AN UPDATE ON THE OSPREY

THE FUTURE OF POWER PROJECTION

REPORT 6

January 2011

AN UPDATE ON THE OSPREY

Moving Forward on Osprey Maintenance

Dr. Robbin Laird

The Osprey is a revolutionary aircraft. As a plane, which can perform like a helicopter, the Marines have used the aircraft in Iraq to cover the entire theater of operation for support in a day; in Afghanistan they have used the aircraft to supplement traditional systems to do envelopment operations of the Taliban, and generally, they have used the aircraft to shrink the battlespace.

An illustration of the shrinking of the battlespace was provided during interviews conducted at New River Air Station (North Carolina) in late August with Osprey pilots, trainers and maintainers.

According to Major York, Osprey pilot and trainer,

We took some soldiers out to the West of Iraq. The crew chief comes up to us and tells us that the guys won't get out of the plane. We're like, what are you talking about? They said we're not there yet. He then said, "the last time he did this flight it took an hour and a half. We've only been in the plane for 40 minutes so we can't be there yet."

We told him to tell the Marines that "we were cruising at 230 rather than at 120 so we were there. I swear we're here, you know, we're not going to send him somewhere we're he's not supposed to be."

Another significant impact of the aircraft has been its ability to re-design the con-ops of the Amphibs by allowing the splitting of the MEU. According to Captain Dwyer, Osprey Pilot who recently deployed aboard the USS Nassau:

The speed of the Osprey allows it to operate effectively with the Harrier. And we actually split the MEU, the entire MEU, which I don't believe, had been done before in specific type model series, so all of the skids, the Hueys and Cobras were on one ship and they were almost autonomous. They pretty much got to do different things they were

scheduled to do with different countries under the umbrella of the 24th MEU but didn't impact our actual operations. The 53s that are grounded in Djibouti, now they hopped off the Nassau as soon as we got in there, so it was really an AV-8 and V-22 show for, I don't know, four and a half to five months.

But the strategic advantages of a new build platform require robust sustainment regimes to keep that capability flying. Here the Osprey as with many new platforms faces challenges.

The aircraft has significant digital reporting capability, which allows the plane to shape enhanced maintenance regimes, but such innovations require technicians used to managing the FROG or the CH-46 through 30 years of experience to adapt to a new regime. This is not unusual for the Osprey but reflects a cultural shift for maintainers as they shift from mechanical systems to digital systems in driving the protocols for maintenance.

And the Osprey is starting to mature its maintenance approach in the middle of an ideological battle over performance-based logistics. PBLs are not popular with the current Administration and more traditional approaches have been highlighted.

The difficulty is simply that the current regime whereby Nav Air buys parts on an annual schedule is challenged by operational realities; and there is a clear need to relate operational realities to supply chains and to ensure that changes in the parts are made in a timely fashion for both the production and maintainence of aircraft.

Ironically, there is a PBL for the engines on the Osprey which works fine. As Matthew "Digger" Howard, who works on the V-22 team within the USMC Department of Aviation, commented

By way of background for PBL, performance based logistics; it has a bad name or a good name depending on whom you talk to. I believe, and we believe collectively as an institution that if you build it right with accurate metrics to capture accurately what you're paying for it works.

So what's good about it? In the case of the V-22 propulsion system, what do the Marine Corps have to do to support the engine? And the answer is basically very, very little.

Under this arrangement, essentially what we do is when the airplane tells us using its diagnostics that the engine needs to be replaced or repairs need to be made, the organizational level, that is the Marines who maintain the aircraft on a daily basis, remove the engine and remove the components as required and perform certain O-level repairs. Beyond that, they take that engine, they put in a can, close it up and they send it for processing and it's appropriately catalogued and it goes to the shipping dock and it goes to Rolls Royce.

Several aspects of the maintenance challenge facing the Osprey were highlighted during the New River interviews.

The "learning curve" required was repeatedly emphasized. The Marines expressed frustration with critics who seemed to assume that a new product will reach maintenance optimum right our box. It takes time was a frequent comment.

According to Lt. Col. Garcia, an Osprey maintainer with experience in both Iraq and Afghanistan, the maintenance approach is a work in progress. It takes time to get it right, but notably the maintenance regime and supply chain is being reworked to reflect actual operational and combat experience. This is normal in the deployment of new systems. But ensuring that the deployed warfighter has the right parts at the right time is the challenge facing the supply system, and this system is clearly a work in progress.

According to Garcia: Improving the performance of the components is central. We have components that are supposed to last in excess of 5,000 hours, which we're routinely replacing less than a thousand hours and it's not just the fact that we have to pull something off and replace it with something else. It's all the other things that you have to pull off to do that, all the maintenance -- it added maintenance on top of that.

According to Sgt. Jeremy Kirk, who has come to the Osprey with significant CH-46 experience, the Corps had decades of experience maintaining this rotorcraft. The V-22 is new and has the normal shake down challenges in operational deployments. The main-

tainers are shaping a regime to understand the new aircraft and how to maintain it in operations. He underscored that there are challenges, but "it takes time to learn how to maintain a new aircraft."

Kirk underscored that "I can see significant improvements from '05 to now from just the experience levels of maintainers learning their tasks and learning the tricks of the trade on the new aircraft. And I think you have seen it on the pilot side also. We just needed to have the aircraft deployed actually to learn how we were going to employ it, and how we're going to maintain it."

The maintainers emphasized the challenge of doing maintenance for deployed forces in Afghanistan and Iraq. It is one thing to maintain the aircraft in a facility such as New River with machinery to lift parts of the aircraft and a building to protect the aircraft from the elements. In Afghanistan, the USMC was operating the Osprey in very tough conditions, and did maintenance out of tents. This is certainly a challenge when considering readiness for operations. So when one thinks of readiness, it is one thing to talk about base operations, but another when talking about deployment in extreme environments.

As Corporal Washek, an Osprey maintainer commented:

I deployed with VMM-261 when they went out. Occasionally, we'd run in something like where would be in a situation where the service representative wasn't available or, we'd be on our own and the publications we were relying on was a little unclear or none of us had seen the problem before quite in the same way. So we would draw upon the "Osprey Nation or the maintainers operating through the global Osprey enterprise."

When asked how challenging was the Afghan maintenance situation, Washek commented:

It definitely was interesting. The space issue was probably our major focus. If a rotor head were to go down, we didn't really have the space at I-level to fix that rotor head. We were working out of the vans.

And for the I-level, we were working out of tents, so we didn't have the space to actually put a rotor head in the tents, take it apart or anything like that so we would have to rely on -- basically we have to rely on the squadrons that they may possibly give us a spot there, hangar, work out there and use all their tools and all that stuff. We're taking our tools down the flight line and basically we had to move our shop down there. This took a couple of hours just to move our shop.

For example, we would have a rotor headstand and a rotor head we fit on and would have to move that from where they were located on the compound down to the flight line. This took a joint effort of supply and using a forklift, maybe a flatbed truck, somebody that would have a license to drive a truck, some way to get it off the truck when we have to have to support the flight line.

In short, the maintenance regime is a work in progress. But being Marines, the Corps inserts its kit to support operations and works the maintenance regime to support the deployed war fighter. When one watches Congressional hearings and hears complaints about readiness rates, one wonders how the Congressman would do working in a tent working on the Osprey.

(A version of this article was published in *Military Logistics International* in December 2010).

The Engine-Based PBL for the Osprey

May 12, 2010

Performance based logistics (PBL) is a time proven concept. At the core of the success of the concept is the ability of the customer and the supplier to work together to re-shape the metrics defining mission success in operations. The V-22 is a new product on deployment, and as such, the support structure for the aircraft will evolve over time. Indeed, because the aircraft is BOTH a rotorcraft and a plane, the challenge is to shape a support concept which fits this revolutionary aircraft.

