



MARINE AVIATION PLAN 2016

MARINE CORPS AVIATION 2016-2026

As Deputy Commandant for Aviation, my responsibility to our Commandant and to our Marine Corps distills into a single word: READINESS.

1. Current Readiness

Our deploying squadrons achieve readiness “just in time”, but our next-to-deploy and non-deployed squadrons do not have the resources to train for the fight tonight or for the fight tomorrow. I am concerned with our current readiness rates, both in equipment and personnel. We have seen a decrease in flight hours per month per aircrew and an uptick in our mishap rates. Our T-ratings (our measure of mission readiness) are not where they need to be for our nation’s force in readiness and I will find the resources to turn that around.

In the past year we conducted two independent readiness reviews: first the Harrier Independent Readiness Review (HIRR) and most recently the Super Stallion Independent Readiness Review (SSIRR). We had dispassionate experts analyze every aspect of our daily operations, at every level from the operational to the depot. The lessons learned from the HIRR provided the model for the readiness recovery efforts we are now implementing across every tactical platform in the Marine Corps, focusing on manpower, materiel and training.



2. Future Readiness

The key to future material readiness is in transition. We are past the point where modernization (procurement) and current readiness intersect, and the two are now moving together. We are approximately halfway through the full transition of every tactical platform in our inventory. We are buying new aircraft and recapitalizing our squadrons with transformational technologies like 5th generation STOVL strike fighters, tiltrotors and soon new heavy lift helicopters and Group 3, 4 and then 5 UAS.

Marine Corps aviation will aggressively adhere to our readiness recovery plans across the board, making the necessary manpower, training and policy changes, funding the totality of the recovery plan and executing same. By doing so, we will achieve an across the board T-2.0 readiness by 2020.

MARINE CORPS AVIATION 2016-2026

3. Digital Interoperability and the MAGTF

Marine Corps aviation - the "A" in our MAGTFs - exists to support Marine ground forces.

In implementing the programs and concepts laid out in this Aviation Plan, aviation will be postured to support the MAGTF - operating at the MEF level all the way through disaggregated and distributed operations at the company level and below. With detachments capable of operating independently from disaggregated Amphibious Ready Groups (ARGs) and Special Purpose Marine Air-Ground Task Forces (SP-MAGTFs) around the world, to Marine Aircraft Groups and Marine Aircraft Wings ready to support major contingency operations, Marine aviation is ready to deploy and employ combined arms from the sea and from expeditionary forward bases under any and every threat condition in every clime and place.



MEFs, MEBs, Marine Corps SPMAGTFs and MEUs rely upon the operational agility provided by aviation. As the Marine Corps evolves, aviation will provide more flexible support; we continue to develop capabilities and technologies to support the future capabilities of company landing teams (CLTs), battalions, regiments and MEFs. Alongside the Navy, Marine aviation is organizing, training and equipping our forces for all domain access; maintaining freedom of action across the five domains of air, land, sea, space and cyberspace. As the Marine Corps continues to define the concept of “maneuvering within spectrum,” aviation is procuring gear that links all of our platforms to each other, to the GCE, the LCE, the Navy and our joint and coalition partners. Our goal remains ensuring every platform is a sensor, a shooter (to include an electronic warfare node) and a sharer – able to move relevant tactical information throughout the spectrum and across the battlefield at light speed.

MARINE CORPS AVIATION 2016-2026

Risk Areas: Materiel

We are laying out the capabilities we truly need to support our Marines in the final configurations of our legacy AH-1Ws, F/A-18s, AV-8Bs, KC-130Ts, CH-53Es, RQ-7s and TPS/TPQ radars. As the nation's force in readiness - for an unknown future fight that might be high end or low - we must prepare for the worst case by continuing our investment in and recapitalization of revolutionary technologies in new platforms like the MV-22, F-35, CH-53K and G/ATOR – and sea-baseable Group 4 and 5 UAS.

Manpower

We will enhance the professional development of our maintainers, logisticians and supply Marines and modernize our aviation material readiness strategies to ensure proper depth, capacity and reach to provide the sustainment we need to keep our ACE the most ready – all the time – and ready to deploy and fight on a moment's notice. We are identifying our best and most-qualified Marines and investing in them to safeguard our future capabilities and readiness. We are also resurrecting Project 21 (and building a Maintenance Training Instructor course and qualification) to provide the highest quality training, education, and standards for our maintainers – ultimately building a stratified training and readiness model, complete with a train-the-trainer model for our best aviation maintenance Marines – just like we have done for our Weapons and Tactics Instructors since 1978.



MARINE CORPS AVIATION 2016-2026

Training

We will continue our tried, true and successful sortie based training strategy, but we need to increase the amount of time our aviators spend in the air honing their currency, proficiency and combat readiness. Our Fleet Replacement Squadrons are fenced off, meaning they will always hold the seed corn of our future readiness. We will train for operations across the range of military operations and will do so in venues and exercises that extract maximum value for our training dollars. We will invest and link with our MAGTF teammates through virtual and constructive training to augment and complement our live training opportunities – for individual and unit training. Teamed with the Marine Corps Concept Development and Integration experts, our GCE, and the LCE, we will experiment aggressively with new concepts and new gear – ensuring that we are the ones who steal the march on our adversaries – not the other way around.

We have much work to do – but we remain on exactly the right track.

We exist to support the individual rifleman on the ground. To provide that support, my mission is to continue the attack to get new gear in the hands of our Marines as quickly as we possibly can – while extracting every ounce of capability possible from our legacy gear. The lessons we learned this year apply to every aspect of our manpower, materiel and training and will make us better prepared for tomorrow's challenges. Our efforts will ensure that Marine aviation and the United States Marine Corps are most ready when the nation is least ready.



Semper Fidelis,

A handwritten signature in black ink, appearing to read 'Jon Davis', is written over a light background.

LtGen Jon "Dog" Davis

Deputy Commandant for Aviation

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SECTION ONE

MARINE CORPS OPERATIONS AND READINESS

- 1.1 How We Fight
- 1.2 Aviation Combat Readiness
- 1.3 RBA Recovery/Independent Readiness Reviews



1.1 HOW WE FIGHT

Combatant commanders are demanding more dispersed, distributed and disaggregated forces, postured forward, ready to concentrate rapidly to achieve decisive results against any enemy- and to do so within hours. The *Cooperative Strategy for 21st Century Seapower*, revised last year, lays out a way ahead for all of us in the naval service to meet that demand. This plan calls for 300 ships in our Navy, with 33 of those amphibious ships. As U.S. forces move closer to shore in forcible entry scenarios, those ships and our units will likely disaggregate into smaller units, then re-aggregate on a fluid battlespace.

The Marine Expeditionary Brigade is the baseline, middleweight MAGTF, which we can aggregate for large-scale combat or break down into smaller, more agile teams below the MEU level, frequently down to the company landing team. We maintain a MEB-centric steady state for forcible entry, while the MEU is evolving, maneuvering and adapting, posturing its MAGTF for success – in an aggregated or disaggregated form; executing split operations, integrating SOF, working from prepositioned equipment and advanced expeditionary bases.



Due to a lack of ready amphibious carriers and ships we have built two Special Purpose MAGTFs and land-based them in Europe and the CENTCOM AOR. SPMAGTF– Crisis Response (SPMAGTF-CR) is becoming a high-profile task force for the Marine Corps. These SPMAGTFs, and our MEUs, are built around operational agility, and are highly dependent upon aviation. As an example, the SPMAGTF in Moron, Spain can reach across the Mediterranean to the countries of the North African littoral, and beyond...and they are staged and ready to move entirely by Osprey and the KC-130J, with support from joint tankers, joint ISR platforms, and joint CAS aircraft.

We expect that forward deployed MEUs and our SPMAGTF-CR forces will be foundational for addressing threats around the world for the foreseeable future (especially so until our inventory of amphibious ships match CCDR and national demand).

1.1 HOW WE FIGHT



The Ground Combat Element

The Marine Corps is built around the individual rifleman. The ground combat element base of maneuver is the rifle platoon, and the infantry Marine Corps is based around our 648 rifle squads. As the Marine Corps evolves, we will deploy our ground combat units with this in mind. Our air-ground team is anchored around infantry battalions, but we continue to build future capacity to employ – and even deploy - the rifle battalion as three separate CLTs, with company-grade officers and SNCOs assuming the authorities over large swaths of terrain which used to be the responsibility of commanders at the battalion level.

To support these small, agile teams, we must provide their leaders with more a range of fire support capabilities and technology: radios, optics, assault and maneuver support, vehicles and vertical lift. Those infantry forces will typically move and fight dismounted, and it is incumbent upon Marine Corps aviation to lift, resupply and support by fire those Marines on the ground. These teams, operating at longer range in smaller formations, will be supported entirely by air. That air will be orchestrated by Joint Tactical Aircraft Controllers (JTACS) and Joint Fires Observers (JFOs) at the platoon and squad level, with both air and ground Marines digitally interoperable with the entire MAGTF.

SEAPOWER IN ACTION: Sea Control & Power Projection

F-35B
Offensive Air Support

Disaggregated
Company Sized
Landing Teams

Littoral Penetration Sites
Beaches of Opportunity

ARG / MEU

ARG / MEU

**1 SEIZE
ADVANCED BASE**

**2 COMPOSITE CRISIS
RESPONSE FORCE**

**3 INTEGRATE
HEADQUARTERS AFLOAT**

Afloat
Staging Base

Fly-In Naval
Command Element

SPMAGTF
Aboard Amphibious Ship

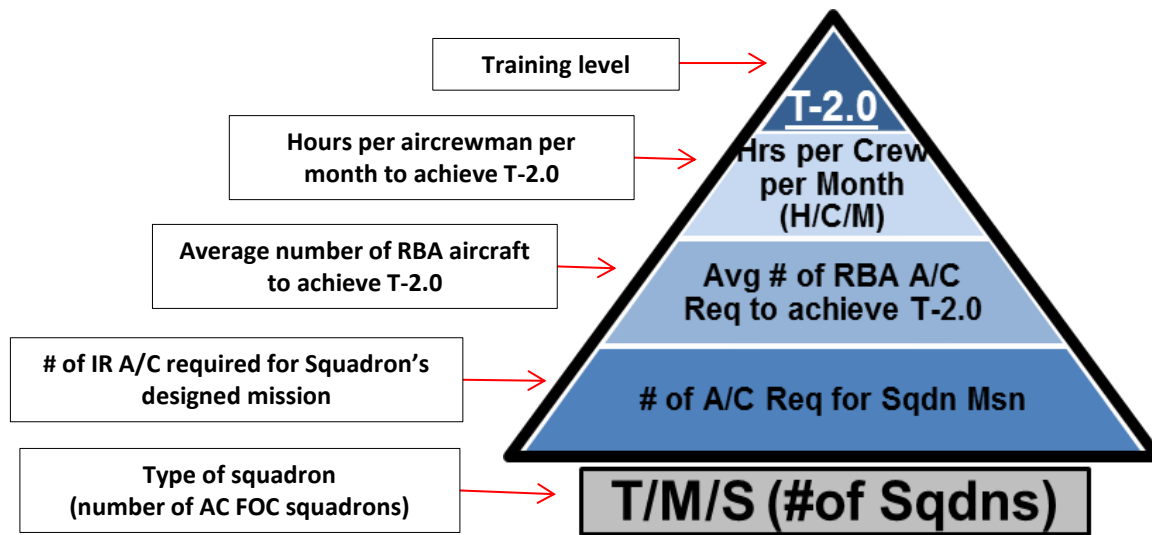
Prepositioned
Shipping

Carrier Strike
Group



1.2

AVIATION COMBAT READINESS



SQDN	T/M/S	Primary Mission Aircraft Authorized (PMAA)	Temporary Degraded PMAI	RBA Required for T-2.0	Hrs per Pilot/WSO/ECMO
HMH	CH-53E	16	12	7	15.1
HMLA	AH-1W	18		10	15.9
	UH-1Y*	9		6	20.5
HMLA	AH-1Z	15		9	18.2
	UH-1Y*	12		7	17.9
VMM	MV-22B	12		7	16.2
VMGR	KC-130J	15		9	23.9
VMAQ	EA-6B	6		3	15.1
VMA	AV-8B	16	14	11	15.4
VMFA	F-35	16		11	16
VMFA VMFA(AW)	F/A-18C/D	12	10	7	15.7

We need to increase the amount of time our aviators spend in the air.

- Our Marine aviators need more “looks at the ball” which equates to more flight time and more time in the simulator.
- The Core Competency Resource Model (CCRM) developed for each T/M/S calculates the number of hours each pilot/WSO/ECMO (or crew) must fly, based on the T&R manual, for a squadron to achieve the standards mandated for a training level of 2.0.

T-2.0: Squadron ≥ 70% METS trained

Our legacy gear will be ready until we are done with it. Improving the material readiness of our legacy gear—the key component to current readiness—is no easy task, but we must do it.

- T-Rating is derived from all squadrons’ reported T-Levels.
- It is one of the primary assessment metrics for the Naval Aviation Enterprise (NAE) to determine whether squadrons have the resources to *generate readiness*.

Highlighted in the RBA column are the number of RBA aircraft required daily (on average) for a properly-resourced squadron to maintain a ready posture.

- Properly resourced = correct number of personnel, aircraft and parts.

*HMLA PMAA is 18W/9Y and changes to 15Z/12Y once squadron converts to all upgrades aircraft.

1.3 RBA RECOVERY/INDEPENDENT READINESS REVIEWS

RBA RECOVERY PLAN

Twenty percent of the aircraft the Marine Corps needs to meet a T-2.0 flight goal are not available today. We are 55% short of the “up” aircraft we need to meet our Title 10 responsibilities. To increase the number of Ready Basic Aircraft and recover our readiness to meet flightline entitlement (FLE) warfighting requirements, we began a series of independent readiness reviews (IRRs) to identify both the issues and the resources necessary to turn this around.

INDEPENDENT READINESS REVIEWS

The Marine Corps conducted the first two readiness reviews during the past year: Harrier was first; CH-53E came next. These will be followed by similar reviews of the MV-22B program and the H-1 program in mid-FY16. The Harrier and CH-53E reviews were intensive and dispassionate, and gave us an in-depth look at the issues and concerns in each community, and at ways forward.



HARRIER INDEPENDENT READINESS REVIEW (HIRR)

The Harrier Independent Readiness Review (HIRR) identified a cost-effective strategy through the remainder of the Harrier platform's service life to produce a daily 11 Ready Basic Aircraft average per squadron equivalent, and 15.4 flight hours per pilot per month, in order to produce the required T-rating of 2.0.

The HIRR focused on three key areas, which were tied to aircraft reporting status:

- 1) Out of reporting aircraft,
- 2) Manpower deficiencies and/or inefficiencies, and
- 3) Materiel.

HIRR output was tailored to two key areas for action:

- 1) Maintenance and material, which included RBA degraders, depot maintenance timeline management, and supply system transition from Boeing to NAVSUP; and
- 2) Manpower, which included both contract maintenance and USMC manpower.

Since the HIRR, we have:

- 1) Established 66 RBA in operational squadrons as the single driven fleet goal for readiness, with 16 RBA aircraft needed in the FRS.
- 2) Identified key degraders, and ensured that the supply chains for these parts are re-energized.
- 3) Conducted executive-level engagement with all DOD agencies that have a supporting relationship with the AV-8B program.
- 4) Conducted executive-level engagement with key vendors and OEMs, ensuring that known deficiencies are being addressed.
- 5) Conducted a holistic analysis of the supply forecasting model for both the F402 engine and the air vehicle as a whole, resulting in improvements in the logistics system.
- 6) Ensured that funding levels for Program Related Logistics and Program Related Engineering are kept at acceptable levels.
- 7) Analyzed maintenance training

To date, we have seen an increase in overall readiness across the fleet; however, the increase is lagging the HIRR forecast. HQMC Aviation, in concert with the TMS lead (the MAG-14 commanding officer and the PMA), is actively engaged at the executive level with OEMs, vendors, and all DOD commands that have a supporting relationship with the AV-8B program, in an effort to continue to increase readiness to meet our readiness requirements by our target date of June 2016.

1.3 RBA RECOVERY/INDEPENDENT READINESS REVIEWS

SUPER STALLION INDEPENDENT READINESS REVIEW (SSIRR)

In response to CH-53E readiness challenges, the Super Stallion Independent Readiness Review (SSIRR) was chartered to identify issues and gaps and conduct root cause analysis for aircraft, aircrew and maintenance personnel readiness and to recommend the best courses of action for the CH-53E community to produce and average of 8 Ready Basic Aircraft (RBA) per squadron and 16.5 flight hours per pilot per month, in order to achieve and maintain T-2.0 until full operational capability (FOC) of the CH-53K in 2028. Findings and recommendations were focused on areas to improve combat readiness of the CH-53E fleet. Some key findings included: inadequate inventory; unacceptable availability of the remaining inventory; too many aircraft in maintenance outside the squadrons; and CH-53E aircraft not reset during and after the war. Recommendations focused on areas that could improve combat readiness of the CH-53E fleet, including increasing the total inventory of aircraft; reducing the number of aircraft not available due to maintenance and/or supply at squadron level; reducing the number of out of reporting aircraft; increasing the efficient use of those aircraft that are available; and improving the management of sustainment.

The SSIRR recommendations were categorized under surge and sustain recommendations. Surge recommendations included: reset fleet aircraft to full mission capability; follow through on full procurement of test equipment and Individual Material Readiness List (IMRL) items; provide contractor training teams to increase technical expertise; and configure fully Aerospace Material and Regeneration Group (AMARG) restoration aircraft. Sustain recommendations included: resource fully program-related logistics (PRL); increase technical support to squadrons; accelerate transition to T-64-GE-419 engines; and establish full performance-based logistics (PBL) contracts for parts.

With the purpose of returning fully mission capable aircraft to the fleet, and of ensuring a ready, reliable, and relevant heavy-lift capability for the Marine Corps through transition to the CH-53K, we have taken several readiness recovery actions since the SSIRR. These include a reset of the CH-53E fleet aircraft; acceleration of T-64-GE-419 engine modification; and restoration of two AMARG MH-53Es for the FRS to use as basic stick-and-rudder aircraft, to provide two CH-53Es back to the fleet. We are procuring test equipment and IMRL, while over-the-shoulder and functional check pilot contractor training efforts are in work. To increase readiness, HQMC Aviation, in concert with the program office and TMS lead, is actively engaged with all who have a supporting relationship with the CH-53E program.





T-2.0

**FLYING
HOURS**

**READY
AIRCRAFT**

**DESIGNED
MISSION**

FIRST TO FIGHT



- 
- 2.1 Marine Digital Interoperability and Cyber-EW Convergence
- 2.2 Marine Aviation Command and Control System
- 2.3 F-35 Joint Strike Fighter and Distributed STOVL Operations
- 2.4 Fixed-Wing Aviation
- 2.5 Tiltrotor Aviation
- 2.6 Rotary-Wing Aviation
- 2.7 Marine Unmanned Aircraft Systems
- 2.8 Marine Aviation Logistics
- 2.9 Marine Aviation Ground Support
- 2.10 Tactical Air Control Party
- 2.11 Science & Technology
- 2.12 Marine Aviation Training Systems
- 2.13 Marine Aviation Weapons and Munitions
- 2.14 Marine Aircraft Survivability Equipment
- 2.15 Marine Operational Support Aircraft

2.1 MAGTF DIGITAL INTEROPERABILITY AND CYBER/EW CONVERGENCE

MAGTF Digital Interoperability – Digital interoperability, or DI, is the seamless integration of Marines, systems and exchange of data, across all domains and networks throughout the MAGTF, naval, joint, and coalition forces, to include communication in degraded or denied environments, to rapidly share accurate information, provide greater situational awareness, accelerate the kill chain, and enhance survivability.

The interoperability goal is to provide the required information to the right participants at the right time, in order to ensure mission success, while improving efficiency and effectiveness. This approach provides the additional advantage of responsible spectrum use, which becomes increasingly important as spectrum demands increase, as technology advances, and our MAGTFs continually operate in more distributed and disaggregated manners. We continue to pursue integration and data exchange throughout the various arenas: situational awareness; aircraft survivability; intelligence, surveillance, and reconnaissance (ISR); fire support; and logistics.

