

CAMERI, ITALY AND THE F-35



Crafting an Italian Approach to 21st Century Airpower

CAMERI, ITALY AND THE F-35: CRAFTING AN ITALIAN APPROACH TO 21ST CENTURY AIRPOWER

Table of Contents

The Italian Approach to the F-35: A Discussion with Rear Admiral Covella	3
A 21st Century Approach to Airpower: The Italian Air Force and the F-35	6
The Italian Way of Procuring the F-35: Shaping a European Base for the Global Fleet	9
Re-Thinking the Role of the Smaller Deck Carrier: The Case of Cavour	11
Building Out an F-35 Fleet Sustainment Center in Italy	14
An Update from Cameri on the Cameri F-35 Campus: October 2013	18
Another Aspect of F-35 Culture Change: Building Out the Cameri Facility	20
Lessons Learned at Cameri: Their Implications for Asia	21
The F-35, Allies, and Global Investments in 21st Century Airpower	25
A Global Supply Chain	26
Global Sustainment Centers or Hubs	26
The Weapons Revolution	28

In this special report, we look at the Italian engagement with the F-35 and the thinking of Italian airpower leaders about the impact of the F-35 on the future.

At Cameri, Italians are standing up a Final Assembly and Check Out Facility or FACO, a Final Wing Assembly for building for the global fleet, and Fleet Sustainment Facility for the region, including Europe, the Mediterranean and the Middle East.

The Cameri facility includes both an ATF or Aircraft Test Facility (for testing stealth performance) and a final paint facility. This means that in the heart of Europe, the F-35 fleet will have a battle damage facility.

Cameri, Fort Worth, Japan and Israel will all see key elements of the F-35 global production system. This means that for the first time, the United States in building its front line fighter is looking to work differently with allies. In turn, allies are building out a global sustainment capability available to those nations, which buy, into the F-35 fleet.

Significant cross learning has already occurred, but is just beginning. The advantages of building a global system where best practices can be developed are obvious.

Building a global sustainment approach is less so. But the impact on the cost of operations of an airfleet is significant.

Rather than bringing the logistical support equipment and material to the operational forward base, the forward deployment of warehoused parts and regionally based sustainment competencies will not only allow an air fleet to move rapidly to a problem but to reduce the need for surge airlift and tanking to get those supplies to the point of attack.

This is part of what the head of the Italian Air Force refers to the F-35 as part of building new coalition capabilities and shaping an F-35 fleet which can operate through coalitions against distributed challenges with distributed operational capabilities.

We start the Special Report by providing the interviews with RADM Covella, the head of the F-35 program in Italy, Lt. General Preziosa, the head of the Italian Air Force, BG Espisoto and Lt General Lupoli who focused on their perspectives on the F-35 and the evolution of Italian airpower.

We next add a look at the impact of the new aircraft on the latest Italian aircraft carrier, the Cavour. What is the impact of shifting from Harriers to F-35Bs on the role of this type of ship?

We next examine the perspectives of four key industrial executives working in Italy with Alenia Aermacchi (AAeM) to make Cameri a reality. Their experience and perspectives are unique and are part of a new approach to Euro-American defense industrial cooperation.

We then close with two more general pieces providing overviews.

The first looks at the nature of change posed by the Italian experience for the Asians as the Japanese add their own FACO facility.

The second looks at the general approach of the F-35 program to allies and the role of global investments.

It is the case of a 21st century combat aircraft built in global 21st century facilities with a global sustainment approach built in.

This is a unique moment in military aviation history.

The Italian Approach to the F-35: A Discussion with Rear Admiral Covella

By Robbin Laird

Upon returning to the United States from Europe, I had a chance to reflect back on my visit to Italy and the discussions, which I had with senior officials about their approach to the F-35.

I was able to do so with Rear Admiral Covella, the head of the F-35 program in Italy during his visit to the United States.

RADM Covella

The Admiral underscored that his office was unique in the Italian MOD in that it brought together various elements of the Italian engagement in the F-35 program. He was responsible not only for the acquisition of the plane but of shaping the infrastructure for the standup of the program as well.

The idea was to pull together in one single organization all of the activities related to F-35 in Italy.

We deal with various aspects of the program, including the security of the program, Italian industrial participation in the program, the logistics of the program, and when we discuss logistics we are also discussing the building of the infrastructure at the Italian bases.

We have several bases where the F-35 will be located: Amendola and a second ITAF MOB, for the CTOL variant, and the Navy base at Grottaglie, where both the Air Force and Italian F-35Bs will be located.

The base of Decimomannu, served by the ACMI range, will be also readied for F-35 as "Deployment Operating Base."

The Cavour will see some changes as well; there are no structural changes necessary but some adaptations such as dedicated secure networks and laying down a new type of surface treatment for the ship flight deck.

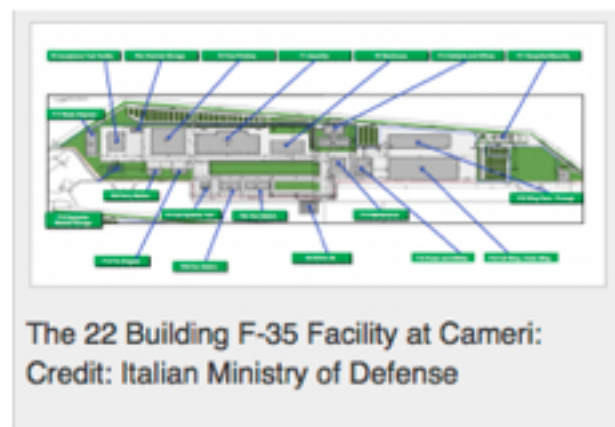
The size and scope of the FACO facility in Italy was a surprise.

It was more of an F-35 campus, than being a final assembly facility. And the Italian approach to the campus as a coalition engagement facility was also evident.

It was evident as well, that the most cost effective approach one might take, was to build out the infrastructure for expansion from the outset rather than just building a narrowly conceived final assembly facility and then later adding capability.

It is exactly that.

It was built with the objective to be a complete MRO&U facility when the production run is finished in the mid-2020s.



It is set up to top up at 2 aircraft build for month.

After that the FACO will be available in full to function as an F-35 MRO facility.

The facility is already established to transition this way.

There is the ATF facility and the final paint facility built on the FACO grounds.

There will be a reshaping of the FACO when the production run is completed but as you noted the overall facility is already in place to provide for an MRO&U capability for the F-35 even during the production run.

We will be able to perform MRO and upgrade on the aircraft, verify the low observability and provide a final paint capability as well.

It is clear as well that MRO for the F-35 is really about combat sustainment.

The Cameri facility is well located to support activity in the region as well, where operational dynamics will very likely be significant.

There are two observations which can be made about Cameri.

It already is state of the art MRO&U site for the Italian Air Force.

It maintains the Eurofighter and Tornado for the Air Force.

It is well located in terms of airports and ports as well to support the facility.

There is space as well for expansion.

And when the Tornado stands down, its current facilities will then be available for F-35 to use.

This means that the services which the facility can provide can expand over time as well.

The F-35 C could be maintained as well at Cameri.

Question: What is the possibility for the F-35 C being maintained at Cameri, given the operational engagement of the USN in Italy?

We believe so.

It is up to the USN, but the study which we did prior to building the Cameri facility clearly underscored that the facility can be rigged up to do all three variants of the F-35 from a sustainment point of view.

The head of the Italian Air Force had underscored during his interview that the 60/40 split between the As and Bs was being done because the Air Force saw the need for expeditionary flexibility. "We want to go to the mission, not the airfield."

What is your view of how the Italian Navy and Air Force will evolve in their use of the B, especially because they will be based at the same facility?

Commonality is a great way to go forward in the future.

There will be two squadrons of Bs, one for the Navy and one for the Air Force.

The missions are different.

The Air Force is focused on expeditionary use of the aircraft and will focus on its ability to operate off of short airfields in operations to be closer to the action, so to speak.

The Navy is focused on the way we use carriers.

We do not use the carrier as the US does; we do not deploy for 6 months at a time.

We need to go out and be ready to go without a significant build up time. We look at the F-35B as providing a more capable ramp up capability for the Cavour.

The two competencies are different.

The Navy is focused on the ability to operate rapidly during the carrier's operation in fleet activities as the main "ship weapon system"; the Air Force is focused on a specialized expeditionary operational focus.

USMC F-35B pilots, some of whom are Harrier pilots, have emphasized that an impact of the B versus the Harrier is a reduction of time necessary to recertify pilots during an operational period.