A key finding from this interview can be put simply: the PBL for the engine allows the USMC to significantly reduce infrastructure costs. And calibrating the evolving PBL is facilitated by the performance of the on-board diagnostic boxes on the aircraft, which we discussed in an earlier interview with Osprey maintainers. The metrics of performance gathered by the Osprey during operations provide the baseline for re-shaping over time the PBL with Rolls Royce in defining the PBL contract.

In this interview, Matthew "Digger" Howard, who works on the V-22 team within the USMC Department of Aviation, addresses the challenges facing the evolution of the PBL supporting the engine for the V-22.

***

SLD: Before we get started tell me a little bit about your background and your involvement in the V-22 PBL?

Matthew "Digger" Howard: I am a retired USMC Lieutenant Colonel and CH-46 pilot. I have fleet experience background and a logistics background to some degree. My involvement with the V-22 program started during my last active duty tour beginning in 2003. Subsequent to retiring from active duty in 2007 I have been working with the program here in the Pentagon.

In the summer of 2007, the government and Rolls Royce were conducting negotiations for the next power-by-the-hour contract to support the V-22, so that's where I became more deeply involved with the discussions. Our role at the time as the customer's advocate was to make sure that the long-term interests were being supported.

Our role has been to understand the process, understand what we're getting into, and document that process for lessons learned for the future and for other programs for USMC aviation.

SLD: The mix of rotorcraft and fixed wing properties of the V-22 have posed challenges to shaping an approach to logistics for this revolutionary bird. This approach is informed by the first deployment in Iraq, and now the next deployment in Afghanistan.

Matthew "Digger" Howard: You've accurately framed the problem, because a lot of this has been a process of learning by discovery. As you say the V-22 is a very new platform and when we narrow down the discussion to the propulsion system, we are talking about a system that is installed in an unprecedented fashion on a production aircraft. This is a first time we've taken a propulsion system and placed it such that it must operate horizontally and vertically and at every degree in between.

So, that in and of itself is a monumental engineering challenge. There has been proof of concept vehicles in the past of course, since the '50's, since the early tiltrotor concept, so it has been proven that you can do this. But supporting it in a production aircraft to a degree that is going to work for Marines and airmen in the field is another piece altogether.

Looking at this from industry's perspective, Rolls Royce based their judgment on their historical experience with the engine core and made some educated guesses with regard to anticipated operational use.

Credit : USMC, March 2010

How much time is this thing going to spend in airplane mode with clean air, how much time is the plane going to spend in helicopter mode or in conversion mode and how much time are they going to spend idling on the ground?

One of the things that became clear in the initial Iraq deployment was that we had a learning curve to climb with respect to how the operating environment impacted this

aircraft. The bulk of experience there, as is typical with assault support operations, was carrying Marines and other folks and their stuff from point A to point B and that involves a tremendous amount of ground idle time.

You land, kick up all the dust, you sit there for a while, troops offload, and troops onload. You take off out of the dust cloud, you go to the next place, you do it again, and you do this all day long.

And at the end of the day when you total up your time, because it is a modern platform all of this data is captured automatically. So we know exactly what the parameters were. The aircraft records all this so it can very precisely tell you this is how much time you spent on the ground with the rotors turning, this is how much you spent in the air in helicopter mode, this is how much time you spent in the air in airplane mode at what altitude and so forth.

So, there you can paint a lot of parallels and differences between what the engine in the V-22 does to what the engine in a standard helicopter does when it's on the ground. And like a helicopter on the ground, it's breathing in a lot of the dust and dirt.

The state of the art air particle separators today can't get all of the dust and the dirt and the foreign stuff out of the airflow into the engine. But when it's operating properly, it does separate a lot of the foreign material out of the airflow and away from the engine. But it certainly doesn't get it all. And it doesn't get anywhere near all of it when it's operating in the dust and the dirt.

That stuff gets ingested into the airflow and gets ingested into the motor and then you get a number of things occurring. You get erosion of the compressor blades; you get buildup of this gunk in and around the hot sections of the engine.

And what you do is essentially you're sandblasting the motor, so you get less service life out of the engine.

SLD: What effect did that have on the PBL effort?

Matthew "Digger" Howard: Coming back now full circle to the original estimates, the contract was setup in a way that you basically pay by the hour; in its essence as a performance based logistics construct the government will pay industry X amount of dollars, and I want this amount of engines ready at any given time, at any given location that I might need them. A properly constructed PBL will allow industry to meet those goals and rewards them when they do. And the government is happy because they have the materials that they need at the time they need with significantly reduced infrastructure costs.

Those original estimates went into the early power by the hour contract with stipulations that all of this sand and damage was causing us to pay more for these so-called excluded repairs. We had to pay over and above the basic rate to repair these engines that have been operating in the desert.

V22 Ospreys operating in dust, USMC, Twentynine Palms, California, 2010

So, there have been some fluctuations over time on what is a fair and reasonable price, if you will, for paying for this logistics arrangement. All of these lessons learned and operational use data have led to a new agreement to shape the way forward.

SLD: Before you do this, could you highlight the significance of the on-board monitoring systems in shaping effective mission metrics?

Howard: Because of the diagnostics resident in the airplane, both on the engine and in the propulsion system in the aircraft as a whole, it does take its own temperature, monitor its own vitals. It does this continuously throughout the time that the thing is operating. There is nothing you don't know about what the airplane did when it gets back.

So, in a perfect world if we could have flown 'em around the desert for a while and gathered all these metrics and then sat down and built this PBL arrangement, before we introduced the aircraft to the fleet, we would've been better informed. But of course, that's not the way it works, we have to field it as soon as it's ready and enter the fight with it.

So to establish these metrics, there was a good deal of analysis going on but at some point you have take a best guess and go from there. And that's what we did and we've adjusted and now we're smoothing out.

SLD: Could you explain more generally how PBLs work?

Matthew "Digger" Howard: By way of background for PBL, performance based logistics, it has a bad name or a good name depending on who you talk to. I believe, and we

believe collectively as an institution that if you build it right with accurate metrics to capture accurately what you're paying for it works.

So what's good about it? In the case of the V-22 propulsion system, what does the Marine Corps have to do to support the engine? And the answer is basically very, very little.

Under this arrangement, essentially what we do is when the airplane tells us using its diagnostics that the engine needs to be replaced or repairs need to be made, the organizational level, that is the Marines who maintain the aircraft on a daily basis, remove the engine and remove the components as required and perform certain O-level repairs . Beyond that, they take that engine, they put in a can, close it up and they send it for processing and it's appropriately catalogued and it goes to the shipping dock and it goes to Rolls Royce.

SLD: So, the advantage is that you don't have to have personnel to do the repairs?

Matthew "Digger" Howard: Right, exactly. You don't have to have the people, you don't have to have the tools, you don't have to have the bulk of the spare parts , and all of those support elements you would have to have for a pure organic capability; you don't have to spend money on that stuff, which is not a small sum.

There is a Rolls Royce representative everywhere we fly the aircraft, be it in CONUS or in Afghanistan, just like there was in Iraq, who assists with O-level repairs and oversees this piece of getting this thing back to the original vendor to do the work and then make sure that the communication is occurring so that motors show up when they need to.

SLD: And the impact on readiness?

Troops and V22 Ospreys, USMC, Twentynine Palms, California, 2010

Matthew "Digger" Howard: From the Marines perspective, the guys on the flight line, we've never waited for an engine; we've never had a bare firewall in the V-22 community. That's a significant statement to be able to make.

SLD: The new iteration of the PBL contract clearly reflects the findings then of the Iraq mission and the projections of the operations in Afghanistan?

Matthew "Digger" Howard: Yes. In the case of Rolls with all good intentions, the core of this engine in the V-22 is used in multiple other commercial applications. So, Rolls doing their research, they want to make sure they're doing it right so they can make a good business case. They based a lot of their assumptions on the time on wing they were getting in these commercial applications. And because nobody was in a position to be able to say 'oh that's not going to work, because V-22's that we used to fly experienced x or y.' There was no 'we used to fly'. We didn't have any basis of reference for this sort of propulsion system from which to say that estimate is going to be wrong or that estimate appears to be right. So, despite all the good faith analysis on both sides that occurred prior to the first contract we really – we were starting from ground zero on that.

