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Leveraging USVs: Extending the SA of the Expeditionary Strike Group

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By Captain George Galorisi and Dr. Scott Truver

As the USN-USMC team shapes its way ahead with regard to the Expeditionary Strike Group, several new capabilities have come to that force. First there was the Osprey; then their was the F-35; and next up will be the coming of the CH-53K.

All of these manned assets can be supplemented with new evolving unmanned capabilities which can enhance the situational awareness of the ESG force as it approaches its objective area for operations.

Two articles on the *Defense.info* website, "The Bold Alligator Exercises and Calibrated Force Insertion" (https://defense.info/maritime-dynamics/2018/05/the-bold-alligator-exercises-and-calibrated-force-insertion/) and Evolving C2 for the Insertion Force (https://defense.info/multi-domain-dynamics/2018/05/evolving-c2-for-the-insertion-force/), both by Dr. Robbin Laird, highlighted initiatives the U.S. Navy and Marine Corps are undertaking to insert innovative technologies into expeditionary strike groups (ESGs).

Both articles focused on the command and control (C2) part of the C4ISR (command, control, communications, computers, intelligence, surveillance and reconnaissance) equation.

Further, they keyed on the Navy-Marine Corps Bold Alligator series of exercises, which were described in the second article as "not just exercises," but "mission rehearsals."

The Bold Alligator exercise series has continued to be one of the most prominent sources of innovation for the Navy and Marine Corps.

After several years of refining the ESG's C2 capabilities, the Navy and Marine Corps have now been using demonstrations, experiments and exercises to insert new and innovative technologies that focus on the "back end" of the C4ISR acronym: intelligence, surveillance and reconnaissance, or ISR.

The reasons for this renewed focus on ISR are clear, and stem from a clear-eyed evaluation of gaps in U.S. military capabilities in 2018.

By way of explanation, at the Navy's 2017 Current Strategy Forum in Newport, Rhode Island, the Chief of Naval Operations, Admiral John Richardson, talked about the "OODA (Observe, Orient, Decide and Act) Loop," first made popular by U.S. Air Force Colonel John Boyd in the 1950s.

According to Colonel Boyd, decision-making occurs in a recurring cycle of observe-orient-decide-act. Admiral Richardson used the OODA Loop as a way of discussing the kinds of new technologies the U.S. Navy was fielding to fill gaps in warfighting capabilities.

While all four parts of the OODA loop are important for effective decision making and success in warfare, the "Observe" piece is arguably the most important to mission accomplishment, for without a reasonable knowledge of what is in the battlespace – friendlies, enemies, and neutrals – most plans fall apart and we never get to the Orient, Decide and Act parts of the OODA Loop.

Almost two decades ago, the then-Vice Chairman of the Joint Chiefs of Staff, Admiral William Owens, stressed the importance of this first segment the OODA Loop in his book, *Lifting the Fog of War*.

While we have made strides in this effort to have an omniscient view of the battlespace, there is still much to do.

Said another way, as the Duke of Wellington, famously put it, we need to, "Endeavour to find out what you don't know by what you do; that's what I call guessing what's on the other side of the hill."

As part of the continuum of inserting innovative technologies – and specifically C4ISR technologies – into Navy and Marine Corps demonstrations, experiments and exercises, two of the most important recent events, based on the number of new technologies introduced, were the Ship-to-Shore Maneuver Exploration and Experimentation (S2ME2) Advanced Naval Technology Exercise (ANTX), and Bold Alligator 2017.

These events highlighted the potential of unmanned naval systems to be force-multipliers for expeditionary strike groups and to contribute to "lifting the fog war."

Why unmanned naval systems, and especially unmanned surface vehicles?

The reason is clear.

Unmanned surface vehicles (USVs) are especially adept at conducting the ISR mission, and are typically better suited for this mission than their unmanned aerial vehicle counterparts for several reasons, particularly their ability to remain undetected by enemy sensors, as well as their dwell time on station.

By performing near-shore intelligence preparation of the battlespace (IPB), unmanned surface vehicles increase the standoff, reach, and distributed lethality of the manned platforms they support.

For ESGs, the "Observe" portion of the OODA Loop is crucial in the opening phase of any operation.

As those involved in naval operations know, there are few missions that are more hazardous to the Navy-Marine Corps team than putting troops ashore in the face of a prepared enemy force.

For this reason, the S2ME2 ANTX focused heavily on using unmanned surface vehicles to conduct critical ISR and IPB missions against enemy formations.

The S2ME2 ANTX demonstration focused on addressing gaps in capabilities that advanced unmanned maritime systems might close for the critical ISR and IPB missions that need to accomplished before conducting theamphibious ship-to-shore mission.

Thus, S2ME2 ANTX had a specific focus on unmanned systems—especially unmanned surface systems—that could provide real-time ISR and IPB support.

During the assault phase of S2ME2 ANTX, the blue force used a USV to obtain information about enemy defenses.

The expeditionary commander selected an eight-foot Tactical Autonomous Unmanned Surface Vessel (a MANTAS USV – one of a family of stealthy, low profile, USVs).

The USV swam into the enemy port (the Del Mar Boat Basin on the Southern California coast) and relayed information to the amphibious force command center using its TASKER C2 system.

Once this larger-scale ISR mission was complete, the MANTAS USV was driven to the surf zone to provide IPB information crucial to planners.

This included obstacle location (especially mine-like objects) and beach gradient.

Carly Jackson, Space and Naval Warfare (SPAWAR) Systems Center Pacific's director of prototyping for Information Warfare and one of the organizers of S2ME2, explained how unmanned systems supported ISR and IPB missions, noting, "We use the Navy's organic labs and warfare centers to bring together emerging technologies and innovation to solve a specific problem.

"It's focused on unmanned systems, with a big emphasis on intelligence gathering, surveillance, and reconnaissance."

The importance of having unmanned systems perform this critical – and inherently dangerous – task was highlighted by Tracy Conroy, SPAWAR Systems Center Pacific's experimentation director, who explained, "The innovative technology of unmanned vehicles offers a way to gather information that ultimately may help save lives.

"We take less of a risk of losing a Marine or Navy SEAL."

S2ME2 ANTX was a precursor to a major Navy-Marine Corps expeditionary exercise, Bold Alligator 2017.

This live exercise was designed to demonstrate maritime and amphibious force capabilities and was focused on planning and conducting amphibious operations, as well as evaluating new technologies that support the expeditionary force.

Bold Alligator 2017 encompassed a substantial geographic area in the Virginia and North Carolina Operating Areas. Mission command was located at Naval Station Norfolk, Virginia.

The amphibious force and other units operated eastward of North and South Onslow Beaches, Camp Lejeune, North Carolina.

For the littoral mission, some expeditionary units operated in the Intracoastal Waterway near Camp Lejeune.

Due to the need to sortie amphibious ships to provide disaster assistance in the wake of hurricanes Harvey, Irma and Maria, Bold Alligator 2017 featured a smaller number of amphibious forces than previous Bold Alligator events, but did include a carrier strike group.

The 2nd Marine Expeditionary Brigade (MEB) directed events and was embarked in USS *Arlington*(LPD-24), USS *Fort McHenry*(LSD-43), and USS *Gunston Hall*(LSD-44).

The early phases of Bold Alligator 2017 were dedicated to long-range reconnaissance.

Continuing their commitment to inserting innovative technologies into the Bold Alligator series of exercises, for Bold Alligator 2017, the 2nd MEB used a 12-foot MANTAS USV equipped with a Gyro Stabilized SeaFLIR230 EO/IR Camera and a BlueView M900 Forward Looking Imaging Sonar, to provide ISR and IPB prior to the ship-to-shore amphibious assault phase.

Operators at the exercise command center at Naval Station Norfolk drove the six-foot and 12-foot MANTAS USVs within the Intracoastal Waterway at Camp Lejeune, North Carolina.

Both USVs streamed live, high-resolution video and sonar images to the command center. The video images showed vehicles, personnel, and other objects in the Intracoastal Waterway.

The MANTAS was also driven through the surf-zone, thereby allowing it to provide sonar images for surf-zone bottom analysis to locate objects and obstacles that could present a hazard to the landing craftduring the assault phase.

Bold Alligator 2017 underscored the importance of surface unmanned systems to provide real-time ISR and IPB early in the operation.

This allowed planners to orchestrate the amphibious assault to ensure that the LCACs or LCUs passing through the surf zone and onto the beach did not encounter mines or other objects that could disable—or even destroy—these assault craft.

Providing decision makers not on-scene with the confidence to order the assault was a critical capability and one that will likely be evaluated again in future amphibious exercises such as RIMPAC 2018, Valiant Shield 2018, Talisman Saber 2018, Bold Alligator 2018 and Cobra Gold.

There is a growing realization regarding the need to insert new technology to make the amphibious assault force more effective in the face of robust adversary defenses.

In an address at the 2018 Surface Navy Association Symposium, Marine Corps Major General David Coffman, Director of Expeditionary Warfare(OPNAV N95), noted the need to make U.S. Navy amphibious ships, “More viable, lethal and survivable, with a focus on command, control, communications, computers, cyber and intelligence (C5I).

Clearly, the ISR and IPB missions depend on these capabilities, and it is unmanned systems that can provide this function without hazarding our personnel.

From a policy perspective, the Department of the Navy (DON) has decided that it is “full speed ahead” on unmanned systems.

The number of air, surface, and subsurface unmanned vehicles envisioned in the Navy alternative architecture studies represents not only a step-increase in the number of unmanned systems in the Fleet today, but also *vastly* more unmanned systems than current Navy plans call for.

The importance of unmanned systems to the U.S. Navy’s future has been emphasized in a series of documents, ranging from the revised *A Cooperative Strategy for 21st Century Seapower*, to *A Design for Maintaining Maritime Superiority*, to the May 2017 Chief of Naval Operations *The Future Navy* white paper.

The last document presents a compelling case for the rapid integration of unmanned systems into the Navy Fleet, noting, in part:

"There is no question that unmanned systems must also be an integral part of the future fleet. The advantages such systems offer are even greater when they incorporate autonomy and machine learning…. Shifting more heavily to unmanned surface, undersea, and aircraft will help us to further drive down unit costs."

Moreover, as evidence that this new policy direction has "legs," the DON has established goals for Navy and Marine Corps unmanned systems development. In a January 11, 2018 memorandum, the Assistant Secretary of the Navy for Research, Development and Acquisition, Mr. James Geurts, highlighted the importance of unmanned systems, noting in his cover letter:

"The United States Navy and Marine Corps have a strategic imperative to exploit emergent and rapidly developing unmanned and autonomous technologies. In order to accelerate the development and fielding of unmanned systems and to ensure an integrated and efficient effort, the Department of the Navy…has established aggressive goals for the acceleration of the DON's unmanned systems and to ensure the DON remains at the forefront of these emergent capabilities."