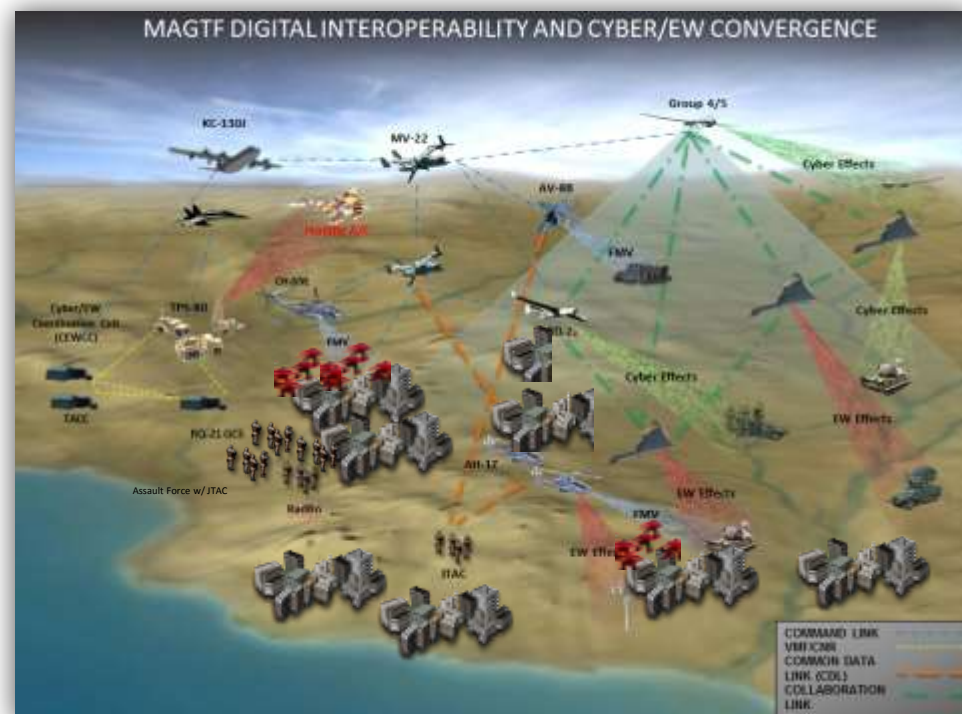
In order to validate our concepts, Marine aviation has adopted an “integration through innovation and experimentation” approach. This approach attempts to couple existing and emerging technologies and integrate them into mission threads to assess their operational viability inside of large scale MAGTF exercises such as the semi-annual Weapons and Tactics Instructor courses hosted by MAWTS-1, as well as the TALON REACH exercises. The inclusion of emerging technologies within mission threads offers several benefits, which include the refinement of existing requirements and validation of the concepts prior to formal requirements generation.

The 15th MEU assessment of digital interoperability, conducted in 2015, will assist in determining software-defined radio waveforms, airborne gateway implementation logic, mesh network data exchange, and tablet interface and employment. The effort will assist in determining the aircraft net ready key performance parameters that will facilitate the seamless integration, decreased kill-chain, and enhanced battlefield situational awareness throughout the MAGTF.

While this process is a significant paradigm shift, it allows for a more precise acquisition process while guiding and influencing future science and technology (S&T) investment funding efforts. This process often provides S&T initiative equipment to our operating forces that they can use to provide immediate capability enhancements for their required missions. There are several key technologies that allow for the exploration of these advanced concepts. These technologies include - but are not limited to - software defined radios, advanced waveforms, mesh networks, airborne gateways, and tablets.

Software Defined Radios – Software defined radios are redefining the way the Marine Corps will make the most of existing network architecture while keeping an eye on future networks and waveforms. Utilizing software defined radios allows for a software only change to radio hardware components and employment of a new waveform without having to change hardware configurations. While antennae and spectrum management will still need to be accounted for, this technology will eliminate the need to replace radio hardware systems when the Marine Corps adopts the use of a new waveform. Due to the vast networks and waveforms being used across the MAGTF, other services and allied nations, the Marine Corps is migrating towards software defined radios capable of communications on multiple waveforms simultaneously allowing for greater digital communication. The adoption of this technology and its capabilities will position the Marine Corps to be the warfighting force with the greatest flexibility in digital communications.

MEU Construct



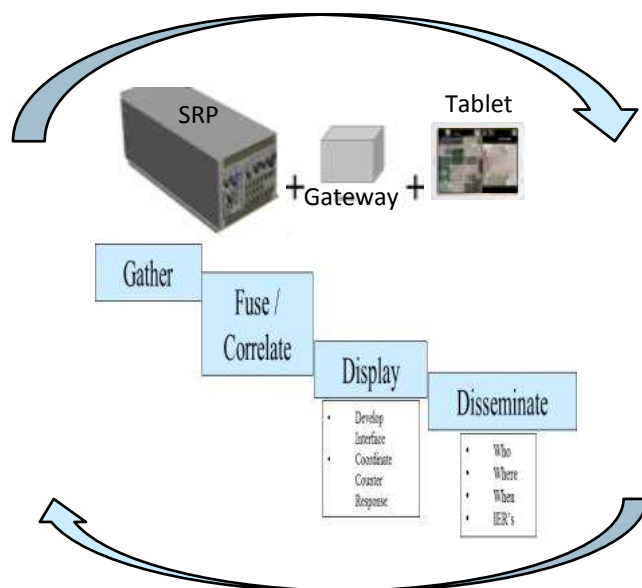
MAGTF DIGITAL INTEROPERABILITY AND CYBER/EW CONVERGENCE

Software Reprogrammable Payload (SRP)

SRP is a software defined radio program that has the capability of hosting multiple waveforms simultaneously while offering an advanced embedded multi-level security architecture known as the Programmable Embedded Infosec Product (PEIP). The MV-22 is the lead platform for SRP with integration commencing. The SRP is a spiral development program that is currently targeting several existing and emerging waveforms and is capable of adopting new waveforms in the future as they become available.

A software defined radio such as SRP has applicability across the entire MAGTF and can be used in a wide variety of platforms, both air and ground. Spiral development of SRP will continue to focus on the integration of new capabilities allowing it to not only replace existing systems but also provide for additional capabilities.

Advanced Waveforms and Mesh Networks – Marine aviation is currently exploiting multiple new and emerging data waveforms. As more entities within the MAGTF and naval service begin to develop the ability to communicate digitally, there is a growing need to develop new methods of exchanging their digital contributions. Given this need and the increase in operationally challenging environments, we need a graceful degradation of data communications.



The Marine Corps continues to define the concept of “maneuvering within spectrum.” This emerging concept will enable the Marine Corps to find the optimal portion of the electromagnetic spectrum to conduct its digital communication. Awareness of the surroundings within the spectrum is one aspect but the Marine Corps will also employ diverse networks and waveforms that allows for movement within that spectrum. Some of the existing networks and waveforms that will provide the Marine Corps with greater maneuverability in the future include the Tactical Targeting Network Technology (TTNT), the Adaptive Networking Wideband Waveform (ANW2), the Soldier Radio Waveform, Bandwidth Efficient-Common Data Link, and Link 16.

Airborne Gateways – Airborne gateways will serve as a conduit between disparate networks and waveforms on the current battlefield. Gateways possess the ability to receive one waveform/message type and process it into another waveform/message type before offboarding the data. Due to the inherent difficulties of replacing or adding new systems to some Marine aviation platforms, adding airborne gateways enables information exchanges across a variety of systems and networks. This increased prevalence of airborne gateways will provide data exchange capabilities throughout the MAGTF without each platform having to be equipped with every waveform currently being used on the battlefield. Airborne gateways, such as the Mesh Network Manager (MNM) currently employed as part of the CH-53K key performance parameter evaluation effort, utilizes a series of radios similar to the SRP program, and then conducts message translation and processing for dissemination.

MV-22 Airborne Gateway– The MV-22 will begin to integrate an SRP and associated gateway solution. The SRP, when used in conjunction with a gateway, will deliver an unprecedented capability to the MAGTF without significantly impacting current operations due to the reduced size, weight and power requirements. This construct is equally applicable to multiple air and ground platforms. This capability will also be complementary to the ongoing Network-On-The-Move (Airborne) initiative

MAGTF DIGITAL INTEROPERABILITY AND CYBER/EW CONVERGENCE

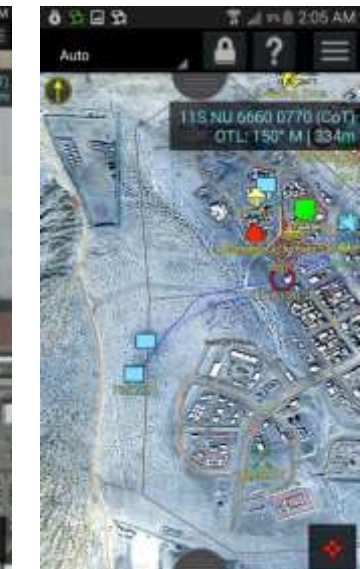
Tablets – Android tablets are emerging as one of the fastest and most effective ways to integrate new information sources into aircraft platforms, while ensuring security requirements. New aviation platforms come with highly integrated and complex operating systems that require years of development and testing prior to fielding. While necessary, this process is typically both time-consuming and costly. In many cases, incorporation of a federated tablet offers the aircrew or embarked Marines with new and relevant information without having to make modification to these operating systems.

This method of integration also allows for rapid modification to a particular application without significant testing to determine the impact on the aircrafts systems. Industry and general aviation have been successfully employing this model for years. Wireless or tethered Android tablets integrated with airborne gateway capabilities will also provide our ground forces enroute collaborative planning and objective area updates when embarked on and upon exiting an aircraft. Once on the ground, infantry forces will remain linked to the rest of the MAGTF by digital, integrated, robust, and flexible network architectures.

Applications depicting a real-time air and ground picture, full motion video, and embarked passenger manifest

Electronic Kneeboard (EKB) / Electronic Flight Bag- These programs are being developed to bring tactically relevant applications to the Android tablet environment, while also addressing administrative issues such as paperless publications. These applications include those that enable situational awareness and Digitally Aided Close Air Support (DACAS), such as applications like Kinetic Integrated Lightweight Software Individual Tactical Combat Handheld (KILSWITCH)/Android Precision Assault Strike Suite (APASS) [pictured below]. KILSWITCH/APASS is a model example of rapid innovation in support of our warfighting requirements. Applications utilizing RFID for personnel and cargo tracking aligned with ASLT/ASSAT manifest structure will continue to enhance situational awareness throughout the mission for all networked participants. Future opportunities to infuse mission related information extracted from EW and targeting sensors will further enhance kill chain execution and battlefield awareness for the end user.

Android Tablet



MAGTF DIGITAL INTEROPERABILITY AND CYBER/EW CONVERGENCE



Ongoing 15th MEU Digital Interoperability
 CDL: Full Motion Video
 Link-16: air/surface tracks
 ANW2: PLI/Chat/Image
 TTNT: High volume data
 SATCOM Voice or HPW
 WiFi tablets
 RFID: Pax accountability



SPMAGTF-CR-AF Today:
SIPR on the Move
 - KC-130J SATCOM:
 SIPR w/text, images

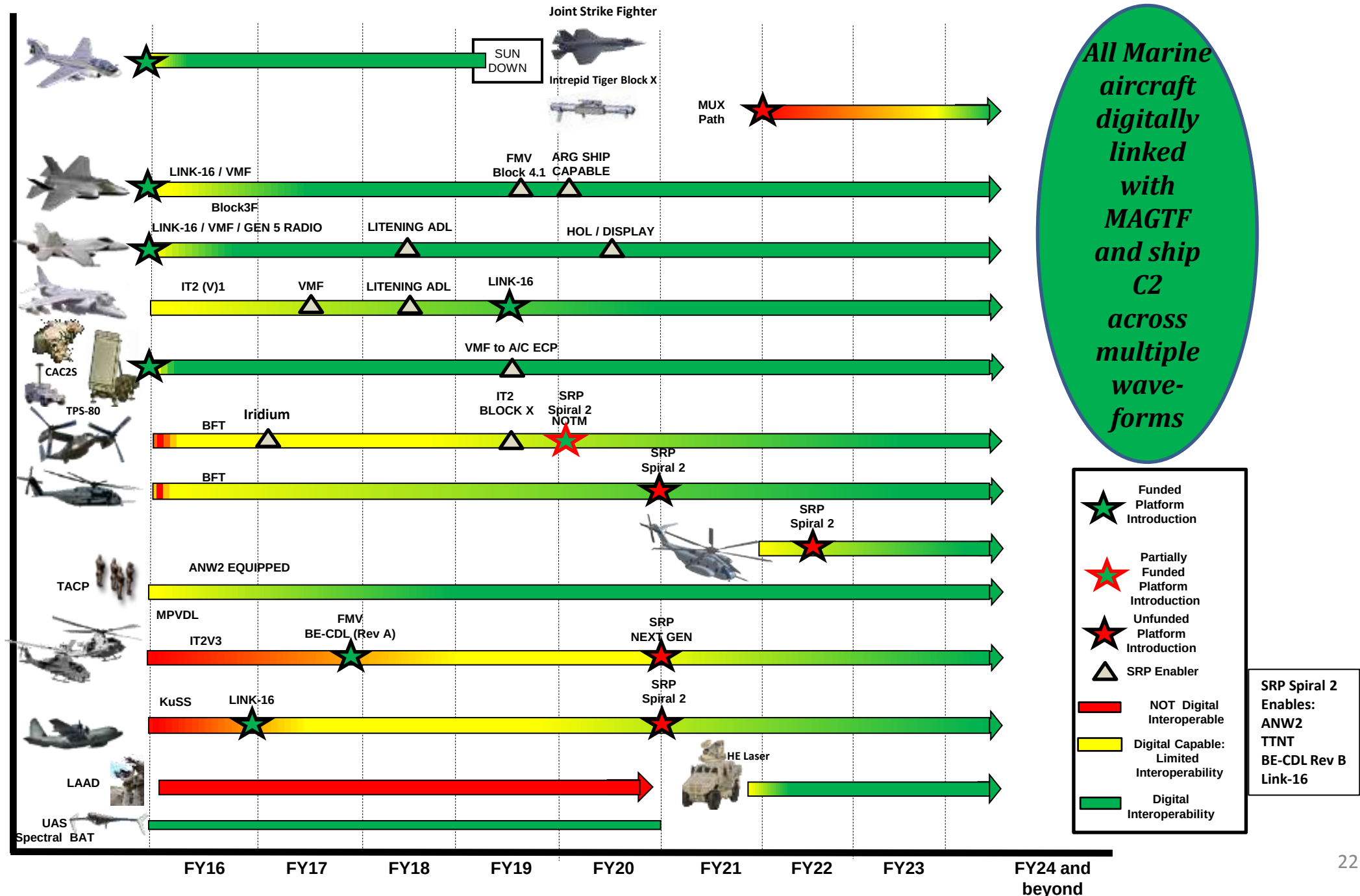
Phased Road Ahead:

1. Beyond-line-of-sight data capability for MV-22 SPMAGTF aircraft in FY17
2. UUNS proposal for limited 15th MEU capabilities for SPMAGTF
3. Software Reprogrammable Payload with an airborne gateway providing access for disparate networks to exchange data throughout the spectrum.



Sensor, Shooter, Node, Connector

“Our priority will be to procure gear that links together all of our ACE platforms, and in turn links the ACE to our brothers-in-arms on the ground and at sea”



MAGTF DIGITAL INTEROPERABILITY AND CYBER/EW CONVERGENCE

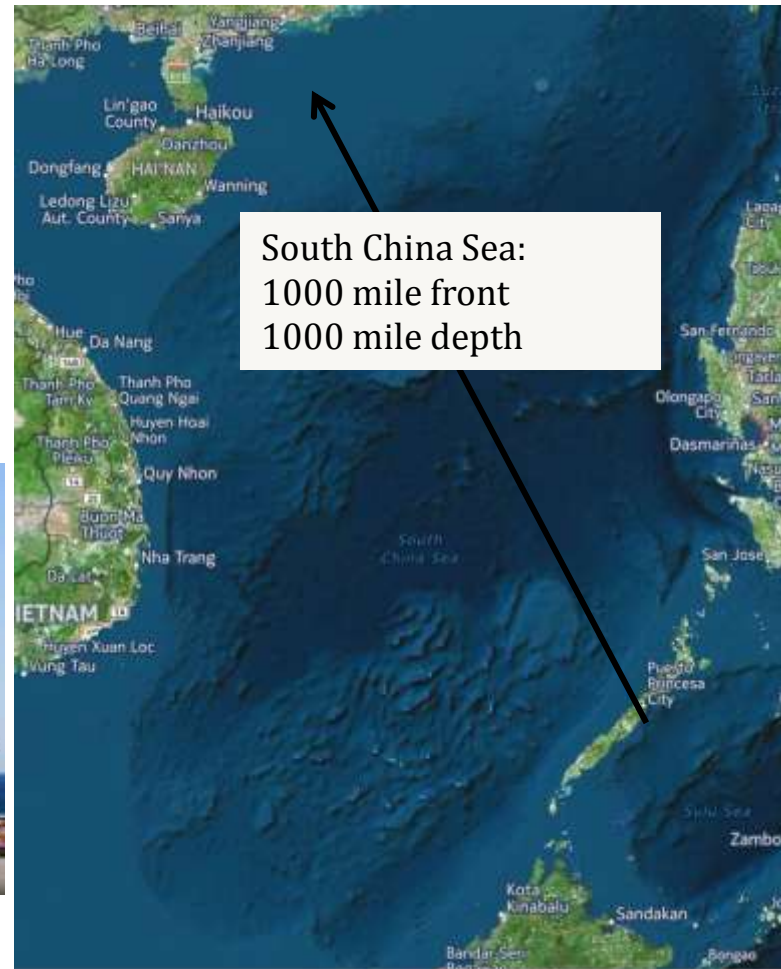
Sea-based/shore-based TACAIR requires digital C2 against high volume, high capability threat

F-35B Block 3C-3F 2015-2017:

- Link 16 w/TACP & MACCS for air/surface tracks, text, & imagery
- K-series messages w/TACP & MACCS for digital nine-line

F-35B Block 4 2019:

- CDL full-motion video



Phased Road Ahead:

- Continue to coordinate efforts with the F-35B Ship Integration Council, OPNAV N95, and HQMC CD&I for MAGTF sea-based C2 as outlined in the Afloat MAGTF C4 Required Capabilities (AMC4RC) Letter
- Build CONOPS for F-35 to plug into the battle force today, and develop MAGTF Advanced Capabilities CONOPS for the future battle force
- Upgrade Ship's Self Defense System (SSDS) and Consolidated Afloat Network Enterprise System (CANES), IOT enable ships' Link 16 for access to F-35 targeting data & digital air control
- Build ship use of VMF K-Series digital nine-line and of F-35 Block 4 CDL full-motion video
- Include aircraft in Naval Integrated Fire Control - Counter-Air (NIFCA-CA)

2.2 MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN



MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN



Marine Air Command and Control System Overview

Command and control is the means by which a commander recognizes what needs to be done and sees to it that appropriate actions are taken. It includes collecting and analyzing information, resource management, planning, communicating instructions, monitoring results, making decisions, supervising execution and making assessments. The Marine Air Command and Control System (MACCS) serves as the catalyst to the timely employment of Marine aviation assets, effective combined arms, and enabling MAGTF freedom of action throughout the battle space. The MACCS structure embodies the Marine Corps belief that:

No activities in war are more important than command and control. Through command and control, the commander recognizes what needs to be done and sees to it that appropriate actions are taken...it provides purpose and direction to the varied activities of a military unit. If done well, command and control add to the strength of a force.

-Marine Corps Doctrinal Publication 1-0, 2011

The MACCS provides the aviation combat element (ACE) commander with the agencies and assets necessary to exercise aviation command and control (AC2) and air defense in support of the MAGTF, naval, and joint operations. These agencies provide the ACE commander with the ability to execute the six functions of Marine aviation.

The MACCS is greater than the sum of its parts, a cohesive system made up of units from throughout the Marine Air Control Group (MACG). The MAGTF's structure, and our training, allows Marines to enjoy decentralized control of both ground and air forces providing greater flexibility and efficiency on the battlefield. Our philosophy is unique, resulting in closely integrated aviation and ground fires, reconnaissance, and other operations into an overall scheme of maneuver allowing for successful mission accomplishment. This seamless integration is accomplished and provided by the MACCS and only exists when all of the MACCS agencies are on the battlefield and expertly coordinating with their joint counterparts interpreting, integrating, and coordinating the MAGTF battle plan into the joint battle.

When command and control is functioning correctly, it affords the MAGTF commander the most lethal and responsive form of fire support available on the battlefield. Logistics occurs more rapidly and targets are identified and destroyed well before friendly ground forces come in contact with them. Efficient AC2 enhances safety of flight, giving the aviator an opportunity to assist when needed or direct where required, ultimately working collectively to accomplish the mission and satisfy the MAGTF commander's intent. An example of efficient AC2 are Operations IRAQI FREEDOM and ENDURING FREEDOM, where the MACCS functioned as a system. Greater efficiency and flexibility were realized, resulting in swift action from Marine aviation. Dynamic re-tasking of missions quickly supported rapid changes in battlefield events. Aircraft were diverted to trouble spots as needed within minutes. Further, ground-based fire support was requested, air cleared, and missions fired near simultaneously.

Since 2001, our current systems and organization construct have proven successful during combat operations. Looking into the future, the Marine Corps is rebalancing to support increasingly dispersed operations by smaller, task-organized forces over ever-greater distances. The fielding of CAC2S, and TPS-80 combined with CTN will allow the MACCS to employ additional C2 nodes over a greater geographical area. The MACCS must examine its organizational and training pillars to maximize capacity to support an increasingly distributed MAGTF.