Which brings us to today, tens of thousands of flight hours after the first power by the hour contract was developed, and through every flight hour the airplane has been capturing all the data and we have been able to fully characterize for the engineers how we employ the aircraft. We know how much time we are in the air; we know how much time we are on the ground. We've taken all that, scrubbed it and the latest "Mission Care" contract is a reflection of our operational experience.

There is a way forward here that we need to address for the propulsion system as a whole, but for the time being it is encouraging that when you look purely at the engine and how we pay for the performance of that thing, we've got a pretty good solution right now. . So, from an overall perspective, I call our new engine contract a success story for the V-22.

Osprey Speed and Range Enables Con-Ops Change

Captain Dwyer (Credit photo: SLD)

10/08/2010 – In an SLD interview with Captain Dwyer, the Osprey pilot discussed his time with the MEU after leaving Haiti. The USS Nassau on which Captain Dwyer was deployed first went to Haiti (which will be discussed next week) and then left for the Gulf of Aden after the Haiti engagement. During his time on board the USS Nassau, the Marine Expeditionary Group executed some new tactical opportunities associated with the use of the Osprey. The speed of the Osprey allows it to work more effectively with fast jets, which allowed the commander to split the MEU into a rotorcraft supported fleet and a fast jet and Osprey supported fleet. By splitting the MEU, the commander gains significant operational flexibility, but without loss of the integrity for the operation. This provides a solid bedrock in preparation for the inclusion of the F-35B with the fleet, anticipating a time when the Osprey and F-35B operate together, enabling the three dimensional warrior.

Captain Dwyer: After Haiti, we started heading east and we went to the Gulf of Aden and from there, we were operating out of Djibouti. We actually split the MEU, the entire MEU, which I don't believe, had been done before in specific type model series, so all of the skids, the Hueys and Cobras were on one ship and they were almost autonomous. They pretty much got to do different things than the ones they were scheduled to do

with different countries under the umbrella of the 24th MEU, but didn't impact our actual operations. The 53s, that are grounded in Djibouti, hopped off the Nassau as soon as we got in there, so it was really an AV-8 and V-22 show for four and a half to five months.

SLD: Because you have operated solely flying the Osprey, you come at the question of the potentials with a fresh eye. Is this an opportunity to shape a new relationship with fast jets and to re-shape con-ops?

Captain Dwyer: I saw so much potential for the short take-off vertical landing attack aircraft, fixed-wing aircraft and the V-22 working together. In the future, I would have those two, the V-22 and F-35 working very closely together and even for extended operations when you add the refueling piece. The paring of these two aircraft are far better than paring the V-22 with any of the helicopters.

I saw so much potential for the short take-off vertical landing attack aircraft, fixed-wing aircraft and the V-22 working together. In the future, I would have those two, the V-22 and F-35 working very closely together and even for extended operations when you add the refueling piece. The paring of these two aircraft are far better than paring the V-22 with any of the helicopters.

An AV-8B Harrier assigned to Marine Medium Tiltrotor (VMM) 162 (Reinforced) participates in a hover exercise off the flight deck of the amphibious assault ship USS Nassau (Credit photo: USN Visual Service, 3/21/10)

SLD: Is it because of speed?

Captain Dwyer: Because of speed, range. And not only that. It's the endurance of the aircraft itself. Basically you might say once it's flying, it's flying. And we had a lot of missions that required flight time above six hours, which is very taxing for the jet guys and for us, it is as well, but maybe not so bad because we can trade off in the cockpit. The fact is that you can have airborne assets, both as a package as well as a trap for sensitive site exploitations, being airborne all at the same time for hours at a time to respond to something that happens in the AOR. It will give you the maximum flexibility for response time down to something like thirty minutes, depending on where it is. And then sanitize the scene from there and then everybody returns home. It's a capability that I'm not going to say it's been overlooked but it just hasn't been utilized like that.

SLD: This provides the capability to insert and withdraw force both airborne and ground insertion.

Captain Dwyer: We just didn't really have that capability before, especially on much longer ranges and in sort of response time. So by marrying those two, the fixed-wing aviation asset we can do operations differently. We could neutralize a target and then you can immediately have a strike team insert to confirm that whatever happen, happened, give whatever materials they need, get back on an aircraft and leave in under thirty minutes in any location that we're operating on a 600-mile ring. This is just so amazing for me.

SLD: What changes to the ships would you make to facilitate Osprey ops?

Captain Dwyer: A bigger hangar. We would be big enough so that the V-22 could do a full range of maintenance inside the hangar.

SLD: What is the impact of replacing the F-35B with the Harrier?

Captain Dwyer: When you separate the V-22 and the fixed-wing striker you untether the range from the helicopters. So since we could put the V-22/F35B tandem on a different vessel, that vessel can go somewhere else and still be able to provide protection for the entire MEU because of speed, range and capabilities.

When you separate the V-22 and the fixed-wing striker you untether the range from the helicopters. So since we could put the V-22/F35B tandem on a different vessel, that vessel can go somewhere else and still be able to provide protection for the entire MEU because of speed, range and capabilities.

SLD: On another ship?

Captain Dwyer: On a different ship. We don't have to accompany them at close range to provide support.

Ospreys from Marine Medium Tilt Rotor Squadron 162 (Reinforced),
24th Marine Expeditionary Unit, quietly remain full stowed on the flight deck of USS Nassau on January 19th, 2010 for their upcoming deployment
Credit photo: USN Visual Service, 1/21/10

SLD: So you would be supporting them, but at much greater range.

Captain Dwyer: Absolutely, or not only could we be supporting them but we could be supporting someone else at the same time that's much farther away. The AV-8 or the F-35 and the V-22 give you great range. We have the opportunity, especially throughout the Mediterranean and also in the Middle East where you can take detachments from each of the squadrons or from each of those aircrafts to take some F-35s, take a couple of V-22s, put them on an airfield somewhere and support those separately. You're not restricted to space yet you have the range to do other things and support those other smaller ships.

The Future of Power Projection: Deja Vu All Over Again

By the Honorable Ed Timperlake

10/08/2010 – As the United States Marines go through one of the cyclic challenges to their mission, it is interesting to look at the Navy/Marine team's recent performance of a Marine Expeditionary Unit (MEU). Navy/Marines forces in the Indian Ocean (IO) projected power from the sea using inherent "ready now" capabilities, in taking back a pirate-held ship. This audacious effort made global headlines. However, there was much more to that one exploit and the entire story really captures some USMC unique capabilities.

The opening narrative of this exploit by Captain Alexander Martin – "The Magellan Star: Pirate Takedown Force Recon Style" - was recently published by the US Naval Institute and says it all:

Over a 48 hour period, the 15th MEU/PELARG team conducted offensive air operations in Afghanistan resulting in the deaths of 5 confirmed enemy fighters, provided disaster relief in Pakistan to 120 victims who had been without aid since July, and seized a pirated vessel, rescuing a crew of 11 hostages and detaining 9 suspected pirates off the coast of Somalia. A busy couple of days and an impressive battle-rhythm by any standard for this dynamic Navy-Marine Corps team.

This IO series of operations is just another successful operation in a long tradition of projecting power from the Sea. Battle hardened and ready to fight on a moment's notice—as the Marine Hymn says– it is proven again and again as not just words but deeds:

We fight our country's battles
In the air, on land, and sea

And let there be no mistake about geography…

We have fought in every clime
And place where we could take a gun

Credit photo: The Magellan Star, http://blog.usni.org

Compare the success being reported in Captain Martin's write up with other authors who recently said in Newsweek that the Marines have to justify themselves to Secretary Gates, and then state:

The Marines launched their last amphibious invasion in Korea in 1950.

