetrical with the operational envelopment of the aircraft.

This is not about taking past practices and applying them to a replacement aircraft; this is about crafting a very different eco system for a very different combat air system.

The working relationship with the Marines will continue to be central as the Marines fly onboard the Queen Elizabeth in 2021 but comet to RAF Marham in 2020 as well.

Here working commonality in the logistics area is a key focal point, especially when operating onboard the new carrier.

“The Marines will come on board with discrete information systems.

“We need to understand how we are going to work side by side.

“Security will always be an interesting challenge between operating nations.

“I think we know all those areas to focus on and we’ve got another 18 months or so to make sure we get them right.”

“I really do think that what the Marine Corp does and the way in which they operate is very similar to what the UK does as well.

“There is a natural working relationship here which needs to be encouraged and leveraged going forward.”

And on June 25, 2019, the UK MoD announced the initial UK F-35/Typhoon combat operation.

F-35s have flown alongside Typhoon aircraft on operational flights over the skies of Syria and Iraq, as part of the ongoing fight against Daesh, the Defence Secretary has confirmed.

It follows a successful training period in Cyprus, known as Exercise Lightning Dawn, aimed at building capability for the aircraft and supporting elements.

Due to the exceptional performance of the aircraft, pilots, and support staff during this time, it was decided that they were ready to make their operational debut from RAF Akrotiri, alongside the Typhoons.

Speaking at RAF Akrotiri, Defence Secretary Penny Mordaunt said:

"The F-35s are the most advanced jets our country has ever possessed and will form the backbone of British air defence for decades to come.

"They have passed every test their training has thrown at them with flying colours and their first real operational mission is a significant step into the future for the UK."

The first RAF F-35B operational sorties were flown on Sunday 16 June in support of Operation Shader, the UK contribution to the Global Coalition's counter Daesh mission in Iraq and Syria. The two aircraft conducted a patrol over Syria, and UK F-35s have flown a further 12 sorties since then.

The F-35 is the first aircraft to combine radar-evading stealth technology with supersonic speeds and the ability to conduct short take-offs and vertical landings.

The Lightning force is jointly operated by the RAF and Royal Navy. With the ability to operate from land and sea, the F-35 forms a vital part of delivering a 'carrier strike' capability to the UK when combined with Britain's new Queen Elizabeth Class aircraft carriers.

Chief of the Air Staff, Air Chief Marshal Sir Stephen Hillier, said:

"This first operational mission for the UK's F-35 Lightning confirms the impressive progress which we have made in introducing this formidable new capability into service.

"It is testament to the outstanding abilities of our dedicated and highly trained air and ground crew that 617 Squadron has achieved this important milestone so quickly and so effectively."

Admiral Tony Radakin CB ADC, First Sea Lord and Chief of Naval Staff, said:

"It's great to see our F35B Lightning jets already proving themselves on operations so early in their life cycle, ably demonstrating the fantastic capability these world-leading aircraft offer.

"This Autumn, our aircraft carrier HMS Queen Elizabeth will return to the East Coast of the United States to conduct Operational Trials with our Lightning Force, taking this 5th generation capability to the next level as they prove their ability to operate from the sea.

"For decades to come, this exciting new combination of aircraft carriers and F35B Lightnings will provide a potent, globally deployable carrier strike capability, a powerful conventional deterrent and the centrepiece of our country's expeditionary forces."

Later in the year, 617 Squadron will embark in HMS Queen Elizabeth for the first time. The UK jets will conduct Operational Tests, alongside 17 Test and Evaluation Squadron, onboard the carrier in the USA

during the WESTLANT 19 deployment, proving their capability at sea. This is vital step on the path to the first Carrier Strike Deployment planned for 2021.

The UK currently owns 17 F-35B aircraft with the reformed 617 Sqn arriving back in the UK last year. More jets are due in Britain over the coming years, including the imminent arrival of 207 Sqn at RAF Marham, and there is an overall plan to procure 138 aircraft over the life of the programme.