To support this DON initiative to move the development and fielding of unmanned systems forward as rapidly as possible, the Naval Sea Systems Command and Navy laboratories have been accelerating the development of a family of USVs and UUVs.

The Navy has partnered with industry to develop, field and test a family of USVs and UUVs such as the Medium Displacement Unmanned Surface Vehicle ("Sea Hunter"), MANTASTactical Autonomous Unmanned Surface Vessel, the Large Displacement Unmanned Underwater Vehicle (LDUUV), and others.

While unmanned systems can be an important addition to many Navy and Marine Corps missions, from our perspective, the ship-to-shore movement of an expeditionary assault force remains *the* most hazardous mission for a Navy-Marine Corps team.

Real-time ISR and IPB will spell the difference between victory and defeat.

For this reason, the types of unmanned systems the Navy and Marine Corps should acquire are those systems that *directly* support our expeditionary forces.

This suggests a need for unmanned *surface* systems to complement expeditionary naval formations.

Indeed, these USVs might well be the bridge to the Navy-after-next.

CAPT George Galorisi, a career naval aviator, who is the Director of Strategic Assessments and Technical Futures at the Navy's C4ISR Center of Excellence; and Dr. Scott C. Truver, a Washington-based naval analyst, who manages Gryphon Technologies national security programs group and is a senior advisor at the Center for Naval Analyses.

The 2nd MEB used a large MANTAS USV, equipped with a Gyro Stabilized SeaFLIR230 EO/IR Camera and a BlueView M900 Forward Looking Imaging Sonar to provide intelligence for the amphibious assault. The sonar was employed to provide bottom imaging of the surf zone, looking for objects and obstacles, especially mine-like objects, that could pose a hazard to the landing craft as they moved through the surf zone and onto the beach.

The cover photos shows the MANTAS USV.

Unmanned Air Systems and Shaping a Way Ahead for the USMC

06/15/2018

By Robbin Laird

For the USMC, the use of 21st century unmanned systems involves two strands of development involving larger unmanned systems.

The first was the decision during operations in Iraq and Afghanistan to join in with the US Army and use the Shadow unmanned aerial system, for similar operations as the US Army was engaged in the land wars.

According to a USMC publication on the Shadow UAV there use was closely tied with the land wars.

The recent development and fielding of Unmanned Aircraft Systems (UAS) has delivered even more capabilities to our Marines. One such aircraft, the RQ-7B Shadow, is deployed in squadrons as an asset of the Marine Expeditionary Force or Marine Expeditionary Brigade.

Designed to provide reconnaissance, relay communications and assist in target acquisition, the RQ-7B Shadow keeps an eye above the battlefield for extended periods of time, constantly relaying information between Marine air and ground controls.

*The Shadow enhances the capabilities of Marine commanders across the spectrum of military operations and was first deployed during Operation Iraqi Freedom in September 2007.**[1]***

An additional USMC publication adds this to the description of the Shadow and its use for the USMC:

The RQ-7B Shadow UAS supports the Marine Expeditionary Force (MEF) and Marine Expeditionary Brigade (MEB). The first Shadow system was deployed with VMU-1 to support OIF in September 2007. Employing MCTUAS electro-optical and infrared (EO/IR) sensors, communications relay payloads, and laser designators, provides commanders on the ground with increased visual reconnaissance and communications capability within their areas of responsibility. The VMU squadron supports the Marine Corps Ground Combat Element (GCE) with route reconnaissance, fires integration and force-protection prior to, during, and post-mission.

But concurrently with the introduction of Shadow into the Corps, the ScanEagle was also introduced.

And this system would fit the trajectory of the evolution of the Corps as it moved from a primary occupation with the land wars to a "return to the sea" and the joining of unmanned systems to the significant evolution of the Amphibious-Read Group and Marine Expeditionary Unit pairing into a flexible amphibious ready task force, a change driven initially by the introduction of the Osprey but being reshaped as other manned aircraft systems come to the force and unmanned systems woven into the overall force insertion capability of the amphibious task force.

Shaping the 21st Century Amphibious Task Force

The USMC is changing significantly as it shifts from the land wars to its evolving role as the nation's key full spectrum insertion force. An entire generation of Marines has fought ashore and become a flexible land force; with the

drawdown in the land wars in the Middle East, the Marines have returned to the sea and are for a new generation learning how to operate from the sea base.

But under the twin impact of the Osprey and the F-35B this is unlike any Navy-Marine Corps team to operate from the sea. The Marines can operate at distance and with greater lethality from the sea. And also, crucial to the reworking of the Navy-Marine corps team operating from the sea has been the evolution of the amphibious task force itself.

The classic ARG-MEU operating within a 200-mile operational box dictated by the rotorcraft onboard has changed dramatically as the Osprey has liberated the ships to operate at much greater distance from one another. A new generation operational capability of the disaggregated force able to operate from the amphibious task force has emerged.

The amphibious task force is a work in progress as new capabilities are added to the force, such as the CH-53K, the new heavy lift element and unmanned systems. These systems are being incorporated into the most flexible and lethal insertion force built in history.

For the Marines, unmanned systems have been utilized significantly during their participation in the land wars. The Marines have operated the Shadow unmanned systems along with the Army in the Middle East; this UAV requires land basing and as such goes against the grain of the return to the sea and the evolution of the amphibious task force.

It is their other unmanned system, namely the ScanEagle whose origin was at sea which has formed to core experience being taken to sea. And along with it the next round of unmanned development for the Marines, namely the Blackjack or as it is known in its commercial variant, the Integrator.

UAS's for the Marines are to be understood in the context of the overall evolution of the amphibious task force and the flexibility the commander of the force will be looking for. He may operate the UAS from the ship to assist Marines inserting force for a short duration mission. He may take that UAS from the ship and operate it ashore with deployed Marines. It is the flexibility of the overwatch asset and evolving payload flexibility of the UAS, which will be important to that commander going forward.

A good perspective on the transition from the Shadow land tethered force to the ScanEagle-Blackjack expeditionary approach was provided by one of the key ground combat marines involved in the transformation of the Osprey.

In a 2014 interview with then Major Cuomo who was head of the Infantry Officer Course at Quantico, he focused on the overall shift towards empowering the marines with aviation assets to become a more flexible and lethal ground combat maneuver force.

In that interview, Major Cuomo described how innovation was being generated and in the process the Shadow being shed.

The process started with a bootstrap operation. The IOC Team started by simply setting up a training exercise operating from Quantico to Paris Island.

We took off from a commercial airport near Quantico. We flew two Ospreys. We were to fast rope out of the Ospreys at the "enemy" area on Paris Island; we had to fast-rope in due to suspect enemy mines in the primary LZs. We were doing it at night but one of the Ospreys developed a hydraulic leak, which led to us executing with only 1 Osprey. We continued on and the 22 guys on the plane fast roped into the objective area.

The exercise highlighted two problems which have been addressed in later exercises: given the distance covered by the Osprey, intelligence received at the point of departure is not that accurate on the point of arrival. And given the

distance of the Osprey team from the command element, who is giving the fires approval? In other words, the plane can outrun the normal fire controls process.

The IOC Team, led by Captain Deane, published a piece in the Marine Corps Gazette in January 2013 which General Schmidle read and then contacted Major Cuomo.

This meant that prior to the second exercise in Camp Blanding, FL that DCA and his team offered IOC their full support. Notably, they were offered a "Shadow," unmanned aerial system (UAS for the second experiment. The idea was to operate in a very humid and tropical objective area similar to many areas in the Asia-Pacific region.

*This exercise was very helpful in highlighting the limitations of the "Shadow" for the type of expeditionary operations being tested in the exercise. And as well, it highlighted what kind of UAS support asset the GCE would find most useful to such operations.**[2]***

Put bluntly, with the Marines looking to advance their capabilities as an expeditionary force, the Shadow was not on the menu; and they turned to leverage their ScanEagles and by working with the company providing the ScanEagle, they generated a new UAS which had even greater flexibility for the evolving USMC expeditionary force.

This interview was supplemented by an interview with a former Marine officer involved with manned and unmanned operations who is now working for Insitu, the company that introduced the ScanEagle and developed and supports the Blackjack with the USMC. This second strain of evolution, namely support to the expeditionary force by a UAS able to operate onboard a ship and on ashore, has been shaped to date by the Insitu working relationship with the USMC.

An Overview on UASs within the USMC: The Perspective of Lt. General (Retired) George Trautman

To provide an overview of the evolution of UAS capabilities within the USMC, an interview with Lt. General (Retired) George Trautman, former Deputy Commandant of Aviation who was a key figure in generating the aviation innovation wave enveloping the USMC currently. Trautman provided his perspective in a recent interview concerning the evolution of UAS's within the USMC from his time as DCA until now and how the USMC is looking at the future pattern of change.

Question: The UAVs going on ships now really had their origin in the land wars.

How did the process get started?

Lt. General (Retired) Trautman: It goes back to the time General Jim Conway was in Iraq with the 1st Marine Expeditionary Force and he found a little company called Insitu that was making the ScanEagle UAV.

Believe it or not, the ScanEagle was being used for the Albacore fishing fleets up in the Pacific Northwest at the time.

In other words, ScanEagle has a shipboard legacy already built right into it.

But, the Marines evolved the ScanEagle principally as an asset for land based operations in Afghanistan and Iraq.

And, in recent years with the focus placed on returning to the sea it became obvious that a similar capability on board our amphibious task force would be quite useful.

That is what led us to make the selection of the Insitu RQ-21 Blackjack which is now deploying on our Marine Expeditionary Units and by all accounts it is doing quite well so far.

Question: It is very challenging to operate unmanned air systems onboard ships and could you discuss those challenges?

Lt. General (Retired) Trautman: Many people who have not spent a lot of time at sea really don't grasp the inherent challenges that you have when you launch and recover from a sea base.

The Marines over the years, along with their partners in the US Navy, have built an aviation force that's quite credible from the sea. F-35Bs, MV-22s, H-1s and the evolving CH-53K all come into the force at a very important time as our nation evolves into a better understanding of the value and proper use of the amphibious task force.

In parallel with those developments, we must figure out how to take advantage of unmanned aerial systems.

As we do that operationally, we at the same time have to experiment and learn and use systems from the sea in ways that cause us to understand what new systems we should procure in the coming decade as well.

In other words, the foundation for the future is being built with our experience on board our amphibious ships today as the new aviation assets marry up with the unmanned systems onboard our ships.

Question: And having the UASs onboard allows the Marine Corps commanders to sort out how best to use those assets in operations as well. How might they do that?