First, before any discussion of the future of the Navy/Marine team can be addressed, it has to be said that the ignorance of that statement is astonishing.

- After the Korean War Inchon landing in 1950, the Marines landed a brigade-sized amphibious force into Lebanon in 1958, which brought almost a decade of stability to a very hot part of the world.
- Then the Marines went ashore in force at Da Nang, South Vietnam, in March 1965 to begin fighting in some of the Corps most historic battles.
- Finally, in endgame Vietnam, a Marine amphibious force had to evacuate South Vietnam citizens to off shore Naval forces in April 1975. In the tragic fall of Vietnam the Navy/Marine team using Marine helicopters saved countless lives. In fact, the last two American killed in the Vietnam War were two members of that force in April 1975, trying to save lives. One note from a historical perspective, "The Mayaguez In-

cident" did not turn out to be the last battle of the Vietnam War, but rather the first battle and a harbinger of today's irregular conflicts that can break out at a moments notice.

- Finally, still focusing on large scale Marine amphibious capabilities, a very sizeable Marine amphibious force was afloat and used as a diversion in Desert Storm to allow General Schwarzkopf to make his brilliant and legendary left hook and win the "100-hour war." Even though Newsweek doesn't get it, Sun Tsu, the genius writer on "The Art of War," would understand completely when a faint is as good as an attack.

In endgame Vietnam, a Marine amphibious force had to evacuate South Vietnam citizens to off shore Naval forces in April 1975. In the tragic fall of Vietnam the Navy/Marine team using Marine helicopters saved countless lives. In fact, the last two American killed in the Vietnam War were two members of that force in April 1975, trying to save lives. One note from a historical perspective, "The Mayaguez Incident" did not turn out to be the last battle of the Vietnam War, but rather the first battle and a harbinger of today's irregular conflicts that can break out at a moments notice.

Make no mistake: Marines, if not degraded, can continue to concentrate significant forces to strike anywhere anytime. However now it will get even better at the smaller MEU level because of innovative 21st century capabilities. The Second Line of Defense interview with USMC Captain Dwyer, a V-22 pilot, captures the innovative thinking in the Marines about coming "bottoms up" from an operator. Captain Dwyer makes some very interesting and thoughtful points, which indeed foreshadow a significant strategic transition.The ability of a fighting force to emphasize and encourage both top down strategic innovations and also allow the operators to express their tactical views is a hallmark of the Marine way of war.

Flight deck crew members prepare an MV-22 Osprey with Marine Medium Tiltrotor Squadron 266, 26th Marine Expeditionary Unit, for take off during flight operations aboard USS Kearsarge, April 23, 2010 (Credit photo: USMC)

There is revolutionary aviation technology coming to the decks of Navy amphib ships which includes the emerging F-35, a V/STOL 5th Generation Fighter, and the remarkable MV-22 Osprey. A Marine force afloat will have the most modern concentrated air/ground units in the world to meet all requirements for 21st Century missions. Innovative thinking and long term planning by Marine leadership will now allow contingencies to be met across a spectrum of simultaneous challenges. From direct amphibious assaults, to flying hundreds of miles inland to project power, to providing relief in times of natural disasters the Marine Expeditionary Unit is ready.

There is revolutionary aviation technology coming to the decks of Navy amphib ships which includes the emerging F-35, a V/STOL 5th Generation Fighter, and the remarkable MV-22 Osprey. A Marine force afloat will have the most modern concentrated air/

ground units in the world to meet all requirements for 21st Century missions. Innovative thinking and long term planning by Marine leadership will now allow contingencies to be met across a spectrum of simultaneous challenges. From direct amphibious assaults, to flying hundreds of miles inland to project power, to providing relief in times of natural disasters the Marine Expeditionary Unit is ready.

In fact, the disaster relief in Pakistan mentioned by Captain Martin is following remarkable relief efforts in the recent Haitian earthquake and also earlier efforts in the tsunami relief with the Navy/Marine team providing aid from off-shore ships to Indonesians.

Harriers aboard HMS Illustrious, 2007 (Credit photo: SLD)

Over time Marines afloat have been pioneering the correct mix of air/ground assets, training and tactics to handle many contingencies. A look at the history of the 22nd Marine Amphibious—now renamed Expeditionary – Unit will show "from the Sea" capabilities to America. The 22nd is but one of several Marine MEUs either afloat or training to relieve a rotating unit

A composite narrative taken from historical reporting:

- On Oct. 18, 1983, the 22nd MAU (name changed to MEU later) left for a deployment to the Med. Several days after embarkation, it was diverted for the Caribbean of Grenada. Following several days of fighting, the victorious Marines re-embarked and set sail for Lebanon. During Operation Urgent Fury the MAU participated with a number

of helicopter and surface landings on the island of Grenada and eventually occupied over 75% of the island.
- After 9/11 the 22nd MEU took part in several anti-terrorist missions in Central Command Theater. Combat mission included Afghanistan and Pakistan border and yet again Marines also launched life-saving humanitarian efforts in the African nation of Djibouti.
- Finally. as mentioned earlier, significant Marine amphibious forces (elements of both 22nd and 24th MEU) with Navy ships in support became part of Operation Unified Response to the earthquake in Haiti.

A melding of the "three dimensional capabilities" of the F-35 with the range and speed of the MV-22 will revolutionize an MEU's ability to attack from the sea. The vector of an insertion from a Navy/Marine combat force afloat can now cover huge distances. The ability to strike from a distance on many vectors combined with pre-insertion support from AF and Navy strategic strike capability along with UAS and emerging robots may for a very significant time, tilt the battle to the Marines favor.

Fourteen Days in Haiti

Captain Dwyer On The Osprey In Haiti

10/17/2010

Late August 2010, Second Line of Defense met with pilots, and maintainers of the Osprey based at New River Air Station, North Carolina. The results of the interviews are being presented in a series of updates on the Osprey as seen through the experience of these Marines stateside, and on deployments to Iraq and Afghanistan. In this second update piece, Captain Dwyer discusses how the USS Nassau and his Osprey operated in the Haitian relief mission. Captain Dwyer is a representative of the new generation of Marines who has only flown the V-22 and is enthusiastically exploring the capabilities of the new aircraft. He was with the second operational squadron deployed to Iraq and then with the second operational squadron deployed on the Marine Expeditionary Unit on the USS Nassau. The MEU began its seven month deployment in Haiti and then when on to operate in the Gulf Aden.

In this piece, Captain Dwyer talks about the experience in Haiti. In the first piece, he discussed the operation of the Osprey with the Harrier, which allowed the MEU to be split and to operate differently, an approach which will be further facilitated by the coming deployment of the F-35Bs.

A medevac in Haiti (Credit photo: Captain Dwyer)

SLD: How was the Osprey used off of the USS Nassau in the Haiti crisis?

Captain Dwyer: The V-22 was used in a perfect conceptual way. We ranged the entire island. We went out to little villages that nobody had been to. We went from the epicenter. We covered the whole concentric rings from where the earthquake struck and we were the first ones on scene for a lot of these places that still hadn't quite gotten the relief that they needed, the water, the food etc.

The V-22 Osprey (Credit photo: USMC)

SLD: Emotionally, that must have been amazing.

Captain Dwyer: It was. It really was. One of the coveted things for me was the Medivac. We actually got to retrieve an 11-year-old girl who had a broken leg and it started to get infected and she was going to loose her leg. We were able to prevent that. So that was, you know, very cool.

One of the coveted things for me was the Medivac. We actually got to retrieve an 11-year-old girl who had a broken leg and it started to get infected and she was going to loose her leg. We were able to prevent that.

SLD: You picked her up, and did you go back to the Nassau?

Captain Dwyer: Indeed we took her back to the ship. There was so much going on at the Port of Prince, the ship was not parked in the port. Because we had the legs, we parked it about 75 miles away.

SLD: And a lot of distraction.