The programme has already generated $12.9 billion worth of orders and at peak production will support thousands of British manufacturing and engineering jobs.

UK Air Component Commander for the Middle East, Air Commodore Justin Reuter, said:

"The pilots, crew and aircraft have exceeded all training objectives since deploying to Cyprus so it was only right that they made the next step on their journey.

"The UK has played a vital role in liberating swathes of territory once subjected to Daesh's cruel regime, and the deployment of our newest and most advanced jets signals our commitment to the enduring defeat Daesh in Iraq and Syria."

The Defence Secretary also used the visit to hold a meeting with her Cypriot counterpart, Savvas Angelides, to further bolster bilateral ties.

Editor's Note: In this article by Australian Aviation the transportable trailers mentioned by Group Captain Townsend are discussed.

Defence has signed a $37.5 million contract with Lockheed Martin Australia to provide the Royal Australian Air Force with deployable mission system equipment, primarily for the F-35A Lightning II.

Lockheed Martin is working with Newcastle-based Varley Group to deliver "transportable, secure and environmentally-controlled" Autonomic Logistics Information System (ALIS) workspaces to enable connection to ALIS elsewhere in the world. ALIS serves as the information infrastructure for the F-35.

The workspace cabins will also host off-board mission planning systems used by the RAAF's F/A-18F Super Hornet, EA-18G Growler and P-8A Poseidon aircraft.

"Acquiring these new portable, Australian-made cabins is an important part of our Joint Strike Fighter program, and will mean that our top secret systems and personnel who support our jets on the ground will be securely housed and protected," said Minister for Defence Industry Christopher Pyne.

Reshaping Perimeter Defense: A New Pacific Island Strategy

08/12/2019
By Robbin Laird

Ed Timperlake laid out some years ago how the Marines might spearhead an island leveraging counter strategy to how the Chinese are shaping their military force and coming out into deeper into the Pacific.

That island leveraging strategy focused upon how the new capabilities — the Osprey, the F-35B and the CH-53K, when combined with a new build infrastructure for offensive or defensive missiles located throughout the Pacific — whether U.S. or Allied — could shape new capabilities which would provide for a forward defense built in front of an air-sea operational U.S. and allied force.

Two recent developments highlighted by the Trump Administration and the Pentagon have brought into highlight the importance of that strategy articulated by Timperlake several years ago.

The first is the decision to withdraw from the INF Treaty which now allows the United States to build a new generation of missiles, including hypersonic ones, deployed throughout the Pacific.

But as I argued in an earlier article, the Administration will need to shape a political strategy along with any military modernization strategy to work with allies for reassurance of allies is part of any effective deterrent strategy.

The new Sec Def has highlighted the opportunity to build and deploy a new class of missiles into the Pacific.

U.S. Defence Secretary Mark Esper said he wants to deploy an intermediate range conventional missile in the Pacific region within months, now that the Trump administration has formally pulled out of a Cold War-era arms control treaty with Russia.

Esper, however, added that it will likely take some time to develop the more advanced land-based missile capabilities. The move is likely to anger China, but Esper said Beijing shouldn't be surprised by it.

"It's fair to say, though, that we would like to deploy a capability sooner rather than later," Esper told reporters travelling with him to Australia on Friday. "I would prefer months. I just don't have the latest state of play on timelines."

Another development of note is the focus of the new USMC Commandant on enhanced capabilities for distributed operations and operating from expeditionary bases in the Pacific.

"Expeditionary Advanced Based Operations (EABO) are driven by the aforementioned adversary deployment of long-range precision fires designed to support a strategy of "counter-intervention" directed against U.S. and coalition forces. EABO, as an operational concept, enables the naval force to persist forward within the arc of adversary long-range precision fi es to support our treaty partners with combat credible forces on a much more resilient and difficult to target forward basing infrastructure."