Lt. General (Retired) Trautman: If I'm a task force commander and I'm deployed somewhere around the globe, I want to be prepared to conduct operations at a moment's notice when the mission dictates.

I also want to have the flexibility to conduct all of my sorties from the sea or if necessary transition to an expeditionary land base for short duration operations that make an impact on the enemy before quickly returning to sea.

I want unmanned aerial systems that enable me to do whatever I need to do in order to accomplish the mission.

That means I need range, speed, endurance, the ability to take off and land vertically, a wide range of payloads, non-proprietary payload "hooks," and the best Size, Weight and Power (SWAP) advantage I can attain.

To do that, you have to think long and hard about the types of capabilities that you wish to procure.

Whether it's classic UAS capabilities like intelligence surveillance and reconnaissance, the delivery of precision weapons, or electronic warfare, there are a whole host of missions that unmanned systems can do with the right payloads.

The key is to have those systems with me, use them and determine how to get the most effective use from them in the widely varied operations that an amphibious task force will pursue.

Question: When you were DCA you worked the decision to sunset the Prowler electronic warfare aircraft.

That clearly has an impact on the payloads which you want to have on a UAS as well?

Lt. General (Retired) Trautman: It does.

We made the decision in 2009 to sunset the Prowler a decade out in 2019.

We did that with our eyes wide open knowing that the F-35B would be coming into the force in a more robust way by that time.

There are inherent electronic warfare capabilities resident in the F-35 but our vision also included the need for unmanned aerial systems to proliferate in the battle space to round out the electronic warfare requirements that the force will have.

We're in our infancy right now in developing those capabilities, but the first step in achieving something is to get started, and to put the capabilities in the hands of young men and women who are in the force and then evolve the capability in a way that makes sense.

I'm confident that we are on that trajectory with our unmanned aerial systems and the payloads that we will develop for those systems in the next few years.

Question: And the experience being gained now and in the next decade will clearly shape the way ahead not only for the amphibious task force but for the unmanned element. In other words, the approach is to experiment by operational use.

What happens next?

Lt. General (Retired) Trautman: The current Deputy Commandant for Aviation has been very prescient in laying out a requirement for a program called MUX (MAGTF Unmanned eXpeditionary UAS) which the current aviation plan says will be ready for initial operations in the 2025 time frame.

That platform, whatever it becomes, should have the capability to take off and land from the sea base, to take off and land from an expeditionary operating location ashore and deliver long-range relatively high-speed service to the fleet so that you can use that range and speed to your advantage.

It should also come in with adequate power and non-proprietary "hooks" so that future users can employ whatever payloads make the best sense for the force as it evolves.

This is a very exciting time for the development of unmanned systems in support of the amphibious task force and the Marine Corps.

The Role of ScanEagle and Blackjack in USMC Expeditionary Capabilities

Lt. General (Retired) Trautman highlighted both the ScanEagle and the Blackjack as key elements of shaping the transition. To get a sense of how this process was involving, an interview was conducted with a former Marine officer involved with manned and unmanned operations who is now working for Insitu, the company that introduced the ScanEagle and developed and supports the Blackjack with the USMC. This second strain of evolution, namely support to the expeditionary force by a UAS able to operate onboard a ship on ashore, has been shaped to date by the Insitu working relationship with the USMC.

Art Crowe is a former Harrier pilot who became the operations officer of VMU-2 in 2003-2004. He participated in the second battle of Fallujah and his combat experience clearly guides his thinking on how remotes can provide a combat edge for Marines as they build out their amphibious capabilities.

Question: What was the origin of the coming of ScanEagle to the Marine Corps?

Crowe: General Conway, later Commandant of the USMC, was in Iraq in 2004 and was looking for support for his maneuver force.

He wanted a way to get support from an effective UAS without having to wait for a long acquisition process.

He got that through a services contract with Insitu whereby the company provided ISR services but operated the assets.

The Marines provided security and operational support; the company operated the asset and delivered the product to the Marines.

Question: This was the origin then of a company operated and company owned system. What was the advantage to both company and the Corps of such an approach?

Crowe: The company could evolve the capabilities of ScanEagle in concert with the feedback from their UAS Operators and Marines on their operational needs.

Rather than going through a long requirements generation process, the company could evolve the capabilities of the aircraft and the payloads to provide for the services the Marines required.

This allowed for rapid innovation and adaptation to customer needs.

The payloads then evolved over time to provide data to meet the evolving needs of the USMC, with the service contract delivering the payoff for the company.

ScanEagle's latest generation of infrared/electro-optical sensors is the 900 series of turrets.[3]

And this evolution of capability has been driven by the company in interaction with the USMC, the US Navy and other DoD and foreign customers.

ScanEagle has become a product and capability deployed worldwide.

The genesis of ScanEagle was in fact to support weather reconnaissance and commercial fishing fleets, so it has been a maritime-proven platform from the beginning.

The return to the sea for the Marines has provided a venue within which ScanEagle has returned home so to speak.

Question: One of the other deployed UAS from Insitu is the RQ-21A Blackjack.

How was this procured and how is it being used?

Crowe: The Navy and Marines procured The Blackjack through the traditional procurement model.

The Navy approved acquisition in 2010 and operated the first Early Operational Capability (EOC) Blackjacks in 2014.

The Program achieved Initial Operational Capability in 2016.

The Blackjack is different from ScanEagle.

While it operates with similar launch and recovery equipment, it is larger and designed to be an air vehicle that can operate a variety of payloads simultaneously.

The aircraft is built around a center of gravity payload bay.

It is a modular set up where you can configure a variety of payloads, to include all previously integrated ScanEagle payloads.

There is room on the air vehicle for up to 39 pounds of payloads, which operate with up to 500 watts of power.

As long as you can meet those requirements and operate with the interface control, you can integrate various payloads.

The Marines have operated ashore and have now brought it to the amphibious force.

Blackjack is configured to operate off of San Antonio class L ships. It first deployed last year with the 22nd MEU and is currently operating with deployed forces.

Operating a UAS off of a ship can be more challenging than ashore.

Integrating the air platform within the workflow of the ship is one challenge; operating with the different operational impacts of the air fleet is another.

And working the launch and recovery can be more challenging in a dynamic shipboard environment. This continues to be a focus of effort for the Blackjack team.

Question: The sun setting of the Prowler has set the stage for another key development for the Blackjack, namely providing support for the MAGTF along with the F-35 for electronic warfare.

How do you see this challenge?

Crowe: The sun setting of the Prowler in 2019 is a key driver of needed capability.

The payload flexibility of the Blackjack means that it could be part of the EW capability for deployed Marines and because we are working the shipboard integration it could be part of that package as well for the at sea force.

It is a work in progress but a key part of the way ahead for the Marines and Blackjack.

The VMUs and Innovation within the USMC

As with other services, the introduction of unmanned systems requires the development of core training and skill sets both to operate current systems and to shape innovation going ahead with the role of unmanned systems within the core USMC approach which is the Marine Corps Air Group Task Force or MAGTF.

There are four VMUs in the USMC, which are geographically located to support their relevant force elements. VMU-1 is part of the 3rd Marine Aircraft Wing and is based at Yuma, Arizona. In 2007, VMU-1 was the first squadron in the USMC to operate RQ-7 Shadows in Iraq. They now are operating Blackjacks as well.[4] VMU-2 is part of the 2nd Marine Air Wing and is based at Cherry Point, North Carolina and is operating Blackjacks.[5] VMU-3 is part of 1st Marine Aircraft Wing and is based at MCAS Kaneohe Bay and its primary mission is to provide support for the III Marine Expeditionary Force. They operate Shadows but are transitioning to Blackjack.[6] VMU-4 is a USMC Reserve united based in Camp Pendleton, California and they operate Shadows.[7]

The shift from the old to the new was highlighted in these comments attributed to VMU-1 in 2016 when they first received Blackjacks.

"The Blackjack is runway independent, expeditionary, modular and a lot quieter than the Shadow," said Cpl. Preston Martin, a UAS maintainer with VMU-1.

VMU-1 Marines received hands-on mobile training from maintenance instructors from Insitu, the company who developed the Blackjack.

"The Blackjack is faster to set up and tear down," said Cody Cavender, a maintenance instructor with Insitu. "It comes loaded with payload packages, it has a longer endurance, and the training out here is going great."

The Small Tactical Unmanned Aerial System Launching equipment and the STUAS Recovery System require a significantly smaller space to store and set up for operations, explained Capt. Garon Taylor-Tyree, director of safety and standardization for VMU-1 and will be the detachment officer-in-charge for the 15th Marine Expeditionary Unit.

"The fact that our footprint has decreased substantially is the first benefit," said Taylor-Tyree. "The second is that we don't require a runway to operate the RQ-21."

VMU-1 is slated to deploy in summer 2017 in support of the 15th MEU with the new RQ-21A Blackjack UAS which will primarily bring the unit Intelligence Surveillance Reconnaissance.

"The capability of the new aircraft will bring organic ISR to the MEU that is persistent and easy to manage," said Taylor-Tyree.

*"We'll be able to distribute that [ISR] feed to other ships, or if satellite capabilities allow, back to the states to various units," continued Taylor-Tyree. "This means that we can provide persistent ISR organic to the MEU instead of having to request it from sister services."**[8]***

Interviews were conducted with VMU-2 during 2014 and 2015 and with VMU-3 in 2017. These three interviews provide a sense of the evolution within the USMC and the perspective of the leadership of the unmanned units about the way ahead seen from the operator's perspective.

VMU-2 Discusses the Future (2014)

The CO of VMU-2 during the 2014 visit was Lieutenant Colonel Kris Faught. The CO most recently served with VMM-266 as the Air Combat Element Operations Officer for the 26th MEU.

The Mission Statement for the squadron highlighted its contextual support role, both now and evolving future capabilities. The Mission of VMU-2 is described as follows:

"To support the MAGTF Commander by conducting electromagnetic spectrum warfare, multi-sensor imagery reconnaissance, combined arms coordination and control, and destroying targets, day or night, under all-weather conditions, during expeditionary, joint and combined operations."

The CO highlighted some key limitations facing UAVs for the USMC, and identified what he saw as a solid growth path going forward. He started with a discussion of the value of the Shadow UAV and its experience for the USMC. Clearly, Shadow has provided important operational experience, yet the Shadow is not congruent with where the USMC is headed. "It is clearly not expeditionary; and looks like it has been designed by a tanker."

The CO then highlighted that the squadron was working with the RQ-21A Blackjack to evolve an expeditionary support capacity from its UAVs. Notably, 2nd MAW Forward was working with an Early Operational Capability (EOC) run up to the RQ-21A in Afghanistan to gain operational experience in order to help shape the way ahead for the UAV role within the USMC.