The Cavour will be eventually be stocked with the F-35B Joint Strike Fighter, replacing the aging Harriers. It has room for ten F-35Bs in the hanger and six on the deck. Credit Photo: Italian Navy

The point made is that after performing a mission, the Harrier pilots would then – because of the complexity of flying the aircraft – need time to do some flying to recertify their flying skills.

It has been emphasized that the B will dramatically reduce the need to do so, and enhance provide for more mission time with regard to the planes aboard the small deck carrier.

The Admiral agreed to this point and elaborated.

I am a Harrier pilot.

Your point is well taken.

We expect to get more mission time out of the F-35B than we have been able to get out of the Harrier.

If you cut out the recertification time necessary for the Harrier pilots, then the B will allow you more mission time.

When I was on the WASP, the pilots made it clear that the B was much easier to fly. And when the aircraft lands it is very stable.

Finally, I asked the Admiral what the advantage of having a coalition aircraft like the F-35 available to a future coalition of the willing?

All the aircraft can do the same range of missions.

Currently, you use your assets on a task-oriented basis; with the F-35 you can consider the coalition aircraft as a combined team.

And with the common flow of parts and procedures to the fleet of coalition aircraft allows for greater operational possibilities as well.

And the common [symbology of the cockpit](#) is significant as well in terms of sharing operational information for common operations.

A 21st Century Approach to Airpower: The Italian Air Force and the F-35

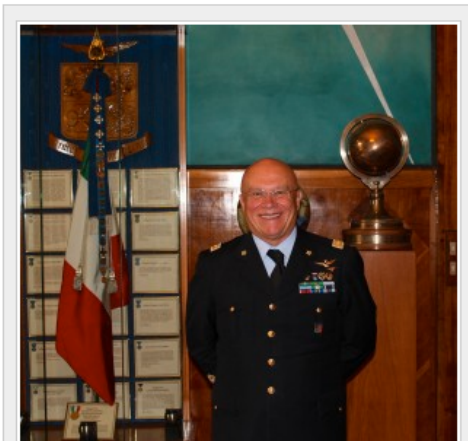
By Robbin Laird

During my October 2013 visit to Italy, where I spent two days at the Cameri F-35 facility, I also had a chance to speak with senior Italian Air Force Officials. I was then able to follow up with an interview in Washington DC with the Italian head of the F-35 program, Admiral Covella.

The first interview in Rome was with BG Esposito and LG Lupoli. During that interview, we focused on the Cameri facility and its potential role within the region to support the Italian and allied fleet of F-35s.

The second interview in Rome was with Lt. General Preziosa, the head of the Italian Air Force.

After receiving a brief tour of the historic Italian Air Ministry, we sat down to talk about the future of airpower and his thinking about the role of the F-35 in shaping that future.



Lt. General Preziosa, Chief of Staff of the Italian Air Force, seen after the interview
Credit: SLD

It was a wide-ranging discussion, which focused on the nature of global change, the role of airpower as a tool for meeting relevant defense and security challenges and how the General believed the F-35 fit into that future.

Lt General Preziosa started by underscoring the nature of global change.

He saw the period through World War II to end of the first decade of the 21st century as having more in common than different. He saw this as a period, which saw significant disruption and then growth built around building up continental focused growth and development. Global regions grew and financial systems largely supported those regions in their growth and development.

Airpower has been largely linear during this period, in which new planes have been added, but they have essentially replicated what we asked planes in World War II to do. Bombers and fighters have over time gotten better, but essentially they work in a linear strike and defense pattern in shaping an approach towards longer-range operations.

Lt. General Preziosa, Chief of Staff of the Italian Air Force, seen after the interview Credit: SLD

With the information age, he sees a different type of development, globalization in which the focus is upon inter-continental growth and development. In this phase, we have to meet the challenge of new growth and development models, shape new financial systems and deal with new defense and security challenges.

“Partnerships are changing; continents are working to get closer and to work more effectively with one another. But there is a governability shortfall in managing the new challenges, and in such areas of shortfall the problems appear. There are continuing conflicts within and among continents but there are also new patches of emerging challenges within the seams of the global system whereby terrorists, organized crime or forces of instability grow and disrupt.”

With the range and distance of erupting threats, and the need for global cooperation or coalitions to deal with them, airpower needs to be modified.

“We now need to have assets which operate in a distributed manner with coalitions engaged to deal rapidly with problems. The advantage of airpower is its reach, speed and mobility. The challenge is to coalesce capabilities to put resources rapidly up against threats and challenges early enough to deal with them.”

More by chance, than by design, the F-35 is entering the global scene at this moment in global history.

“This is an information warfare airplane which can share data across a fleet of global players. The reach of the F-35 means that my planes operating in the Western Mediterranean can receive data from throughout the region. And it is a plane with coalition designed into the aircraft.”

The plane is an information warfare aircraft, or an aircraft built to operate very differently from legacy aircraft.

“We will start with the plane and operate in a more traditional manner. But the new pilots will learn how different it is and will shape new approaches. When I started with an F-104 and then we transitioned to the Tornado, we applied the F-104 tactics to the new Tornado. We did not focus on the presence of the second man in the cockpit, the navigator, and needed to shape new approaches to use the new capabilities built into the Tornado. It will be similar as we transition from legacy aircraft to the F-35.”

The difference is that the change will even be more disruptive and more radical.

“Command and control capabilities are built into every cockpit of the F-35; the challenge will be to leverage those capabilities and the distributed decision making capabilities inherent in a fleet of F-35s.”

He underscored that a strategic shift towards pockets of defense and security challenges around the European, African, Mediterranean and Middle East regions meant that Europe, the United States and others needed to shape collaborative approaches to insert airpower when appropriate rapidly.

And the F-35 as a key distributed force asset was the right match for meeting distributed challenges.

“The fusion system built into every cockpit will allow shared coalition decision making that is required for the kinds of multi-national operations which are becoming the norm. We are not fighting in mass; we are applying tools rapidly and directly to discrete problems and challenges.”

He saw the approach at Cameri where it is part of a global production and sustainment system as symmetrical with the new strategic realities as well.

“Australia, Japan, Italy, the UK, the U.S. and others will share their production and sustainment capabilities for the F-35 and learn how to apply lessons learned from the use of a coalition aircraft in dealing with the evolving 21st cen-

ture problems. This is not yesterday's aircraft being applied to the challenges of the next 30 years; it is about reshaping concepts of operations for coalitions meeting the evolving new challenges and operational requirements."

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

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

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

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

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

He emphasized the importance of cultural change.

"We older pilots adapted to the information revolution. The new pilots are native to that revolution. They will learn differently and this plane is designed for them."

We closed by looking at some final issues.

The first issue is the question of why the Italian Air Force was mixing its fleet between As and Bs.

"We studied the issue carefully and for the kind of missions we face we needed the flexibility which the B can add to the fleet. We need to go to the mission not the airfield. We will operate in many areas where there are only short runways; the B allows us to operate in those conditions.

We can mix the fleet and operate at sea on land, on our own ships or own others. It is the kind of flexibility, which we see as crucial to a 21st century setting.

I will give you an example of what we don't want. We planned to operate with the USMC in Afghanistan. But we were three months later in the deployment than we intended because our Tornados could not operate in the same conditions as the USMC. We had to take three months to build out the air base from which we would operate with them.

Time is crucial to many of the missions in which we will be engaged. The Bs give me a more rapid insertion aircraft."

The second issue is the impact of the F-35 on the legacy fleet. Although the F-35 provides for a new approach, clearly the Italian Air Force and every other F-35 partner will look to use their legacy aircraft for a considerable period ahead, and seek to use them more effectively as the F-35 fleet becomes a reality.

"This is an important issue. One way to think about the way ahead is to continue to use 4th generation aircraft in surging mass to more classic airpower situations. One would use the F-35 as the key asset up against the distributed operational settings or for operations in denied air space.

Another way to look at it will be to find ways to gain more synergy between the F-35 and the legacy fleet. How can we better utilize our older assets during the process where the F-35 fleet becomes a reality?

Shaping combinations of 4th generation with the F-35s will be a mix and match opportunity in tailoring airpower to the missions ahead.

This is a challenge; but it is a key task within which the F-35s will make the legacy aircraft more effective; and the 4th generation aircraft will add support and strike capabilities to an F-35 enabled air power force.”

He then added that when he was speaking of airpower, he was not simply speaking to the question of an air force. All of the services are enabled by airpower.

“The Navy is not defined by its ships but by its operational reach and this comes with airpower. The Army tends to think of airpower in terms of their helicopters, but Afghanistan teaches a different lesson. Continents are working together; why not the services?”

He concluded by emphasizing that the line between those countries that operate in the fifth generation and those that don't will be more than just a line in the sand.