The MACG commander must be able to employ task-organized AC2 nodes capable of providing task-organized MACCS capabilities supporting military operations. These agencies will be highly expeditionary and capable of seamless expansion based on evolving situations. There will also be a focused effort to support forces afloat. We will re-engage with the Navy and recommend where integration of command arrangements and control functions may provide a more cooperative and integrated blue/green solution for the AC2 of MAGTF assets afloat.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

The future MACCS will be expeditionary; able to operate in a distributed manner; capable of fusing and integrating AC2, sensor and weapons data across the joint force to provide shared situational awareness and increase the decision space for the MAGTF commander. Because of the unique position as the integrator between the ACE and GCE, the MACCS must ensure the ability to bridge divergent communication efforts within the MAGTF and joint force by providing beyond line-of-sight (BLOS) tactical data links (TDLs), data forwarding, radio relay, tactical gateways, and ground-based air defense (GBAD) capable of engaging low RCS targets. This vision will be realized with the fielding of CAC2S phase II, TPS-80, and future GBAD weapons systems:

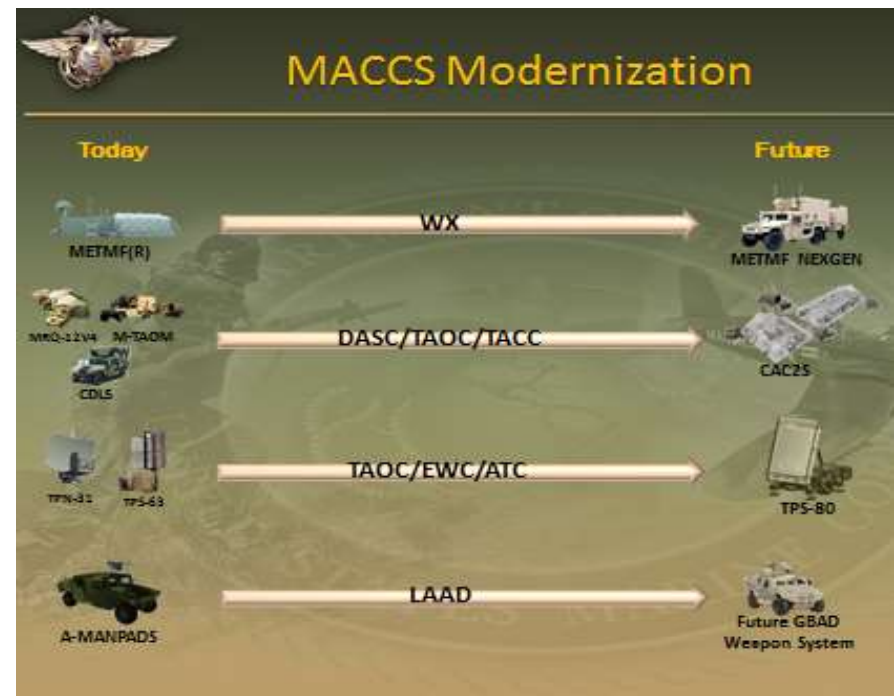
Common Aviation Command and Control System (CAC2S) – will fuse weapons and sensor data into a single integrated display, and serve as the integrator and gateway of waveforms between the ACE and GCE.

AN/TPS-80 Ground/Air Task Oriented Radar (G/ATOR) – is a 3-D, medium range radar that gives the MAGTF commander unparalleled detection within their AO while also providing fire control quality data supporting Integrated Fire Control (IFC) concepts.

Composite Tracking Network (CTN) – is a land-based version of the US Navy's (USN) Cooperative Engagement Capability (CEC) which is a fused radar network providing sensor quality data to weapon systems.

Directed Energy (DE) – provides exceptional air defense capabilities versus the low observable/low radar cross section (LO/LRCS) threat when integrated with CAC2S, TPS-80, and CTN. DE provides a low shot-cost, deep magazine, precision accuracy, speed of light engagement solution for knocking down hostile UAS IEDs as well as hostile ISR UASs supporting indirect fires threatening both our Marines in the field and our high value aircraft on the ramp.

The most critical resource in the MACCS is the individual Marine. As we transition to a common set of equipment, new operational concepts, and operations in complex battle spaces, we must transition to a training paradigm that provides baseline knowledge for all AC2 operators to excel. The goal for MACCS operators is to become air command and control experts who will assist the commanders and decision makers in receiving and interpreting operational information and translating this information into effective direction and control for the platforms operated by Marine aviation.



For our tactical control agencies, OEF and OIF have shown that many of the skillsets that were formerly exclusive to either the DASC or TAOC have begun to converge. For example, the clearance requirements for extended range munitions have made knowledge of the ground situation and MAGTF fires critical to TAOC mission success. The proliferation and persistent presence of UAS and civilian aircraft throughout the area of operations (AO) has highlighted the DASC's need for an air picture. Integration with Special Operations Forces and the increased capabilities of new MAGTF platforms, such as the F-35B and MV-22, have also blurred the lines between these two agencies.

Marine Air Traffic Control (MATC), normally focused upon airspace requirements in and around the airfield, has become more involved in the clearance of fires and the safe integration of new platforms and UAS into operational airspace. Recent history has also shown the need for the ACE to protect HVAs. This mission falls clearly within the purview of the Low Altitude Air Defense (LAAD) battalion.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

Tactical Air Command Center – The TACC provides the MAGTF with the ability to plan and execute an air tasking order (ATO) in direct support of the MAGTF, integrate with the joint force, and seamlessly absorb the support of coalition forces through its flexible design. The TACC will provide the functional interface for employment of MAGTF aviation in joint and multinational operations.

Tactical Air Operations Center – The TAOC distributes the air picture to the MAGTF and joint commands while controlling deep air support, aerial refueling and anti-air-warfare (AAW) operations and routing itinerant aircraft. Newly fielded systems have transformed the TAOC into a highly mobile AC2 agency. With the completed fielding of the CTN, the TAOC will contribute to Naval Integrated Fire Control-Counter Air (NIFC-CA) where it can provide engageable, fire-quality track data. The combined capabilities of CAC2S, CTN and the future TPS-80 have put the TAOC at the forefront of force protection for the MAGTF.

Direct Air Support Center – The DASC is the critical link between the ACE and GCE within the MACCS. During OEF/OIF operations, the DASC has continued to conduct its core mission of processing immediate requests for air support and has also expanded its ability to control ever increasing and complex volumes of airspace. With the fielding of CAC2S Phase I, the DASC now has a standard set of equipment for a near real-time air picture used to enhance situational awareness and increase safety of flight in the assigned airspace.

Marine Air Traffic Control – MATC detachments provide all-weather services to friendly and civilian aircraft operating in support of the MAGTF or within their assigned airspace. The continued development of the highly expeditionary ATNAVICS has ensured MATC's ability to meet mission requirements across the range of military operations (ROMO) with increasing interoperability with the MACCS.

Meteorological and Oceanographic – The Meteorological and Oceanographic (METOC) section, resident in the Marine Air Control Squadron, is tasked-organized to provide direct support to the ACE. It is equipped to support a variety of MAGTF deployments and operations. With the fielding of the Meteorological Mobile Facility (Replacement) Next Generation [METMF(R) NEXGEN], the METOC section has become a highly maneuverable capability that provides environmental products and mission impact assessments to the MAGTF commander and is currently being employed in Afghanistan. Additionally, METOC Support Teams (MST), sourced from either the MACS or the intelligence battalion, will utilize the stand-alone Naval Integrated Tactical Environment Subsystem Variant (IV) (NITES IV) to provide expeditionary METOC support to forward operating bases (FOBs), Marine Expeditionary Units and Special Purpose MAGTFs.

Low Altitude Air Defense Battalion – The LAAD battalion's capability to provide air and ground defense of airbases and MAGTF HVAs in an evolving battlespace is a critical tool for the ACE commander to meet their force protection and AAW responsibilities. LAAD successfully conducted ground defense of FOBs and security force (SECFOR) tasks during OEF/OIF for more than ten years. The SECFOR tasks included internal and external security along with tactical recovery of aircraft and personnel (TRAP), and training of indigenous and coalition forces in counterinsurgency operations. The LAAD battalions are the only dedicated Marine Corps asset that is able to provide three dimensional SECFOR to defeat an adversary's threat to destroy MAGTF HVAs.

Marine Wing Communication Squadron – MWCSs will continue to be in demand for data pathways between ACE, MAGTF, and joint/coalition elements. The MWCS incorporates numerous systems ranging from single-channel radio to systems with an emphasis on interoperability and BLOS communications for a broad spectrum of information services. These services include video, multimedia, data, and imagery which enable the ACE with a reliable communications architecture.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

Aviation Command and Control Family of Systems

As we look to the future, the strategy to modernize the MACCS is synchronized with the arrival of our new, key platforms. The speed, range, and operational flexibility of the MV-22, and the firepower and electromagnetic spectrum dominance of the F-35B are new capabilities the MACCS, via its own advances, must fully exploit for the MAGTF commander. The AC2 family of systems (FoS) provides key material enablers that are on track to field to the operating forces and to modernize the ACE. The AC2 FoS is a set of related, scalable, and modular systems, which the MACCS can arrange or interconnect in various configurations to provide different capabilities. The mix of systems can be tailored to provide desired capabilities, dependent on the situation or mission assigned. The AC2 FoS includes the CAC2S, CTN, TPS-80 G/ATOR, and TPS-59 long-range radar.

Command and Control Systems

Common Aviation Command and Control System

CAC2S is the foundational command and control system of the future AC2 FoS. Increment 1 of CAC2S replaces equipment used by the TACC, TAOC, and DASC. Increment 1 is being developed and fielded in two phases:

Phase 1 replaced equipment in the DASC and is employed in conjunction with the Mobile TAOM in the TAOC. The TACC received improved communications capability from Phase 1 by upgrading the AN/MRQ-12v4 to the MRQ-13. CAC2S Phase 1 has completed fielding twenty systems.

Phase 2 completes the development and fielding of Increment 1 by including sensor integration and data fusion. Data fusion is accomplished through combining real-time sensor data (TPS-59, TPS-80, external sensors via a sensor network) correlating tactical data links (TDLs) and associating non-real time track data (TBMCS, AFATDS, IOS) in order to develop and display an integrated tactical picture. The result is an integrated situational display that can be manipulated by an operator to effectively command and control air operations. Phase 2 will also translate GCE waveforms (K-Series messages) into ACE (Link 16) waveforms. CAC2S's ability to translate these messages will increase situational awareness and information exchange throughout the MAGTF. CAC2S phase 2 fields common software and hardware to the TACC, TAOC, and DASC providing a modular and scalable capability across the MACCS.

The size and capability of these agencies will vary based on mission requirements. The future concept of employment for CAC2S is to create operational facilities capable of performing any AC2 function within the MACCS. The CAC2S Phase 2 Aviation Command and Control System (AC2S) will integrate the signal data element (UGS-4B) of CTN as its sensor interface and utilize the CTN antenna trailer to link into the network.

Composite Tracking Network – CTN is a land-based version of the USN's Cooperative Engagement Capability (CEC), which is a radar network providing fire-quality data to weapon systems. CTN provides command and control systems and firing units high rate targeting data. CTN/CEC is the primary network enabling Integrated Fire Control (IFC), the concept that provides multiple engagement solutions for MAGTF weapons systems. Furthermore, CTN extends USN Sea Shield/Sea Strike concepts inland by providing fire quality data to Aegis beyond its fire control radar. This accurate high rate data can provide the Navy with an opportunity to expand Aegis engagement solutions that protect the sea-base and sustain combat forces ashore. CTN will be employed with organic MACCS air defense radars ensuring a fused radar picture within the operational environment. Current Authorized Acquisition Objective (AAO) of ten systems has completed fielding.



Theater Battle Management Core System - TBMCS is a Joint Chiefs of Staff-mandated air war planning tool for the generation, dissemination and execution of air tasking orders and airspace coordination. TBMCS is the primary system utilized for airspace command and control, assault support processing and execution, and provides the ACE commander the ability to support the Joint Force Air Component Commander (JFACC). In the future, TBMCS is programmed to be replaced by the Command and Control Air Operations Suite - Command and Control Information Services (C2AOS-C2IS). This program is intended to develop, field, and sustain modular net-centric command and control applications and web-enabled information that will allow operators to plan and execute joint air operations.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

Sensors

AN/TPS-80 Ground/Air Task Oriented Radar

TPS-80 is a highly expeditionary, medium range multi-role radar able to detect low observable/ low radar cross section (LO/LRCS) targets, such as cruise missiles, rockets, artillery, and mortars (CRAM), UAS, and aircraft. TPS-80's expeditionary multi-role capabilities represent the next generation in ground radar technology and will provide greater accuracy, detection, target classification, and performance against new and evolving threats and enemy countermeasures. TPS-80 is being developed and fielded to cover both aviation and ground missions and will replace three in-service legacy systems. Each TPS-80 block consists of common hardware with different software applications that can be adjusted to pace the threat for decades.

TPS-80 Block I Air Surveillance Radar will provide the MACCS with a real-time display of all medium range air activity. Its ability to detect LO/LRCS targets will provide early warning and enhance force protection. TPS-80 Block I track data will interface with CAC2S and augment other sensor data to create a single composite track within the CTN/CEC network, improving opportunities for engagement of airborne threats. In the littoral combat zone, it will enhance force protection for USN Sea Shield/Sea Strike concepts by providing target cueing and early warning through the CTN/CEC network. Fielding will begin for TPS-80 Block 1 in FY18 with all seventeen systems fielded by FY24.

TPS-80 Block II replaces the GCE's AN/TPQ-46 and will provide counter battery target acquisition and detection for CRAM. TPS-80 Block II, known as the Ground Weapons Locator Radar (GWLR), will be capable of 90 or 360 degrees of coverage while extending range and increasing accuracy when compared to currently fielded counter battery/fire finder radars.

TPS-80 Block IV Expeditionary Airport Surveillance Radar (EASR) is the ASR replacement for ATNAVICS. This radar will provide a common ASR radar within the MACCS and bring MATC fully into the MAGTF digital interoperable network. This will provide the MAGTF commander the interoperability required to support a Base Defense Zone (BDZ) with longer range surveillance, increased TDL integration, weapons cueing, IFC, and MATC integration within the National Airspace System (NAS) and International Civil Aviation Organization (ICAO) ATC Systems

AN/TPS-59 Long Range Radar

The improved TPS-59v3 radar provides the MAGTF and joint force with an expeditionary long range radar capable of ballistic missile detection. It is the principal MAGTF sensor that contributes composite track data to CTN/CEC networks and will integrate with CAC2S. The TPS-59 provides TBM detection capability which is transmitted via Link 16, delivering early warning, targeting, and launch and projected impact point data with an accuracy range of two to ten kilometers, enabling the joint force to conduct force protection and attack operations. TPS-59 increases the joint force's ability to truly conduct IAMD.

Marine Air Traffic Control Systems

The MATC equipment portfolio is a system of systems (SoS) that supports expeditionary MATC from an MATC Mobile Team (MMT) up through multiple main airbases (MAB) in sustained operations. This SoS includes MATC command, control, and communications (C3); towers; navigational aids (NAVAIDS); and air traffic control (ATC) radars.

MATC Towers

AN/TSQ-120C expeditionary ATC tower and AN/TSQ-216 Remote Site Landing Tower (RSLT) will be modernized into an expeditionary tower system (ETS) that is lighter, mobile, and scalable to meet the range of military operations, and maximizes use of existing infrastructure. A common, scalable, remote-able mobile communications and control package will support the ETS.

MATC Navigational Aids

The Legacy AN/TRN-44 TACAN is being replaced by the AN/TRN-47 v(2) Airfield Mobile TACAN (AMTAC), a lighter trailer-mounted system that maintains current capability while reducing size, weight, logistical requirements and setup time. The AN/TRN-47 initial entry TACAN will be replaced by a lighter system capable of one-man transport (including power source), providing better MEU support.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

AN/TPN-31A Air Traffic Navigation, Integration, and Coordination System –ATNAVICS is the fielded Airport Surveillance Radar (ASR) and Precision Approach Radar (PAR) for the MATC detachments. ATNAVICS will bridge expeditionary MATC to the TPS-80 Block IV EASR. As a bridging system, all modernization efforts in ATNAVICS are focused on MATC mission essential tasks (METs) including radar range extension to 60 nautical miles and upgrade of the AN/TYQ-164 ATNAVICS Data Link System (known as Range Guardian) to support two-way TDL information exchange.

MATC Future Systems- The future MATC detachment will have CAC2S combined with TPS-80 Block IV. This will provide the MAGTF with state-of-the-art capability to send and recover aircraft. Furthermore, these new systems will protect HVAs at airbases by providing accurate track data to future GBAD weapons systems.

Precision Approach Landing Capability Roadmap – This effort has been established as a transition from precision approach radar (PAR) systems to emerging global positioning system (GPS) technology in order to provide Marine Corps aviators a self-contained cockpit “needles” precision approach in all operational environments (expeditionary, ship, and shore.) Joint Precision Approach Landing System (JPALS), due to the current fiscal environment, was dramatically scaled back to fund ship systems only. For the Marine Corps, this will provide a precision capability on all LHA and LHD amphibious ships to support the F-35B, and on all carriers to support the F-35C. Marine aviation will leverage maturing GPS technology to bring a self-contained precision approach landing capability (PALC) to MATC that is worldwide deployable.

METMF(R) NEXGEN - The METOC sensing equipment is the Meteorological Mobile Facility (Replacement) Next Generation [METMF(R) NEXGEN]. The METMF(R) NEXGEN is a highly mobile, fully integrated, FORCENet compliant, tactical meteorological support system which delivers relevant, timely METOC products and mission impact assessments to the MAGTF and joint force as required. The NEXGEN is a comprehensive environmental sensor capable of employing a Doppler weather radar, receiving weather satellite photos, launching weather balloons to receive upper-air data and predicting expeditionary airfield local weather.

When employed as a standalone sensor and production capability, the METMF(R) NEXGEN’s organic NOWCAST program downloads the Navy Global Environmental Model, current alphanumeric and area of responsibility upper-air data to produce an initialized weather depiction. When both NIPR and SIPR are available, the METMF(R) NEXGEN operates as a reach-back system, utilizing both national and international weather information which allows the MAGTF commander the ability to exploit environmental information in support of combat and combat support operations.

Weapons

Air defense is in the initial phases of transitioning to an improved IAMD family of system while continuing to provide integrated, low-altitude, GBAD and ground security of MAGTF HVAs.

The GBAD Initial Capabilities Document (ICD) was signed by the Assistant Commandant of the Marine Corps (ACMC) and identifies gaps and the required capabilities of the Stinger Missile replacement system. The GBAD ICD identifies the primary threat to the MAGTF as the LO/LRCS UAS. The secondary threats are fixed wing (F/W), rotary wing (R/W), and cruise missiles.

The UAS and CM threat has outpaced the current program of record, the Stinger missile. The Stinger missile is also not financially proportional nor operationally adequate to engage the inexpensive UAS (\$10,000 and below) threat. In order fill this capability gap and reverse current air defense kinetic strategy, the Marine Corps intends to invest in non-kinetic (directed energy) and improved kinetic (missiles and guns) technologies that create a cost-exchange ratio that favors the MAGTF and increases organic counter UAS and CM capabilities.

The LAAD gunner will also transition: from using the human eye to detect, identify, and engage targets, to BVR engagements to defeat asymmetric air and ground threats using organic/non-organic fire control quality data to protect HVAs. This data provides the LAAD gunner with the situational awareness to monitor and understand the air/ground battle space and evaluate friendly, enemy and neutrals that are in range of the future GBAD weapon system. This requires the ability to share, exchange, and correlate fused information and sensor data across multiple agencies to facilitate real time coordination, collaboration, and decision making; therefore, we must leverage current investments in sensors and C2:

- Sensor investment: TPS-80 G/ATOR provides ability to accurately detect LO/LRCS air threats.
- C2 investment: CAC2S and CTN provide integration into netted and distributed fire control architecture.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

The Marine Corps is investing in the modernization of current weapon systems and LAAD equipment. We are:

- Fielding remaining AMANPADS Inc 1 to provide a common tactical picture (CTP) that enables timely cueing for LAAD firing teams and enhances aircraft identification and target acquisition to engage hostile air threats against the MAGTF. AMANPADS Increment I is a C2 bridge for CAC2S and the Composite Tracking Network.
- Executing joint Service Life Extension Program (SLEP) for Stinger Block I Missiles in 1QFY14. The SLEP extends the shelf life to 2026 and serves as a bridge until another kinetic MDD capability is determined.
- Monitoring the on-going High Energy Laser (HEL) weapon system Office of Naval Research (ONR) S&T initiative, which supports a MDD to transition non-kinetic technology to a POR in FY18, with a planned IOC of the future GBAD Weapons System in FY26.
- Upgrading and modernizing LAAD Simulators.
- Developing, sourcing, and fielding a day/night sight to enhance the effectiveness of the Stinger Block I missile against UAS targets.
- Developing, sourcing, and fielding a Mode 5 IFF capability by 2020 to conform to DoD-directed fielding requirements.

Future Marine Air Command and Control System Concepts

MACCS agencies have proven their utility supporting combat operations for over seventy years. The future MACCS will continue to be tactically flexible, readily scalable, and capable of rapid deployment. It will be manned by tactically and technically proficient AC2 Marines positioned to support the ACE/MAGTF commander in the execution of missions across the ROMO and will be interoperable with the joint force and aligned to support capstone operational concepts.

Future MACCS Employment

Marines in combat will always need varying degrees of air support, air defense/surveillance and a command post for the ACE. Because of this, current agencies and unit organization will remain the baseline and point of departure for any near-term MACCS re-organization. As the Marine Corps rebalances its forces to support increasingly dispersed operations with smaller forces over greater distances, aviation must adapt by providing new AC2 employment options for the MAGTF commander both ashore and afloat. These options must continue to provide task-organized, expeditionary, and state-of-the-art AC2 functionality.