The principle differences are software and some ship compatibility issues with launcher and retriever between the EOC system and the RQ-21A system. A key quality of the Blackjack is its non-proprietary payload system.

"The payload bay is not patent-protected. This means that L-3 is building payloads. Lockheed Martin is building payloads. Little one-off shops in San Diego are building payloads." And clearly the trend line, which the Marines would like to see, is an ability to shape modular payloads to provide for the support missions envisaged for UAVs.

At the time of the interview, the Blackjack carried the following types of payloads:

- **Electric-Optical**
- **Mid-Wave Infrared**
- **IR Marker**
- **And the Secondary Payload Bay Supports: CRP and EW.**

The approach to support the RQ-21A is considerably less than the Shadow and clearly allows the Marines to work on their expeditionary support approach.

With regard to the RQ-21A, the squadron was working with industry to shape ways to enhance capability.

"We are looking at size, weight, power tradeoffs to enhance overall platform capability. Currently, we are at 135 pounds with the platform and we could go as high as 165 which would give us more payload to carry onboard."

Lt. Col. Faught emphasized throughout the discussion the need to evolve the payloads along with other key aviation capabilities being shaped for the MAGTF. He especially felt that EW payloads would be increasingly of interest going forward.

And he felt as the F-35B joins the force along with the Ospreys, the opportunity to rework evolving UAVs to operate with these more expensive combat systems would be significant.[9]

VMU-2 Revisited (2015)

It is clear that the use of UASs in Afghanistan was an important phase in the evolution of UAS use within the US forces. But this really is a phase and one which needs to be put into its historical place with a clear need to move on. UASs were used in a land operation with many years of infrastructure put into place, and this infrastructure – wide ranging, expensive and significant – is hardly going to be waiting for an expeditionary insertion force.

And the conops utilized in Afghanistan clearly are a problem as well. As one squadron member put it: "The UAS controllers were more part of the intelligence system in Afghanistan than of the Marine Corps. They were an asset which plugged into the intelligence gathering system, and did not operate as we do more generally with air assets in the USMC."

"Normally, the airborne assets work with the ground element and share the intelligence picture in an operational context. This was the norm in Afghanistan: an external asset managed by the intelligence system rather than organic integration with the MAGTF."

As the operations officer put it bluntly: "We are trying to burn down the whole UAV structure which the Marine Corps created in Afghanistan and shaping a new approach, one in which it is integrated within MAGTF operations."

According to the Marines interviewed, the intelligence community views UAVs as "their assets" because that is how the system evolved in Afghanistan. "UAV operations personnel would basically check in with the air officer who would then pass them over to intel and they would then work together."

Rather than having UAVs as part of the fire support system, they became assets, which were part of observation and evaluation, and the authorization of fires was handled separately. "This became a loop rather than a straight line which is where we would like it be when we operate as a MAGTF."

The separation of Marine Corps UAV assets was the norm rather than the exception. "When I would fly in Afghanistan, I might look down and see a Shadow or ScanEagle below me, but I never once coordinated with these assts. I had no idea what they were looking at. I just knew that they were below me," noted the Operations Officer.

Lt General David A. Deptula, who in his last active duty position oversaw the planning, policy, and development of Air Force UAVs, and grew that force by over 500 percent in the Air Force, agreed with the Marine officers interviewed about the need for integration.

"One of the biggest advantages of remotely piloted aircraft is that they allow for the condensation of the 'find, fix, and finish' kill chain onto one platform. To capitalize on this capability these aircraft need to be integrated into the entire combat enterprise, not just one piece of it."

That is exactly what the next phase of UAVs involves in the Marine Corps—the integration of these systems within the Air Combat Element (ACE) of the MAGTF. "The GCE should be requesting the capability, not the asset. If you need persistent IS with full motion video, that will probably fall to UAS."

The UAS operator is a key part of the equation and when it works properly, the operator can work with the GCE and work with the sensor onto the target by shared situational awareness. The challenge is shaping ways to parse the information to the appropriate element within the MAGTF to empower the GCE or ACE to become more effective.

A clear requirement going forward is to build swappable packages for the evolving USMC UAS birds as well, for missions can highlight C2, ISR or EW needs. "When we looked at an after action report for a SP-MAGTF mission, there was a desire to have communications reachback, the ability to have armed escort and persistence surveillance, all capabilities which the proper UAS can provide. Why would put in anything else but a UAS to provide for those capabilities?"[10]

Shaping the Way Ahead: The Perspective of Colonel J.B. "Buss" Barranco

Appropriately, we will end this article by looking forward to the evolving path for the USMC with regard to UASs.

On June 16, 2017, I had a chance to discuss that future path with the person charged with Headquarters USMC with working that mission area.

Col. Barranco is a veteran Marine Corps aviator and graduate of the Naval Academy with several tours of duty in Iraq and Afghanistan. It is from this operational background, and from a very clear focus on how UASs serve the evolving USMC concepts of operations that he approaches the question of the future of those systems for the USMC.

The current operation of Blackjacks at sea and on land is a key part of the learning curve with regard to the operation of the systems and their integration within evolving Marin Corps operations. As is Marine Corps practice, the Blackjack is in the force in advance of fully being able to support the force. The Marines it is about getting capability to the force and letting the war fighter use that capability as that capability evolves and becomes fully operational.

According to Col. Barranco, the Blackjacks are providing a significant learning experience, which will impact later evolutions of UASs within the MAGTF. He highlighted that learning how to work the unmanned with the manned onboard ships, learning how to operate onboard ships, more generally, and learning how to use the various payloads in support of the Marine Corps afloat and ashore all were being facilitated by the Blackjack experience.

And the Blackjacks as part of the new Air Combat Element for the Marine Corps is impacting on the ship design for the LHR which will be modeled on an enhanced San Antonio Class ship and on the America class LHAs. A key part of this effort is the need to expand significantly the capability to handle much larger volumes of data generated by F-35s and UASs to the ship as well. In this regard, it is the Navy-Marine Corps team, which is learning from Blackjack deployments, not just the Marine Corps.

He also noted that as a medium range tactical UAS, the Blackjack has replaced the Shadow. The Blackjack does not need to rely on runways, which is a core requirement for the USMC. He argued that the Blackjack will remain with the Marine Corps even as they work to add a new UAS to the force.

For the Marines, the requirement to operate without a fixed runway is crucial. As Col. Barranco underscored the Marines were focused on force insertion in an area of interest and having an organic capability carried with the force was indispensible. Also, airfields are under threat from peer competitors and cannot be relied upon. And allies are crucial but if allied facilities are denied for political reasons, the Navy-Marine Corps team needs to be able to operate with organic sea-based assets.

The Marines are working to add a new more robust UAS capability to the force by the mid 2020s. And they are hoping that the US Navy will buy in as well, and allies who are building up their amphibious fleets might well be candidates for the new platform as well. The Marines are looking for a platform, which can fly with the Osprey, which means range and speed, are essential. It may well be a tiltrotar platform although other platform variants might be feasible as well.

This Group 5 UAS will have an open architecture system allowing complete software upgradeability to keep abreast of threats. The RAAF speaks of the need to build in software transient advantage and this is clearly what the Marines are looking for in their new UAS system as envisaged.

They are looking for the new platform to have a number of plug and play capabilities. They want to it to be an armed UAS with a variety of weapons which can be configured to the mission. With the core focus on shaping a digital interoperable MAGTF, they look to the UAS to be a key node in the network afloat and ashore. They are looking at the new UAS as a partner with the F-35, Osprey and CH-53K, where the UAS could be as well a cargo carrier as well, dependent on the operation and the mission.

As the Marine Aviation Plan 2016 put it about one of these requirements:

"UAS are a planned critical component of the MAGTF EW concept. As such, EW expertise normally resident within the VMAQ community began to transition to the VMU community in 2015. Airborne electronic attack (AEA) capabilities post-2019 will be provided by EW payloads such as the Intrepid Tiger II EW Pod, UAS EW payloads, and the EW capabilities inherent to F-35."[11]

The new UAS will be STOVL as that fits both the shipboard and well as no fixed airfield requirement. The MAGTF will rely on the F-35 and related systems for forceable entry, so that the UAS as envisaged will operate largely in a non-contested air environment, although arming the UAS will be crucial for its self defense in gray operating situations.

The Marine Corps Aviation Plan put forward the following as how to characterize the way ahead for UASs:

"In the 2016-2029 timeframe, the family of unmanned aircraft systems (FoUAS) provides support to any sized MAGTF for influence of the electromagnetic spectrum, battlespace awareness, offensive air support, target acquisition, force protection, and digital communication backbone. Marine Corps UAS employment will continue to enhance and extend the lethal and non-lethal capabilities of MAGTF and joint force commanders, facilitating advancements in observation, understanding, and influence on the battlefield. The FoUAS will play a key role in all USMC missions across the range of military operations to include forward presence, security cooperation, counterterrorism, crisis response, forcible entry, prolonged operations, and counterinsurgency."[12]

The new UAS, labeled as MUX, would leverage the operational experience of the Blackjack and combine with Blackjack in shaping a way ahead. Given the payload flexibility of the Blackjack, this system could well complement the new MUX as well.

But Col. Barranco clearly underscored that UASs were part of the future of the MAGTF and of Marine Corps aviation, not the future of Marine Corps Aviation. Notably, he underscored that the need for forceable entry was crucial to the Navy-Marine Corps team and did not see the UASs on the horizon as the key enablers for that crucial mission. He also highlighted that both the Navy and the Marine Corps were working the manned and unmanned systems in an integrated manner and were clearly avoiding creating a UAS stovepipe.[13]

Conclusion

President Trump has come to power at a time when a very flexible force able to insert from the sea and rapidly return to the sea has emerged. This USN-USMC capability has migrated beyond the classic Amphibious Ready Group-Marine Expeditionary Unit (ARG-MEU) into a very flexible and lethal amphibious task force.

The evolving Marine Corps aviation assets, coupled with the reshaping of Marine Corps concepts of operations for conducting force insertion from the sea, are shaping a new capability and within that capability unmanned aerial assets are playing a key role.

Evolving the capability of the insertion forces rather than simply relying on putting "Walmarts" ashore and conducting combat support from Forward Operating Bases and airbases in contested territory, the sea base provides its own integrated support and operational integrated capabilities.

This force and support integration offshore provides capability for not only force protection but also surprise against enemies who wish to use agility to their advantage. And integrating unmanned with manned systems able to operate from the sea base or to move from the sea base for a limited duration operation can provide the American leadership with a very powerful tool set indeed.