In Timperlake's approach identified some years ago, the Marines and the Navy could leverage new missile technologies to put in place an offensive-defensive capability with missiles placed on uninhabited Pacific islands which could form a string of steel to support US and allied forces able to counter the forces of the 21st century authoritarian forces seeking to move their forces further out into the Pacific.

For example, in 2013 interview, Timperlake began to insert this perspective into our work:

"The commanding Officer of the First Marine Air Wing, based in Japan, highlighted this change (how the Osprey allowed use of islands in a deterrent strategy) in an interview he did with us. We discussed with Major General Owens recent exercises which his Marines conducted that presage changes in Pacific operations….

"Question: There is a broader strategic point, which emerges from you exercise…There are many islands in the Pacific. With the flexibility and relocation skills evident by the USMC (e.g. with regard to expeditionary airfields) islands can be a useful compliment to amphibious ships to provide the kind of presence which we may well need in the years ahead. What is your thinking along these lines?

Major General Owens: "This makes sense. We have a relative paucity of amphibious shipping. When I was a young lieutenant and captain, I think we had somewhere in the neighborhood of 65 amphibious war ships in the Navy inventory. Right now, we have 28 and they're spread about as thin as they possibly can be. We're running through their lifecycle faster than anticipated, and yet they're never enough.

"Going back to the whole challenge in this AOR is getting to where you need to be with some capability. Being able to stretch the legs of the aircraft and operate from austere sites is critical.

"A good case in point is that we just brought a couple of KC130s back from disaster relief in the Philippines, a typhoon rolled through Mindanao and Palawan a few weeks ago. And we deployed a couple of KC130s to haul relief supplies from Luzon to Mindanao.

"The KC-130J was the aircraft of choice because there was a useable airfield at the southern end, at the affected end. But had there not been an airfield, which is often the case after tsunamis and typhoons, we could have done the same thing with the Osprey; flown it to Clark Field, operated out of Luzon — loading supplies in Luzon and dropping them to a point landing site in Mindanao supported by KC130s in the air, providing aerial refueling.

"And it's a capability we've never had before, and I expect that within the next couple of years, we'll have an opportunity to demonstrate that the Osprey may be the only aircraft that can get in to an affected area at the distance that we'll be required to support from.

"Whether it be from an intermediate staging base, like Clark or flying directly from MCAS Futenma here in Okinawa…."

As we expanded our work to encompass thinking about how Army ADA could be woven into the texture of what we called a honeycomb force deployed and operating in the Pacific, Timperlake expanded ways to think about how to leverage a new island strategy.

On January 7th, 2014, we published this piece by Timperlake:

In our recent book on the rebuilding of American military power in the context of shaping a new Pacific strategy, we highlighted the significance of shaping a new template for the synergy between defense and offense.

With the new multi-mission systems – 5th generation aircraft and Aegis for example – the key is presence and integration able to support strike or defense in a single operational presence capability. Now the adversary cannot be certain that you are simply putting down a marker.

This is what former Air Force Secretary Michael Wynne calls the attack and defense enterprise.

The strategic thrust of integrating modern systems is to create an a grid 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 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, which can honeycomb an area of operation, an attack and defense enterprise can operate to deter aggressors and adversaries or to conduct successful military operations.

http://sldinfo.com/crafting-an-attack-and-defense-enterprise-for-the-pacific/

Our interview with PACAF Commander, General Hawk Carlisle, highlighted a key way ahead is forging various paths towards cross-domain synergy among the joint and coalition forces.

One of the key examples he provided was the role of the first THAAD deployment to the Pacific.

Thanks to a demonstrated rapid THAAD deployment to Guam, the Air Defense Artillery (ADA) branch of the US Army has demonstrated their significant role in US and Allied Air Sea Battle planning.

We followed up on Carlisle's illustration to interview the Guam commander of the THAAD battery.

And this interview made it clear that ADA capability far transcends moving infantry around the Pacific tying up precious Air Force resources. Army Pacific battle planning was reported as being called "Pacific Pathways."