MWCS detachments will provide the data communications requirements for a multi-functional C2 node providing planners more flexibility as data and long range communications will be internally sourced. Common data supporting shared awareness, automated decision aides, and distributed collaborative planning enables the aviation command & control to link warriors, weapons platforms, and targets, massing

desired effects in a timely manner. The ability to command and control dispersed forces as they aggregate will become a core competency in this new force construct as highlighted by dispersed forward presence and quick crisis response. Balanced, expeditionary multi-functional nodes are ideally suited to respond quickly to global contingencies and allow for the seamless expansion of AC2 as the situation evolves.

Amphibious Command and Control Operations

The Commandant's updated planning guidance reaffirms that the Marine Corps is a critical portion of our integrated naval forces, designed to project power ashore from the sea. Our partnership with the Navy enables a forward-deployed and engaged force that shapes, deters, responds, and projects power well into the future. Marine aviation must re-engage with their Navy counterparts to determine where integration of command arrangements and control functions may best provide a more cooperative and synergistic blue/green solution for the AC2 of MAGTF assets afloat.

The MAGTF commander must possess the ability to command and control their forces in support of an ever distributed and increasingly diverse mission set. As part of this they must also be able to provide the full range of MACCS capabilities from the sea base during STOM operations.

USMC Aviation & Tactical Air Control Group (TACGRU) leadership are integrating aviation command & control Marines into sea-based operations in order to optimize MAGTF littoral capabilities. Current lines of effort include aviation command & control Marines attending Tactical Air Control Squadron (TACRON) training to integrate with the Supporting Arms Coordination Center (SACC), Navy Tactical Air Control Center (NTACC) and the Landing Force Operations Center (LFOC) for future MEU deployments. Additionally, Joint Interface Control Officers (JICO) are augmenting the TACRON staff on MEU deployments while TACRON personnel are attending WTI as a Command, Control & Communications (C3) student. This is required due to emerging aircraft capabilities aligning with an increase in disaggregated and distributed operations afloat. As new Marine aviation platforms begin to field, they will provide more capability and higher fidelity information to ships via new sensors and gateways enabling such concepts as Sea Shield and Sea Strike. Also, forward-deployed C2 nodes equipped with netted sensors, CAC2S and a TPS-80, will contribute fire control quality data to the naval force, achieving an appropriate defensive or offensive targeting solution against enemy forces.

Our sea-based C2 integration will enhance the command relationships and partnerships among the Navy and Marine Corps team afloat. Properly employed MACCS Marines afloat, supported by the right mix of AC2 systems, and working with their naval counterparts will be positioned to process, integrate, and operationalize this myriad of information in support of MAGTF operations.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

Integrated Fire Control

IFC is an concept that teams sensors and shooters together to address challenging AAW and air defense problem sets. Under the IFC concept, sensors from air, land, or sea providing high fidelity target data enable weapons to be fired from any domain, agnostic of platform. The IFC concept takes different forms (see operational graphic below):

Through the use of TDL, composite tracking, and collaborative sensor sharing, the Marine Corps will have the ability to develop fire control solutions from information provided by one or more non-organic sensors. IFC provides several advantages for the MAGTF:

- 1) Reaction time will be decreased as detection and target information can be provided by both organic and non-organic airborne assets and ground-based radars.
- 2) Combat identification will be enhanced through the ability to access multiple sensors, providing better context of who is in the airspace.
- 3) Defense-in-depth will be increased through the use of data from non-organic sensors and weapons will be employed at their maximum effective kinematic range. This will provide a higher probability of kill due to a better view of the target, thus increasing the depth of defended airspace for the MAGTF.
- 4) Electronic attack (EA) resistance will be stronger, because weapons systems can rely on multiple sensors for firing solutions and be used at maximum effective kinematic range.



Digital Interoperability

Digital interoperability is a key component in synthesizing ACE combat power. MACCS Marines and systems continue to serve as the integrator and are focused on tactical air and ground command and control systems interoperability. They continue to aggressively pursue advanced capabilities leveraging a mix of TDL, proprietary waveforms, and commercial protocols. For the MACCS to be effective for the ACE/MAGTF commander it requires the capability to coordinate combat operations verbally and digitally using joint standard information exchange standards, such as Link 16, Joint Range Extension Application Protocol (JREAP), and Variable Message Format (VMF). The MACCS is the gateway for the MAGTF and joint force commander and must be appropriately equipped, trained and employed to fuse information from various sources, domains, and network participants in order to achieve decision superiority for the MAGTF and joint force commander.

The MACCS will also be a key component of digital kill chains. Digital requests will seamlessly flow from requesting to approving agency and back down the chain with mission data or reason for denial after adjudication. End-to-end digital fires will require the DASC and TAOC to serve as gateways/data-forwarders for these digital requests which will enable the information and the corresponding tracks that are produced in this process to be managed. MACCS agencies will bind all of the elements of the MAGTF and joint force.

CAC2S will implement standardized information exchanges, waveforms, and commercial protocols. This will allow the exchange of relevant, timely and actionable information between aviation, ground, naval platforms, agencies and organizations. Through this implementation, operators will have the information necessary to provide informed decisions, accelerate the kill chain, increase situational awareness, and enhance survivability. To facilitate the development and implementation of standardized information exchanges and employment concepts, VMX-22 AC2 operational test Marines will work to ensure mission effective exchanges of relevant tactical information during exercises, limited user evaluations, and quick reaction tests.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

VMX-22 Operational Test and Evaluation and Tactics, Techniques, and Procedures Development

In July 2013, DCA established a consolidated Marine Aviation Operational Test & Evaluation Center at MCAS Yuma to provide a single source multi-platform USMC aviation operational test center that can optimize the development of ACE tactics, techniques, and procedures (TTPs). The VMX-22 AC2 Department was established as part of that effort. In concert with APX, MAWTS-1, MCSC, MCOTEA and the operating forces, the VMX-22 AC2 department will assist in the conduct of operational test and evaluation (OT&E) to ensure mission integration and effectiveness of aviation platforms with MACCS equipment and other aviation technologies across the force. The coordinated efforts of VMX-22 and MAWTS-1 define and refine employment concepts and TTP development that drives system/platform evaluation and digital interoperability throughout the aviation community.

Marine Air Command and Control System Training

Historically, the MACCS has trained in narrow specialties that develop specialized Marines to operate and maintain unique systems developed to carry out specific MACCS functions. As technology changes and more responsibility is levied on MACCS Marines by commanders, there is a demand that we modernize our training approach. The desire is to produce entry level Marines that can exploit the full capabilities of their AC2 system and execute process driven information exchanges.

Once in the operating forces, Marines will become experts in planning and controlling MAGTF airspace, integrating organic Marine and joint fires, employing TDL and radio communications, and employing MACCS agencies, and will be trained to operate in a joint and coalition environment. This expertise comes with a cost and requires a new emphasis on distributed learning capability, live-virtual-constructive (LVC) environments, and standards-based assessments.

A common set of equipment and new MACCS employment options will also drive us to look at the feasibility of a common controller in the DASC and TAOC. Currently, controllers in the DASC are officers and a majority of controllers in the TAOC are enlisted operators. Enlisted MACCS Marines will retain agency-specific skill sets early in their careers and then transition to becoming common aircraft controllers and finally to become MACCS specialists later in their careers. To do this we will need to greatly enhance our simulation capabilities and usage in the operating forces and in the supporting establishment.

The first step in this process was the creation of the Air Control Training Squadron (ACTS) at Marine Corps Communications Electronic School (MCCES) at MCAGCC Twentynine Palms, California. ACTS has successfully combined three of the four MACCS entry-level schoolhouses. The next steps will be to redesign enlisted and officer training to address these new training paradigms.

Officers

We envision our entry-level training paradigm creating MACCS officers who understand all facets of MACCS employment, not just that of their primary MOS. In addition to learning their primary MOSs in air defense, air support, GBAD or MATC, all MACCS officers will receive instruction in civil/military airspace, fires integration, digital interoperability, planning and employment of the MACCS agencies, and instruction in joint and coalition operations. This shifts the emphasis of company-grade officers away from initial controller qualifications and re-focuses them as agency directors and planners. This creates a more well-rounded AC2 officer much earlier in their careers, and better prepares them to perform duties in the TACC as well as their primary agency. This early exposure would also enhance an officer's knowledge baseline as they approach their duties as department heads. Most importantly it will empower our MACCS officers to operate independently in a distributed operations environment.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

Enlisted

Early in their careers our enlisted Marines will hone their skills as operators in the specific agency for which they were initially trained. As they progress through the NCO ranks they will be given the opportunity to be trained as common aircraft controllers to work in the DASC, TAOC, or a MAOC if needed. A move toward creating a common controller will baseline tactical controller skills across the MACCS, create enlisted controllers in the DASC, and provide a larger pool of experienced controllers that gives greater professional continuity for an extremely perishable skillset. The ideal skillset we will build is:

- the ability to positively and procedurally control aircraft;
- an intimate knowledge of TDL, AC2 software applications, and communications equipment; and
- expertise in MAGTF command and control and fires integration.

The career progression for a Marine in the DASC or TAOC will logically flow from operator (Private - Corporal), to controller (Sergeant – Gunnery Sergeant), to enlisted subject matter expert (Master Sergeant – Master Gunnery Sergeant). This progression aligns and better defines the career paths of our TAOC and DASC Marines. It also creates a better operator for the TACC because of their exposure to different aspects of the MACCS prior to working in the wing commander's command post ... which is an extension of the MEF commander's. Our enlisted Marines are the technical and tactical bedrock of our community and we need to ensure that we are making the best training available to them through all phases of their careers.

Maintenance Training

Just as the lines between the agencies have been blurred with the introduction of new equipment, so have the maintenance concepts for the equipment. As technology has advanced, troubleshooting has shifted from the traditional component-level to the lowest replaceable unit. Additionally, almost every piece of modernized equipment is software- and network-driven. The complexity of modernized equipment forces maintainers to take an active role in the setup, configuration, operation, and maintenance of this equipment.

Maintenance officers, as restricted officers, will be paramount in the transitioning to new equipment and training by providing the subject matter expertise allowing operators to successfully employ their weapons system. The enlisted maintainer of the future will have to be agile enough to adapt to the potential for rapid changes in capabilities and system implementation amongst this AC2 FoS, and will be required to be as competent in basic data link implementation as operators. The synchronization between the roles of the operators, maintainers, and tactical users will continue to allow the MACCS to be successful in all future missions.

Simulation

As MACCS training is refocused to support this new training paradigm it is critical that we also add a robust simulation capability that can interface with other aviation training systems. Simulation provides the most cost-effective means of gaining and maintaining crew proficiency and readiness. Modeling and simulation will give commanders the ability to link into their local MATSS facility and participate more readily in relevant, integrated training with the Navy and as part of the larger aviation training system (ATS).

Current exercises do not provide the aircraft or dynamic environment necessary to truly stress a MACCS agency. Through simulation we can generate sufficient numbers of events and sorties to allow us to push each agency to its limit as it trains for a wide range of missions across the ROMO. None of the MACGs have the same simulation program and each has had varying degrees of success becoming interoperable with the MATSS.

All MACGs require a common simulation program that is interoperable with the local MATSS facility. This provides a realistic training environment where aviation simulators generate the tracks that populate MACCS simulators. The MACG must have the ability to plan for and fully integrate into wing-level LVC exercises that tie together the MACCS, wing battle staff, and MAG training simulations during a single, integrated simulation. It will enable training for the MACCS and will be used to stress the MACCS for exercises across the ROMO.

As a final initiative the MACCS must create and maintain a repository of MACCS simulation events. This will decrease redundant efforts in each MACG centered on constantly building new events to support different types of operations. Being able to access all of the simulations created by the community will allow for more diverse training in different geographic threat areas.

2.3 F-35 JOINT STRIKE FIGHTER AND DISTRIBUTED STOVL OPERATIONS



F-35B AND F-35C JOINT STRIKE FIGHTER

F-35 DESCRIPTION

The F-35 JSF is the next generation strike weapons system designed to meet an advanced threat, while improving lethality, survivability, and supportability. It will be the cornerstone of a multi-mission joint force possessing improved mission flexibility and unprecedented effectiveness to engage and destroy both air and ground threats.

The F-35 was developed using a complete analysis of legacy aircraft shortfalls, emerging threats, and consideration of future operating locations. This approach led to an aircraft design that incorporates advanced stealth characteristics and a powerful sensor suite that provides superior awareness to the pilot and ensures increased survivability and lethality in all environments.

The F-35 has an autonomous capability to strike a broad range of moving or fixed targets, either day or night and in adverse weather conditions. These targets include air and ground threats, as well as enemy surface units at sea and anti-ship or land attack cruise missiles. The F-35 can complete the entire kill chain without reliance on external sources by using fused information from its onboard systems and/or other F-35s. This capability allows shortened engagement times, less exposure to threats, and retains the element of surprise.

Together these elements allow the pilot to control the tactical environment using proactive tactics. The F-35 provides sensor data to Marine Air-Ground Task Force command and control agencies to enable intelligence collection and targeting across the force.

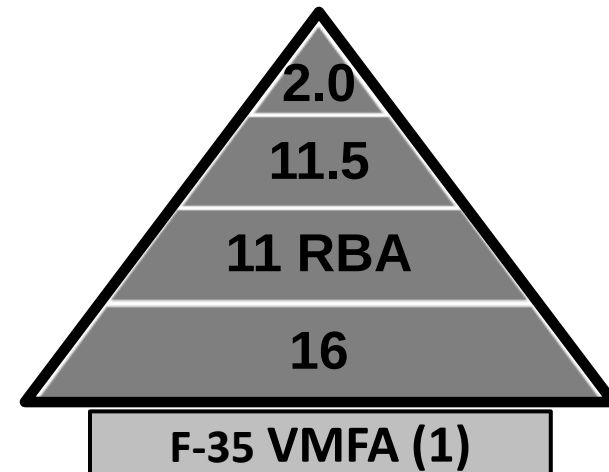
Transition Plan

The F-35B and F-35C will replace F/A-18, AV-8B and EA-6B. The Marine Corps will procure a total of 353 F-35Bs and 67 F-35Cs in the following squadron bed down:

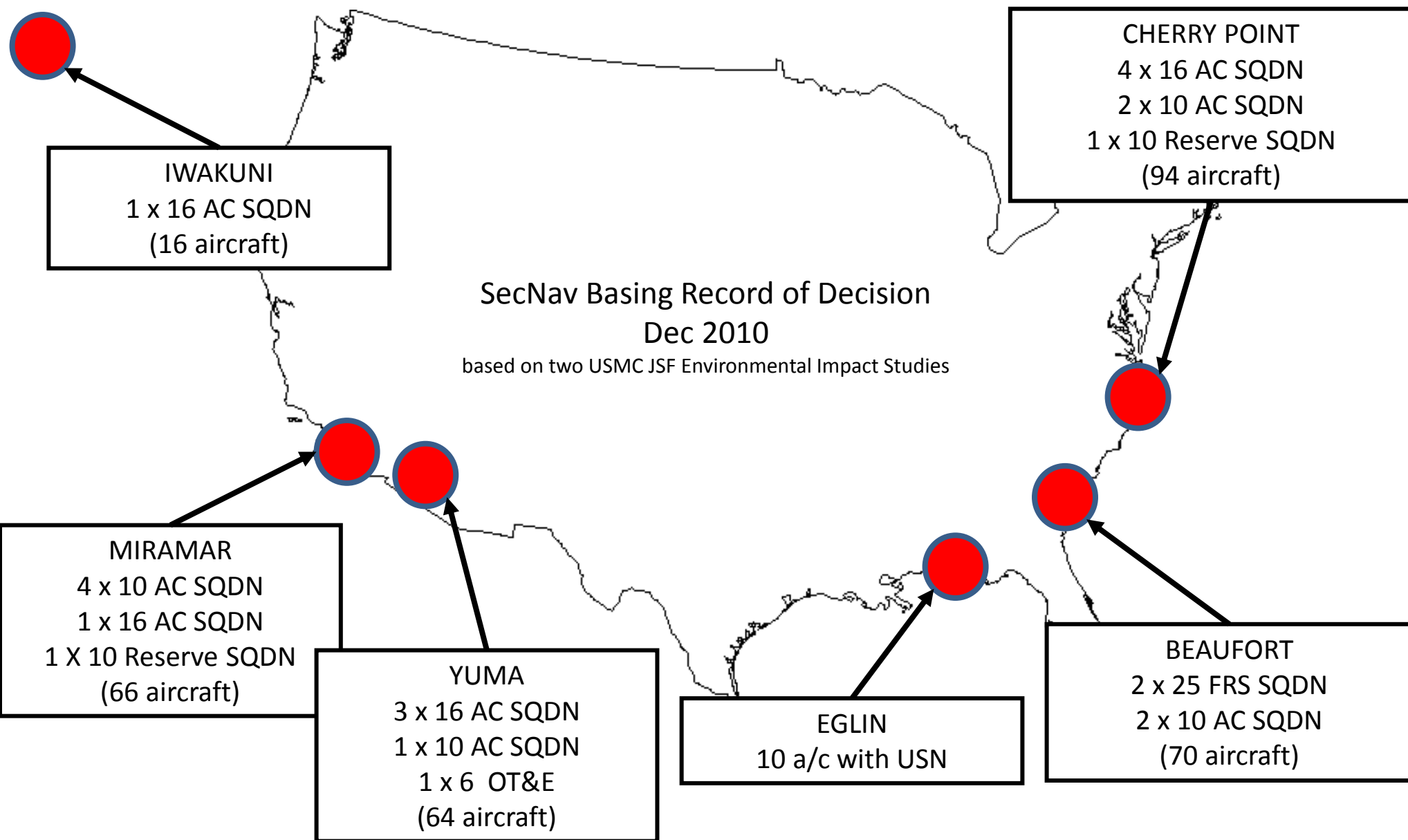
- 9 Squadrons x 16 F-35B
- 5 Squadrons x 10 F-35B
- 4 Squadrons x 10 F-35C
- 2 Squadrons x 10 F-35B reserve
- 2 Squadrons x 25 F-35B FRS

The Marine Corps declared F-35B initial operational capability in July of 2015, five months ahead of the December threshold date. At IOC, the squadron underwent an operational readiness inspection proving that it met the requirements with ten aircraft in the Block 2B configuration. The squadron demonstrated the capability to execute CAS, limited offensive and defensive counter-air, air interdiction, air support escort, armed reconnaissance, and limited suppression of enemy air defenses.

The aircraft is currently tracking to reach its full program-of-record operational capability (Block 3F) in Q4 of CY 2017. The full transition from legacy to F-35 will complete with the transition of the second reserve squadron in 2031.



MARINE JOINT STRIKE FIGHTER SQUADRON GEO-LOCATION



Basing plans are subject to change and further environmental analysis

CURRENT FORCE PAA:

7 AC VMFA SQDN x 12 F/A-18 a++/C
 4 AC VMFA(AW) SQDN x 12F/A-18D
 1 AC VMFA SQDN x 16 F-35B
 1 RC VMFA SQDN x 12 F/A-18A++
 6 AC VMA SQDN x 14 AV-8B
 1 FRS x 26 AV-8B/TAV-8B , 1 FRS x 36 F/A-18A/B/C/D, 1 FRS SQDN x 16 F-35B

TACAIR LEGACY TO JSF TRANSITION PLAN

FORCE GOAL PAA:

9 AC VMFA SQDN x 16 F-35B
 5 AC VMFA SQDN x 10 F-35B
 4 AC VMFA SQDN x 10 F-35C
 2 RC VMFA SQDN x 10 F-35B
 2 FRS SQDN x 25 F-35B

	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34
VMFAT-501	→ 25B		Beaufort																		
VMFA-121	6B → 16B		Yuma	---	Japan																
VMFA-211		Yuma		6B → 16B		Yuma															
VMFA-122				Beaufort		6B → 16B		Yuma													
VMFA-314						Miramar		6C → 10C		Miramar											
VMA-311				★		Yuma		6B → 16B		Yuma											
VMA-214							Yuma		6B → 16B		Miramar										
VMA-223								Cherry Point		6B → 16B		Cherry Point									
VMFA-224								Beaufort		6C → 10C		Yuma									
VMA-542								Cherry Point		6B → 16B		Cherry Point									
VMFA-533									Beaufort		6B → 16B		Cherry Point								
VMFA-312									Beaufort		6C → 10C		Beaufort								
VMFA-251									Beaufort		6B → 10B		Beaufort								
VMA-231										Cherry Point		6B → 16B		Cherry Point							
VMFA-115						C+ CONVERSION				Beaufort		6C → 10C		Cherry Point							
VMFA-232											Miramar		6B → 10B		Miramar						
VMFA-242											Japan		6B → 10B		Cherry Point						
VMFA-323											Miramar		6B → 10B		Miramar						
VMFA-225											Miramar		6B → 10B		Miramar						
VMFA-112 (RES)															Ft Worth		6B → 10B		Cherry Point		
VMFA-134 (RES)																	6B → 10B		Miramar		

Transition sequence meets current global commitments, optimizes deployment to dwell, and maximizes available combat aircraft in support of Marines.

Consolidates remaining Harriers on the east coast in 2021.