Captain Dwyer: Right. The physical presence of the ship was not an issue because we could go so far away. With that, we could range the entire island and still on an every other day basis, we could range Guantanamo Bay for just a general logistics run. They had massive amounts of shipments going into Guantanamo Bay that it was taking ships approximately like three days to turn around.

SLD: So you were lifting Guantanamo to Haiti?

Captain Dwyer: We were lifting them from Guantanamo Bay to other ships. Port-au Prince was so cluttered. They had so much food and relief effort supplies there, they couldn't move aircraft around. We would take supplies to different ships and then from our ship, we would take it directly to where they needed it. And we would also take the Marines with us with translators etc. and we could go to survey basically every village that we thought had gotten some amount of damage.

SLD: So you were the first insertion doing situational awareness, and evaluation, because you could get around to different locations?

Captain Dwyer: Absolutely. There was a lot congestion in the airfield itself at Port-au Prince which prohibited us from really going in there. We only operated around it. We didn't actually go in to Port-au Prince.

We also functioned as an overflow for the hospital ship, Comfort.

SLD: That's not a huge ship.

Captain Dwyer: Right. So we became kind of holding area for some immediate treatment. so there were a lot of flights, ferrying back and forth between the Comfort and the Nassau and later the Bataan; after that ,they decided they didn't need us anymore when the roads were starting to clear up. We were there about 14 days.

Building the "Osprey Nation"

An Interview With Captain Smith

Ospreys based on the West Coast in an exercise at 29 Palms
Credit: USMC

10/29 /2010 – In the discussions of the Osprey at New River, a concept new to us was that of the Osprey Nation. What the pilots and maintainers were in effect saying was that critical mass was being forged in the USMC built around an emergent domain knowledge for operations and maintenance. And the resultant "Osprey Nation" was, in turn, shaping corporate understanding about the aircraft as a USMC asset.

In an interview with Captain Paul Smith, the notion was introduced and discussed.

Captain Paul Smith
Credit: SLD

SLD: Could you give us a sense of your background?

Captain Smith: I'm actually an Osprey student pilot. I just transitioned from being a FROG guy. I did two deployments in the FROG, flew them in various countries, combat zones from Afghanistan, Iraq, the whole nine yards. I'm new to the Osprey, but what I'm not new to is the process of maintenance.

SLD: I understand that the MAG has been split here at New River. Could you explain this?

Captain Smith: This year, 2010, the MAGs have split temporarily to make MAG-26, our MAG, strictly Ospreys. We have an all-Osprey staff, all the way from the CO on down. Everybody here is an Osprey guy and then the other MAG is everybody else.

SLD: And this is driven by having enough critical mass on Osprey to focus on Ospreys?

Captain Smith: Yes, but when we deploy as a MEU we still deploy as a normal MAGTF with the Osprey replacement of the FROG being the core, the nucleus and then all the other type model series come with us, Cobras, Hueys, Harriers and the like.

SLD: In effect, you are creating domain knowledge in one place and now that the Ospreys are also based in California, you are setting up ways to share joint experience, trying to figure out how best to maintain and operate the aircraft?

Captain Smith: As we come onto the neophyte type phase of operating this aircraft, we are shaping an "Osprey Nation". The advantages are obvious. For example, if squadron

A is hurting to get some qualifications done, squadron B and C have a trained up instructor who's rated in that regime and I need my guy up to speed. Well, if we're all under the same MAG, we're all in the same street; it makes it a lot easier.

Same thing for maintenance; if these guys were O level and they needed a particular wrench because theirs is broken or something is on backorder, it's much easier if we're all under the same umbrella, the same street to walk 100 yards. When he goes to get a soda, he walks 100 yards. He walks 100 yards, goes and grab another maintainer. Same thing with me, if I need to get that X out this week in order to make the boat period for example. Well, my OpsO calls the OpsO right next door or sees him at chow at the same place and can ask "I really need to borrow your NSI for XYZ flight on Thursday." And get a response like "Hey, I can't do it Thursday but if you don't mind flying Friday, we can make it happen." Or, "Oh, by the way, you know what, I'm loaning you my NSI. Can you give my two crew chiefs in the back this training and that training?"

Again, we're all under the same umbrella. We're all under the same SOP. It makes everything flow and work that much easier. So that's the sure intent, it's to support V-22 nation. Shared assets, shared experiences are building our domain knowledge.

We're all under the same umbrella. We're all under the same SOP. It makes everything flow and work that much easier. So that's the sure intent, it's to support V-22 nation. Shared assets, shared experiences are building our domain knowledge.

SLD: So you generate "Osprey Nation" through critical mass of operational Ospreys so to speak.

Captain Smith: Yes, sir.

Expanding the Battlespace

An Interview With Major Lee York

10/05 /2010 – In a wide-ranging interviews with Osprey pilots and maintainers at New River Air Station discussing their operational experience with the Osprey, one pilot highlighted with a single story the impact of the Osprey's speed on operating in the battlespace.

Major Lee York (Credit: SLD)

SLD: Could you tell us about your background?

Major Lee York: My name is Major Lee York. I started out as a CH-46 pilot and did two deployments. The first one was in 2002; we deployed on a 24th MEU and participated in OIF and then after that came home and then we went back out with 24th MEU again. This time in Iraq 2004-2005, set up deployment there, and came home with 263 and stood the squadron down and then transitioned to the V-22 and then I deployed with VMM-263 as a first operational V-22 squadron to Iraq for seven months. After that, we came home and then went to the VMMT-204 to train new students on how to fly V-22 and then I'm back at 263 again.

SLD: What was your operational experience in Iraq with regard to the ability to land the Osprey in spots similar to your helo? Because of your experience of flying rotorcraft in the first deployment and then Osprey's in the second, your perspective would be definitive on this point.

Major Lee York: I have read all stories, all the naysayers, that the V-22 can't replace the FROG. But my experience says the opposite. The landing zones if used in '04-'05 with the FROG, we went back in '07 with V-22 and we landed in I would say 95 percent of the same zones. The same number of aircraft, two FROGs, two V-22s we put at the same zones and we were able to do it. And I'm talking the same exact place, you know, Ramadi and other cities, on landing zones that we've landed earlier with FROGs and now with V-22s. For the guys who said that they couldn't do it, well, they're wrong.

Three Ospreys Coming Into Land in Close Quarters During USMC Exercise
(Credit: USMC)

SLD: You had an anecdote, which underscores the impact of speed in the battlespace?

Major Lee York: We took some soldiers out to the West of Iraq. The crew chief comes up to us and tells us that the guys won't get out of the plane. We're like, what are you talking about? They said we're not there yet. And we said, "What are you talking about?" He then said, "The last time we did this flight it took an hour and a half. We've only been in the plane for 40 minutes so we can't be there yet."

"The last time we did this flight it took an hour and a half. We've only been in the plane for 40 minutes so we can't be there yet."

We told him to tell the Marines that "we were cruising at 230 rather than at 120 so we were there. I swear we're here, you know, we're not going to send him somewhere where he is not supposed to be."

Osprey: A More Flexible Medium Lift Capability

An Interview With Lieutenant-Colonel Garcia on the Osprey in Iraq and Afghanistan

11/18/2010 – Lieutenant-Colonel Garcia discussed his time in Iraq and Afghanistan involving both rotorcraft and the Osprey. The tiltrotor craft was used differently in the two countries due to mission differences and geographic differences. In the next posting, Lieutenant-Colonel Garcia describes the challenges of shaping a more effective maintenance regime for the Osprey. Here he describes the operational experiences.

Lt. Col. Garcia (Credit: SLD)

SLD: Could you describe your involvement in the Iraq and Afghani operations?

Lieutenant-Colonel Garcia: I was the maintenance officer for the VMM-261 during the Afghanistan deployment. I did the first deployment overall with VMM-263 in Iraq. I was CH-46 pilot in Iraq. I've been in the program since prior to the operational evaluation at VMX-22, so I've been flying for about six-and-a-half years. Before we get into the

maintenance piece of it, I'll talk a little bit about the aircraft and kind of how it operated in the theater.