“It will first of all be about survival. Do you want to be the Eagle or the Chicken in an airpower confrontation?

And there is the key question of the cultural revolution associated with the aircraft. With an aircraft with coalition capabilities built in, one will need to learn to operate differently, and this difference is central to the new phase of airpower. One needs to get on with it.”

Lt. General Preziosa

The Italian Way of Procuring the F-35: Shaping a European Base for the Global Fleet

2013-11-01 By Robbin Laird

During my trip to Italy in October 2013, I was able to spend two days at the Cameri F-35 facilities and to then discuss my visit with two senior Italian Air Force officials, intimately familiar with the program and the Cameri effort.

I sat down with Lt. General Domenico Esposito and Brigadier General Giuseppe Lupoli to discuss the Cameri effort.

Lt. General Esposito is the head of Air Armaments procurement and has an extensive background in logistics, which is really central when discussing Cameri. BG Lupoli is the head of fixed wing aircraft procurement issues within Esposito's directorate. In this capacity, he also functions as the Italian MOD's FACO program manager.

Lt. General Esposito kindly signed a book after the interview, which is entitled, Defence Procurement: The Italian Way.

It was clear both after the two day Cameri visit and the discussions with the two generals that the F-35 procurement way for Italy is quite visionary: the focus is upon establishing an Italian located European support facility for the F-35 global enterprise.



Lt. General Domenico Esposito and Brigadier General Giuseppe Lupoli after the SLD interview. Credit: SLD

The Cameri Air Base is a logistics facility where Eurofighters and Tornados are currently maintained.

The Italian government under the management of Alenia Aermacchi (AAEM) has built a 22 building facility to support the F-35 program.

The support comes in three parts.

First, there is a Final Check Out and Assembly facility, for assembling Italy's As and Bs, as well as other European F-35 partners, initially the Netherlands.

Second, there is a wing construction facility with Italy building a minimum of 835 full wings for the F-35 global program.

Third, with the 22 buildings of more than a million square feet of covered work space comes significant space to build out support for F-35s operated by the US and allies in Europe. With the Mediterranean and the Middle East as a busy operational area, the Cameri facility can provide significant operational support to the F-35 fleet operating in the area.

Lt. General Esposito underscored that the establishment of the FACO has been a challenge.

And it has been difficult as well to get other Europeans to understand fully what is behind the Italian approach: it is not just about assembling Italian planes but it is about taking a new look at the European approach to shared support.

We certainly hope other European nations, besides the Dutch, will look to the FACO to assemble their planes. For this facility is much closer to them physically than is Fort Worth.

Esposito highlighted that the Italian way with F-35 was to build a facility not simply targeted on Italian needs.

Cameri is in Italy but it is a well located facility open to significant European participation and to support to the European and American operational fleets in Europe. We have seen Cameri as part of a global solution, and not just a narrowly understood Italian focus.

BG Lupoli added that he believed that there might be facilities built to support manufacturing in the Far East as well.

This would mean that there would then be at least three centers of excellence in support of the F-35 global fleet, rather than having just one located in the United States.

We look at Cameri as a key facility in such a global enterprise and able to support the F-35 fleet operating in the region without having to look at the flag on the plane.

In effect, the two generals argued that Cameri should be looked at as an Italian-based facility for the F-35 global enterprise.

And as such would be part of the next thirty years of innovation associated with the F-35 program.

The two generals added three other points of note as well.

First, Cameri is well located within Europe to operate as a sustainment facility. It is located close to Milan and its commercial airports. And there are significant port facilities as well.

Second, Cameri has been the aviation business for a long time and there are many smaller companies in the region, which could support a build out of the sustainment facility over time as well.

Third, Cameri can be a key warehousing facility for the F-35. The support facilities are completely compliant with NATO and American safety and security standards. For example, the USAF could operate within Cameri as a sustainment facility quite easily as the security standards for doing so are ALREADY in place.

And it is the only European base where a testing facility for stealth and ability to paint aircraft are both present.

It should be remembered that because the F-35 is built with common parts identifiers for every plane built, nations will already have commonality in parts identification built in.

And with a common IT system, the ability to identify those parts and move them within multinational fleets is historically unprecedented for military aircraft.

In other words, the Italians have recognized the global fleet reality of the F-35 and have built in its anticipation.

This certainly highlights the commitment of Italy to 21st century innovation.

[Lt. General Esposito](#)

[Brigadier General Lupoli](#)

Re-Thinking the Role of the Smaller Deck Carrier: The Case of Cavour

2013-10-25 The Italian aircraft carrier ITS Cavour is the newest Italian carrier.

It has been born in the age of significant evolution of carrier aviation, weaponization and the evolution of ISR systems.

Its role is being shaped in part, by the dynamics of change in all of these core areas.

The ship was commissioned in 2008 and the ship is an extremely flexible asset able to play the role of a flagship for a maritime force or key element for a distributed coalition seabase in support of coalition operations.

According to an article published in [Naval Technology](#):

The ship has a standard displacement at full load of 27,100t, an overall length of 244m and a sustained speed of 27kt. The carrier's runway is 180m×14m with a 12° ski jump. It can accommodate up to 1,202 people on board, including the ship's crew of 486, 211 aircrew, an amphibious command force of 140, and San Marco Battalion of 360, plus an extra 90 troops if required.

A strong feature of the ship is its high flexibility in operational terms. It is able to carry out the functions of an aircraft carrier as well as the transport of wheeled and tracked vehicles, for both military and civil missions. The aircraft hangar can accommodate 100 light vehicles or 24 main battle tanks for amphibious missions. The ship can also support four LCVP landing craft. There are two 30t elevators for aircraft and two 15t elevators for armaments.

The vessel is equipped with a flight deck suitable both for operations with helicopters and with short launch, vertical take-off fighter planes. It has a hangar / garage of approximately 2,500m² which can also accommodate wheeled and tracked land vehicles.

The ship can support eight VTOL (vertical take-off and landing) aircraft such as AV-8B Harrier or F-35 joint strike fighter VTOL variant, or 12 helicopters, such as the EH101, NH 90 or SH-3D, or a mix of platforms.

Under the influence of the Osprey and the F-35 fleet dynamic, along with the addition of new ISR and strike missile systems, the USN-USMC team is evolving the concept and operation of the sea base.

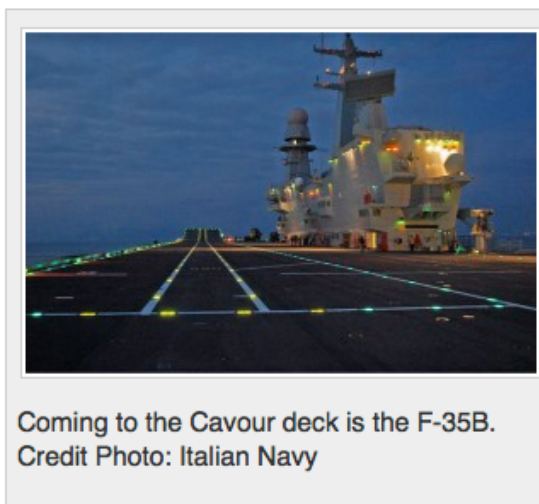
And the shift in the role of the support fleet operated by Military Sealift Command is redefining the role of support ships, so that the pressure on the reduced number of amphibious ships can be reduced by the broader inclusion of support ships within the overall functions of the sea base. The Osprey now able to operate off of the T-AKE ships is a case in point.

The two most recent Bold Alligator exercises, the one held in 2012 and the one in 2013, both have underscored the evolution of reshaping maneuver from the sea with new ships, aviation and C5ISR assets.

<http://www.sldinfo.com/bold-alligator-2013-shaping-a-21st-century-insertion-force/>

<http://www.sldinfo.com/special-report-bold-alligator-2012-and-the-future-of-the-expeditionary-strike-group/>

By having very flexible air assets operate across the Gator Navy, and the Osprey is the current driving force for change, the entire sea base operates differently.



Add the F-35 B as a “flying combat system” and the capabilities are not only enhanced by the role of each individual key ship, which can operate F-35Bs, will become key elements for the distributed force.

For the first time, amphibious ships and carriers the size of the Cavour will carry their own airborne C5ISR capabilities.

This means that the smaller ships will not only carry more organic punch, but be able to provide overwatch and strike support to a distributed fleet.

The intersection of land based and seabased assets can conjoined in coordinated operations as the F-35 fleet becomes a reality operating in the Mediterranean as well.

In [an earlier piece](#), we looked at the “fit” between the evolutions of the new sea base approaches and changes in the global situation.

The Libyan operations as well as evolving events in the Middle East suggest even more strategic relevance of the rapid evolution of the sea-basing approach into a broader understanding of maneuver warfare from the sea.