Consolidates Hornets on west coast 2027

CADRE

F/A-18

AV-8B

F-35B (16 AC)

F-35C

F-35B (10)

★ Decision Point: TACAIR transition order will be updated based on F/A-18 A-D and AV-8B flight-line readiness to maximize combat power

MARINE FIXED-WING AVIATION PLAN

TOTAL SQUADRONS	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
F/A-18A+/C	8	8	7	7	6	6	6	6	6	4	4
F/A-18D	4	4	4	4	4	4	4	3	3	2	2
AV-8B	6	5	5	5	5	4	3	2	1	1	1
EA-6B	3	3	2	1	0	0	0	0	0	0	0
F-35B	2	2	3	3	4	5	5	7	8	9	10
F-35C	0	0	0	0	1	1	1	2	3	3	4
F/A-18 FRS	1	1	1	1	1	1	1	1	1	1	1
AV-8B FRS	1	1	1	1	1	1	1	1	0	0	0
F-35B FRS	1	1	1	1	1	2	2	2	2	2	2
EA-6B FRS	1	0	0	0	0	0	0	0	0	0	0
F-5N/F	1	1	1	1	1	1	1	1	1	1	1
PAI PLAN	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
AC/RC PMAI											
F/A-18A+/C	96	96	84	84	72	72	72	72	72	48	48
F/A-18D	48	48	48	48	48	48	48	36	36	24	24
AV-8B	84	80	80	80	80	64	48	32	16	16	16
F-35B	21	32	42	48	64	74	80	106	122	138	154
F-35C	0	0	0	0	9	10	10	20	30	30	40
EA-6B	18	18	12	6	0	0	0	0	0	0	0
F-5N/F	12	12	12	12	12	12	12	12	12	12	12
TOTAL AC/RC TACTICAL	279	286	278	278	285	280	270	278	288	268	294
FRS PTAI											
F/A-18A/C	19	19	19	19	18	18	17	16	15	13	10
F/A-18B	4	4	4	2	0	0	0	0	0	0	0
F/A-18D	20	20	20	18	16	16	15	15	15	15	12
AV-8B	12	10	10	10	8	8	8	8	0	0	0
TAV-8B	12	10	10	8	8	8	8	8	0	0	0
EA-6B	6	0	0	0	0	0	0	0	0	0	0
F-35B	23	17	16	23	26	35	42	34	36	38	40
F-35C	6	8	10	12	5	5	5	5	5	5	10
TOTAL FRS PTAI	102	88	89	92	81	90	95	86	71	71	72

* Operational commitments, contingency plans, and service life expenditure rates may change T/M/S turnover sequence

DISTRIBUTED AVIATION OPERATIONS

Strategic Context

Potential adversaries are equipped with advanced anti-access / area denial (A2/AD) long-range precision strike capabilities that threaten traditional US power projection through fixed infrastructure and naval strike groups. The MAGTF is challenged with developing asymmetric operating concepts which counter an enemy A2/AD strategy, thereby allowing access for the joint force.

Distributed Aviation Operations

The future ACE will have the ability to operate effectively in the absence of traditional fixed infrastructure and supply lines for short periods of time. There are several drivers for Distributed Aviation Operations (DAO), including:

- to respond to a threat
- to capitalize on surprise and flexibility, and
- to overcome the challenge of distance.

The proliferation of long-range, precision conventional threats, such as cruise missiles and armed UAVs, has contested the use of traditional bases and methods of operations. While advances have been made to counter such threats, such as interdiction, interception, and base hardening, the complexity of the problem and the sheer number of threats means that more needs to be done; while in traditional warfare mass can be seen as an asset, in this case mass, coupled with predictability, is also a liability.

DAO will also allow the MAGTF to extend its operational reach and enable maneuver at longer ranges. The use of aviation-delivered ground refueling and support will allow the ACE to support the MAGTF and operate at distances and in areas beyond the immediate coastline, extend the reach and maneuver capability several hundred miles beyond the shore, and do so for greater periods of time.

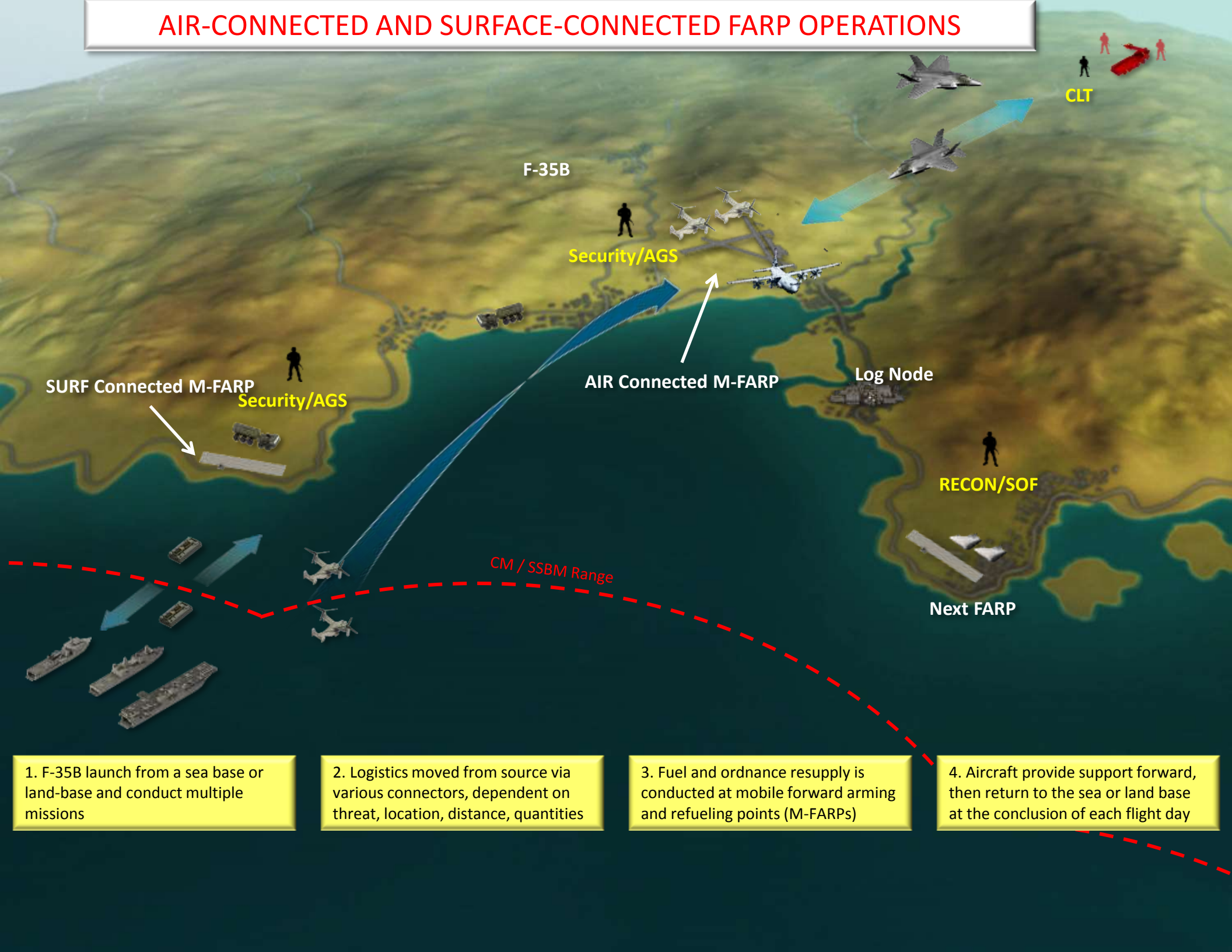
Scalable, pre-planned force packages that balance the need for logistics, maintenance, and ordnance with the ability to maintain a light footprint and ability to move on short notice will be key to operating from austere bases.

These force packages can be tailored and used for any aircraft in the Marine Corps inventory, and will be enabled by dedicated support from the aviation ground support and command, control and communication communities.

DAO Characteristics

- Can be executed with sea-based or land-based logistics and land sites; shared logistics assets (whether from ships or main bases) support numerous dispersed M-FARPs through mobile distribution sites.
- Austere M-FARPs enable deployment at time of crisis rather than requiring years of infrastructure preparation.
- DAO can rely on a passive defense if not operating in the vicinity of a main base or from a damaged main base airfield. M-FARPs are only active for a limited period of time to operate inside of an enemy's targeting cycle (24-72 hrs). Deception and decoys further increased efficacy.
- Scalable in size, DAO can range from MEU-sized F-35B divisions supported by KC-130Js/MV-22s/CH-53s to MEB-sized multiple squadron packages. The specific footprint ashore is scenario based for designated M-FARPs.
- The concept has been the subject of a feasibility study and wargame-informed CONOPS development process. It has been shown to be logistically feasible, using organic MEU/MEB air and surface connectors along with maritime prepositioning ship squadron (MPSRON) and combat logistics force (CLF) ships. Additionally, we have the opportunity to employ to and from allied STOVL carriers such as the 34 jet capable Queen Elizabeth or Prince of Wales, the Garibaldi, and an assortment of amphibious carriers.
- Scheduled aircraft maintenance will be conducted on sea base (LHA, LHD or a coalition carrier, such as the UK's *Queen Elizabeth II*) or at main base away from threat. DAO provides high sortie generation through fuel and ordnance reload inside of the threat WEZ.

AIR-CONNECTED AND SURFACE-CONNECTED FARP OPERATIONS



2.4 MARINE FIXED-WING AVIATION PLAN



TACAIR 2030 ROADMAP

The updated FY16 TACAIR transition meets current global commitments, optimizes deployment to dwell, and assists Hornet inventory recovery in order to maximize available Marine Corps combat power and TACAIR readiness.

F/A-18s remain the primary bridging platform to F-35B/C with a planned sunset of 2030. Hornets will consolidate on the West coast by 2026 with the exception of maintaining VMFA (AW)-242 assigned to the western Pacific at MCAS Iwakuni until the scheduled F-35B transition in 2028.

AV-8B Harriers consolidate on the East Coast by the end of 2021 and continue to support East coast MEUs and squadron(-) deployments through scheduled sundown in early 2026.

*The Marine Corps and US Navy have synchronized a ten- year operational deployment plan across all L class carrier, CVN aircraft carrier, and land based TACAIR assets.

The TACAIR transition will remain flexible with regards to VMA/VMFA transition order based on F-35 program progress and legacy readiness. In 2017 1stMAW will have VMFA-121 and VMFA(AW)-242 assigned as forward-deployed forces at MCAS Iwakuni. This is critical to meeting current deployed requirements, recovering TACAIR readiness, and achieving a deployment to dwell of 1 to 2 for the TACAIR community.

- By the end of FY17, VMFA-121 will fill both the 31st MEU and forward deployed land-based requirements as a 16-aircraft F-35B squadron.
- VMFA-122 will transition from F/A-18 to F-35B and relocate to MAG-13 in FY18.
- West coast MEUs are sourced solely with F-35B by end of FY19.



MARINE FIXED-WING AVIATION PLAN

Missions

MARINE FIGHTER/ATTACK SQUADRON (VMFA); MARINE ATTACK SQUADRON (VMA): Support the MAGTF commander by destroying surface targets and enemy aircraft and escort friendly aircraft, day or night, under all weather conditions during expeditionary, joint or combined operations.

MARINE ALL-WEATHER FIGHTER/ATTACK SQUADRON (VMFA-AW): Support the MAGTF commander by providing supporting arms coordination, conducting multi-sensor imagery, and destroying surface targets and enemy aircraft day or night, under all weather conditions during expeditionary, joint or combined operations.

MARINE FIGHTER/ATTACK TRAINING SQUADRON (VMFAT): Conduct combat capable fighter/attack training for selected aircrews in the Joint Strike Fighter F-35B aircraft and the legacy F/A-18 aircraft, and provide technical training for aviation maintenance personnel.

MARINE ATTACK TRAINING SQUADRON (VMAT): Conduct combat capable attack training for selected aircrews in the AV-8B and provide technical training for aviation maintenance personnel.

MARINE REFUELING TRANSPORT SQUADRON (VMGR): Support the MAGTF commander by providing aerial refueling, assault support, conducting intelligence, surveillance, reconnaissance, target acquisition, indirect and direct fires adjustment, battlefield damage assessment and destroying surface targets day or night under all weather conditions during expeditionary, joint, or combined operations.

MARINE TACTICAL ELECTRONIC WARFARE SQUADRON (VMAQ): Support the MAGTF commander by conducting airborne electronic warfare, day or night, under all weather conditions during expeditionary, joint, or combined operations.

MARINE TACTICAL ELECTRONIC WARFARE TRAINING SQUADRON (VMAQT): Conduct core skill introduction training for selected aircrews in the EA-6B in order to successfully achieve the assigned annual aircrew training requirement.

MARINE UNMANNED AERIAL VEHICLE SQUADRON (VMU): Support the MAGTF commander by conducting electromagnetic spectrum warfare, multi-sensor reconnaissance and surveillance, supporting arms coordination and control, and destroying targets, day or night, under all-weather conditions, during expeditionary, joint, and combined operations.

MARINE UNMANNED AERIAL VEHICLE TRAINING SQUADRON (VMUT): Conduct core skill Introduction training for VMU aircrews in accordance with the T&R syllabus.

MARINE FIGHTER TRAINING SQUADRON (VMFT): Provide fixed-wing adversary support to Marine aviation and ground units to enhance Marine Corps combat readiness with a focus on increasing Marine aviation's core capability in air-to-air combat.

MARINE TRANSPORT SQUADRON (VMR): Support the MAGTF commander by providing time sensitive air transport of high priority passengers and cargo between and within a theater of war, day or night, under all weather conditions, during expeditionary, joint or combined operations.

MARINE FIXED-WING AVIATION PLAN

TOTAL SQUADRONS	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
FA-18A+/C	8	8	7	7	6	6	6	6	6	4	4
FA-18D	4	4	4	4	4	4	4	3	3	2	2
AV-8B	6	5	5	5	5	4	3	2	1	1	1
EA-6B	3	3	2	1	0	0	0	0	0	0	0
F-35B	1	2	2	3	3	4	4	5	7	8	8
F-35C	0	0	0	0	1	1	1	2	2	3	3
FA-18 FRS	1	1	1	1	1	1	1	1	1	1	1
AV-8B FRS	1	1	1	1	1	1	1	1	0	0	0
F-35B FRS	1	1	1	1	1	1	2	2	2	2	2
EA-6B FRS	1	0	0	0	0	0	0	0	0	0	0
F-5N/F	1	1	1	1	1	1	1	1	1	1	1
PAI PLAN	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
AC/RC PMAI											
FA-18A+/C	96	96	84	84	72	72	72	72	72	48	48
FA-18D	48	48	48	48	48	48	48	36	36	24	24
AV-8B	84	80	80	80	80	64	48	32	16	16	16
F-35B	16	32	42	48	48	64	64	80	112	128	136
F-35C	0	0	0	0	9	10	10	16	20	28	30
EA-6B	18	18	12	6	0	0	0	0	0	0	0
F-5N/F	12	12	12	12	12	12	12	12	12	12	12
TOTAL AC/RC TACTICAL	274	286	278	278	269	270	254	248	268	256	266
FRS PTAI											
FA-18A/C	19	19	19	19	18	18	17	16	15	13	10
FA-18B	4	4	4	2	0	0	0	0	0	0	0
FA-18D	20	20	20	18	16	16	15	15	15	15	12
AV-8B	12	10	10	10	8	8	8	8	0	0	0
TAV-8B	12	10	10	8	8	8	8	8	0	0	0
EA-6B	6	0	0	0	0	0	0	0	0	0	0
F-35B	23	17	16	23	26	35	42	34	36	38	40
F-35C	6	8	10	12	5	5	5	5	5	5	5
TOTAL FRS PTAI	102	88	89	92	81	90	95	86	71	71	67

* Operational commitments, contingency plans, and service life expenditure rates may change T/M/S turnover sequence

F/A-18 PLAN : PROGRAMMATICS, SUSTAINMENT AND FUTURE

F/A-18A-D:

The F/A-18A-D community continues combat operations for the fourteenth straight year as Hornets support OPERATION INHERENT RESOLVE from both land-based SPMAGTF-CR and the aircraft carrier.

The USMC fleet currently has eleven active squadrons and one reserve squadron that has a sustained 40 aircraft shortage due to depot maintenance backlog. HQMC has reset the force by temporarily reducing squadron flight line entitlement (FLE) to 10 aircraft to preserve future combat readiness while meeting today's current operational requirements. Forecasted improvements in aircraft availability will enable USMC F/A-18s to deploy 12 PMAI squadrons in 2017.

SUSTAINMENT:

The F/A-18 Service Life Management Program (SLMP) consists of the Center Barrel Replacement Plus (CBR+) and High Flight Hour (HFH) inspection programs. The CBR+ has extended the service life of 210 Lot 17 and below aircraft and the HFH inspection has extended the life of more than 160 DoN F/A-18A-D aircraft beyond 8000 hours.

In parallel to HFH and CBR+ maintenance, the Service Life Extension Program (SLEP) incorporates a combination of inspections, repairs and a number of Engineering Change Proposals to extend an additional ~150 hand selected F/A-18 C/D to 10,000 Flight Hours. In FY15 the first Marine Hornet was authorized to 10,000 hours.

FUTURE:

In FY15 the USMC F/A-18 program, PMA-265, and industry began integration of the Advanced Capabilities Mission Computer (ACMC) for the F/A-18C/D that will run High Order Language (HOL) based on FA-18E/F Super Hornet Operational Flight Program software. The ACMC and upgraded displays will posture Marine F/A-18s as a fully digital interoperable platform to support the MAGTF and ensure tactical relevance as a lethal, interoperable, and survivable TACAIR aircraft.

TACAIR Integration (TAI): Currently the Marine Corps has three TAI squadrons allocated to USN CVWs and in FY17 will reduce to two TAI F/A-18C squadrons. The Navy and Marine Corps will increase TAI levels to three, and eventually four, with the IOC of F-35C. The Marine Corps is committed to TAI and the F-35C program.



*Note: throughout this document, items denoted in red are unfunded per current budgeting

Final Fit:

Survivability Upgrade Roadmap:

ALR-67 v3 - 2016

ALQ-214 v5 - 2016

Interoperability Upgrade Roadmap:

High Order Language mission computers - 2020

DACAS/ Gen 5 radios (software reprogrammable) - scheduled to field in 2017

MIDS JTRS (CMN-4/ TTNT 7.0) - scheduled to begin fielding in 2017

Lethality Upgrade Roadmap:

AIM-120D – 2016

Lightning Air to Air functionality – 2016

AIM-9X Block II – 2017

Zap Lars (limited functions) – 2017

Upgraded displays – 2017/18

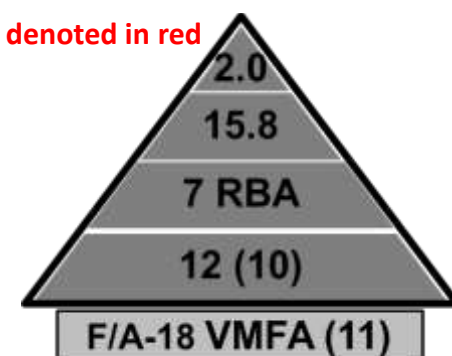
Intrepid Tiger II V 1 Block X

APKWS – 2017/18

Stand-off net-enabled weapons: JDAM-ER / SDBII / JSOW-C1

Reliability Upgrade Roadmap:

Solid-state recorders – 2016



AV-8B PLAN : PROGRAMMATICS, SUSTAINMENT AND FUTURE

AV-8B II:

Recent operations ODYSSEY DAWN (Libya) and ENDURING FREEDOM (Afghanistan), and Marine Expeditionary Units (MEUs) conducting national tasking in CENTCOM, demonstrate the versatility of short takeoff / vertical landing (STOVL) Marine tactical aircraft. The AV-8B, equipped with advanced precision weapons, the LITENING targeting pod (with streaming video downlink), and beyond visual range air-to-air radar missiles, provides relevant and lethal capability to the Marine Air-to-Ground Task Force (MAGTF). As recently as November 2015, Harriers flying from *Kearsarge* went into combat against ISIS as the world responded to terror attacks in Paris.

VMA-211 will be the first AV-8B squadron to transition to the F-35B in FY16. The Marine Air Board approved a TACAIR plan which accelerates the transition of all West Coast VMAs to the F-35B by 2021 and the out-of-service date of the remaining East Coast VMAs by 2026.

There are currently 6 active VMAs comprised of 14 AV-8B aircraft each. When we transition VMA-211 we will reestablish the remaining five VMAs as 16-aircraft squadrons, allowing them to deploy as a full 16-plane squadron; a 10- and 6-plane (MEU) squadron; or an 8- and 8-plane (MEU) squadron.

SUSTAINMENT:

As an out-of-production aircraft, the AV-8B program will continue to focus on readiness by solving chronic parts inventory shortfalls. In 2015 the aircraft transitioned support from Boeing to NAVSUP.

In the first half of 2015, the AV-8B received the H6.1 Operational Flight Program (OFP) enabling full integration of the Generation 4 LITENING targeting pod, as well as correction of noted software deficiencies to smart weapon employment and targeting. H6.1 also integrated a Common OFP for LITENING to the AV-8B, enabling the LITENING pod to be interchanged between F/A-18s and AV-8Bs without any software reloads. Airborne Variable Message Format (VMF) terminals will be installed in the AV-8B, enabling the AV-8B to have the joint standard digital-aided close air support (DACAS) technology. Other integration efforts include the digital video recorder; BRU-70/A digital improved triple ejector rack (DITER); expanded carriage of the AIM-120, and the introduction of the Deployable Mission Rehearsal Trainer, which will enable deployed forces to continue to train and retain proficiency in with the aircraft's advanced systems. In 2018, the program plans to field the H6.2 OFP which will integrate initial Link 16 capability, and FAA-compliant Required Navigation Performance / Area Navigation capability, and will correct additional software deficiencies identified through combat operations.