SLD: Could you talk to your experiences in Iraq and Afghanistan with the aircraft?

Lieutenant-Colonel Garcia: The aircraft self deployed off of the ship. We flew into Al-Asad on one day, spent the night. The next day from Al-Asad, we got into Bastion with only single air refueling required with some internal tanks.

This aircraft doesn't have the capability to be broken down and put inside a C5 like the helicopters can. However, it does have the capability to be able to deploy itself.

This aircraft doesn't have the capability to be broken down and put inside a C5 like the helicopters can. However, it does have the capability to be able to deploy itself.

There are still some challenges in that with the icing protection and some related issues. But assuming that the weather is good enough, you have support from the KC-130 for fuel. You can pretty much get anywhere that you need to. With internal tanks, you can go for long distances, too. It was designed to go from the coast of California out to Hawaii without any external support.

SLD: The refueling system, is it a probe?

Lieutenant-Colonel Garcia: For aerial refueling, there is a probe. The newer models have the retractable probe, so it extends and then it comes back. We also have three tanks that fit inside the aircraft, increase our range considerably.

Ospreys Landing at Camp Bastion After "Self-Deploying" Off of Amphib (Credit: USMC)

SLD: How did you use the range of the aircraft?

Lieutenant-Colonel Garcia: Once we were in theater, we got to do some longer-range missions as far as Kabul, Camp Clark, out to Zaran in the west and then down to the south towards the Pakistani border. These flights supported VIPs a lot of times, and the movement of high-level personnel. We went out to Kabul to pick up the Chairman of the Joint Chief of Staff. I led a division of four aircrafts to go do that. Some day we'd take a C-130 to do so, but it gives the opportunity to go the distance that a C-130 would go. However, going to land in a single-ship zone it will land vertically. C-130 didn't have the capability to do that, so that's the flexibility that we bring.

The majority of the missions required were just local and fairly close in within the Helmand province or a little bit to the west of that. That's where we primarily operated.

We operated there largely in helicopter distances where our speed doesn't really help us just because of the small distances that we're going. What the aircraft provides that the helicopter cannot is the ability to go high. We typically flew between 9,000 and 10,000 feet to get away from the ground threats; whereas, most of the helicopters flying were lower than that. So they are more in threat from ground fire.

What the aircraft provides that the helicopter cannot is the ability to go high. We typically flew between 9,000 and 10,000 feet to get away from the ground threats.

SLD: I would assume that the roles in Iraq and Afghanistan are different because the missions are different given USMC deployments?

Lieutenant-Colonel Garcia: That's a valid point. A part of the issue also is just the way the forces are structured in Afghanistan. In Iraq, it was a lot more integrated. We pretty much operated throughout the entire country. Whereas in Afghanistan, the Marine Corps is pretty much limited to Helmand, south there and out to the west. You have a very large Army presence in Kandahar and along with the other coalition nations. It's broken up much more piecemeal and there's very little crossing at those borders.

SLD: It's more of a honeycomb where you have a cell?

Lieutenant-Colonel Garcia: Absolutely. And each theater has sufficient assets to support that theater. So there's less need for us to go outside of there. That's kind of what limits us to those small areas. And the rugged environment puts a lot of stress especially on dynamic components.

The environment in Iraq was challenging, Afghanistan is just as much, if not more so, because of higher altitudes. We could carry less weight. So we generally took less fuel since we didn't have to go as far and we could carry comparable weights as we did in Iraq. But the sand is very corrosive to the engines and to a lot of the components.

We have different types of aircrafts there. We did have the skids there, the Hueys and Cobras. They operated throughout the entire area. Within the Marine Corps, you had AV-8s at the time, KC-130s. We also have CH-53E and CH-53D. The Deltas towards the summer were almost entirely ineffective during the day just because of the heat and the higher elevations. So that's kind of the niche that we fit into there.

Osprey Operating in Afghanistan (Credit: USMC)

SLD: Could you describe that niche?

Lieutenant-Colonel Garcia: The medium lift used to be traditionally the CH-46 and CH-53 Delta, medium lift capacity. Well, everything has gone heavier now. Medium lift is not medium lift the way it was in Vietnam. So now, that is the niche that we fill.

The medium lift used to be traditionally the CH-46 and CH-53 Delta, medium lift capacity. Well, everything has gone heavier now. Medium lift is not medium lift the way it was in Vietnam. So now, that is the niche that we fill.

We've got CH-53Es that carried the heavier weights that did most of the external carrying, most of the cargo carrying ,and we had the opportunity to carry a lot of the personnel to move them very quickly. Some of the more important roles that we played other than just moving people and things around the theater were supporting local governance, moving a lot of the governors or all the local folks from one place to another.

SLD: Presumably as we start the drawdown within Afghanistan, the Osprey will move much throughout the theater and provide a significant transition tool as the US Army draws down its forces.

Lieutenant-Colonel Garcia: Good point; we have our cell now but the mission can change.

SLD: What is the reaction of folks when they prepare to fly in an Osprey the first time?

Lieutenant-Colonel Garcia: The first time for the U.S. forces and coalition forces, you had some people who almost refused to get in. You hear the press and how bad they are, although you know nothing has happened for years. But once they're in it, they really get to see how comfortable it is.

Going 80 miles doesn't take them 45 minutes to an hour in the back of a helicopter. It's a lot cooler in the back of the aircraft. It's a lot more comfortable, a lot quieter: got a lot of converts very quickly.

With many Marines, you would get hooting and hollering in the back from them enjoying the ride: you'd think you're on a roller coaster! But that is also the aircraft of choice for VIPs whether it is our own generals, politicians, or the Afghans or coalition members: they get to fly them around a lot.

SLD: How many aircrafts did you have?

Lieutenant-Colonel Garcia: We started off with ten. Then we got two more around February, I believe late January or February. Now we have twelve aircrafts. We generally operated about ten of those aircraft on a regular basis. Usually, one of them was in phase maintenance, i.e. scheduled maintenance at 210 hours of flight hours. The other aircraft is generally in the down status for extended period of time due to cannibalization, because the supply system is in process of development.

Now we have twelve aircrafts. We generally operated about ten of those aircraft on a regular basis. Usually, one of them was in phase maintenance, i.e. scheduled maintenance at 210 hours of flight hours. The other aircraft is generally in the down status for extended period of time due to cannibalization, because the supply system is in process of development.

The Maintenance Learning Curve

From Supply Of Parts To Battle Damage Repair: The Challenge Of Components' Reliability

An Interview With Lieutenant Colonel Garcia

12/09/2010 - This is the second part of the interview with Lieutenant Colonel Garcia with both Iraq and Afghan experience. In the first part of the interview, Garcia laid out some findings from his operational experience, and ways to look at the Osprey from combat deployments. Here Lieutenant Colonel Garcia deals with the challenge of maintaining the aircraft in Afghanistan. He highlights that the maintenance approach is a work in progress. It takes time to get it right, but notably the maintenance regime and

supply chain is being reworked to reflect actual operational and combat experience. This is normal in the deployment of new systems. But ensuring that the deployed warfighter has the right parts at the right time is the challenge facing the supply system, and this system is clearly a work in progress.

SLD: How many aircraft did you have in operation?

Lieutenant Colonel Garcia: We generally operated about 10 of those aircraft on a regular basis. Usually, one of them was in phase maintenance, scheduled maintenance at 210 hours of flight hours. The other aircraft is generally in the down status for extended period of time due to cannibalization, because of some issues with the supply system.

SLD: Could you identify some of those issues?

Lieutenant Colonel Garcia: Let me be clear: it's not the aircraft itself, which poses the challenge. Aircraft does what it's been designed to do. In fact it's done it very well. As I mentioned, we had a lot of converts, a lot of fans of it.