In a recent Washington Post article the Senior Army Pacific Commander, General Brooks, a command based in Hawaii, was recently elevated to four stars, and makes a significant point:

"We can no longer afford to build [combat] units and put them on a shelf to be used only in the event of war," the Senior Army Pacific Commander's command wrote in an internal planning document.

He is exactly correct and the best answer to General Brooks thinking is very simple: just don't do it.

There is no need for a large standing army to be built. America has shown the ability to very successful in mobilizing what is often called "trigger pullers."

In fact The Washington Free Beacon has given a wonderful tribute to the men and women in today's US Army. "2013 Man of the Year: The American Soldier."

With the Afghan transition comes the opportunity to shift from a land heavy mobilization force. Indeed in our forthcoming piece in the Joint Forces Quarterly, we argue that the decade ahead has little in common with the decade behind and that "the force being remade by new technologies ripening in the decade ahead, there are significant possibilities for innovation and re-shaping of the force structure."

In the decade ahead, it is clearly the time for Big Army demobilization.

The current Chief of Staff of the US Army, General Odierno, West Point 1976, has an appreciation for the combat legacy of the Long Gray Line. As a strong advocate for the US Army, he told Congress and hence the American people that to win a war send in the Army. He was exactly right for the Civil War, WWI and WWII.

Unfortunately, unless he wants to argue to support, equip and train a standing "Big Army" to capture Beijing or Tehran, his vision for Army resources has to be modified to recognize the realities of the potential combat facing America in this half of the 21st Century.

Hussein assumed that Kuwait was his. Neither Iran nor China should believe that they can make such an assumption about any of their neighbors.

It is American power projection backed by mobilization if necessary which adds a key deterrent quality to Iranian or Chinese thinking.

America, can mobilize an Army, but the need for ready now survivable aircraft, and air bases and Navy ships with a 9/11 force of US Marines afloat to shape an attack and defense enterprise is the key challenge.

And not funding these forces along innovative lines while maintaining an Army built for Iraq and Afghanistan makes little sense in the decade ahead.

Our role is to shape global reach and bring power to bear for our allies, which makes any adversary like Iran or the PRC lack certainty that a perimeter attack on one of their neighbors is just that.

http://sldinfo.com/echoes-from-history-in-a-veterans-cemetery-the-way-ahead-for-a-21st-century-american-military-force/

Also involved is the challenge of shaping a key understanding of the appropriate tactical and strategic role of the US Army in the Pacific. One just has to look at the geography of the Pacific and ask why just Guam and does a THAAD Battery always have to be moved by truck?

The answer to this question is part of a larger question: how does Army missile defense play in the attack and defense enterprise within the strategic quadrangle?

US Navy and Japanese Aegis ships, THAAD on islands, and "Rapid Raptor" which are a parts of an evolving con-ops that can be proof of concept for F-35 and tankers can make tactical and strategic moves to many PacRim airfields.

The problem is the US Army is not a lift command. It borrows USAF lift to move around the vast Pacific. And the Afghan war has weighed heavily on the lift and tanking resources of the USAF and its ability to support the joint force.

What is needed is to rethink how to support ADA in the Pacific without overtaxing lift assets.

An alternative way to think about the ADA approach is to build the support facilities throughout the Pacific whereby THAAD and air defense can be supported. THAAD–globally transportable, rapidly deployable capability to intercept and destroy ballistic missiles inside or outside the atmosphere during their final, or terminal, phase of flight. THAAD Weight launch vehicle, fully loaded 40,000kg=88, 184 lbs or 44 short tons.

http://oshkoshdefense.com/variants/m985a4-guided-missile-transporter-gmt/

The Gross Vehicle Weight Rating (GVWR) of missile battery truck alone is 66,000 lbs.

Now let us rethink how it might be deployed to remote islands as part of a flexible grid.

The CH-53 can take 30,000 lbs internal or sling 36,000 external-range unrefueled is 621 nm. The MV-22 human capacity is 24 combat-loaded Marines-range app 700 miles.