FUTURE:

The next major step for the aircraft will be OFP H7.0, which will provide Link 16 full integration into all AV-8B II+ Radar aircraft. Additionally, the program intends to integrate SRP into the airframe. This effort will include hardware installation and an OFP upgrade to enable the aircraft to be digitally interoperable with the current and future network infrastructure.



Final Fit:

Interoperability Upgrade Roadmap:

DACAS VMF terminals

TPOD ADL / TTNT

Link 16

Software Reprogrammable Payload (SRP) radio replacement

Lethality Upgrade Roadmap:

Net Enabled Weapons standoff weapons

1760 Wiring on Station 1 and 7

APKWS II

AIM-120 C

AIM-9X block II

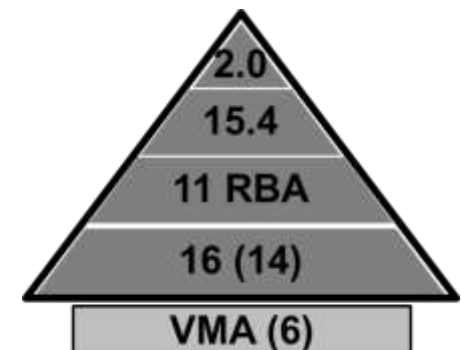
Intrepid Tiger II V 1 Block X

Reliability Upgrade Roadmap:

Digital Video Recorder

RNP / RNAV (GPS Approach capable)

IFF Mode 5/S



EA-6B PLAN : PROGRAMMATICS, SUSTAINMENT AND FUTURE

EA-6B:

The USMC currently has three operational and one FRS EA-6B squadrons, each operating the Improved Capabilities (ICAP) III version of the EA-6B Prowler. This variant will support Marine and joint operational requirements through 2019. Planned ICAP III Block 7 upgrades to software and hardware will improve EW performance and interoperability through the end of service life. In the summer of 2013, one of the four operational VMAQ squadrons was re-designated as a VMAQT and assumed FRS responsibilities.

The sundown of Marine Prowlers, starting with the FRS (VMAQT-1), will begin at the end of FY16, with one squadron decommissioning each year until complete at the end of FY19.

FUTURE INITIATIVES:

The Marine Corps is building an organic and distributed electronic warfare system of systems known as MAGTF EW. MAGTF EW transitions the Marine Corps from a focus on the low-density/high-demand EA-6B, to a distributed, platform-agnostic strategy – where every platform contributes/ functions as a sensor, shooter and sharer – to include EW. Under MAGTF EW the Marine Corps is leveraging emerging technologies and integrating multiple aviation platforms (unmanned, fixed wing, and rotary wing assets); payloads; ground-based EW nodes; and cyber capabilities to provide commanders with an organic and persistent EW capability – for every MAGTF – large and small. This integration of manned and unmanned airborne and ground EW capabilities will provide the MAGTF commander with greater flexibility and control of the electromagnetic spectrum – and in many cases giving that MAGTF commander a capability where previously they had none. MAGTF EW assets will be modular, scalable, and networked, utilizing an open architecture that is rapidly adaptable and remotely re-programmable at the tactical level to support future Marine Corps warfighting 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.

MAGTF EW digital interoperability across all platforms and nodes will be facilitated by the inclusion of SRP. SRP is a multi-function, reprogrammable RF device providing EMS maneuver superiority for complex environments, interoperable across all MAGTF assets.



MAGTF EW AEA CAPABILITIES:

Intrepid Tiger II: Advanced AEA and ES capability

- EOC of pod in OEF conducted in 2012
- 116 pods for counter-comms and irregular warfare RF target sets
- Field radar variant of Intrepid Tiger II in 2019 (Block X)
  - **MV-22 (IOC with Block X)**
- (V) 1. Deployed on AV-8B and F/A-18 aircraft, **KC-130 in development**
- (V) 2. **Planned UAS variant (Group 3)**
  - **Planned full system integration on Utility UAS and Group 5 UAS**
- (V) 3. Rotary wing, UH-1Y EOC FY16, AH-1Z (Future)

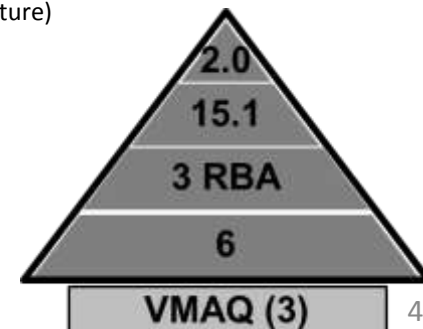
EA-6B:

3 operational squadrons of 6 aircraft

1 Fleet Replacement Squadron of 6 aircraft

Transition to ICAP III completed in 2012

Program of Record until 2019



EA-6B ROADMAP: SUNDOWN PLAN

CURRENT FORCE: 4 AC SQDN X 6 EA-6B

FORCE GOAL: Electronic Warfare System of Systems

		FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24				FY25				FY26			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
UNIT/LOCATION	PMAI/PTAI																																												
CHERRY POINT																																													
VMAQT-1	6 EA-6B																																												
VMAQ-4	6 EA-6B																																												
VMAQ-3	6 EA-6B																																												
VMAQ-2	6 EA-6B																																												

VMAQ squadron stand down begins FY16 and is completed in FY19.

USMC EA-6B structure of 4 operational squadrons (5 a/c each) converted to 3 operational squadrons and one FRS (increasing to 6 a/c each).

F-5 PLAN : PROGRAMMATICS, SUSTAINMENT AND FUTURE

F-5E/F, N:

The F-5 fleet consistently meets readiness goals while supporting as many MAGTF adversary commitments as possible based on limited structure. USMC adversary requirements have grown significantly over the past thirteen years of combat operations. Today, the adversary capacity gap is in excess of 5,000 sorties, with VMFAT-501 requiring more than 500 per year and growing. Some of the additional requirements needing adversary support are:

- FY10 MAWTS-1 reconstitutes Marine Division Tactics Course for the F/A-18 fleet
- FY13 AV-8B training and readiness manual increases focus on air defense and BVR AMRAAM employment
- FY15 VMFAT-501 (the F-35 FRS) requires adversary support for training
- TBD VMFAT-502 (2nd F-35 FRS) stand-up Beaufort

F-5 SERVICE LIFE MANAGEMENT

The F-5 fleet is funded for life limited components of upper cockpit longerons, wings, horizontal stabilator pairs, and vertical stabilators that will enable the F-5 to achieve its 8000 hour life. This extends the Department of the Navy's 44 F-5 airframes from 2016 to 2025 and at least 12 aircraft to 2028 in support of fleet training.

CAPABILITY

The current configuration of the F-5 meets all MAGTF requirements except for F-35 and F/A-18.

Upgrades to provide improved beyond visual range situational awareness, as well as passive weapon systems are being studied. Advanced electronic attack capabilities will continue to be fielded.

ACCESSIBILITY

Further expansion of the F-5 program, to potentially include adversary elements at MCASs such as Miramar, Yuma, Beaufort and Cherry Point are being explored. Efficiently co-locating adversary support with the operational forces generates the most readiness for our operational forces at the least cost. Composite training squadrons beneath 4th MAW will answer several training challenges, and we are exploring options. See Section 3.1 for a discussion of those concepts.

F-5 PROGRAM CAPACITY, CAPABILITY AND ACCESIBILITY

Current USMC inventory is 12 F-5s assigned to VMFT-401 at MCAS Yuma. Based on the low cost per flight hour and ease of maintenance of the F-5, plans to expand the adversary capacity and capability while improving accessibility are being developed.

FUTURE

Procurement of numerous F-5s with significant service life remaining would allow the USMC to meet, with organic assets, most requirements for adversary training. The first phase of expanded adversary capacity will be to establish a detachment on the East Coast in support of VMFAT-501.



KC-130J HERCULES

KC-130J DESCRIPTION:

The KC-130J is a new production aircraft that supports the Marine Air-Ground Task Force commander by providing air-to-air refueling, aviation delivered ground refueling, and assault support airlift, day or night in all weather conditions during expeditionary, joint, or combined operations.

The KC-130J carries up to 92 ground troops or 64 paratroops plus equipment. It can be configured as a medical evacuation platform capable of carrying 74 litter patients plus attendants.

The KC-130J is capable of operating from austere airfields in forward operating areas and can provide mission support in emergency evacuation of personnel and key equipment, advanced party reconnaissance, tactical recovery of aircraft and personnel, and special warfare operations.

Transition Plan:

The transition is complete for the active component and is underway for the reserve component. This AVPLAN provides the roadmap for completion of the transition, presents known operational commitments, and highlights future improvements:

- Enhanced aircraft survivability equipment beginning in FY16.
- Enhanced Harvest HAWK systems beginning in FY17.
- Enhanced enlisted aircrew training devices deliver in FY17-FY19
- VMGR-234 projected to reach full operational capability (FOC) in FY20 with 12 Primary Mission Aircraft.
- VMGR-452 will transition to the KC-130J after VMGR-234 reaches FOC (FY20-FY25).
- Planned EW / digital interoperability capabilities.
- Backup aircraft procurement deferred until VMGR-452 reaches FOC.

As the KC-130J evolves through its block upgrade program, the incorporation of digital interoperability via Link 16 will enhance MAGTF command and control agencies' intelligence collection and targeting capability across the force.

KC-130T (Reserve only):

USMCR KC-130T squadrons began their transition to the KC-130J in FY14. KC-130T aircraft will be divested incrementally as KC-130J aircraft are delivered to 4th MAW VMGR squadrons.

Divested KC-130T aircraft will be sold via foreign military sales in order to offset the cost of procuring KC-130J replacement aircraft.



KC-130J HARVEST HAWK

KC-130J

HARVEST HAWK: The USMC fielded a bolt-on/bolt-off ISR/weapon mission kit for use on existing KC-130J aircraft. A total of 10 aircraft are modified to employ the Harvest HAWK kits with 5 modified aircraft in 2d MAW and 5 modified aircraft in 3d MAW.

This mission kit enables the KC-130J aircraft into a platform capable of performing persistent targeting ISR and delivering precision fires using Hellfire or SOPGM family munitions such as the Griffin. This mission kit is a complementary capability taking advantage of the aircraft's endurance and/or range.

First deployed in October 2010, Harvest HAWK missions resulted in success in theater. With the Harvest HAWK ISR / Weapon Mission kit installed, the KC-130J provides the MAGTF commander with a platform capable of extended endurance multi-sensor imagery reconnaissance and on-call close air support in low threat scenarios.

Beginning in 2016, the mission kit receives sensor and fire control system upgrades to address system obsolescence and eliminate deficiencies, while sustaining relevancy through transition from P2A Hellfire to the P4 Hellfire, and eventually JAGM.



KC-130 J AND T PLAN : PROGRAMMATICS, SUSTAINMENT, AND FUTURE

KC-130J

Active component VMGR squadrons completed the transition to KC-130J in 2009 and have consistently met readiness and operational commitments. Since IOC in 2005, USMC KC-130Js have provided air-to-air refueling, aviation delivered ground refueling, battlefield illumination, and aerial delivery and air-landed transportation of cargo and personnel in support of our troops engaged in ground combat in multiple theaters of operation.

RESERVE COMPONENT KC-130J TRANSITION

In March 2014 the reserve component began the transition to the KC-130J with IOC for VMGR-234 declared in August 2015. FOC for VMGR-234 is projected to occur in 2020. VMGR-452 will transition to KC-130J after VMGR-234 reaches FOC (FY20-FY25).

KC-130J BLOCK UPGRADE PROGRAM

The USMC participates in a joint users group with the USAF and seven international partner nations, to reduce costs associated with the development and fielding of updated baseline configurations resulting from emerging requirements and diminishing manufacturing sources. These new configurations include system and safety improvements and satisfy known CNS/ATM mandates. Block 7.0/8.1 is the new baseline for all DoD and international C-130J users, which includes Link 16, Mode 5 IFF, GPS approach capability, ADS-B (out), RNP/RNAV and includes a new flight management system.

KC-130T

Legacy KC-130T aircraft will continue operation in 4th MAW until VMGR-452 reaches KC-130J IOC planned for FY21. Efforts are currently underway to replace the hydraulic propeller valve housing with an Electronic Propeller Control System and the analog engine instruments with an electronic Engine Instrument Display System. The TACAN and RADAR systems are also being replaced due to obsolescence.

Additionally, Diminishing Manufacturing Sources and Material Shortages (DMSMS) as well as CNS/ATM mandates will need to be addressed in order to sustain and maintain relevance through 2021. KC-130T Tactical Systems Operators and Flight Engineers will continue to be required until KC-130J IOC at VMGR-452 in FY21.



Final Fit:

Survivability Upgrade Roadmap:

AAQ-24B(V)25 DoN LAIRCM/ATW –
Fleet retrofit beginning in FY16.

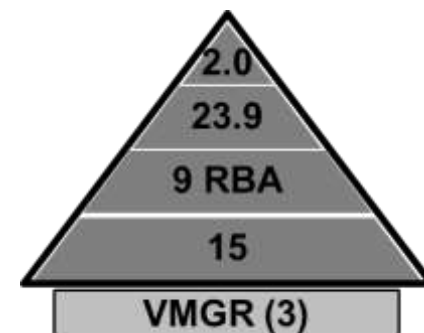
Intrepid Tiger Block 2X

Interoperability Upgrade Roadmap:

Dual Vortex – 2016 (TKI/Test) – Harvest HAWK retrofit beginning in 2016.
Block 7.0/8.1 with Link 16 - Fleet retrofit beginning in FY18.
Software Reprogrammable Payload (SRP) radio replacement – FY19
EO/IR Sensor – FY23

Harvest HAWK Lethality Upgrade Roadmap:

Hellfire P+/P4 – 2017
TSS to MX-20 transition – 2017
Fire Control Station to Mission Operator Pallet transition – 2017
JAGM – 2020



MARINE AERIAL REFUELER / TRANSPORT (VMGR) PLAN

	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
KC-130J/T TOAI PLAN											
AC/RC KC-130J TOAI	51	53	54	56	60	63	65	67	69	71	73
AC KC-130J PMAI	45	45	45	45	45	45	45	45	45	45	45
RC KC-130J PMAI	5	7	8	10	14	17	19	21	23	24	24
AC KC-130J BAI	0	0	0	0	0	0	0	0	0	1	3
RC KC-130J BAI	0	0	0	0	0	0	0	0	0	0	0
VX KC-130J PDAI	1	1	1	1	1	1	1	1	1	1	1
KC-130J SHORTFALL	28	26	25	23	19	16	14	12	10	8	6
RC KC-130T TAI	14	14	14	14	9	5	0	0	0	0	0
KC-130J/T TOAI	65	67	68	70	69	68	65	67	69	71	73

NOTES:

- 1) TOTAL OVERALL AIRCRAFT AUTHORIZED (TOAA) PROGRAM OF RECORD IS 79 KC-130J AIRCRAFT.
- 2) PMAI FOR EACH ACTIVE COMPONENT VMGR SQUADRON IS 15 AIRCRAFT AND PMAI FOR EACH RESERVE COMPONENT VMGR SQUADRON IS 12 AIRCRAFT.
- 3) KC-130J BAI AIRCRAFT DELIVERIES BEGIN FY25 (POST RC FOC DELIVERY COMPLETION).
- 4) KC-130T RETIREMENT SCHEDULE IS A PROJECTION AND REQUIRES CONTINUED ADJUSTMENT UNTIL THE RESERVE KC-130J TRANSITION IS COMPLETED.

MARINE AERIAL REFUELER / TRANSPORT (VMGR) PLAN

KEY

J = KC-130J TRANSITION BEGINS
V = KC-130J IOC (5) KJs

CURRENT FORCE:

3 AC SQDN X 15 KC-130J
1 RC SQDN X 5 KC-130J
1 RC SQDN X 12 KC-130T

FORCE GOAL:

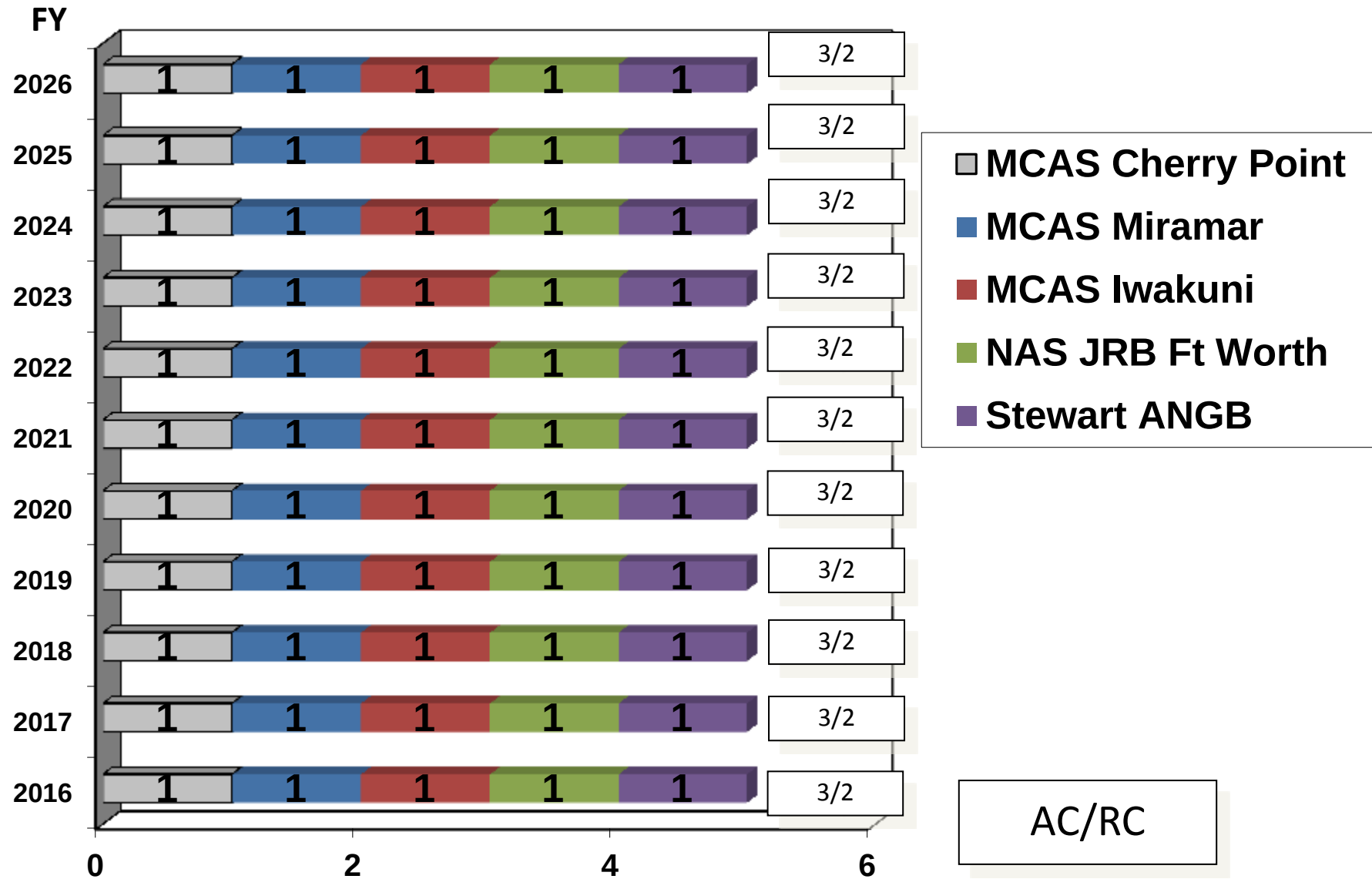
3 AC SQDN X 15 KC-130J
2 RC SQDN X 12 KC-130J