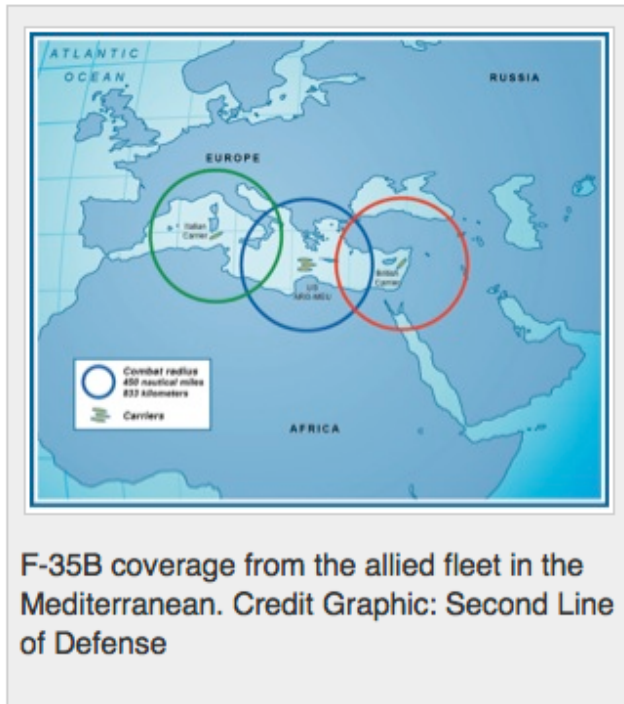
The concept of maneuver warfare from the sea featured in BA-12 is not about amphibious ships, it is about leveraging them as part of sea base to shape a broad maneuver space to shape engagement options and mission success.

The “new” Middle East is rapidly creating the need for such a capability, and such a transformation of US and allied forces. And remember the core role, which allies played in BA-2012.

With the Arab Spring, the security and defense framework, which the West has underwritten over the past thirty years, is shattered. The Arab Spring states are in upheaval, the Iranians are preparing to enter the stage as a nuclear power, the Conservative Arab states have to prepare to defend themselves against Iran, and the interaction between Arab Spring forces and the stability of the key conservative Arab states is significant. Who will the West be aiding and abetting if the Arab Spring continues to pull the rug out from under the de facto Conservative Arab, Israeli and Western alliance?

Will Western states be able and willing to deploy land based forces, whether ground or air, on Arab soil? And given uncertainties even in key Arab allied states, how might the West best defend its interests, and to ensure energy security in the region?

A ship like the Cavour, operating F-35Bs, can form a centerpiece of a maritime operational force or provide overwatch and strike support for an allied coalition force, seen as a distributed force.



Given Italy's key location in the Mediterranean, its land and sea based assets can be blended into a more coherent capability to protect Italian interests by more effectively combining its air assets around the F-35.

For example, if one looks at the Mediterranean and considers simply the deployment of three F-35B carriers, the Cavour, the new Queen Elizabeth class or the USS America class, the Mediterranean can be considered under the reach of the air fleet but one clearly considered not as an end in itself but as integral part of joint and coalition operations.

With the F-35, the key consideration is not simply range, but the reach of the fleet.

The impact of the new combat systems aboard the F-35 an enabler which enhances the role of a ship like the Cavour.

We know from the performance of the F-35 radar in the Northern Edge Electronic Warfare exercise in 2011, that the radar can scan significant surface areas over water as well as land.

According to the F-35 [Joint Program Office](#) release at the time:

A return participant, the AN/APG-81 AESA demonstrated robust electronic protection, electronic attack, passive maritime and experimental modes, and data-linked air and surface tracks to improve legacy fighter situational awareness. It also searched the entire 50,000 square-mile Gulf of Alaska operating area for surface vessels, and accurately detected and tracked them in minimal time.

And of course, the radars of the F-35 fleet are designed to share their data with each other creating [a grid over an operational area](#).

When the F-35B was on "probation," many lost sight of the synergy between the aviation revolution and the changing dynamics of the sea base.

We did not.

[Ed Timperlake](#) underscored in the Fall of 2011 that the two went hand in hand.

The Italian commitment of a billion dollars to build a beautifully designed Aircraft Carrier for the F-35B is a tribute to the faith and commitment the Italian Government made for the US to keep its word....

The F-35 is part of enabling a coalition of like-minded states and shaping a global fleet capability. Allies worldwide are building ships upon which the F-35B could land and operate. Yet the myopic IOC cost focus, forgets the capabil-

ity issue and notably coalition capability. In a cost downturn, the U.S. would wish to have less or more allies? The U.S. would wish to have a globally enabled fleet of C4ISR D aircraft or stovepiped fleets located on specific U.S. decks?

The US is clearly on probation here with regard to a core coalition partner who generously allows the US to operate off of Italian soil. As the USN considers its options, it would be useful to remember that throwing the Italian carrier into the dust heap of history by not building the F-35B makes NO strategic sense.

<http://www.sldinfo.com/the-italian-carrier-the-f-35b-and-the-future/>

Fortunately, Secretary Panetta saw it through, and the F-35B prepares for its IOC in 2015 and will move from Yuma, Arizona to Japan to spearhead the coming of the F-35 fleet to the Pacific.

This means that the Italian carrier is a key element of the expanding role of the sea base under the influence of the aviation revolution.

Editor's Note: For a series of videos highlighting the Cavour as the flagship of a recent NATO exercise in the Mediterranean, Brilliant Mariner 13, see the following:

<http://www.sldinfo.com/nato-tests-navies-crisis-response/>

<http://www.sldinfo.com/italian-carrier-cavour-in-exercise-brilliant-mariner-13-1/>

<http://www.sldinfo.com/italian-aircraft-carrier-its-cavour-2/>

<http://www.sldinfo.com/italian-aircraft-carrier-cavour-3/>

<http://www.sldinfo.com/italian-aircraft-carrier-cavour-4/>

<http://www.sldinfo.com/italian-aircraft-carrier-cavour-5/>

With regard to the exercise see the following:

<http://www.mc.nato.int/PressReleases/Pages/BRILLIANT-MARINER-13-steps-up-a-gear.aspx>

<http://www.eucom.mil/blog-post/25438/protectors-on-deck>

Building Out an F-35 Fleet Sustainment Center in Italy

2013-11-01 By Robbin Laird

During my October 2013 visit to Italy, I spent two days at the Cameri F-35 facility.

While there, I had a chance to discuss the facility and the approach of the Italians with Debra Palmer, Lockheed Martin's General Manager at the facility.

Palmer comes from a military family and herself served in the US Army. She has many years of experience in the defense business, first with General Electric and then with Lockheed Martin. Her position at Cameri is the first that she has held with Lockheed Martin Aeronautics.

We discussed the standing up of the facility, the role of Lockheed Martin in the process, and the Italian approach to the facility within a European context.

Palmer: The project is a green field project, meaning that it is a new build facility. The actual construction began on February 2011 and we were able to start our first F35 production line at the new facility in about 18 months.

The Japanese will configure their F-35 facility within existing plants for Mitsubishi Heavy Industries (MHI), but here the Italians built from the ground up.

Laird: How would you describe your job in terms of your key interfaces?

Palmer: As the LM GM at Cameri I have several key relationships within which to work.

First, LM works in a Joint Venture-like arrangement with Alenia Aermacchi (AAeM) to assist in the standup of the facility.

Second, I am the primary LM interface with the Italian MOD and play a role in representing their interests at LM and to the Joint Program Office (JPO).

And I interface with the JPO; for they are the contracting customer for all planes built in the program.

I also focus on ensuring that Italian companies are in position to have opportunities within the F-35 program, by championing their designation as a qualified supplier.

Italian companies are well positioned within the program and will be in position to receive anywhere from 8 to 12 billion dollars worth of work during the production phase of the program.

Sustainment presents a whole additional set of opportunities for Italian industry as well.

Laird: Might you describe the facility and the process of standing it up?

Palmer: There are 22 buildings with more than one million square feet of covered work area.

The plant mirrors the processes followed in Fort Worth. It is really to be viewed as an extension of the FACO and Wing production lines to provide capacity and flexibility to the F35 program.

The Italian commitment is to ensure that the planes built and maintained here would be to the same quality as if they were built in Fort Worth and for the same price; and not one penny more.

We have three types of Lockheed personnel at the plant.

The first encompasses the expats who are here to work and advise, in partnership with Alenia Aermacchi, for the standup of the entire project and system. There are over 30 expats at Cameri.