Insertion forces are a key tool set and with the changes in how amphibious task forces operate and with the coming of a whole new capability associated with the USS America, the sea base is adding to its capability for the insertion of force into a vector of assault, destroy and withdraw.

For example, changing the nature of the force being used against ISIS and reshaping the operational compass against a mobile force which likes to pop up across the region can meet its match – there is no place you can hide that we cannot come and find you and kill you. And integrating the unmanned elements into this evolving force structure is the Marine Corp's approach and challenge.

[1] http://www.sldinfo.com/shadow-company-uas/

[2] http://www.sldinfo.com/the-gce-drives-usmc-aviation-innovation-major-cuomo-of-the-infantry-officer-course-discusses-the-iocs-team-perspective/

[3] https://insitu.com/information-delivery/unmanned-systems/scaneagle/imagers#2

[4] http://www.3rdmaw.marines.mil/Units/MAG-13/VMU-1/

[5] http://www.mag14.marines.mil/MAG-14-Units/VMU-2/

[6] http://www.1stmaw.marines.mil/Subordinate-Units/Marine-Aircraft-Group-24/VMU-3/

[7] https://en.wikipedia.org/wiki/VMU-4

[8] http://www.3rdmaw.marines.mil/News/News-Article-Display/Article/918857/vmu-1-receives-new-rq-21a-blackjack/

[9] http://www.sldinfo.com/visiting-a-usmc-unmanned-aerial-vehicle-squadron-the-vmu-2-discusses-the-future/

[10] http://www.sldinfo.com/visiting-a-usmc-unmanned-aerial-vehicle-squadron-the-vmu-2-discusses-the-future/

[11]https://marinecorpsconceptsandprograms.com/sites/default/files/files/Marine%20Aviation%20Plan%202016%20FINAL.pdf

[12] Ibid.

[13] For Col. Barranco's discussion as well of future vertical lift technology, see the following: https://news.usni.org/2016/12/12/pentagon-vertical-lift-technology and https://www.c-span.org/person/?johnbarranco

The Marines, Reapers and MUX: Working a Way Ahead for UASs in the MAGTF

06/15/2018
By Defense.info

The Marines are shaping a way ahead with regard to larger UASs, class IV and V, by working with USAF Predators and by working towards the MUX system.

MUX is meant to be a Group 5 UAS capability that launches from an amphibious ship or other ship and can land either on a flight deck or in an expeditionary airfield. This large system would supplement the Marines' Group 3 RQ-21 Blackjack and the ongoing fielding of small quadcopters at the lowest levels of the infantry.

Working Reaper

In an article by Megan Eckstein published on June 7, 2018, Marine training on USAF Reapers as they prepare to field a Group 5 UAV was discussed.

The Marine Corps will work with the Air Force to put its Marine Unmanned Aerial Vehicle Squadron (VMU) crews through Group 5 UAV training to be qualified to operate MQ-9 Reapers. The idea is to help create an infrastructure and a knowledge base on large UAV operations ahead of fielding the Marines' ship-based UAV in the 2020s.

The service is in the early stages of developing a Marine Air-Ground Task Force (MAGTF) Unmanned Aerial System (UAS) Expeditionary – called the MUX – that would be a similar size to the Reaper but would operate off amphibious and other ships and expeditionary fields without a runway.

It is meant to focus on airborne early warning missions as well as command and control, electronic warfare and intelligence, surveillance and reconnaissance (ISR).

Col. James Frey, headquarters Marine Corps aviation expeditionary enablers branch head, told USNI News at a MUX industry day on June 6 that "our Marines go through flight school for UAS down at Randolph (Air Force Base in Texas) with their Air Force counterparts, same school.

Then they break off "before learning Group 5-specific skills," he said. "We're asking the Air Force, and they've approved, to send some of our crews through the finished training so they can fly Reapers, which is good because you build that base to have folks that eventually will be into MUX, so they're used to having a Group 5 type things, so we're not pulling everybody from fixed-wing and rotary-wing platforms."

Frey said it is still unclear what those Group 5 UAV-trained crews would do after they finish training.

The Senate Armed Services Committee notes in its version of the Fiscal Year 2019 National Defense Authorization Act that there is a shortage of RQ-21 Blackjack Group 3 UAVs for the Marine Corps today and that "procurement of a Group 5 type MALE (Medium-Altitude Long-Endurance) UAS solves all of the capability and performance gaps of the RQ–21 and will help the Marine Corps to more precisely refine its requirements for the future MUX program.

Additionally, the experience gained in MALE UAS operations and fire support execution as well as the ISR acquired by using such a system will help to train and educate a new generation of Marine UAS operators and planners, who will then be ready to transition smoothly to a future MUX system.

Therefore, the committee recommends … $100.0 million, for the acquisition of a Group 5 MALE UAS fleet…."

Working Towards MUX UAS

The target goal is to develop and build a future MUX UAS.

Megan Eckstein provided an update on USMC thinking associated with this class of UAS in an article published by USNI News on April 23, 2018.

The Marine Corps has refined its vision for a large sea-based unmanned aerial system (UAS) after honing in on capability gaps the Marines most urgently need to fill.

Since creating a program of record for the Marine Air-Ground Task Force (MAGTF) UAS Expeditionary (MUX) in the summer of 2016, the service has learned much about what it really needs, what industry can provide, and how to keep the program's cost from becoming unmanageable, Col. James Frey, the director of the Marine Corps' Aviation Expeditionary Enablers branch, told USNI News in an April 18 interview.

MUX is meant to be a Group 5 UAS capability that launches from an amphibious ship or other ship and can land either on a flight deck or in an expeditionary airfield. This large system would supplement the Marines' Group 3 RQ-21 Blackjack and the ongoing fielding of small quadcopters at the lowest levels of the infantry – dubbed "quads for squads."

Though the MUX was originally given a lofty set requirements to perform seven distinct – and not necessarily complementary – mission sets, a March 8 request for information prioritized those missions.

Tier 1 missions for the MUX are now early warning; intelligence, surveillance and reconnaissance (ISR); electronic warfare; and communications relay. Offensive air support is now a Tier 2 mission, and aerial escort and cargo are listed as important but potentially being re-allocated to other systems in the MAGTF.

In fact, Frey said, the ongoing Future Vertical Lift program is almost certain to cover the Marines' aerial escort and cargo needs, according to wargames that have been recently conducted.

Whatever cargo requirement is not met by Future Vertical Lift could be accomplished with the CH-53K heavy-lift helicopter delivering goods in bulk or by a smaller UAS that the Marine Corps' Installations and Logistics community is now working to develop, which would deliver smaller loads of supplies to distributed Marine forces.

"So what do we need? It is persistence and endurance and time on station," he said of MUX, when put into the context of the MAGTF air combat element of the future: the CH-53K and the Future Vertical Lift to do major lifting, and the MV-22 Osprey and F-35B Joint Strike Fighter that would need a UAS that can keep up with their extended-range operations.

The decision to emphasize the four missions – and early warning in particular – was also in part due to how the threat set around the world has evolved and the "National Defense Strategy [that] dictates what missions and roles of the Marine Corps we should focus on," Frey added.

It was also informed by industry feedback the Marine Corps solicited early on that said "you're asking for too much, it's going to cost too much," Lt. Gen. Robert Walsh, deputy commandant of the Marine Corps for combat development and integration, told USNI News in February.

"The [initial capabilities document] we wrote was really all-encompassing," Walsh said.
"We started really working with the contractors off the ICD and what we were kind of getting from them was, boy, this is a pretty big broad capability – this is going to be big and this is going to be expensive. They were almost looking to develop a V-22 unmanned sized and cost aircraft. So we looked at that and said, okay, that's why we've got to work with industry more as we develop requirements."

Ultimately, the new focus on persistence and endurance during these sensor-based missions will affect the shape of the vehicle that can best meet the MUX requirements as they stand today.

"When you put cargo lower, what that does is, you don't have to have that dead space in the fuselage. That space can be used for fuel, for payload, for other sensors," Frey said.

"Instead of focusing on 3,000 or 4,000 pounds internally on cargo, I'd rather have that on the wings as electronic attack pod, or look at weapons – weapons take up a lot of your weight, a lot of your drag, so you want to have that capability. So it absolutely will influence the design. Instead of the design having to have so much extra power to come in and deliver cargo … that's a different model, different rotor. …

"What you get in efficiencies on slow-speed handling and takeoff, you're giving up something in endurance. So there's always a tradeoff, and if you prioritize this thing less on cargo and more on getting on the wing and have endurance at 300 or 700 miles" then industry can optimize the vehicle design for missions that will most benefit the MAGTF.

Much is yet to be decided about how the MUX will ultimately operate at sea, but Frey described for USNI News a vision of MUX: the air vehicle fits into an H-60 hanger for storage and maintenance, and potentially even folds up to an H-1-sized vehicle so that two can be stored in the H-60 hangar.

It operates off the San Antonio-class amphibious transport docks (LPD-17) – or even potentially a frigate, a destroyer or the Future Surface Combatant – and as many as three or four might deploy on the big-deck amphibious assault ships to provide greater support for forces ashore and for the Joint Force.

It provides persistent early warning and ISR coverage autonomously, and it could potentially have air vehicle command passed from the control station onboard a ship to V-22 or F-35B pilots nearby to more closely check out a target or to conduct a kinetic or nonkinetic attack.

Though he was careful to note "I'm not writing the Navy's requirements," Frey said the Navy's MQ-8 Fire Scout was scheduled to sundown around the time MUX would reach full fielding, so if the MUX program were executed correctly the Navy could adapt the system for its needs as well.

The RFI outlines a vehicle that would autonomously take off from and land on either an amphibious ship or an Expeditionary Sea Base such as the USS Lewis B. Puller (ESB-3), or from an unsurveyed austere 150-foot-by-150-foot landing zone; cruise at speeds of 200 to 300 knots with a full payload; maintain a minimum time on station of eight to 12 hours at 350 nautical miles from the ship; and fly 350 to 700 nautical miles from the ship unrefueled with a payload to conduct a mission.

Ultimately, Frey said, MUX would be "the eyes and ears for most of the surface fleet. Absent AWACS (the Air Force's E-3 Airborne Warning and Control System), absent E-2 (the Navy's E-2C/D Hawkeye), it's the best thing you have out there."

Frey said the Air Force's Group 5 UAS, the MQ-9 Reaper, costs about $15.8 million apiece for the airframe, which serves as a good goal for the MUX cost.

"We know [MUX] will probably be a little bit more than that because the capabilities are apples and oranges, and the vertical is another component" that adds cost, he said, in addition to being sea-based versus land-based. But he cautioned that if the MUX cost grew too much beyond the Reaper cost, it could become unaffordable for the Marine Corps.