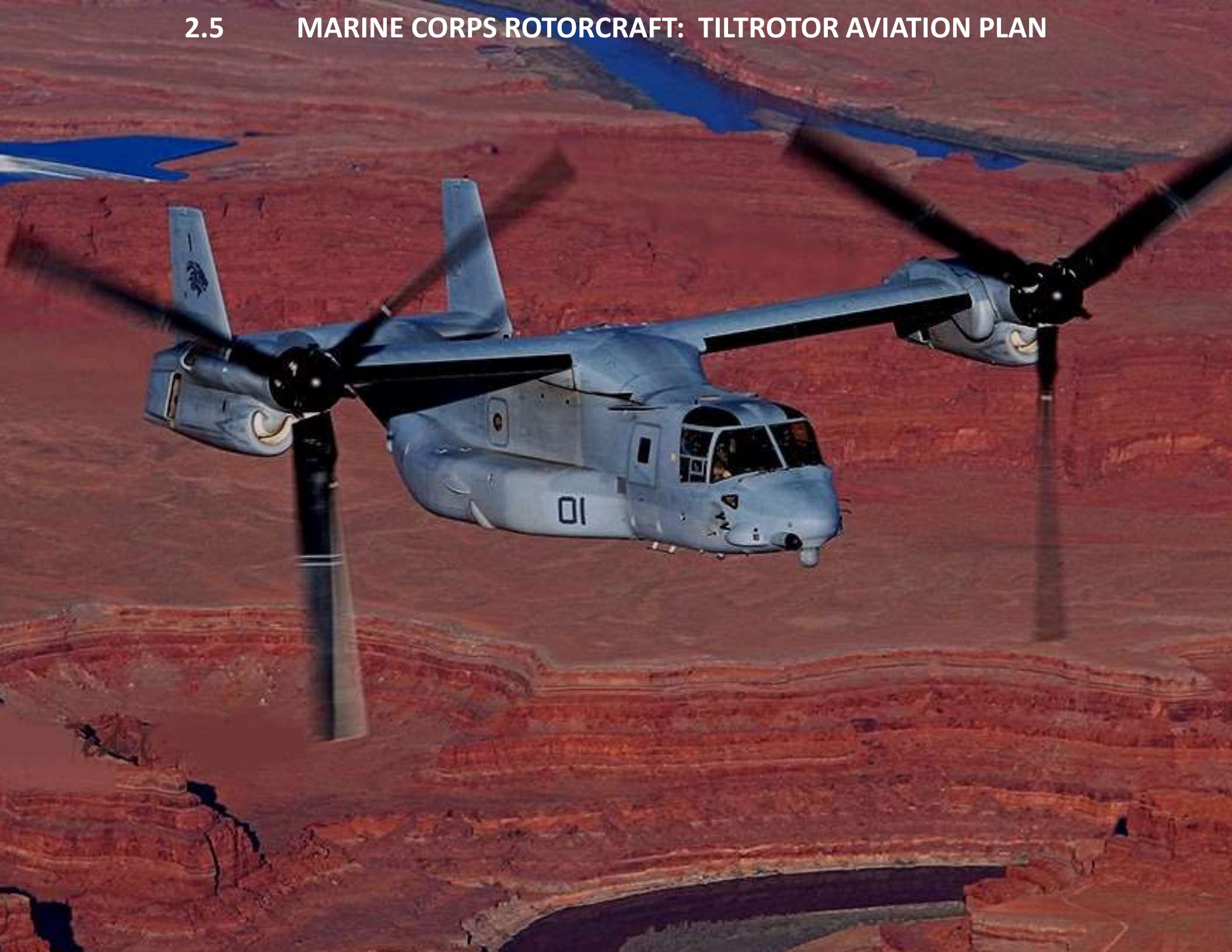
		FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24				FY25				FY26			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
UNIT/LOCATION		PMAI																																											
MAG-11/MIRAMAR, CA																																													
VMGR-352	15 KC-130J (FY16)																																												
WEST COAST MEU PTP																																													
RFF SUPPORT																																													
I MEF GENERAL SUPPORT																																													
MAG-12/IWAKUNI, JA																																													
VMGR-152	15 KC-130J (FY16)																																												
WESTPAC MEU																																													
MRF-D/MRF-G/TSC																																													
III MEF GENERAL SUPPORT																																													
MAG-14/CHERRY POINT, NC																																													
VMGR-252	15 KC-130J (FY16)																																												
EAST COAST MEU PTP																																													
RFF SUPPORT																																													
II MEF GENERAL SUPPORT																																													
MAG-41/FORT WORTH, TX																																													
VMGR-234	12 KC-130J (FY20)																																												
RFF SUPPORT																																													
I/II/III MEF GENERAL SUPPORT																																													
MAG-49/NEWBURGH, NY																																													
VMGR-452	12 KC-130J (FY25)																	J				V																							
RFF SUPPORT																																													
I/II/III MEF GENERAL SUPPORT																																													

NOTES:

- 1) VMGR SOURCING IS UPDATED DURING QUARTERLY FORCE SYNCH CONFERENCES.
- 2) THE ABOVE DEPICTED REQUIREMENT RESULTS IN LESS THAN A 1:2 DEPLOYMENT TO DWELL.
- 3) VMGR SQUADRONS ARE STRUCTURED TO SUPPORT A CORE ELEMENT AND TWO (3) PLANE DETACHMENTS EACH.
- 4) DETACHMENT SIZE IS SCALABLE TO MEET THE ASSIGNED MAGTF MISSION.
- 5) MEU PTP SUPPORT REMAINS A REQUIREMENT, BUT NOT SOURCED WITH DEDICATED DETACHMENT UNTIL FUTURE FORCE SOURCING RELIEF IS REALIZED.

MARINE AERIAL REFUELER / TRANSPORT SQUADRON GEO-LOCATION





MARINE MEDIUM TILTROTOR(VMM) PLAN

MV-22 DESCRIPTION:

The MV-22 Osprey is the world's first production tiltrotor aircraft and the medium lift assault support platform for the Marine Corps. It blends the vertical flight capabilities of helicopters with the speed, range, altitude, and endurance of fixed-wing transport aircraft. Since the first deployment in 2007, the MV-22B's revolutionary capability has been a cornerstone of the Marine Air-Ground Task Force.

Due to the increasing demand for the Osprey, a detachment capability is being built into the VMMs. Staffing began in 2014 for detachment capability in two East Coast squadrons. Sixteen additional squadrons will receive the increased staffing in FY17. The 17th and 18th VMMs will stand-up with a detachment capability. Efforts are underway to adjust the spares, tools, and support equipment to match the unit requirements of the detachment capability.

The program is targeting 2035 to commence the first delivery of a major MV-22 capability upgrade (beyond simple platform evolution). This improvement will leverage technologies from joint multi-role (JMR), future vertical lift (FVL), and other emerging technology initiatives: these will provide a capability leap to ensure relevance and improved readiness at a lower cost for decades.

Transition Plan:

The MV-22B has replacing the CH-46E and CH-53D. The Marine Corps will procure a total of 360 MV-22B's in the following squadron beddown:

- 18 active squadrons x 12 MV-22B
- 2 reserve squadrons x 12 MV-22B
- 1 fleet replacement squadron x 20 MV-22B

The Marine Corps is 70% complete with the medium lift transition. There are fourteen FOC squadrons in the active fleet. The units on the East Coast and Okinawa are complete with the transition, leaving the West Coast, Hawaii, and the reserve component to complete. Two active component squadrons are scheduled to relocate from Southern California to Hawaii in FY17 and FY18.



The transition of the two reserve squadrons began in the third quarter of FY13. VMM-764 relocated from Edwards Air Force Base to MCAS Miramar in 2013 and attained initial operational capable (IOC) in June 2014. The unit will reach FOC in the second quarter of FY16.

In the beginning of FY17, VMM-268 will relocate to Kaneohe Bay. They will be followed by VMM-363, beginning in the first quarter of FY18. A 17th active component squadron, VMM-362, will stand-up beginning in FY18 in Miramar, CA. In FY19, VMM-212 will stand-up in Jacksonville, NC to complete the active component transition.

MARINE MEDIUM TILTROTOR(VMM) PLAN

MISSIONS

MARINE MEDIUM TILTROTOR SQUADRON (VMM): Support the MAGTF commander by providing assault support transport of combat troops, supplies and equipment, day or night under all weather conditions during expeditionary, joint or combined operations.

MARINE MEDIUM TILTROTOR TRAINING SQUADRON (VMMT) Conduct combat capable assault support tiltrotor training for selected aircrew in the MV-22B and provide technical training for aviation maintenance personnel.

* Additional future MV-22 mission sets will include aerial refueling of fixed wing, tiltrotor, and rotary wing; command and control; and intelligence, surveillance, and reconnaissance (ISR). The VMM, through Link 16 and Software Reprogrammable Payload, will be digitally linked to the MAGTF, enhancing interoperability of ground and air forces during long range operations.

* Deputy Commandant for Aviation initiative to modify mission statements is in progress



MV-22B PLAN : PROGRAMMATICS, SUSTAINMENT AND FUTURE

MV-22

Since the first deployment in 2007, the MV-22's revolutionary capability has been a cornerstone of the Marine Air-Ground Task Force. MV-22s provided essential medium lift assault support to ground forces in multiple theaters of operation.

MV-22 readiness has been stressed due to accelerated deployments, accelerated squadron standups, continuous combat use since 2007 and emergent operational tasking. This OPTEMPO has been sustained in parallel with the medium lift transition from legacy assets which is only 70% complete. Additionally, the Special Purpose MAGTF construct has driven the requirement to adjust the VMM T/O in order to support detachment operations. As MV-22 employment grows and evolves to meet CCDR demand, the industrial and logistics support base is working to keep pace.

The MV-22 is a maturing platform that is scheduled to reach FOC in 2020; the support base is maturing in parallel. This base, both industrial and organic, has been challenged to meet established repair timelines and required depot throughput. Across the enterprise, changes to manning are being made to support detachment operations, organic depot facilities are expanding, contracting strategies are evolving to support timely delivery of long lead items, and industry continues to grow their support capability. These and other adjustments are being made to ensure the support base is able to meet logistical requirements driven by current and future MV-22 operational requirements.

SUSTAINMENT:

TIME ON WING IMPROVEMENTS

Readiness initiatives remain a focus of the MV-22 program in order to increase mission capable rates and decrease operating cost. Improvements have been achieved through team execution of a comprehensive plan which includes implementation of R&M improvements, maintenance concept changes, repair capability standup, and contract strategy changes.

FUTURE:

ASSAULT SUPPORT INTEGRATION

In the years ahead, the Osprey will remain the nation's crisis response platform of choice in support of the "new normal." Due to the increasing demand of the Osprey, a detachment capability is being built into the VMMs. Staffing began in 2014 for detachment capability in two East Coast squadrons. An additional sixteen squadrons will receive the increased staffing in FY17. The 17th and 18th VMMs will stand-up with a detachment capability. Efforts are underway to adjust the spares, tools, and support equipment to match the unit requirements of the detachment capability.



Final Fit:

Survivability Upgrade Roadmap:

UUNS DON LAIRCM – 2016 (SPMAGTF)

JUONS DON LAIRCM – 2017 (MEU)

RF Threat Protection System

Intrepid Tiger Block 2X

Interoperability Upgrade Roadmap:

Iridium SATCOM in FY17 to provide Beyond Line Of Sight (BLOS) C2 capabilities.

Software Reprogrammable Payload (SRP) with a gateway functionality will be available in FY20 and will incorporate an enhanced situational awareness through voice, data, still photos, and video

Airborne gateway functionality for multiple waveforms, initially including Link 16, ANW2, TTNT, and BE-CDL

Radio frequency identification (RFID) of cargo and personnel to be fielded with SRP

Lethality Upgrade Roadmap:

V-22 Aerial Refueling System (VARs)

Traffic Collision and Avoidance System (TCAS)

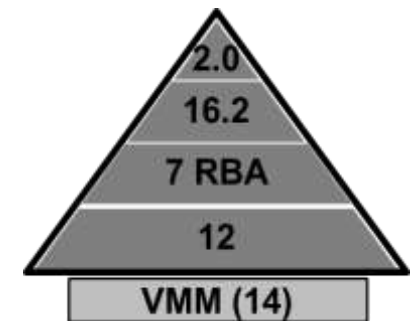
Enhanced Weapon System; Medium range immediate suppression

TFLIR; Advanced Targeting Sensor (ATS) with EO/IR optics, Laser Target Designator and Ranging (LTD-R), IR Marker, and Video Data Link (VDL)

Reliability Upgrade Roadmap:

Open Architecture / Modular Avionics

Electrical System Redesign



MARINE MEDIUM TILTROTOR(VMM) PLAN

MV-22 Aircraft Test and Evaluation Updates

DEVELOPMENTAL TEST (DT): Ongoing DT efforts include:

- Fleet sustainment – Vehicle Management System (VMS) and JVX Application System Software (JASS) software drops
- Nacelle sails for increased range
- Envelope expansion for shipboard operations
- High altitude operations and defensive maneuvering
- Strategic tanker envelope expansion

OPERATIONAL TEST AND EVALUATION (OT&E): Ongoing OT efforts include:

- Support of integrated test for aircraft and mission planning software development
- Operational assessments of flare effectiveness and Blue Force Tracker (BFT) Phase IV
- Defensive weapon system envelope expansion
- Digital interoperability

Future Capabilities

Strategic Air-to-Air Refueling (AAR)

The V-22 and KC-130 are a formidable tandem for the MAGTF commander. The addition of joint and coalition strategic tankers will increase the flexibility of the combatant commander to utilize the V-22. In 2014, a flight clearance was completed for the V-22 to conduct air-to-air refueling from the Air Force KC-10. Further testing and flight clearances are planned for the KC-46 and the Omega 707.

V-22 Aerial Refueling System (VARs)

Planned to have the initial capability in mid FY18 being able to refuel fixed wing, tiltrotor and rotary wing aircraft. Fielding of the full capable system will be in FY19. This system will be able to refuel all MAGTF aerial refuel capable aircraft with approximately 10,000 pounds per VARs-equipped V-22.

Enhanced Weapon System

Enhanced weapon systems is in early development to increase all-axis, stand-off, and precision capabilities.

Integrated Aircraft Survivability Equipment (IASSE)

An IASSE urgent universal needs statement (UUNS) was approved in FY14. Delivery of the first 24 sets will be in FY16. Upgrading the remaining fleet will begin in FY17.



MARINE MEDIUM TILTROTOR(VMM) PLAN

The next MV-22

The V-22 has proven its worth by transforming rotorcraft operations across the globe. The operational reach and versatility of this remarkable platform has created tactical and strategic options where there previously were none. Building on this success is key to ensure the platform's relevance and capability for the future force.

Initial planning has begun to map the next upgrade to the MV-22B, which will attempt to achieve a single configuration by the mid 2020s. This concept will take the reliability upgrades in the current Block C and integrate them into fielded Block B aircraft. New capabilities, such as open architecture, will allow the V-22 to remain lethal on the evolving modern battlefield. Additionally, the modernization of the aircraft will increase its readiness and cost efficiency. The procurement of a new sensor, that can off-load IASE and DI gathered threat information to friendly attack platforms, will reduce the steps in the kill chain.

Upgrades will take advantage of maturing technologies as well as incorporate improvements realized since the platform's introduction to the fleet. The single configuration aircraft will increase operational effectiveness, reliability and maintainability. It will also sustain the downward trend in operating costs while increasing readiness, which are hallmarks of the platform's overall performance to date.

To take full advantage of the success of tiltrotor technology, we plan to field the next build of the Osprey in the beginning of 2040. The next Osprey build will take advantage of technologies spurred by the ongoing joint multi-role and future vertical lift efforts, and other emerging technology initiatives. This upgrade will ensure Marines have state of the art medium lift assault support for decades to come.



MARINE MEDIUM TILTROTOR (VMM) PLAN

	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
TOTAL SQUADRONS / PRIMARY MISSION AIRCRAFT AUTHORIZED (PMAA) - REQUIREMENT											
Active Component											
12 MV-22B	16	16	17	18	18	18	18	18	18	18	18
Reserve Component											
12 MV-22B	2	2	2	2	2	2	2	2	2	2	2
	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
PRIMARY AIRCRAFT INVENTORY (PAI) PLAN - INVENTORY											
AC/RC PMAI											
MV-22B	216	216	216	228	240	240	240	240	240	240	240
FRS PTAI											
MV-22B BLOCK A	6	2	0	0	0	0	0	0	0	0	0
MV-22B BLOCK B	14	18	20	20	20	20	20	20	20	20	20
HMX-1 PMAI											
MV-22B	12	12	12	12	12	12	12	12	12	12	12
PDAI / POAI											
MV-22B	8	8	8	8	8	8	8	8	8	8	8
BAI/PIPE											
MV-22B	19	37	37	37	37	37	37	37	37	37	37
PROGRAM OF RECORD	360	360	360	360	360	360	360	360	360	360	360

GENERAL NOTES:

1) TOTAL PROCUREMENT OBJECTIVE IS 360 MV-22B. A REQUIREMENTS-BASED ANALYSIS IS UNDERWAY TO INCREASE THE PROGRAM OF RECORD TO 380 WITH THE INTRODUCTION OF VMM-362 and VMM-212 IN FY18 AND FY19.

2) FLEET SQUADRONS WILL CONTAIN A MIX OF BLOCK B AND BLOCK C. THE MIX WILL MOVE FROM 8 BLOCK B AND 4 BLOCK C TO A 6 AND 6 MIX.

3) VMMT-204 WILL CONTAIN BLOCK A AND BLOCK B AIRCRAFT UNTIL FY18.

MARINE MEDIUM TILTROTOR(VMM) PLAN

18 AC SQDN X 12 MV-22B
2 RC SQDN X 12 MV-22B
FRS x 20 MV-22B
HMX-1 x 12 MV-22B

KEY

M = TRANSITION BEGINS
V = TRANSITION COMPLETE

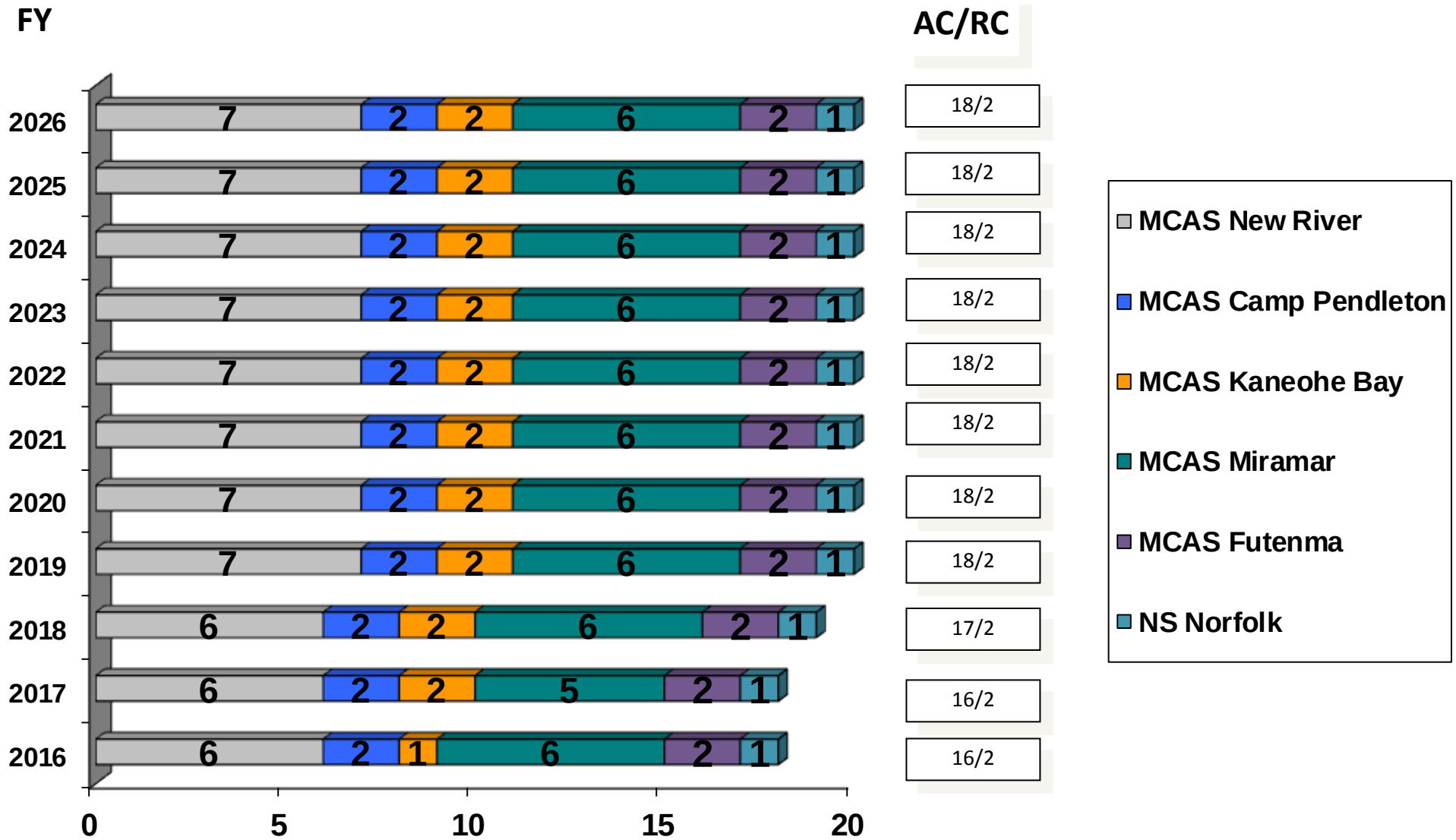
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NOTES:

- 1) VMM-268 FOC Q1 FY16. RELOCATE TO MAG-24 DURING Q1 FY17.
- 2) VMM-363 RELOCATE TO MAG-24 DURING Q1 FY18.
- 3) VMM-362 WILL BEGIN STAND UP IN FY18 IN MIRAMAR.
- 4) VMM-212 WILL BEGIN STAND UP IN FY19 IN NEW RIVER.

- 5) VMM-164 IOC Q2 FY16. FOC Q3 FY17.
- 6) VMM-364 FOC Q1 FY17.
- 7) VMM-764 FOC Q2 FY16.
- 8) HMM-774 TRANSITION WILL BE CONDUCTED AT NS NORFOLK.
IOC Q3 FY16. FOC Q4 FY18

MARINE MEDIUM TILTROTOR(VMM) GEO-LOCATION



Basing plans are subject to change



Retirement of the CH-46E 1 August 2015

2.6 MARINE ROTARY-WING AVIATION PLAN



MARINE CORPS HELICOPTER PLAN

Missions

MARINE HEAVY HELICOPTER SQUADRON (HMH): Support the MAGTF commander by providing assault support transport of heavy equipment, combat troops, and supplies, day or night under all weather conditions during expeditionary, joint or combined operations. Conduct intelligence, surveillance and reconnaissance missions and MAGTF electronic warfare missions.