The actual missile battery is 26,000 lbs and well inside the lift capacity of a CH-53.

The problem is the mechanics to raise and lower the battery and rearm. A battery lowered from the air sans truck on reinforced concrete pads with calibrated launch points may make sense. A separate modular lift device could be put in place to load and reload.

Consequently, taking apart modules doesn't appear to be a showstopper, and Marine MV-22s flying in Army ADA troops into any reasonable terrain is absolutely no problem.

The weight of TOC and Radar maybe of concern, and it appears that in todays world there may have been little appreciation by Big Army on using MV-22 and CH-53Ks.

To be very fair the US Vietnam War Army did get it brilliantly by setting up firebases in remote areas with helo lift of very heavy guns.

A THAAD island maneuverability concept is the same in principle but with different technology.

Combine ADA Batteries with the ability to move a floating airfield as needed inside the potential sanctuary of a 200+ KM protection umbrella of disbursed island bases with ADA batteries and power projection of the sort needed in Pacific defense is enhanced.

The targeting and thus war fighting capability of a projected threat from any PLAA2AD becomes incredibility complicated. A distributed offensive defensive grid is an additional factor in the US current PLA or North Korean IRBM kill chain R&D efforts.

The most fundamental point is US technology is already tested. Some weapons already in combat others on ranges. The US does do rigorous testing and has many important ways to share technology with all allies.

In contrast, the PLA has not tested any of their asserted A2AD capability, which is much quoted in US-search, acquisition, launch, guide, and end-game maneuver. So far they have poked a few holes in their land target outlined like a Navy Carrier. This is 1960s stuff.

The involvement of THAAD in an Aegis engagement grid may actually give" Big Army" employing ADA capability both a realistic and important way ahead to for them to make a contribution to the Air Sea Battle within resources available.

Currently it looks like the Army is assuming they can utilize AF lift as their announced right to move 700 troops around the Pacific every three months, which is an incredibly waste of resources and taxing on a lift fleet already stretched to the limit. The Afghan tax on Air Force lift has to be paid back.

The Marines know how to maneuver forces at sea and in the air to protect islands–and also deny the PLA any opportunity for them to go "feet wet" to grab Islands for their strategic use.

The USAF could stage an Army THAAD battery on a runway anywhere around Pacific. The USAF would have no problem doing just that and it sure beats the resource drain on AF heavy lift of moving 700 Army troops around every three months as proposed in their Pacific Pathways emerging doctrine.

The THAAD package could go from the runway to an Amphip, Deck or directly to MV-22s and Heavy lift helos to move this capability to a couple of rocks jutting out of Pacific.

The Island Geography around the Pacific Rim is a critical physical reality which such a deployment approach can play to:

Japan is an archipelago of 6,852 islands;

The Philippine archipelago comprises 7,107 islands, of which only about 2,000 are inhabited;

Korea has more than 3,300 islands;

Vietnam has 20 Islands-including their claim on Sprats and Parcels cluster;

And finally, Republic of China islands provide additional deployment options.

The geography of islands inside the Pacific strategic quadrangle can favor moving a THAAD Battery to various pre-planned island launch pads to protect vital runways and harbors.

When combined with Aegis ships and 7th AF maneuverability, cross-domain synergy is enhanced which can then greatly complicate PLA and NK targeting and thereby enhance deterrence.

So much for the "run-away" A2AD bogy man-especially with F-35 arrival in the region, which will extend significantly the forward reach of the sensor package to work with defensive systems!

Now if the US National Command Authority and Secretary of Defense could just convince the Army to consider accepting a strategic view that cross-domain 21st Century technology (not just boots on the ground for their own sake) can move war wining capability ADA into a strategic battle position inside our Strategic Quadrangle by Air instead of "the caissons go rolling along "

The biggest show stopper could be fighting a tradition from 1908 (date of song)-that has very little appreciation for an Air/Sea Battle–over the expanse of the Pacific OCEAN.