To further ensure the Marine Corps is moving down an affordable and technologically feasible path, the service will host an industry day on June 6 and 7, 2018, it announced last week. After hearing from contractors – both those with prototypes already in development and those who just have an individual system or technology to contribute – Frey

said the Marine Corps would likely go through multiple draft requests for proposals before releasing a final RFP to solicit industry bids. The analysis of alternatives should be completed in the second quarter of Fiscal Year 2019, he said, with a downselect to two or potentially more contractors that the Marines will work with to develop the technology.

Ultimately, Frey said he's hoping the program will reach initial operational capability in 2025 or 2026, and full operational capability by 2034. Frey said there may be some lag time between the IOC date and the system's ability to operate off a ship due to shipboard integration test and certification requirements, but the RFI notes that the sea-based capability must be achieved by 2028. The RFI also notes the Marines are willing to use rapid acquisition authorities to achieve this timeline.

Frey said three systems are in the prototype design phase and should begin flight testing soon – the Lockheed Martin Aerial Reconfigurable Embedded System (ARES) ducted fan UAS that will begin flight testing later this year, the Bell V-247 Vigilant unmanned tiltrotor scheduled for flights in the coming years, and the Northrop Grumman TERN tail-sitter UAV that will wrap up a prototype phase with DARPA in FY 2019 and then move into shipboard testing with the Navy's Self-Defense Test Ship.

Additionally, some manufacturers have technologies for individual components of the UAS that have caught the Marine Corps' interest. Frey said Karem Aircraft has a new two-speed transmission rotor design that would "revolutionize" tiltrotor technology by slowing down the hub and therefore achieving three times the range. Frey said the company would be doing tests this fall.

Overall, with the MUX program's lofty goals and challenging timeline for something that's so new – Frey likened it to the V-22 not in terms of size or cost but rather the potential to overhaul how the military can conduct its missions – Frey said the pressure was on industry to step up.

"We are forcing them to take what they have and accelerate to get to this," he said.
"We'll make decisions over the next year, hopefully by the second quarter of FY 1'9. Downselecting to two, and then having a fair competition."

The featured graphic shows a Bell V-247 tiltrotor unmanned aerial system (UAS) that will combine the vertical lift capability of a helicopter with the speed and range of a conventional fixed-wing aircraft, and would provide long-endurance persistent expeditionary and surveillance and fires capabilities. Bell Image

The Office of Naval Research and DARPA are collaborating on the Tern project to give forward-deployed small ships the ability to serve as mobile launch and recovery sites for medium-altitude, long-endurance unmanned aerial systems that would provide ISR and other capabilities. DARPA renderin

MAWTS-1 Works the Unmanned Systems Challenge

06/16/2018

By Robbin Laird

here is probably no single air platform more affected by the transition from the strategic shift from counter-insurgency to the high-end fight than unmanned aerial systems.

These systems have come to the fore during counter-insurgency operations and have provided significant persistent surveillance for the ground forces.

They have grown in significance in working targeting options for air and sea strike forces as well.

But such systems are not well placed to operate in the contested air space and counter-battery fires, which would characterize force-on-force conflict with a peer competitor.

They suffer from several problems ranging from vulnerability to electronic warfare and jamming to becomes targeting drones rather than UAVs for combat aircraft, and the rapid growth in counter UAS systems associated with advancing technologies such as directed energy.

There is no easy way for the theoretical potential of remotes to be translated into combat reality until cyber security, counter EW, jamming, communications and an ability to operate against a variety of strike threats are attenuated.

There is no magic wand going to get from 2018 to the mythical ghost fleet any time soon.

During the recent WTI course, the Marines focused on generating a variety of contested operational threats, and jamming proved to be an effective means in attenuating the utility of their own UASs.

It is also the case that the smaller UASs which are very useful to provide ISR and C2 support to the ground force are not very effective in the presence of an adversary with high speed ground maneuver capabilities as well.

While at MAWTS-1, I had a chance to talk with two Marine Corps officers involved in working with the evolution of UAS capabilities in the Marine Corps.

Both officers have significant backgrounds in rotorcraft as well as in operating UAS systems, in the USMC squadrons, which operate their unmanned systems.

Major Daniel “Postal” Weber and Major Donald “Grace” Kelly have worked with UAS systems for a number of years, and provided significant insights into the challenges of moving forward effectively with UAS capabilities.

One challenge facing the MAWTS-1 team is how to shape the TTPs for UASs.

The challenge is that in the absence of a significant cohort of systems it is difficult to test, and to operate UASs enough to shape standardization norms for the fleet.

As the Marines look to operate in a contested objective area, what can the UAS bring to the party?

How does it fit in with an evolving MAGTF that is looking for extended reach fires integration?

How do they work with Ospreys, Ks, and F-35s?

The focus on MAGTF integration, and now what one might call extended reach MAGTF operations puts significant pressure on shaping what an effective UAS element would look like.

The con-ops are in progress; and so is the question of how best to fit UAS systems into that evolving concepts of operations.

The Marines clearly have adopted UASs into their operations, but the best fit is in the counter insurgency effort.

To shape an effective role in the contested environment, Majors Weber and Kelly underscored a number of aspects for a way ahead.

How best to leverage other service's platforms and capabilities in the UAS area and leverage them for the USMC?

How best to leverage the Blackjack system to gain more operational experience with a class three UAS while they expand their thinking and reach into a class five UAS, which is being considered for future shipboard operations?

How best to build up a cadre of experienced personnel working with UAS systems and leverage that experience to shape a realistic way ahead?

How to handle the trade-offs between airframes and payloads?

In effect, the question of which payloads that could be carried by a UAS are most useful to the Marines as they evolve their con-ops is central.

And how to best carry those payloads on an effective unmanned aircraft then becomes the focus of attention, rather than focusing primarily on the unmanned aircraft itself?

As Lt. General (Retired) Trautman put the objective:

The current Deputy Commandant for Aviation (at the time Lt. General Davis) has been very prescient in laying out a requirement for a program called MUX (MAGTF Unmanned eXpeditionary UAS) which the current aviation plan says will be ready for initial operations in the 2025 time frame.

That platform, whatever it becomes, should have the capability to take off and land from the sea base, to take off and land from an expeditionary operating location ashore and deliver long range relatively high speed service to the fleet so that you can use that range and speed to your advantage.

It should also come in with adequate power and non-proprietary "hooks" so that future users can employ whatever payloads make the best sense for the force as it evolves.

This is a very exciting time for the development of unmanned systems in support of the amphibious task force and the Marine Corps.

This target goal for a Marine Corps going into contested areas is a work in progress.

What Majors Weber and Kelly are suggesting is that to get to that goal will require building a cadre of operators engaged in the evolution of current capabilities to be able to leverage that experience and help shape the desired goal, which is a class five UAS able to operate off a ship and to contribute to an extended reach MAGTF.

Given that MAWTS-1 is working closely with VMX-1 in shaping a way ahead for the MAGTF as the new technologies such as G/ATOR and F-35 are leveraged to shape an extended fires capability, clearly VMX-1 and

MAWTS-1 are key players in help work the challenge and the opportunity for a new class of UAS to work with the future MAGTF.

But it must be done with a close eye to the core challenges which UASs pose as well, such as survivability, payload useability, and vulnerability to electronic warfare threats.

The Coming of the Triton

06/16/2018

By Defense.Info

he US Navy will be deploying its first operational Triton's later this year to the Pacific.

According to an article by Sam LaGrone published in USNI News on April 10, 2018,

The Navy's first two operational MQ-4C Triton high-altitude surveillance aircraft will start missions over the Pacific by the end of the year from a forward base in Guam, Naval Air Systems Command officials told reporters on Monday.

The pair of 131-ft wingspan UAVs built by Northrop Grumman for intelligence, surveillance and reconnaissance missions will deploy with an early set of capabilities designed for maritime ISR and will grow to include a signals intelligence function in 2021, Triton program manager Capt. Dan Mackin said in a briefing at the Navy League's Sea Air Space 2018 exposition.

Triton will reach an initial operational capability in 2021, and the Navy will add two additional aircraft to the Guam orbit. Under the current concept of operations for the platform, four airframes will make up one 24-hour, seven-day orbit.

"One on the way out, one on station, one on the way back and one in maintenance," Mackin said.

The first capability will combine a series of electro-optical sensors and radar to track maritime targets from as high as 60,000 feet over the ocean and compare tracks to automated identification systems on ships. A Triton will relay the information back to one of two main operating bases in the U.S. – Naval Station Mayport, Fla., and Naval Air Station Whidbey Island. Wash. – or to nearby P-8A Poseidon anti-submarine warfare aircraft.

"One of the main reasons that the Navy decided to fund Triton was to have that teaming arrangement, to be able to communicate back and forth between P-8s and the Triton aircraft.

One of the primary missions of P-8 is to do the anti-submarine warfare and ISR, not necessarily things you want to do at the same time," Mackin said.

"You want to give the P-8 the ability to perform the anti-submarine warfare mission while trying to high-altitude ISR mission.

"One of the things we'll do is pass information back and forth between the two aircraft and the situational awareness of the fleet will be enhanced.

"Both aircraft have the ability to do chat, so both crews will be able to communicate back and forth."

And last year, we visited Pax River to get an update on the Triton and that story which was published on March 14, 2018 follows:

Triton is the latest and cutting edge US Navy platform associated with advanced ISR or maritime domain awareness for the fleet.

Australia also intends to acquire 7 Tritons and other allies are looking closely as well to possible acquisition.

According to the Royal Australian Air Force:

The seven Tritons will be based at RAAF Base Edinburgh and will operate alongside the P-8A Poseidon to replace the AP-3C Orion capability.

The Triton will operate alongside the P-8A to replace the ageing AP-3C Orion capability.

https://www.airforce.gov.au/Technology/Aircraft/MQ-4C-Triton-Unmanned-Aircraft-System/?RAAF-BYjCaU6eHptQ3E2EiHw9jKOLJvauES8Y

But as we learned at Jax Navy air station last year, no Triton flies alone.

It is part of an overall Navy approach to distributed lethality or an evolving kill web.

In narrow terms, the P-3 platform and mission are being replaced by the P-8 and Triton dyad.

But given the nature of both the evolving data sphere as well as decision-making approach, the P-8, F-35, Triton, and Advanced Hawkeye are all key elements in the flying part of distributed lethality for the Navy-Marine Corps team.

It is a key part of the evolving sensor-shooter system being shaped to allow for distributed operations.

It is clearly a work in progress but it is a decisive shift from the legacy approach as well. With regard to Triton and P-8, the US Navy will operate them as a dyad.