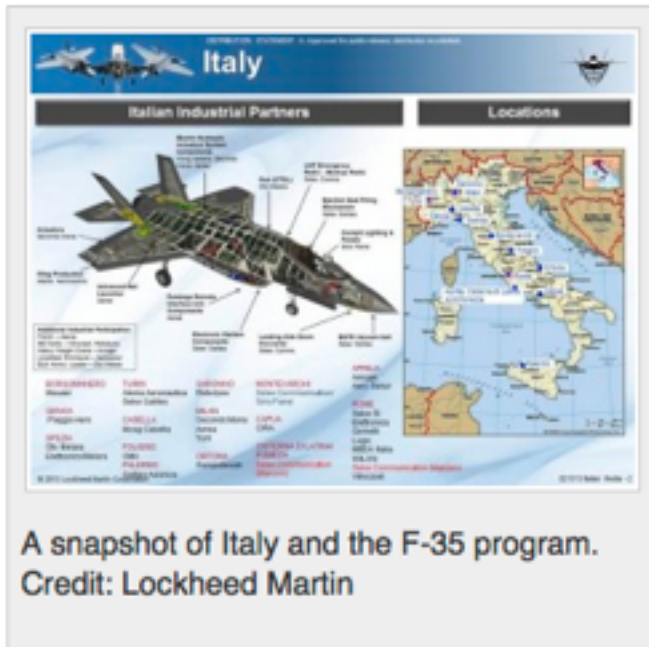
The second encompasses long-term TDY personnel and these are technicians and process specialists who are in the plant for several months at a time to train specialized tasks.



The third involves surge support from technicians from the US for generally less than a month to provide support with regard to a very specific task.

In reverse, Alenia Aermacchi has sent supervisors to Fort Worth for orientation and training in the F-35 program for up to two years at a time.

We start by recalibrating the processes within Fort Worth at Cameri but as we do so we learn from the Alenia people as well so that processes get better.



We can take that learning back to Fort Worth as well.

And many of the LM personnel who have been involved at Cameri will work with the Japanese next.

In other words, we are part of building out a world wide manufacturing process at Cameri.

Laird: The plant and facilities have been built from the outset to provide for F-35 sustainment in Europe and the Mediterranean.

Indeed, one might look at the facility as a **Fleet Sustainment Center** for the F-35 fleet in the region.

What is your take on this?

Palmer: The JPO has not decided on a final worldwide logistics strategy but it is obvious

that Cameri provides important capabilities.

And from day one of operations it meets requirements for US forces.

US certifications are built in; we do not need to go through a long process of additional certifications and costs to meet those certifications.

Why would you want to fly your planes all the way back to the US if you are in the region and are operating within the region?

Laird: Could you go over the roles of the facility?

Palmer: There are three roles.

First, the FACO assembles Italian planes and those of Europeans who wish to have their planes assembled here.

Second, the plant will build a minimum of 835 wing sets for the global enterprise.

Third, extensive warehousing, an ATF facility for testing stealth and a paint facility support the sustainment efforts.

I should mention that for other European nations, there is an advantage of building the planes here as well due to EU requirements. Obviously, planes built here are built to EU standards, built in so to speak.

Laird: Let us go back over the last point.

In effect, by having the combination of a F35-tooled facility, an ATF (Acceptance Test Facility) and an Aircraft and Component Finishes paint facility, Cameri can function as the aviator's "dry dock" to provide for battle damage repair within a regional context?

F-35 ATF

Palmer: That is a good way to look at it.

The Italians are committed fundamentally to partnering.

They look at the warehouses and support facilities here as locations where allies could establish secure facilities with their own data systems, which can be isolated for security purposes.

They understand the importance of sovereignty and national security but within an allied context.

Laird: Clearly, a key component of standing up such a facility is the human capital in such an enterprise.

How has Alenia Aermacchi gone about doing so?

Palmer: Human capital is crucial.



The plant is located in the industrial heartland of Italy; in addition to aeronautical companies like Alenia Aermacchi (AAeM), there are cutting-edge high performance automotive manufacturing operations such as Maserati and Ferrari located nearby. A very rich environment for hiring a technical work force.

Alenia Aermacchi has built a blended workforce.

They have brought in experienced workers from other parts of AAeM as well as hiring new workers. There are several colleges specific to engineering and aerospace in the area from which to draw.

In addition, there are agreements with local high schools, which then teach students techniques applicable to airplane manufacturing.

AAeM has set up 90-day training sessions at the plant as well. LM has provided engineers and technicians at Cameri and we are training with both classroom and on the job techniques specific to F35 manufacturing.

I should note that the Italians are paying LM to provide this expertise. But it is also the case that AAeM has been building airplanes for over a 100 years, longer than LM and its heritage companies.

Their ability to produce is excellent so far. In fact, they have performed at the same level, or better on some parts, as the US-based production processes.

Laird: I went with Ed Timperlake and Secretary Wynne to Eglin last month. The sense of enthusiasm from the maintainers and pilots was clearly evident. I see the same around the Cameri campus.

Palmer: I came here because I wanted to be part of something which could form an important legacy for the future.

This plant will be supporting the F-35 program for the decades to come.

It is gratifying to be here and to be part of the process and I think the Alenia Aermacchi and Lockheed Martin personnel feel as I do.

It is an adventure to build out a 21st military aerospace process and to lay the foundations for the F-35 global enterprise.

An Update from Cameri on the Cameri F-35 Campus: October 2013

2013-10-30 By Robbin Laird

During a visit with Ed Timperlake at Yuma USMC Air Station and then at the Lockheed Martin Fort Worth F-35 facility, Ed and I had a chance to discuss the Cameri F-35 effort with two young Lockheed Martin Aero officials involved in that effort.

We sat down with Brian White and Kris Yowell in late 2012 to discuss the FACO and its significance.

Brian White is a relative newcomer to the program but with significant background in international business with Lockheed Martin. He has been the Lockheed official responsible for the execution of the contract for the FACO from the Lockheed side.

Yowell has been with Lockheed since 1986 and the JSF program since the start of SDD production. He has worked within production and global supply chain within the program and has worked with the Italians for the past five years living in Italy for 3.

The two have brought significant international and production experience to the working relationship with the Italians.

<http://www.sldinfo.com/the-italian-f-35-faco-a-key-asset-in-the-global-f-35-support-system/>

While I was visiting Cameri in October 2013, the two had just come back to the facility, and I had a chance to sit down with them again to get an update on the past six months from their perspectives.

In the discussion, which followed with White and Yowell, several key themes were emphasized.

First, June 18, 2013 was an important date in Cameri history. This was the day that the first F-35 to be built at Cameri began its assembly process.

Second, the year ahead will be challenging as the ramp of production continues, the wing assembly process accelerates and as the first planes prepare to be flown and put through the acceptance process.

Third, there has been significant cross-learning within the program between Fort Worth and Cameri, and with the addition of the Japanese this process will continue.

An example was cited of how the Italians have improved on the automated drilling process for wing Outer Wing Boxes, being able to simplify the process by dry drilling which demonstrates new possibilities to Fort Worth as well.

Fourth, the Japanese have visited the plant to learn how a Cameri-sized facility might be built in Japan, for such a facility is clearly closer in scale to what Japan itself will do.

The complexity of the multi-year process of setting up the plant was highlighted as well for both the American and the Italians. The process had to be shaped for export, the machine tooling products put into place, the production processes installed and the teaching of the processes commenced and honed.

The learning at Cameri with regard to wing production is important as well in two ways. First, the Cameri process is producing high quality wings for the entire F-35 program and second, the stand up of this facility will help in learning how to set up the wing facility in Israel as well.

In effect, the Cameri plant demonstrates to important developments with regard to the F-35 program.

First, the production processes have matured to the level whereby they can be transferred.

Second, that the production processes can indeed be transferred and a new line established in a completely different geographical and cultural area.

The Italians also have the advantage of closer geographic proximity for their supply chain so that the Cameri plant can shape a supply chain to support the plant in close proximity to the plant as well.

Technology transfer is not simply about technology; it is about business processes and models as well. And this is not a one way but a two way street, as a global manufacturing system is set up within the F-35 program. It is not just about a global supply chain; it is about global system providers and global manufacturing, meaning manufactured outside and inside the United States.

The full benefits of such a process are only beginning.

As the ramp up of production occurs, and the cross-learning is allowed to reshape production processes more effectively, not only economies of scale but economies driven by process innovation will occur.

This is clearly the benefit of having a global program built around a plane with more than 80% commonality built into its three variants.

Another Aspect of F-35 Culture Change: Building Out the Cameri Facility

2013-11-3 By Robbin Laird

During my visit to Cameri in October 2013, I had a chance to visit the Cameri facility with Fred Napurano, the Italian Program In-Country Operations Lead for Lockheed Martin.