SLD: What then in your view is the challenge, which needs to be met to get to the next phase of reliability with the aircraft?

Lieutenant Colonel Garcia: Improving the performance of the components is central. We have components that are supposed to last in excess of 5,000 hours, which we're routinely replacing less than a thousand hours and it's not just the fact that we have to pull something off and replace it with something else. It's all the other things that you have to pull off to do that, all the maintenance — it added maintenance on top of that.

Improving the performance of the components is central. We have components that are supposed to last in excess of 5,000 hours, which we're routinely replacing less than a thousand hours and it's not just the fact that we have to pull something off and replace it with something else. It's all the other things that you have to pull off to do that, all the maintenance.

SLD: The challenge is enhanced by the need to access the parts to be replaced?

Lieutenant Colonel Garcia: For example, with repair to the gearbox, you have to remove almost everything out of the nacelle. To get at the gearbox, the blades have to come off the hubs. The engine has to come out; a lot of accessories have to come out of that. And you have inherent low risk once everything gets put back together to make sure it works properly.

Waiting for Parts, February 2010 in Afghanistan (Credit: USMC)

SLD: And you are doing this in difficult conditions in Afghanistan?

Lieutenant Colonel Garcia: Absolutely.

SLD: Do you think there's any way that they can redesign some of the access panels in the aircraft to be more effective?

Lieutenant Colonel Garcia: That is happening. The access panels have improved a lot. The block A to the block B is night and day as far as some of the access panels and some of the rewiring. Changes have been funded to rework some of these issues. So basically what it looks like if you take a wire diagram of the aircraft, the hydraulics folks, the engineers built the hydraulic system, the electro-guys built their system, the fuel guys built their system, none of it was integrated. Among some of the issues we missed out

back in 2000, a lot of these were fixed. We are working more effective approaches to integration.

Among some of the issues we missed out back in 2000, a lot of these were fixed. We are working more effective approaches to integration.

SLD: From your point of view, you look at the system overall. You don't really care about the subsystem replacement. You want to see the system and your ability to get the aircraft operational as rapidly, as safe as possible.

Lieutenant Colonel Garcia: Absolutely. Once again, the design inside has gotten better. So it's a little easier, it's not as cluttered. The panels have gotten bigger, a lot better.

SLD: What is the impact of the digital maintenance systems on the aircraft?

Lieutenant Colonel Garcia: The aircraft was designed before you went flying in a regular basis, you weren't supposed to go and open these panels unless you had to work on it. The aircraft is instrumented that it tells on itself. If there's an issue, it'll tell you based on vibrations, based on electrical components not working properly, not sending back the appropriate signal to tell you that everything is okay. So the panels weren't supposed to be used as often. So with that mindset, the panels that they had on there probably made sense, that's no longer the case. We are changing the panels to reflect actual operational experience. The aircraft always tells on itself entirely. Although it identifies an issue, you don't know completely what it is from the digital indicators, especially when we talk about wiring.

Maintenance is a 24/7 demand.Maintaining at Night in Afghanistan
(Credit: USMC)

SLD: So you need to visually look?

Lieutenant Colonel Garcia: Absolutely. We also need to do periodic checks just to make sure that there's no undue wear. A lot of things that we have to do now—a lot of the checks that we do on a daily and turnaround inspection that the crew chiefs go out and do, that the mechanics go out and do—is to look for undue wear, parts that came loose, wiring that is broken. This reflects our learning process over the past five or six years.

SLD: So you have worked a learning curve to shape the next phase of reliability enhancements in effect, based on operational experiences?

Lieutenant Colonel Garcia: Our maintainers have learned a lot and their knowledge has grown by leaps and bounds. Battle damage repair was one of the things and when we went out with the VMM-263 in Iraq, there were no publications that said this is how you fix it. This is what's going to happen. Because nobody knew, we hadn't faced that before. In fact right now, it's still in its infancy. So we went out there, that was one of the unknowns. We weren't sure what to expect. We had the misfortune of receiving some damage. However, we quickly found out the aircraft is very survivable. We weren't hit with anything very large, mostly small arms, and from RPGs, stuff like that but the holes that actually left were very small. The composites performed exceedingly well. So we were able to fix those things. The maintainers have learned a lot and they get very good at fixing composites, some of the repairs, you cannot tell that anything had happened. Unfortunately, the forklifts also created some damage.

SLD: One of the things you were monitoring was the real state of the performance of the parts and essentially either the parts have to be modified to give you the actual performance hours or one must have more realistic performance parameters?

Lieutenant Colonel Garcia: We always poke supply, hey, you guys are getting the supplies that we need, the parts that we need. You know, if you have all the parts, if you have an endless supply of parts right there handy, we can keep this aircraft flying constantly. The maintainers will bend over backwards to make sure it happens. But the reason the supply is not working optimally is once again a 5800 to 5900 hour component is lasting less than the stated norm. There are multiple components like that. Some of them are on 75 to 80 percent of the projected lifetime. Some are 40 percent or less. Those that are 40 percent or less or something at some point, if you just re-normalize what that lifetime component is, it's not really 268 hours, it's 130 hours. So we can then buy twice as many parts to ensure continuity of operation.

The reason the supply is not working optimally is once again a 5800 to 5900 hour component is lasting less than the stated norm. There are multiple components like that.

Some of them are on 75 to 80 percent of the projected lifetime. Some are 40 percent or less. Those that are 40 percent or less or something at some point, if you just re-normalize what that lifetime component is, it's not really 268 hours, it's 130 hours. So we can then buy twice as many parts to ensure continuity of operation.

The Challenges of Osprey Maintenance in Iraq and Afghansitan

An Interview With Corporal Warshek And Sergeant Fante

11/28/2010 – Second Line of Defense in late August 2010 talked to Osprey maintainers at New River Air Station. One theme, which was discussed, was the challenge of maintaining the aircraft in the tough operating environment of Afghanistan. It is one thing to maintain the aircraft in a facility such as New River with machinery to lift parts of the aircraft and a building to protect the aircraft from the elements. In Afghanistan, the USMC has been operating the Osprey in very tough conditions, and did maintenance out of tents. This is certainly a challenge when considering readiness for operations. So when one thinks of readiness, it is one thing to talk about base operations, but another when talking about deployment in extreme environments.

Osprey Hanger in Afghanistan
Credit: USMC

Corporal Warshek (Credit: SLD)

SLD: Could you tell us about your job in maintaining an Osprey?

Corporal Warshek: I'm a dynamic component mechanic.

SLD: What is a dynamic component mechanic?

Corporal Warshek: We touch the rotor systems, the drive systems, flight controls. We would see the rotor heads, the swash plates, you know, pretty much the big components, the blades, everything like that that would fall under us.

SLD: Did you work on rotorcraft before?

Corporal Warshek: I've done all type manual series. I have worked on land and at sea.

Sergeant Fante (Credit: SLD)

SLD: Sergeant Fante, what is your background?

Sergeant Fante: Right now I work on the Osprey, but had six years experience in hydraulics and tire wheel shops. I've worked on all type model series from Iraq and on the ships. I've done C-130s and EA-6s, virtually in all of these on-sea, at-sea, on the land.

SLD: What has been the challenge of moving from rotorcraft to a tiltrotor craft?

Sergeant Fante: It was slow, really slow at first because mostly with lack of experience and lack of supply assets. Whereas, with the 46 and the 53, we see a part come in and if you didn't know what it was, you can easily go to QA (Quality Assurance), go to a senior guy to get help. Until we get a part in, everybody is kind of scratching their heads. We have to call a civilian an FS, field service representative and they'd have to come in and kind of guide us along.

It was slow, really slow at first because mostly with lack of experience and lack of supply assets.

The service vendors provided the transition, because we had no experienced Gunnys. The FSs here and they're very, very, very adequate. They're awesome guys but before with the traditional aircraft we relied on the long experience of Gunnys. And you have enough to pull in assets where you're going to have parts and you have 30 years experience producing parts so there's going to be a supply chain that's got capability built into it.