The USN is approaching the P-8/Triton combat partnership, which is the integration of manned, and unmanned systems, or what are now commonly called "remotes". The Navy looked at the USAF experience and intentionally decided to not build a Triton "remote" operational combat team that is stovepiped away from their P-8 Squadrons.

The teams at Navy Jax and Pax River are building a common Maritime Domain Awareness and Maritime Combat Culture and treats the platforms as partner applications of the evolving combat theory.

The partnership is both technology synergistic and also aircrew moving between the Triton and P-8.

The P-8 pilot and mission crews, after deploying with the fleet globally can be assigned significant shore duty flying Tritons. The number of personnel to fly initially the Tritons is more than 500 navy personnel so this is hardly an unmanned aircraft. Hence, inside a technological family of systems there is also an interchangeable family of combat crews.

These new systems are all software upgradeable which sets in motion the opportunity and a need to shape new acquisition approaches to take advantage of software, which can evolve to deal with the threat environment as well.

Software upgradeability provides for a lifetime of combat learning to be reflected in the rewriting of the software code and continually modernizing existing combat systems, while adding new capabilities over the operational life of the aircraft.

Over time, fleet knowledge will allow the US Navy and its partners to understand how best to maintain and support the aircraft while operating the missions effectively in support of global operations.

The baseline Triton getting ready for deployment is an ISR platform; but will evolve into a tron warfare platform engaged in the extended battlespace.

And this evolution will be largely software driven.

What makes the Triton different from the Advanced Hawkeye, P-8 or F-35 is that it is all software driven, in that there is no man onboard, although the man in the loop will be key both to the C2 role and the proliferation of the information garnered by the platform.

And the software on the platform also derives much of its capability from the software developed for the F-35. And onboard are scalable systems which provide for ongoing innovations in radar capability at very high altitudes.

According to Northrop Grumman, "Triton will support a wide range of missions including maritime ISR patrol, signals intelligence, search and rescue and communications relay.

The aircraft can fly up to 24 hours at a time, at altitudes higher than 10 miles, with an operational range of 8,200 nautical miles."

Again according to Northrop Grumman, there are four key systems onboard the aircraft:

A multi-function active sensor radar which provides "unprecedented 360 degree views for detecting and identifying targets at sea;

An automatic identification system which tracks ships;

An electro-optical/infrared MTS-B multi-spectral targeting system which captures both hi-res images and full motion video with multiple field of views;

And electronic support measures which identify and locate signals emitted from maritime vessels.

To get an update on the Triton, we visited Pax River and to meet with the program manager and his Triton program team.

Sean Burke is the program manager for the Persistent Maritime Unmanned Aircraft Systems Program Office (PMA-262), headquartered in Patuxent River, Md. He assumed command in December 2014 and is responsible for the development, production, fielding and sustainment of all persistent maritime unmanned aircraft systems, including the Triton Unmanned Aircraft System (BAMS UAS) and BAMS-demonstration program.

He was joined in the interview by Captain Tom Hoover and Commander Daniel Papp.

http://www.navair.navy.mil/index.cfm?fuseaction=home.displayBio&key=D84E96EA-7435-4AD0-AAF9-7954C95AE5CF

We started by discussing the Triton and its synergy with other new air platforms.

“We reach out across every available relevant enterprise in the Navy and beyond to find ways to make the Triton a better platform. We have a team lead in our office focused on interoperability.

“We are looking closely at the flow of data from out platform and how best use can be made of that data.

“From a technical perspective, we are focused on sharing radar technological development.

“And that started at the outset when Northrop came in and proposed a radar option, driven from the F-35 program, to give us something much better than the radar we were initially considering.”

And the sharing in this case between the Triton and the F-35 radar occurs at the cards, chips and processor level.

“The F-35 has a sunk cost in the cards, chips and processors to build its radar; we can use those same cards, chips and processors for ours.

“And as a software upgradeable platform upgrading those cards, chips and processors over time as well can provide improvements for the Triton as well. It is both a cost savings and technologically dynamic upgrade process.”

Both Papp and Hoover came from the P-8 program to the Triton program and illustrate the point driven home in Jax Navy of the commonality of the team developing and operating the two systems as a dyad.

“With the P-3 we of course shared data with the fleet and coalition partners.

“But the approach with P-8 and Triton is much different – it is web based. It is about sharing and acting on information in the operational force, whether to the surface ship, the Growler, the P-8 or the F-35”

And the new generation officers are growing up in this new operational environment.

“When deploying on the P-8 it was obvious that innovation started on the P-8 rail onboard the aircraft with the various systems operators.

“On the P-3, we were fairly narrowly constrained specialists; onboard the P-8 rail the operators may have a focus but are looking at the bigger picture as part of working their focus.

“And C2 is changing as well as the chat rooms established with the deployed force provide an opportunity for the operators to let one another know what is most important in their judgments about the information they are taking in – it is not just about conveying information into a giant data base.

It is about operators learning how to identify operationally the most important developments they are seeing and to convey those judgments and to send targeted information to the key elements of the combat force.”

And the Trion from this point of view is an "information sponge" but needs to be understood not simply as a collector of information but a platform manned by officers capable of making real time judgments on what they are seeing operationally.

"Our aircrews recognize that we will be the choke point if we do not pull in and disseminate simultaneously. We learned this lesson early on P-8 and are applying it to Triton."

In other words, the P-8 and the Triton are being developed and will operate as a dyad.

"We are shaping a maritime patrol and reconnaissance community.

"It is not two communities; it is one community, which applies multiple assets.

"The operator who is flying P-8 today will be flying Triton on the next tour.

"They will flow between being P-8 to Triton crewmen.

"We view it as a body of operators within a broader community who will learn how to operate multiple forms for the same common goal of ISR and ASW in the support of the fleet."

The team emphasized the key tactical role for the information, which the dyad generates for the fleet.

It is not about simply collecting information; it is about providing judgment as well as data to the fleet for its tactical missions.

"Our operators are looking at the tactical relevance of the information coming into the systems and providing both their judgment and data to the relevant assets engaged in the operation.

"It is the DNA of the new generation of operators to think cross platform and to think in information and decision terms."

They emphasized as well that the Triton program is set up to have regular interactions with the deployed P-8 fleet and with those operating the initial Tritons.

"We have a very strong feedback loop with operators and maintainers in the program.

"We have close ties with the fleet in terms of their operations and the evolving role of the P-8 prior to deploying Triton.

"P-8 operators come to Pax to operate our software and provide real world experience in our testing out of our evolving Triton software.

"We marry up the test pilot trained in developmental testing with P-8 operators with real world experience in shaping our evolving software on Triton."

The Navy liaison program becomes even more important as the Navy deploys software upgradeable platforms. As the platform cycles to the fleet, each iteration can be different and the fleet commander needs to understand what that "new" platform can contribute to the fleet.

"We are going to deploy the Tritons at Mayport which will provide a great opportunity given its proximity to Jax as well to shape cross-decking learning opportunities.

"The surface and subsurface officers know that in order for us to be successful, everyone else has to have a basic understanding of our evolving capability, so they can employ their weapons platforms more effectively."

A challenge seen on the Triton along with other software upgradeable platforms is shaping the kind of acquisition system, which can optimize the contribution of software upgradeability.

21st century air and maritime combat power is being built around a number of multi-mission systems which are themselves software upgradeable; but there still is a legacy mindset that platforms are hardware first and software second.

This means as well that you want to get these platforms into the hands of the operators to gain operational experience to guide software development rather than too rigid of a requirements setting process which can get in the way of actually using the platform today and leveraging that operational experience to drive further development of the platform.

The Triton to be deployed next year will meet the requirements set in the 2007-2008 timeframe with the software onboard the Triton to be deployed next year.

Then the team will look to evolve that basic capability into the next platform iteration of capability.

The Navy is looking to evolve the Triton from an ISR to multi-intelligence platform.

And that will happen with the evolution of the software much more than modification of hardware, yet the acquisition system is challenged to allow for the software driven flow for such a platform, rather than prioritizing hardware over software.

Editor's Note: For earlier articles on Triton, see the following:

http://sldinfo.com/triton-joins-poseidon-in-forging-a-21st-century-maritime-combat-capability-operating-a-dyad-rather-than-a-single-platform/

http://sldinfo.com/visiting-the-integrated-training-center-at-navy-jax-shaping-the-way-ahead-for-the-new-navy-combat-team-operating-p-8s-and-triton/

http://sldinfo.com/us-navy-mq-4c-triton-makes-persistent-progress-towards-deployment/

Editor's Note: On software upgradeability and 21st century air platforms, see the following:

http://sldinfo.com/from-troubled-to-trailblazing-program-the-wedgetail-and-21st-century-combat-innovation/

http://sldinfo.com/the-right-stuff-f-35-style-the-edwards-f-35-integrated-test-force-talks-about-the-roll-out-of-the-global-aircraft/

http://sldinfo.com/rolling-out-the-f-35-fleet-from-the-testing-perspective-an-interview-with-the-chief-test-engineer-for-the-f-35-itf-at-pax-river/

http://sldinfo.com/the-software-upgradeable-combat-aircraft-the-case-of-the-p-8/

http://sldinfo.com/whitepapers/the-f-35-with-software-upgradeability-built-in/

http://sldinfo.com/the-a400m-as-a-digital-aircraft-crafting-a-21st-century-baseline/

http://sldinfo.com/the-role-of-platforms-in-the-extended-battlespace-the-potential-impact-of-the-aussie-re-think/

Comments by Commander Papp as quoted in a NAVAIR article on Triton published June 22, 2016:

The Navy recently demonstrated two key capabilities for the Triton Unmanned Air System (UAS) program that will enhance future fleet operations.

During a flight test June 2, an MQ-4C Triton and P-8A Poseidon successfully exchanged full motion video for the first time inflight via a Common Data Link (CDL), marking another interoperability step for the program.

The test demonstrated Triton's ability to track a target with its electro-optical/infrared camera to build situational awareness for a distant P-8 aircrew.

"In an operational environment, this would enable the P-8 aircrew to become familiar with a contact of interest and surrounding vessels well in advance of the aircraft's arrival in station" said Cmdr. Daniel Papp, Triton integrated program team lead.

The MQ-4C Triton's ability to perform persistent intelligence, surveillance and reconnaissance within a range of 2,000 nautical miles will allow the P-8A aircraft to focus on their core missions.

Last week also marked the completion of Triton's first heavy weight flight that will expand Triton's estimated time on station significantly. Triton operated in the 20,000 foot altitude band in the heavy weight configuration for the first time and completed all test objectives. A second heavy weight flight on June 14 had Triton operating in the 30,000 foot altitude band.

"The heavy weight envelope expansion work will enable Triton to realize its long dwell capability and become the unblinking eye for the fleet," Papp added.