Napurano is the key person interacting with Alenia Aermacchi (AAeM) to assist in the standup of the facility.

The visit as well as the discussions with Napurano underscored the sense of enthusiasm at the facility in shaping a new US-European approach to building military aircraft and shaping a future sustainment facility for the F-35 operating in the region.

While visiting the plant, I saw several interactions among the Italian workers as well as between the Lockheed and Alenia worker, which clearly demonstrated the interest in working together in shaping a futuristic venture.

Napurano noted several examples of such enthusiasm and noted, "several workers had volunteered to come from Torino (an Alenia Eurofighter facility) and to work on the program. This means that whether by car or car pooling or by train, workers are coming 60 to 90 minutes each way from Tornio to work at the plant."

Napurano highlighted that the Italian government had taken a broader view when building the facilities in Cameri. "Rather than just standing up a limited facility focusing simply on assembling their own planes, the Italian government took the broader view and built out capacity for other Europeans and to shape an infrastructure able to encompass fleet sustainment as well."

The facilities at Cameri are designed to be very flexible in terms of providing for future sustainment engagements by allies.

"The facilities are very flexible for maintenance. There are no fixed bays but are open areas where the client can figure the support area as they might wish to support their combat aircraft."

And it is obvious as well that as LM personnel teach Alenia personnel that it is not a one-way street.

"Alenia has been making airplanes for a long time. And the adaptation of techniques transferred from Fort Worth is seeing changes as the Alenia personnel not only improves on these techniques but also suggest different approaches.

And these approaches can provide significant future benefit to the global program as well.

An important aspect of the manufacturing process is [digital thread manufacturing](#) and with the time differences between Fort Worth and Cameri, a key challenge is to translate digital changes being made in Fort Worth into changes on the Italian line as well.

"We communicate daily with Fort Worth to ensure synergy in the process of manufacturing. It is a challenge. They become much more detailed as the process continues."

There obviously is a learning curve involved in the process.

“Translating from Fort Worth to Cameri is a two way process. And we have to adapt the Italian process to EU laws and regulations which is an additional challenge we deal with here.”

Napurano highlighted the importance of building relationships in the production process of trust and mutual understanding.

“It is not just a question of getting to yes; it is about getting to good quality finished product. That will only happen with demonstrated success in working through the problems on a day-by-day basis.”

Lessons Learned at Cameri: Their Implications for Asia

by Robbin Laird

The Italians were significant innovators at the beginning of the era of airpower.

They continued throughout the history of airpower to innovate and with the launch of the F-35, they are proving to be innovators once again.

Their facilities at Cameri provide support not only for Italian aircraft, but anticipate an ability to support an allied F-35 fleet operating in the Mediterranean and the Middle East.

The innovation does not stop there.

It is inherent in the Italian thinking about the concepts of operations of the airplane and its contribution to Italian defense and security. In a recent interview with Lt. General Pasquale Preziosa, the Italian Air Force Chief of Staff underscored that the F-35s will provide the kind of flexibility necessary for airpower over the period ahead.

And he highlighted that the Italian Air Force will be deploying a mixed fleet of F-35s (As and Bs) because they believe that they need to deploy to the mission and not the airfield.

This anticipates the kind of learning the USAF and USMC will shape as they deploy As and Bs to Japan starting in 2015.

Earlier, we provided an interview, which highlighted the Italian effort and provided an update at the time. In an interview with Brian White and Kris Yowell, two LM employees involved with the standup of the facility.

As White [concluded the interview](#), he underscored:

The Italians understand the investment they're making and they are master strategists in understanding the long-term ramifications. For them, it's not about buying a jet or being able to produce a jet, it's about helping their economy, creating jobs, creating an infrastructure in-country that is part of a global enterprise that has things coming in to Italy.

It extends far beyond just the Italian F-35 jets that they intend to buy, it's their partners that are suppliers on the F-35 program. It's their wing-line that supports not only Italian jets, but also all the partner countries.

And they are positioning themselves; again, to be the MRO, a new resource in country and they're very forward-thinking in setting up that infrastructure now far ahead of there being any ability to definitively say yes, you have that work.

I recently had the chance to visit the Cameri facility and with the Japanese about to announce the launching its own F-35 manufacturing facility as well, one can see some implications for the F-35 as a global program.

And I was able to see first hand that White was not overstating the case. But as well there are a number of lessons learned at Cameri which affect the entire future of the F-35 program and its roll out in the Pacific as well.



The Italian facility can both final assemble and provide a basis for opening a maintenance facility or hub for the F-35. It is sized and equipped to achieve a full rate of 24 aircraft /year within 3 years (2016) to accommodate ITALY + NETHERLANDS deliveries. Credit Photo: Lockheed Martin

The F-35 facilities are built on the Cameri Air Base which is a logistics hub for the Italian Air Force. Eurofighters, and Tornados are maintained at the base.

There are various other facilities as well consistent with an airframe sustainment facility.

The location at a logistics hub really is the heart of the story.

Although an assembly facility, the sweep of the facility is really about the ability to support the F-35 fleet operating in Europe, the Mediterranean and the Middle East.

And the core lesson which comes from the standup of this facility is that shaping operational support for the F-35 fleet is a core business for allies as they acquire their planes and shape the fleet in their region.

If one looks at the usual photo of the facility, one sees an overhead shot of the Final Assembly and Check Out or FACO facility. If this is what you have seen, you are not prepared for what you will experience when you come to the campus.

It really is an F-35 campus on which the Italians have built 22 buildings which represent more than a million square feet of covered work areas.

The facility will include a final paint facility for the F-35 as well as the only ATF (Acceptance Test Facility for verifying the F-35 radar signature) in Europe.

The facility is operated by Alenia Aermacchi (AAeM) and contains three sectors of activity, two underway and one in planning.

- The first is for the final assembly of the Italian F-35As and Bs, and the first jet is being currently worked on.
- The second is a wing assembly facility where the Italians will produce at least 835 wings for the airplane.
- The third is really a laydown for the future of the F-35 fleet engaged in operations in the region.

In a recent comment made during an audit at the Chamber of Deputies Defense Commission, the Finmeccanica CEO Alessandro Pansa highlighted that with the participation in the F-35 program “the Italian industrial system brings home potential returns for \$ 10 billion” and jobs exceeding 5,000 people.”

The development of these potentialities “depends on our capability to use the infrastructures which have been created to build components and to provide maintenance related to avionics and electronics both for the European aircraft and the US aircraft based in Europe. There’s no other European plant with the same requisites as our plant in Cameri”

Pansa underscored that 90 Italian companies are involved in the program and so far contracts have been let for \$765 million.

(From the Italian newspaper, *Italia Oggi*, October 17, 2013).

And when visiting the plant, it is obvious that the workforce is a mix of older and younger workers, and provides a significant boost to the future of Italian aerospace and defense.

It is also difficult to argue with the proposition that the Mediterranean and the Middle East will not be a busy operational area for NATO and allied forces.

The F-35 fleet that rolls out from a diversity of users will need the kind of operational and maintenance support which can be provided at Cameri.

The Italians have built major warehouse facilities to hold parts for the F-35 as well as maintenance bay accommodations secured to collateral SECRET, and, with the IT system which can manage the parts which are stamped with common parts identifiers, it will be straightforward to manage the inventory coming in and out of these warehouses to support an allied fleet.

A way to look at this would be the shape a graphic as follows with Cameri as the hub to support the Western and Eastern Mediterranean and the entire sweep of allied F-35 fleet operations. This could include the USAF, the USN, the USMC, the Italian forces, the British forces, the Norwegian forces, etc.

The Italians have understood the F-35 fleet concept and have laid down an infrastructure to support it AT THE SAME TIME as they built their FACO and wing production facility.

As we have written elsewhere, the F-35 fleet is at the heart of a reworking of US defense strategy in the Pacific. And the Japanese emulating in part of the Italian example can position themselves for fleet support as well.

(See our new book, Robbin Laird, Ed Timperlake and Richard Weitz, *Rebuilding American Military Power in the Pacific: A 21st Century Strategy*, Praeger Publishers, published on October 28, 2013).

<http://www.amazon.com/Rebuilding-American-Military-Power-Pacific/dp/1440830452>

The Italian approach to the F-35, based on fleet support for the F-35 operating in the region, reinforces as well the strategic realities and requirements for Italy and its allies.

It is difficult to imagine the U.S. operating in the Mediterranean without access to Italian bases. With the F-35, Italy can enhance its business in support of the fleet and the USAF operating in Europe as well.