WW II was Island hopping for offensive air power-but first the enemy air threat had to be beaten back, or there would be big holes in runways and destroyed aircraft on the ground.

One could imagine the PLAAF and 2nd Arty surprise if a lot of "rocks" off shore around PRC became fortified shooters linked into Aegis Carrier Battle Groups, the USN/USMC "Gator Forces" and 7th AF air mobility and Pacific strike capability mutually cross linked and reinforced with allied capability into a solid honeycomb of Pacific defense only activated when needed.

Editor's Note: The combination of Ospreys, with F-35Bs, and Ks provide the Marines with some key tools to support the joint force in a new perimeter defense strategy.

In a recent article by Megan Eckstein, the USNI News analyst, highlighted that the Marines are folding F-35B into a New Pacific Island-Hopping concept.

The Marine Corps is learning how to incorporate its new F-35B Joint Strike Fighter jets into its island-hopping concept of Expeditionary Advance Base Operations, with the 31st Marine Expeditionary Unit rehearsing this concept recently in the Pacific.

The Japan-based MEU was the first to operate with the new F-35B, though its experience with the jet has been quite different than that of the 13th MEU and Essex Amphibious Ready Group, which were the first to deploy with the F-35B from the United States and the first to conduct an operational air strike with the Joint Strike Fighter.

The 31st MEU, unique in being the only forward-deployed amphibious group, has been focused on integrating the new jet into its crisis-response and self-defense missions and showing off the new plane to Pacific allies and partners, MEU Commanding Officer Col. Robert Brodie said today at the Potomac Institute for Policy Studies. If a conflict were to emerge in the Pacific, 31st MEU would likely be among the first on the scene and would likely use its island-seizing EABO concept – so, figuring out how to conduct this mission with the new airplane was the focus of a recent exercise on a small Japanese island, Brodie said.

On Ie Shima, off Okinawa, 31st MEU conducted a standard raid and seizure: a recon team jumped in to pave the way for a raid force being flown in to seize the island. Once the island was secured, CH-53E heavy-lift helicopters flew in fuel bladders and ordnance to conduct a forward arming and refueling point (FARP) operation with the F-35Bs.

"We were actually able to set up a refueling point, and our 53s were taking the gas from a bladder and filling up F-35s, and then the F-35s were going and flying missions," Brodie said.

"That's kind of the concept we rehearsed there. And the key to this is speed: we did not rush through it because we wanted to be very deliberate and we're in a learning phase, but I think you could do these types of things relatively quickly if you had the right ground."

Brodie said the Marines could do this type of operation with either the CH-53E or the MV-22B Osprey, but the MEU has found the helicopter works best.

"We find the 53 works out really well with the F-35, it does a great job pumping gas into it. And I think the 53K will be a tremendous asset when we incorporate it in the future," he said of the replacement heavy-lift helicopter still under development.

"We utilized our CH-53 with aviation ordnancemen; they just rolled [the munitions] right off, put it right in while the 53 was gassing up the aircraft."

The K part of this is very significant in multiple ways.

Not only can the aircraft lift three times that of an E, it is a much more capable information generating and sharing asset within a force insertion package.

And if the US Army were to buy the K in numbers to support its ADA efforts which would be necessary both to deploy offensive and defensive missiles and their C2 posts, then their would be a clear opening to enabling the approach laid down by Timperlake several years ago.

Editor's Note: Baseline K Capabilities to the Mission

- **The CH-53K is aerial refueling capable.**
- **Max external load is 36,000lbs**
- **Max useful internal load is ~30000 lbs**
- **Max of 30 troops or 24 litter patients**
- **Endurance without refueling is 4 hours; max range without fueling is 406nm; 550nm with one internal extended range tank installed.**
- **The KPP is 27,000 external load out to 110nm from sea level at 103 degrees F to 3000' at 91.5 degrees F with ability to hold in objective area then return 110nm to the ship with 20 minutes of reserve fuel remaining.**

https://defense.info/system-type/rotor-and-tiltrotor-systems/ch-53k/