Triton is designed to fly missions of up to 24 hours at altitudes over 10 miles high, allowing the system to monitor two million square miles of ocean and littoral areas at a time. Since its first flight in 2013, Triton has flown more than 455 flight hours.

The Coming of Triton: Perspective from RAAF Edinburgh

06/16/2018

By Robbin Laird

During a visit to Australia in March 2017, I had a chance to visit South Australia and RAAF Edinburgh, which is near Adelaide.

At Adelaide, the Australian Navy will be building its new submarines and at RAAF Edinburgh the Aussies are standing up the other key element of their 21st century ASW capabilities, namely, the core P-8/Triton base.

I visited RAF Lossiemouth where the Brits are standing up their P-8 base and both the Aussies and the Brits are building 21st century infrastructure to support their new fleets of aircraft.

And certainly there will be cross learning between the two air forces as both face similar and large operating areas working with the USN and other ASW partners.

Australia is a cooperative partner in the P-8, somewhat similar to an F-35 partnership so are developing capabilities from the ground up with the USN.

And because they are a cooperative partner, FMS buyers will pay a fee to both the USN and the RAAF.

At Lossiemouth I discussed the new infrastructure with key RAF officials responsible for the effort, and that interview will be published later but the key role of standing up new infrastructure to support this effort is crucial to handle the new data rich airplanes, as well as the work with allies in operating the assets.

Having visited Norway earlier this year and having discussed among other things, the coming of the P-8 and the F-35 in Norway, it is clear that what happens on the other side of the North Sea (i.e., the UK) is of keen interest to Norway.

And talking with the RAF and Royal Navy, the changes in Norway are also part of broader UK considerations when it comes to the reshaping of NATO defense capabilities in a dynamic region.

The changes on the UK side of the North Sea are experiencing the standup of a P-8 base at Lossie, which will integrate with US P-8 operations from Iceland and with those of Norway as well.

In effect, a Maritime Domain Awareness highway or belt is being constructed from the UK through to Norway.

A key challenge will be establishing ways to share data and enable rapid decision-making in a region where the Russians are modernizing forces and expanded reach into the Arctic.

What was clear from discussions at Lossie is that the infrastructure is being built from the ground up with broader considerations in mind, which I am calling, building a 21st century MDA highway.

To the South, at Marham and Lakenheath, the UK and the US are shaping would clearly be an integrated operational capability reaching to Norway, Denmark and the Netherlands.

Flying the same ISR/C2/strike aircraft, the challenge will be similar to what will be seen in crafting the MDA highway as well – how best to share combat data in a fluid situation demanding timely and effective decision-making?

The UK is clearly a key player in shaping the way ahead on both, investing in platforms, infrastructure and training a new generation of operators and maintainers as well.

In this sense, the UK-US-Norwegian-Danish-Dutch interoperability will be a foundation for shaping 21st century security in the region.

It is as much about the US learning with the allies as the allies learning from the United States.

And at the heart of this learning process are the solid working relationships among the professional military in working towards innovative concepts of operations.

This is a work in progress that requires infrastructure, platforms, training and openness in shaping evolving working relationships.

The RAF is building capacity in its P-8 hangers for visiting aircraft such as the RAAF, the USN, or the Norwegian Air Force to train and operate from Lossiemouth.

The Australians are building a very interesting structure to support their P-8s and Tritons.

At the heart of the enterprise is a large facility where Triton and P-8 operators have separate spaces but they are joined by a unified operations centre.

It is a walk through area, which means that cross learning between the two platforms will be highlighted.

This is especially important as the two platforms are software upgradeable and the Aussies might well wish to modify the mission systems of both platforms to meet evolving Australian requirements.

I had a chance to discuss the standup of the facility with Wing Commander Mick Durant, Officer Temporary Commanding 92 Wing, Wing Commander David Titheridge, Commanding Officer 11 Squadron and Wing Commander Gary Lewis, , Deputy Director P-8 and Triton Transition.

Question: Obviously, you are working with the USN in standing up these two platforms. Could you describe that working relationship?

Answer: We've got an incredibly tight connection with the USN at the moment.

In fact, they're doing all of our initial transition training.

So they're taking our current P-3 aviators and converting them to P-8 in Jacksonville through the VP-30 training system.

There's an enduring connection, which everybody's going to benefit from in the long run.

We are P-3 operators and you need to realize that we developed indigenously a significant set of upgrades on our AP-3Cs that are not on the US P-3Cs.

In fact, some of these upgrades provided functionality in sensors that are similar to what we have so far on the P-8.

But the operating concept of the two airplanes is very different and we are working the transition from the P-3 to the P-8 which is a networked asset both benefiting from other networks and contributing to them as well as a core operational capability and approach.

The changes that are coming are very exciting.

So we're moving from an aircraft, which we've pretty much maximized, to a new one which is called P-8, for a reason.

This is an A model aircraft. So with an A model aircraft comes to the ability to grow.

And we're going to a new world with a starting point, which allows us to grow.

The capacity to integrate, innovate, and talk to our allies and our own services is a quantum leap in what we've had in the past and it will allow us to be able to do our roles differently.

Shaping that change is one of the key missions that we've got.

We are going to innovate and think out of the box compared to P-3 tactics and concepts of operations.

Question: You fly the Wedgetail and the P-8.

Even though the systems are different, there must be some cross learning opportunities?

Answer: There are.

We can start with the 737 aspects of operating both aircraft and the maintenance opportunities and challenges.

And we do train the electronic system operators on the Wedgetail.

And as we stand up we can connect the simulators as well to shape a broader approach to the capabilities the three aircraft can deliver, namely Wedgetail, P-8 and Triton.

There are many opportunities regarding the synergies between the E-7A and the P-8A that we are yet to explore.

Question: With an aircraft with a broader span of capability, there is the challenge of the demand side.

What about the challenge of meeting the needs of a broader set of customers?

Question: The MPA is a very flexible platform and has been in high demand by many customers.

That is both an opportunity and a challenge.

What it means it that is we will have to prioritize the missions and the customer base for the new systems and capabilities.

We have a large, expansive ocean that we need to patrol around Australia, a large region of interest and we have a small number of assets.

Tasking prioritization, discipline associated with that and getting that right so that we can maximize all those opportunities is key.

With the P-8, and family of systems with the Triton, we can deliver capabilities to many more customers at varying levels, ranging from the strategic to the operational tactical level.

Balancing that demand and getting it right is going to be challenging.

It's a bonus, it's a fantastic opportunity, but at the same time we can't do everything for everyone all the time.

That said, we have directed levels of capability that we will be able to meet.

Question: Let us talk about the way ahead and the advantages of being on the ground floor of the P-8 program.

How do you see those advantages?

Answer: In some ways, it is like having a two nation F-35 program.

Because we are a cooperative partner we have a stake and say in the evolution of the aircraft.

And this is particularly important because the aircraft is software upgradeable.

This allows us working with the USN to drive the innovation of the aircraft and its systems going forward.

We've been allowed to grow and develop our requirements collectively.

We think this is very far sighted by the USN as well.

I think we've got the ability to influence the USN, and the USN have had the ability to influence us in many of the ways that we do things.

We will be doing things differently going forward.

It is an interactive learning process that we are setting up and it is foundational in character.

Let's look at what we're actually generating at the moment.

We're generating generation's worth of relationship building, and networking between the communities.

We are doing that over an extended period of time.

For about three years we have been embedding people within the USN's organization.

There's friendships that are being forged, and those relationships are going to take that growth path for collaboration forward for generations to come.

When you can ring up the bloke that you did such and such with, have a conversation, and take the effort forward because of that connection.

That is a not well recognized but significant benefit through the collaborative program that we're working at the moment.

We are shaping integration from the ground up.

And we are doing so with the Australian Defence Force overall.

A number of exercises and training opportunities are designed to have all the three services integrated and working in the same complex battle space.

We're reworking the way we do business internally, let alone as a collective, or collaborative process.

It's a great opportunity with the new capabilities we've got to actually empower our forces for integration at all levels.

Question: With the focus for the past decade upon land wars, ASW skill sets have clearly atrophied for the key allied navies.

How have you dealt with this?

Answer: It is a challenge.

We've had to work hard to make sure that our skills did not atrophy to the point where we didn't have that capability.

And we've done that.

And we've done it on the AP-3C in time to move to the P-8 and take on all these new ways of doing business.

So I think we arrested that just in time, but it was a real risk that we faced as well.

Some can look at the new P-8/Triton dyad as delivering significant ISR and C2 capabilities into the battlespace and it will.

But we cannot forget our core mission – which is ASW or as you have described it Maritime Domain Awareness strike capabilities.

We're the only capability that does independent long range maritime strike.

That's the thing we need to work hard to maintain.

We need to make sure that we meet our preparedness requirements to provide long range ASW, and ASUW and those missions are key to the way we train, and do business.

This article was first published on April 28, 2017.

USCG Leverages Scan Eagle for the Cutter Fleet

06/14/2018

By AUVSI

After being awarded a United States Coast Guard (USCG) contract award, Insitu's ScanEagle UAS will be used to provide small UAS ISR services aboard the entire U.S. Coast Guard National Security Cutter fleet.

Valued at approximately $117 million, the service contract covers the installation and deployment of small UAS for 200 hours per 30-day operational patrol period. ScanEagle will be used for a variety of tasks, including conducting surveillance, detection, classification and identification operations.

The UAS will also be used to "support prosecution" by providing real-time imagery, data, target illumination, communications relay and other capabilities to the fleet, as well as other government platforms as needed.

Just two years ago, Insitu won the contract to provide small UAS ISR services aboard one National Security Cutter, the USCGC STRATTON. By January of this year, ScanEagle had directly assisted the ship's crews in seizing more than $1.5 billion of cocaine and heroin, as it played a major role in the USCG's record-breaking year for drug busts in 2017.

"When ScanEagle initially deployed with the STRATTON, we recognized what an incredible opportunity we had to partner with the U.S. Coast Guard to bring dynamic improvements to mission effectiveness and change aviation history," says Don Williamson, vice president and general manager, Insitu Defense.

The contract award also marks a major milestone for the acquisition process, notes Cmdr. Daniel Broadhurst, who served as unmanned aircraft systems division chief in the Office of Aviation Forces.

"The sUAS has already proven itself to be a transformational technology, and the deployment of this capability to the entirety of the NSC fleet is an incredibly important first step in realizing the Coast Guard's vision of fleet-wide UAS implementation," Broadhurst says.

"The Coast Guard is excited to award the contract for the service's first class-wide sUAS to Insitu."

http://www.auvsi.org/industry-news/insitus-scaneagle-provide-small-uas-isr-services-aboard-entire-us-coast-guard-national