In addition, the operation of allied fleets as well as land-based air can be supported in regional operations as well. The Italian Navy's *Cavour* will operate the Bs, along with the British *Queen Elizabeth* and the US amphibious fleet as well. U.S. large deck carriers will operate the Cs which have significant commonalities with the As and Bs to be operated by the Italian Air Force. This provides significant possibilities for support for the USN C fleet at Cameri as well.

In other words, the area of strategic operations for the Italian forces, those of allied forces operating in the Mediterranean and the Middle East, can dovetail on support from Cameri.

Hidden inside the program is the inherent possibility of naval and air forces collaborating much more effectively than in the past. The reach of the F-35 fleet, which conjoins aircraft operating either of land or sea, is a central combat capability for Italy and its allies in regional operations.

Another lesson being learned by the Cameri FACO startup is the impact of a global manufacturing system upon the F-35 enterprise.

By standing up the FACO facility, Lockheed Martin (LM) is working in partnership with AAeM in shaping a new manufacturing facility. By so doing, LM is not simply transmitting information but learning from AAeM about ways to improve production in Fort Worth.

When the Japanese join the manufacturing side of the program, the contribution of Japanese manufacturing skills will be incorporated into the program as well. I think it would be difficult to argue that the Japanese do not know a considerable amount about manufacturing.

In other words, it is not just about validating the F-35 manufacturing model; it is about U.S. and allied investment in an ongoing process improvement to the manufacturing of the 21st century jet.

Also inherent in the process is the shaping a new approach to US-allied collaboration. The classic trans-Atlantic programs have atrophied and are going to be replaced by blended production approaches, which shape capability shared across the partner nations.

The F-35 is an example of this approach, and Debra Palmer, the Lockheed Martin GM, provided insight into how the process has worked from her perspective. She emphasized that LM in working with AAeM to stand up the facility has involved three packages of team members in the effort:

The first encompasses the expats who are there to help standup the entire project and system. There are about 30 expats at Cameri.

The second encompasses what she calls "long term TDY" and these are technicians and process specialists who are in the plant for a few months and are working on training specific tasks.

The third involves surge support from technicians from the US for less than a month to provide support with regard to a very specific task.

In reverse, Alenia Aermacchi has sent supervisors to Fort Worth for orientation and training in the F-35 program for up to two years at a time.

This is an aspect of this evolving Euro-Atlantic collaboration built into the F-35 program.

And it is clearly not a one-way street.

Lockheed has learned from the Cameri startup ways to improve their processes at the Fort Worth F-35 facility, and significant improvements and processes with savings over time come from such collaborative learning.

Again this is a lesson learned at Cameri, which surely will be repeated as the Japanese stand up their plant working closely with the United States.

And improvements, which come from starting with a fresh, start up plant and working from best practices as one stands up that plant evolve over time into better practices. And these Japanese lessons learned can reach back to both Fort Worth and Cameri.

And this is not a one off, but an ongoing process of collaborative learning.

In short, Cameri is not just about assembling Italian planes or those of selective European partner nations.

It is about inserting itself within the evolution of the future F-35 fleet and becoming a key part of a global production system.

As I wrote many years ago, the F-35 is about culture change.

And this encompasses the manufacturing and support sides of the program as well as affecting concepts of operations.

<http://www.defensenews.com/article/20110221/DEFBEAT05/102210314/Embrace-the-Air-Power-Revolution>

A version of this piece appeared on *Breaking Defense* as well.

<http://breakingdefense.com/2013/11/lessons-learned-at-cameri-italys-f-35-hq-implications-for-asia/>

The F-35, Allies, and Global Investments in 21st Century Airpower

2013-04-18 The F-35 as a fleet is a key foundational element for the future of US power projection.

The F-35 has been designed from the ground up to provide for interconnected ISR and strike capabilities which can be leveraged as a fleet to enable more effective use of U.S. and allied forces.^[1]

It also part of an airpower revolution essential for the U.S. and its allies to provide for 21st century Pacific defense.^[2]

Sensors, combined with stealth combined with speed can provide a new paradigm for shaping the Pacific force necessary for the U.S. in working in the Pacific.

The F-35 as part of the forward deployed sensor package, which is also stealthy, can guide weapons to their targets, including the anticipated high speed hypersonic cruise missiles.

The “re-norming of air power” associated with the 5th generation aircraft are simply part of the entire evolution of an approach to shaping distributed operations as a strategy which allows the United States to work very differently with allies in providing for global reach. The allies are always forward deployed; the U.S. role becomes re-enforcement and providing scalable forces capable of reachback and situational dominance.

The reshaping of deterrent and warfighting forces is a crucial aspect associated with the F-35 as a global fleet. But the ability to maximize global investments in the evolution of 21st century air combat capabilities is essential as well. The F-35 is designed from the ground up to be a global system and an upgradeable one.

A Global Supply Chain

The F-35 has built into it a significant global supply chain.

Lockheed is a 30% “prime contractor” with the other 70% of the aircraft coming from global suppliers. And a significant proportion of those 70% are foreign suppliers as well.

There are four key ways the F-35 enables global investments and risk sharing among the F-35 partners.

The first way is simply in shaping the supply chain, which is crucial not just for building the plane but also for supplying parts for the plane. One aspect of so-called performance based logistics systems, which simply is not well understood, is that the companies building parts and supplying parts are the same companies.

Attempts by those in the United States to roll back the PBL is really about re-nationalizing the supply chain.

This makes little sense in an era of financial scarcity and growing global threats. This system also allows the tapping of capabilities, which have been, available in specific nations and unleashing their potential to support global coalitions.

The case of Japan is suggestive whereby the participation of the Japanese in building parts for the F-35 means they are building for the global coalition not just for Japan. The Japanese government is focusing on how to participate in F-35 global supply production and modify the current ban on arms exports in the Japanese system.

Clearly, the coalition engagement aspect of the F-35 is a very good framework within which Japan can participate in global production, without exporting weapons for national or narrow nationalistic purposes.

Global Sustainment Centers or Hubs

The second key way investments are maximized is shaping a system of global sustainment centers or hubs. Because the planes are the same, and there is 80% commonality across all three variants, an Australian supply hub can support allies throughout the region including the United States.

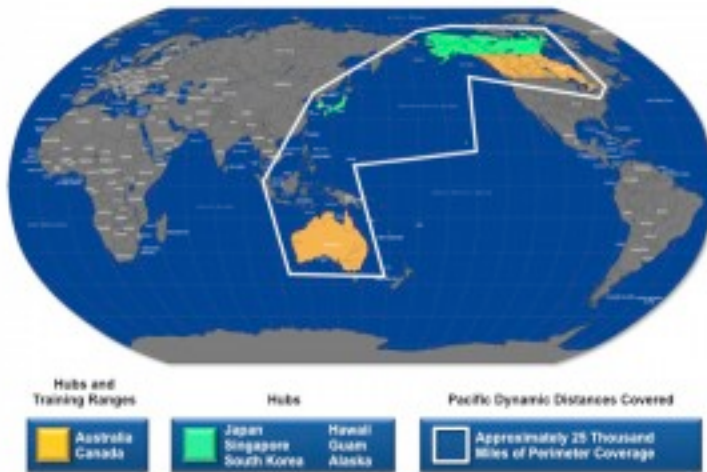
The entire approach of the F-35 enables the sustainment of the fleet in radically different ways from the past. And it is coming at a time when economic pressures create such a need; but if new approaches are not taken money will be invested in maintaining less effective forces.

The F-35 global sustainment approach allows for a more effective and dynamic force at less cost than operating a legacy fleet. At the heart of the new approach is an inherent capability to leverage logistics hubs throughout the Pacific to create a seamless ability to sustain both allied and American planes.

Presence from this perspective has a whole different meaning. Hub sustainment means that the US can surge aircraft to the region and be supported during surge operations without having to carry its sustainment capability forward with the surged aircraft, which is the requirement currently.

The opportunity and ability to build hubs and/or training ranges in the Pacific with hubs and ranges in Canada and Australia and hubs in Japan, South Korea, Singapore, Alaska, Hawaii and Guam provides an opportunity to re-shape how sustainment can be done in around the world. This will bring with it a significant boost to sortie rates and hence operational capabilities.

F-35 as Allied Pacific Lynchpin



The Pacific F-35 Fleet can be sustained through a network of hubs and training ranges. Credit Graphic: Second Line of Defense

As Lou Kratz, former Assistant Deputy Under Secretary of Defense, and now with Lockheed Martin has argued:

The F-35 enables all the Services to dramatically reduce the equipment that is necessary to maintain the aircraft, thereby freeing up both air and sea lift capability to bring in combat elements which then allows you to close the theater faster and enable more rapid responses to emerging threats. Additionally, because our allies are all over the world, not only do they have the support structure, they have the aircraft. Our allies become a key part of that coalition force which is already in theatre. So you reduce both the time, and the cost associated with the total force capability buildup.[3]

The Italians and the Japanese are making the third key contribution. Both countries are building Final Check Out or Final Assembly Facilities and these facilities can function as maintenance facilities for allied aircraft as well. In effect, to serve their own needs the Italians and Japanese are in effect putting in place maintenance facilities or MRO facilities which the U.S. Air Force, USN and USMC are able to use in two key regions, central to American interests.