SLD: Whereas, in the case of the Osprey, the supply chain is new and you have challenges with availability of parts and metrics of performance and life cycle of those

parts? So you're either going to have to adjust the metrics to make them realistic and you're certainly going to have to improve the product towards whatever the "normal" is. That gets you back to your lack of experience issue. There's no gunny to go to and say, okay, we're going to work in sync for a long time, you know, I'm looking at this part, is this normal, right? It's hard to have a normal, when you don't have normal.

Sergeant Fante: We are dealing with a lot of new recognition issues with regard to the parts and their performance.

Corporal Warshek: There is the problem of dealing with changing capabilities. Certain pieces of gear change almost constantly as upgrades are made. This meant we had to learn to adjust.

There is the problem of dealing with changing capabilities. Certain pieces of gear change almost constantly as upgrades are made. This meant we had to learn to adjust.

For example, we just recently got in first two pendulum assemblies into our shop. We've never seen before. We rely on the SR's to provide guidance on how we would tackle something like that. The pendulum assembly attaches to the rotor head.

SLD: What was your experience in Afghanistan with regard to maintenance?

Corporal Warshek: I deployed with 261, VMM-261 when they went out. Occasionally, we'd run in something like where would be in a situation where the service representative wasn't available or, we'd be on our own and the publications we were relying on was a little unclear or none of us had seen the problem before quite in the same way. So we would draw upon the "Osprey Nation."

Osprey Operations in Afghanistan in Challenging Conditions
Credit: USMC

SLD: So you had to face two uncertainties: maintaining a new aircraft and operating in a tough environment? How did you handle that challenge? It must have been interesting.

Corporal Warshek: It definitely was interesting. The space issue was probably our major focus. If a rotor head were to go down, we didn't really have the space at I-level to fix that rotor head. We were working out of the vans. And for the I-level, we were working out of cans, so we didn't have the space to actually put a rotor head in the cans, take it apart or anything like that, so we would have to rely on the squadrons, so that they may possibly give us a spot there, a hangar, work out there and use all their tools. We're taking our tools down the flight line and basically we had to move our shop down there. This took a couple of hours just to move our shop. For example, we would have a rotor headstand and a rotor head we fit on and would have to move that from where they were located on the compound down to the flight line. This took a joint effort of supply and using a forklift, maybe a flatbed truck, somebody who would have a license to drive a truck, some way to get it off the truck when we would have to support the flight line.

SLD: Without breaking it.

Corporal Warshek: Absolutely. And then there is the challenge of dealing with the sand, which we had in Iraq. If we get sand in the hydraulic system and sand goes rushing through there and it's absolutely destroyed. So if we've got a sandstorm coming in and we've got all these gear in the shop we're working on, if it's coming in through the seams, the doors, it's a potential serious problem.

If we've got a sandstorm coming in and we've got all these gear in the shop we're working on, if it's coming in through the seams, the doors, it's a potential serious problem.

"It Takes Time"

An interview With Master Sgt. Jeremy Kirk

12/21/2010 – Master Sgt. Jeremy Kirk discussed his experience with maintaining the V-22. As an experience CH-46 maintainer he underscored that the Corps had decades of experience maintaining this rotorcraft. The V-22 is new and has the norm shake down challenges in operational deployments. The maintainers are shaping a regime to understand the new aircraft and how to maintain it in operations. He underscored that there are challenges, but "it takes time to learn how to maintain a new aircraft."

Master Sgt. Jeremy Kirk (Credit: SLD)

SLD: Could you give us a sense of your background in maintenance?

Master Sergent Kirk: I was a FROG guy from the get-go. With the 265, I did the Desert Storm, Desert Shield deployments, and numerous support operations out to Okinawa. I did a little stint in NATO, did the rework thing for a while for four years, and got to 263 in '02 and did all the same deployments as Major York.

We went to Europe, spent nine months on a boat, quick turnaround, back out with the big Iraq operation. Then in 04 to 05 was in the Fallujah operation and I flew the whole time I was a crew chief originally.

I then did the transition to the V-22. I was with 263, then with the transition and then a month prior to them deploying I hurt my back. I had to have surgery. I went to 204 to do the training for a couple of years rehab, got back out at 264 and then got promoted to a job of the maintenance control chief. I've been around maintenance for a little bit.

SLD: What are the differences between maintaining a FROG and a V-22?

Master Sergent Kirk: There are differences. One of the biggest differences is the lack of experienced maintainers for the V-22. With the FROG being around for so long we have decades of experience with that experience in the minds of the maintainers. We are still learning the V-22. You have younger marines and a new aircraft.

Working on the Aircraft at New River, August 2010 (Credit: SLD)

SLD: The interaction between the novelty of the aircraft, lack of maintenance experience and challenges in the supply chain obviously created a challenge.

Master Sergent Kirk: Yes one problem was that the expectation of part life was difference from the experience. So we need to close the gap. We are trying to learn the gap.

Because parts weren't lasting as long as they were supposed to last, we were fixing them faster than you anticipated.

SLD: The metrics of performance for the parts were out of whack with the operational experience?

Master Sergent Kirk: Absolutely. For example, a prop box, a huge transmission inside the nacelle, which is supposed to work for 5800 hours when we get them out of the factory, last considerably less. We're changing these gearboxes faster than we need to.

One problem was that the expectation of part life was difference from the experience. So we need to close the gap. We are trying to learn the gap. Because parts weren't lasting as long as they were supposed to last, we were fixing them faster than you anticipated. For example, a prop box, a huge transmission inside the nacelle, which is supposed to work for 5800 hours when we get them out of the factory, last considerably less. We're changing these gearboxes faster than we need to.

SLD: Another issue we discussed earlier was that improved simplification for access to change parts is underway as well : we discussed challenges in getting the gearbox off for repair.

Working on the Aircraft in the New River Air Station Hanger, August 2010 (Credit: SLD)

Master Sergent Kirk: Repairing the gearbox entails taking the engine, taking the hub off, taking everything off and then all of skin around it needs to come out also. It's a pretty maintenance intensive task there.

SLD: What improvements are you seeing in terms of the ability to maintain the aircraft?

Master Sergent Kirk: Honestly, I like this aircraft. I was a FROG guy for 16 1/2 years but you can definitely see the worth of the V-22. It can do a lot of things. It would make our job a lot easier if things just lasted longer.

I can see significant improvements from '05 to now from just the experience levels of maintainers learning their tasks and learning the tricks of the trade on the new aircraft. And I think you have seen it on the pilot side also. We just needed to have the aircraft deployed actually to learn how we were going to employ it, and how we're going to maintain it.

SLD: So your point that you got the aircraft, you got it into service and have four or five years of experience now, maintenance is getting better.

Master Sergent Kirk: Yes.

SLD: But you are also pointing out that the initial maintenance of the aircraft has required a lot of adjustments, and that's okay for a while but that obviously is not a prescription for normal operation. Is that a fair observation?

Kirk: I think it's a very fair observation. We take parts off the factory to support aircraft. I'm sure that last V-22 that rolls out of the factory is going to be missing quite a few parts just because they're not available for the rest of them.

SLD: So parts availability is an issue as well as durability of parts.

Working on the Bird With Trained Hands, New River Air Station, August 2010 (Credit: SLD)

Master Sergent Kirk: Parts availability, and durability. For example, you see the Marines all the time dealing with the oil coolers; we always have hot oil coolers. We're always cleaning them out. In order for the Marine actually to clean it, he's got to pull off all those panels and pull it apart to get inside and clean it. If there is a more expeditious way to clean it that would be the way we'd want to go.

SLD: I think part of the problem is nobody has ever operated tiltrotor aircraft.

Master Sergent Kirk: Absolutely. We've come leaps and bounds in the five years that I've been involved. But it does take time.