The Italian facility is already built while the Japanese facility is currently planned. In an interview with two Lockheed managers involved in standing up the facility in Italy, they emphasized the following:

The plant was sized for 24 (aircraft) a year, including the Dutch aircraft. So, planning is underway for that. However, there is no official agreement in place yet between the Dutch and the Italians.

Question: And obviously such a facility could perform a key role for MCO in Europe and the region?

Answer: It clearly could. They are making a very strong play to be MRO go-to for that region. Given their investment, what they're doing with the capability standup, it's our position that that's a logical choice.

However, that work has to be contracted, awarded and competed. But they are making a very, very strong case for that work to be put there in the future.[4]

In discussions with senior USAF officials, it is clear that they understand the impact of having Italian and Japanese maintenance facilities in place and Japanese and Italian capital invested in providing for MRO services in the future.

The Weapons Revolution

A third key way to understand how global investment is leveraged in shaping 21st century combat capabilities via the F-35 program is the evolution of weapons for the 21st century. One problem facing the F-22 and the F-35 is that the weapons onboard are third and fourth generation weapons. The reach and range of these aircraft is far beyond current weapons. Why fire an AMRRAM of 70 miles in range when your F-35 can see more than 200 miles ahead of you in 360 degree combat space?

An entire weapons revolution is enabled by the F-35 in which key developments such as off-boarding of weapons are enabled. What this means is that weapons can be fired by other platforms, whether air, sea or land based, while the aircraft is determining target sets.^[5]

Even though the US has been the core architect for the aircraft, the implementation of the fleet will not be solely and perhaps primarily American. The diversity of global weapon suppliers – European, Israeli, and Asian – will seek to integrate their products onto the F-35.

There are two examples already in play of how allies can work with the F-35 to weaponize the aircraft to the benefit of the entire fleet.

The first example is the inclusion of a Norwegian missile on the F-35. Indeed, for Norway, a key element of the F-35 decision by Norway was the acceptance of the integration of a new Kongsberg missile onto the F-35 itself.

Through the development of the Naval Strike Missile (NSM), the Norwegian Armed Forces has established KONGSBERG and other Norwegian industry in the top tier as a supplier of long-range, precision strike missiles that will meet military requirements in a 20 to 30-year perspective.

Historically, a Norwegian selection of an aircraft and a decision to integrate a missile on that aircraft would be largely for Norway or whoever else chose that aircraft and the series variant of that aircraft. This would not likely be a large natural market.

With the F-35 the situation is totally different. The F-35A to be purchased by Norway has the same software as every other global F-35, and so integration on the Norwegian F-35 provides an instant global marketplace for Kongsberg. And the international team marketing the aircraft – is de facto – working for Kongsberg as well.

It is very likely, for example, that Asian partners in the F-35 will find this capability to be extremely interesting and important. And so Kongsberg's global reach is embedded in the global reach of the F-35 itself.

The second example is the development of the Meteor missile by the European consortium MBDA Systems. The new Meteor missile developed by MBDA is a representative of a new generation of air combat missiles for a wide gamut of new air systems. It can be fitted on the F-35, the Eurofighter, Rafale, Gripen and other 21st century aircraft.

There are a number of aspects of the Meteor program, which are inherent to a 21st century weapons enterprise. At the heart of the Meteor program is an integrated development team led by the prime contractor, MBDA. The missile was developed to meet the operational requirements of 6 partner nations and for 3 very different combat aircraft, the Eurofighter Typhoon, the Rafale and the Gripen. It is also compatible with the F-35 weapon bay.

Frequently, a multi-national program is more of a problem than a solution. In this case, the challenge of building for multiple aircraft and partners at the same time, has given the MBDA team a leg up on the 21st century. To design and build the missile, a comprehensive model was developed; this incorporated the various aspects of a successful missile, ranging from aircraft characteristics, to radar system performances, and the various operational scenarios/operational styles of the different aircraft and air forces.

This has meant that MBDA has forged a very robust model for development, which is then at the heart of the production of the missile itself. The missile is software upgradeable so that changes over time will be written into the code in the model and directly incorporated into production runs.

Software upgradeability is a game changer for 21st century systems not well understood or highlighted by analysts. In the past, new products would be developed to replace older ones in a progressive but linear dynamic. But now, one builds a core product with software upgradeability built in, and as operational experience is gained, the code is rewritten to shape new capabilities over time. Eventually, one runs out of processor power and BUS performance and needs to consider a new product, but with software upgradeability, the time when one needs to do this is moved significantly forward in time.

It also allows more rapid response to evolving threats. As threats evolve, re-programming the missiles can shape new capabilities, in this case the Meteor missile. The current production missile is believed to be using well below the maximum processing power and bus capacity of the missile. Significant upgradeability is built in from the beginning.

Although software upgradeability is not new with regard to weapon systems, the F-35 as a software upgradeability is. Combining the launch of a software upgradeable aircraft with a missile designed from the ground up with upgradeability built in will allow the aircraft and the weapon to evolve together over time to deal with evolving threats and challenges.

The MBDA approach to shaping upgrades for software also reflects a key concept which is important as well; one keeps software upgradeability within the prime contractor working with global coalition members, rather than having an individual service or nation responsible for software upgrades. The advantage of multi-nationality whether it be the F-35 program itself, or the weapons providers participating in the program is the opportunity for industry to play a global role, and just narrowly focused on a single service or nation. This will require a cultural change for a number of US services as well with the dawning of the F-35 age.

And underlying the model and the code is a multinational team. And this team is the core capability, which can drive weapons development over time. MBDA has functioned as the prime and has worked with three aircraft manufacturers and radar manufacturers already and is working with additional players as the missile prepares to go onto the F-35.

What has been a challenge – working with 6 air forces – is an opportunity as well. Each of the partners had different takes on the target set they wished the missile to serve. This has meant that the range of targets and engagement envelopes were very wide ranging, from low-level cruise missiles and high flyers, to UAVS, to helos, etc. The end result is a software upgradeable missile with a very wide-ranging initial capability to deal with a diversity of targets

Another key aspect of the missile is it is designed from the beginning to be employed on and off-board. It can be fired by one aircraft and delivered to target by that aircraft or the inflight data link can be used via another asset – air or ground based – to guide it to target.

The missile ought to be integrated into the Block 4 of F-35. When so done, the missile can provide a sweet spot of 4th and 5th generation weapons integration with its core networking capability.

Because of the nature of software integration on the F-35, the Meteor missile, which will be integrated onto the F-35 due to European requirements, means that it is available to all the other global partners of the F-35 as well. The partner aspect is crucial in leveraging global investments of America and its partners in a resource-constrained age.

In short, the F-35 is not simply a tactical replacement aircraft.

As a fleet it provides for a set of “flying combat systems” which allow for unprecedented allied and American integration across all three variants of the aircraft. It also allows for efficient investment in the evolution of future capabilities available to the fleet as well as providing for significant global sustainment for a globally deployed fleet. It is a revolution in the making if it is given a chance.

[1] Robbin Laird and Ed Timperlake, “The F-35 and the Future of Power Projection,” *Joint Forces Quarterly* (July 2012).

[2] Robbin Laird, Ed Timperlake, and Richard Weitz, *Rebuilding American Military Power in the Pacific: A 21st Century Strategy* (Praeger Publishers, forthcoming).

[3] Robbin Laird, “The Strategic Impact of the Global Sustainment Approach of the F-35,” *Second Line of Defense*, October 22, 2012,

<http://www.sldinfo.com/the-strategic-impact-of-the-global-sustainment-approach-of-the-f-35/>

[4] “The Italian FACO System: A Key Asset in the Global F-35 Support System,” *Second Line of Defense*, December 5, 2012

<http://www.sldinfo.com/the-italian-f-35-faco-a-key-asset-in-the-global-f-35-support-system/>

[5] Robbin Laird and Ed Timperlake, “Building 21st Century Weapons for 21st Century Operations: Key Attributes of the New Weapons Enterprise,” *Second Line of Defense*, March 15, 2013,

<http://www.sldinfo.com/building-21st-century-weapons-for-21st-century-operations-key-attributes-of-the-new-weapons-enterprise/>