MARINE HEAVY HELICOPTER TRAINING SQUADRON (HMHT): Conduct combat capable assault support heavy lift helicopter training for selected aircrews in the CH-53E aircraft-and provide technical training for aviation maintenance personnel.

MARINE LIGHT ATTACK HELICOPTER SQUADRON (HMLA):

Support the MAGTF commander by providing offensive air support, utility support, armed escort and airborne supporting arms coordination, day or night under all weather conditions during expeditionary, joint or combined operations. Conduct intelligence, surveillance and reconnaissance missions and MAGTF electronic warfare missions.

MARINE LIGHT ATTACK HELICOPTER TRAINING SQUADRON (HMLAT) Conduct combat capable attack training for selected aircrews in the UH-1Y, AH-1W and AH-1Z aircraft, and provide technical training for aviation maintenance personnel.



MARINE HEAVY HELICOPTER (HMH) PLAN

New Aircraft Test and Evaluation Updates

CH-53K King Stallion:

DEVELOPMENTAL TEST: 1st Qtr FY14 to 2nd Qtr FY18

OPERATIONAL TEST/OPEVAL: OT-B1 testing in support of Milestone C Decision begins 1st Qtr FY17. Integrated Operational Test and Evaluation (IOT&E) commences in FY19 in support of Initial Operational Capability (IOC) / Full Rate Production (FRP).

INITIAL OPERATIONAL CAPABILITY: Scheduled for FY19. IOC shall be achieved when the first squadron receives four CH-53K aircraft with required personnel suitably trained and certified, required primary and support equipment and technical publications, to include initial spares with interim repair support and initial training in place, ready to deploy in accordance with USMC standards.



CH-53E PLAN: PROGRAMMATICS, SUSTAINMENT AND FUTURE

CH-53E SUPER STALLION:

The CH-53E entered service in 1981 and is the only heavy lift helicopter in the DoD rotorcraft inventory. Current force construct is eight active component HMHs and one reserve component HMH(-). The Super Stallion fleet has enabled heavy lift assault support operations in OEF, OIF, HOA, and is forward deployed in support of MEUs, UDP Okinawa, MRF-Darwin and SPMAGTFs. The past 14 years of combat operations and various humanitarian crises have validated the relevance of vertical heavy lift by both MAGTF and joint force commanders alike.

The current CH-53E inventory is 149 aircraft. Replacement production capacity does not exist nor are there CH-53Es available in war storage. Low aircraft inventory is accentuated by pipeline aircraft (aircraft receiving modifications, depot level repairs and standard depot-level maintenance) which creates a shortfall of physical assets available for tasking on the flight line. HMH PAA is 16 CH-53Es per squadron. HQMC has reset the force by temporarily reducing the amount of aircraft a squadron has on its flightline to 12 aircraft preserving future combat readiness while meeting today's current operational requirements. Transition to the CH-53K will enable re-distribution of CH-53E aircraft, allowing squadrons to return to 16 aircraft.

CH-53E SUSTAINMENT:

In response to the poor readiness of the CH-53E, the Deputy Commandant for Aviation chartered the Super Stallion Readiness Review (SSIRR) to identify issues, gaps, and root causes for aircraft, aircrew and maintenance personnel readiness, and to recommend the best courses of action for the CH-53E community to achieve and maintain T-2.0 until FOC of the CH-53K in 2029.

The SSIRR made multiple surge and sustainment recommendations to get the CH-53E back on step, and multiple CH-53E readiness recovery efforts are moving forward and underway. One of the recommendations is to reset all 149 CH-53Es, which will focus on inducting aircraft that are Non-Mission Capable (NMC) or Partial Mission Capable (PMC) and return them Full Mission Capable (FMC) to the squadrons in order to provide RBA.

The SSIRR also recommended procuring the full complement of test equipment and Individual Material Readiness List to ensure squadrons have more aircraft on the flightline available for training and operational missions.

Ultimately these efforts will increase the amount of time our aviators will spend in the air, honing their combat readiness, currency, and proficiency.



FUTURE:

The CH-53E will continue to support the full spectrum of assigned combat operations and scheduled deployments. It is imperative to sustain the current CH-53E fleet throughout the transition to the CH-53K (IOC FY19 / FOC FY29).

Final Fit:

Survivability Upgrade Roadmap:

AAQ-24 DIRCM(V25)

Dual Pod/Forward Firing Chaff and Flare Dispensers

Hostile Fire Indication (HFI)

Advanced Threat Warner/Missile Warner/Laser Warner

Integrated Aircraft Survivability Equipment (ASE)

Interoperability Upgrade Roadmap:

Software Reprogrammable Payload (SRP) radio replacement

LINK 16

Reliability Upgrade Roadmap:

419 Engine Upgrade (increases payload by 5 to 8K pounds)

Engine Reliability Improvement Plan (ERIP)

Prognostic/Diagnostic Based Maintenance

Engine Nacelles

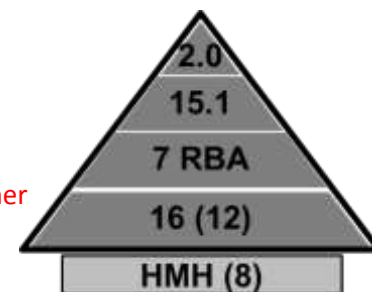
Kapton Wiring Replacement

Critical Systems Upgrade: Mode V IFF, Master Zeroize Switch, GPS Inertial

Navigation System (INS), Brown Out Symbolology Set (BOSS), Embedded SATCOM

Smart Multifunction Color Display (SMFCD)

Degraded Visual Environment (DVE) Phases 2 and 3



MARINE HEAVY HELICOPTER (HMH) PLAN CH-53K

CH-53K KING STALLION DESCRIPTION:

On 27 October 2015, the CH-53K King Stallion flew for the first time: a thirty-minute test of sideward, rearward and forward flight control inputs while hovering in ground effect. Flights have followed nearly daily since. OT-B1 testing will continue, to support a Milestone C decision in 2nd QTR FY 17.

The CH-53K is a critical airborne connector which will enable ship to objective maneuver and seabasing. The CH-53K will be capable of externally transporting 27,000 pounds to a range of 110 NM under high/hot conditions. This provides nearly three times the capability of the CH-53E under similar environmental conditions. Major system improvements of this new build helicopter include: fly-by-wire flight controls; a composite airframe housing more capable and fuel efficient engines and a split torque main gearbox to enable increased gross weight; advanced fourth-generation composite main rotor blades; modern interoperable glass cockpit; internal cargo handling systems compatible with USAF 463L pallets; triple hook external cargo system; and fourth-generation aircraft survivability equipment. Additionally, the CH-53K will be supported by the fleet common operating environment (FCOE) which will facilitate condition based maintenance.

The CH-53K helicopter provides JTF and MAGTF commanders with a vertical heavy lift capability to project, sustain and reconstitute combat forces. The CH-53K operates at distances, airspeeds, and gross weights sufficient to support the full range of military operations, expeditionary maneuver warfare, operational maneuver from the sea and seabasing concepts. The aircraft affordably optimizes performance, survivability, maintainability and supportability in a “best value” solution to provide an effective heavy lift assault support platform.

Unique in aviation build and test history, the CH-53K program has a dedicated Ground Test Vehicle (GTV) on which to test dynamic components, airframe fatigue, systems and flight surfaces and controls. A separate, static test article, used to measure strain and critical loads under several thousand load conditions, allows a rigorous testing program in a safe environment, and data from these two systems are implemented into the program far more quickly than if this were a flying aircraft. The GTV, by discovering issues inherent in any helicopter test program, bought down risk and made flight test safer and more efficient.

The program entered Development Test 1st QTR FY 14 with the successful light off of the ground test vehicle. The first of four Engineering Demonstration Models (EDM) was delivered in the first quarter of FY 14. EDM 1 first flew on 27 October 2015; EDM 3 is in systems check out for flight; EDMs 2 and 4 are in final stage of build. System Demonstration Test Articles (SDTAs) 1-3 are in assembly, while SDTA 4 is in build at the vendors with follow on contracts pending for SDTAs 5 and 6.

Transition Plan:

The Marine Corps will procure a total of 200 airframes, fielding eight active component squadrons, one fleet replacement squadron, two HMH(-) reserve component squadrons, and developmental / operational test squadrons.

The CH-53 transition begins in earnest in FY-19, when HMH-366 and HMHT- 302 enter transition. HMH-366 will be the first tactical squadron to deploy a detachment of CH-53K King Stallions. Transition timelines are as follows:

- 2nd MAW FY 19-25
- 1st MAW FY 25-26
- 3rd MAW FY 26-30
- 4th MAW FY 29-31.

In FY 23, 4th MAW will restructure its single HMH into two separate HMH(-)s with the reactivation of HMH-769 at MCAS Miramar. CH-53K FOC will be achieved in FY 29 with the transition of the last active component squadron. Backup aircraft inventory / attrition reserve deliveries will complete in FY31 when the program of record reaches 200 aircraft.



MARINE HEAVY HELICOPTER (HMH) PLAN

	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
TOTAL SQUADRONS / PRIMARY MISSION AIRCRAFT AUTHORIZED (PMAA) - REQUIREMENT											
Active Component											
16 CH-53E	8	8	8	7	7	7	7	6	5	4	4
16 CH-53K	0	0	0	1	1	1	1	2	3	4	4
Reserve Component											
8 CH-53E	1	1	1	1	1	1	1	2	2	2	2
8 CH-53K	0	0	0	0	0	0	0	0	0	0	0
	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
PRIMARY AIRCRAFT INVENTORY (PAI) PLAN - INVENTORY											
AC/RC PRIMARY MISSION AIRCRAFT INVENTORY (PMAI)											
CH-53E	102	104	104	104	104	104	104	108	108	80	64
CH-53K	0	0	0	4	4	7	13	23	32	54	74
FRS PRIMARY TRAINING AIRCRAFT INVENTORY (PTAI)											
CH-53E	12	10	10	10	10	10	10	8	8	6	4
MH-53E	0	2	2	2	2	2	2	0	0	0	0
CH-53K	0	0	0	0	2	3	4	6	11	9	12
TOTAL PTAI	12	12	12	12	14	15	16	14	19	15	16
PRIMARY DEVELOPMENTAL/TEST AIRCRAFT INVENTORY (PDAI)											
CH-53E	2	2	2	2	2	2	2	2	0	0	0
CH-53K	6	8	8	4	4	4	4	4	4	3	3
TOTAL PDAI	8	10	10	6	6	6	6	6	4	3	3
BACKUP AIRCRAFT INVENTORY (BAI)/PIPELINE											
CH-53E	33	33	33	33	33	33	33	31	25	21	21
CH-53K	0	0	0	0	0	0	0	0	0	0	0
TOTAL BAI	33	33	33	33	33	33	33	31	25	21	21
TOTAL PAI	155	159	159	155	157	158	159	159	156	119	104

GENERAL NOTES:

- 1) FOUR CH-53K ENGINEERING DEMONSTRATION MODELS (EDM) , NONPRODUCTION AIRCRAFT, WILL BE UTILIZED FOR DEVELOPMENTAL TEST AND RETAINED AT HX-21. IN FY19 (2) EDMs WILL BE REMOVED FROM HX-21 TO BE CONVERTED TO PRACTICAL JOB TRAINERS (PJT)s FOR UTILIZATION AT CNATT NEW RIVER FOR INITIAL ACCESSION TRAINING. EDM AIRCRAFT DO NOT COUNT AGAINST THE PROGRAM OF RECORD.
- 2) PROGRAM OF RECORD IS 200 CH-53K.
- 3) TWO AMARG MH-53Es CONVERTED TO HMHT-302 FAMILIARIZATION FLIGHT TRAINERS WITH EST DELIVERY IN FY17

MARINE HEAVY HELICOPTER (HMH) PLAN

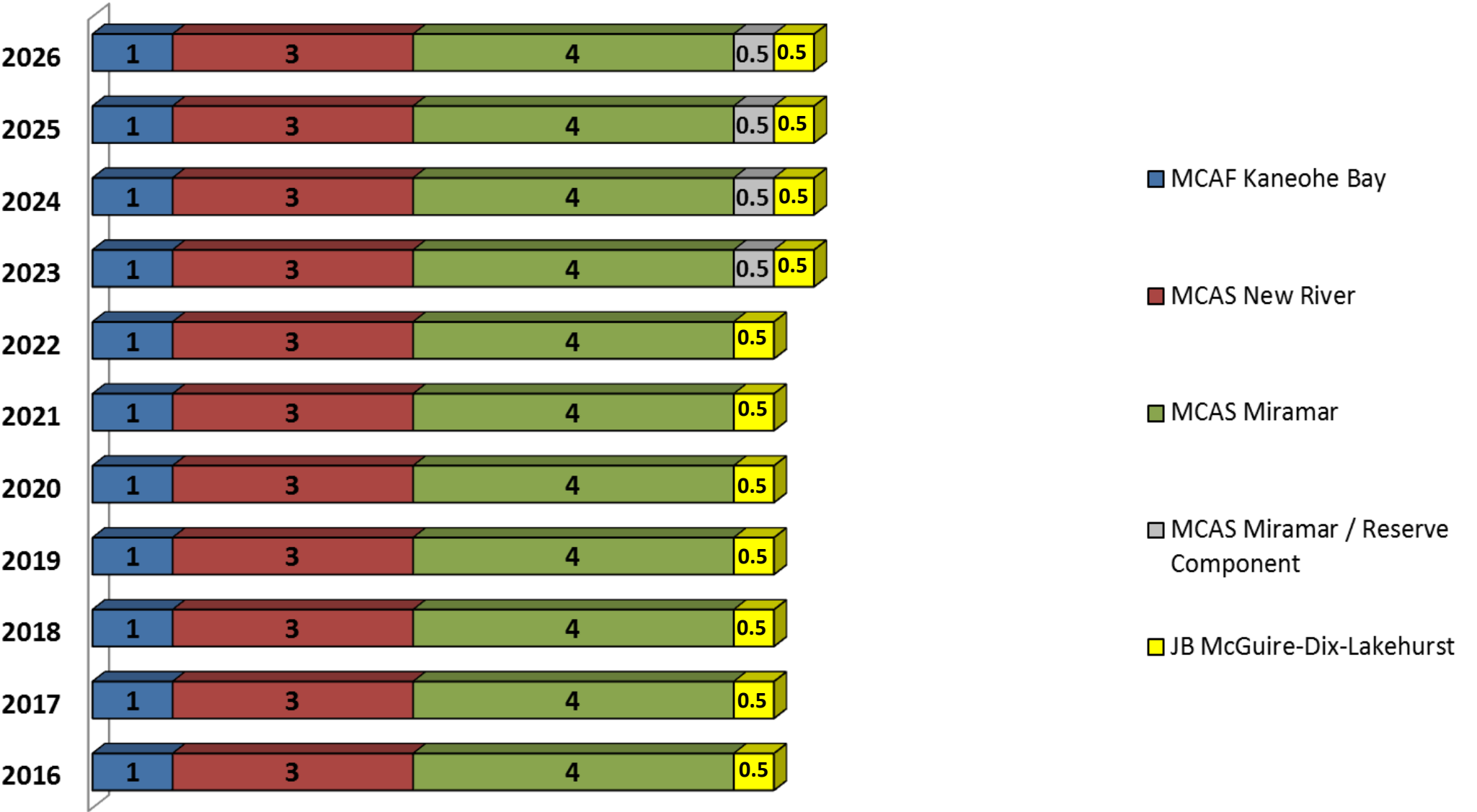
CURRENT FORCE:												FORCE GOAL:																																	
8 AC SQDN X 12 CH-53E (1)												8 AC SQDN X 16 CH-53K																																	
1 RC SQDN X 6 CH-53E (2)												2 RC SQDN(-) X 8 CH-53K																																	
1 FRS SQDN X 12 CH-53E (10 CH-53E / 2MH-53E) (4)												1 FRS SQDN X 21 CH-53K																																	
		FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24				FY25				FY26			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
UNIT/LOCATION	PAI																																												
MAG-16																																													
HMH-361	12 CH-53E (1)																					16 CH-53E																							
HMH-462	12 CH-53E (1)																					16 CH-53E																							
HMH-465	12 CH-53E (1)																									16 CH-53E																			
HMH-466	12 CH-53E (1)																									16 CH-53E																			
West Coast MEU		1	5	3	1	5	3	1	5	3	1	5	3	1	5	3	1	5	3	1	5	3	1	5	3	1	5	3	1	5	3	1	5	3	1	5									
MAGTF Tasking																																													
MAG-24																																													
HMH-463	12 CH-53E (1)									16 CH-53E																												K							
31st MEU		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B										
MILCON		MALS AIRCRAFT MAINT EXPANSION																																											
MILCON		MAG-24 ARMORY EXPANSION																																											
MILCON		HANGAR 102 MODERIZATION																																											
MAG-29																																													
HMHT-302 (3)	12 CH-53E (4)													K																															
	2 MH-53E (4)					2 MH-53E																																							
HMH-366	12 CH-53E													K				V																											
HMH-461	12 CH-53E																									K				V															
HMH-464	12 CH-53E																													K				V											
East Coast MEU		6	2	6	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6	2	4									
MAGTF Tasking																																													
MILCON		53K HANGAR																																											
MILCON		53K MAINTENANCE TRAINING																																											
MAG-41																																													
HMH-769 (-) (5)	8 CH-53E																											A																	
MAG-49																																													
HMH-772 (-)	6 CH-53E (2)					8 CH-53E																																							
MILCON		53K TRAINER FACILITY																																											

A=ACTIVATE
K=ENTERS CH-53K TRANSITION
V=TRANSITION COMPLETE

NOTES:

- 1) PRIMARY AIRCRAFT INVENTORY (PAI) OF 12 A/C PER SQUADRON UNTIL TOTAL INVENTORY SUPPORTS 16 A/C SQUADRONS FACILITATED BY CH-53K TRANSITIONING SQUADRONS.
- 2) PAI OF 6 A/C PER SQUADRON UNTIL TOTAL INVENTORY SUPPORTS 8 A/C SQUADRON FACILITATED BY CH-53K TRANSITIONING SQUADRONS.
- 3) HMHT-302 WILL BECOME A DUAL T/M/S (CH-53E/CH-53K) THROUGHOUT THE DURATION OF THE CH-53K TRANSITION.
- 4) TWO AMARG MH-53Es ADDED TO INVENTORY IN FY15 FOR HMHT-302 FAMILIARIZATION AIRCRAFT CONVERSION, EST DELIVERY DATE OF FY17
- 5) SQUADRON (-) ACTIVATES. LOCATION MCAS MIRAMAR FY23

MARINE HEAVY LIFT SQUADRON GEO-LOCATION



MARINE LIGHT ATTACK HELICOPTER (HMLA) PLAN

This AVPLAN represents a shift for the HMLA community in several key areas:

The end of the NATO mission in Afghanistan defines a transition point in the USMC's reset to the Pacific, and the return of HMLAs to the Unit Deployment Program (UDP). The USMC Pacific reset plan is a crossroads that represents both an operational shift and a pivotal point within the AH-1Z conversion. This period of transition is an opportunity to align the resourcing and operational employment of the H-1 community based on mass and mutual support. The 2016 AVPLAN maximizes mutual support within the HMLA community by changing the sequence and pace of the H-1 transition.

We are planning deactivation of HMLA-467 at the end of FY16. In order to mitigate fires risk within the MAGTF, an additional reserve component HMLA, HMLA-775(-), will be re-activated in Q1 FY17. The sequence of AH-1Z conversion is now 3d MAW, 1st MAW, 2d MAW, then 4th MAW. The conversion of 1st MAW ahead of 2d MAW accelerates TMS mutual support by aligning 1st MAW and 3d MAW to the AH-1Z, while 2d MAW and 4th MAW remain aligned to the AH-1W. This allows the last active component AH-1W squadron to be collocated with robust HMLA support structure, thereby eliminating the challenges created by isolating the last AH-1W squadron on Hawaii.

Once each active component MAG fields to 15 AH-1Z aircraft per squadron, the AH-1Z conversion begins in the next MAG. The reserve component will begin AH-1Z conversion when the active component is complete. The result of these changes is an acceleration of T/M/S alignment within MARFORPAC and increased mutual support for all HMLAs, while mitigating the delay of the 2D MAW AH-1Z conversion.

Employment of these new aircraft systems will include updated missile technology. The JAGM program is fully funded and will implement a three-step incremental approach. The first increment will provide a dual-mode semi-active laser (SAL) and millimeter wave (MMW) seeker. The MMW guidance can be activated while the weapon is still on the aircraft, giving the operator a fire-and-forget missile. The second increment will increase the maximum range to twelve kilometers and add an imaging infrared (IIR) mode to the seeker providing improved lethality, flexibility in modes of fire, advanced countermeasures capability, and additional capability in an obscured battlefield. The third increment will expand the missile envelope to sixteen kilometers. Marine Corps integration on the AH-1Z began in FY15 with an expected IOC in FY19.

The H-1 program plans to execute a block upgrade that will encompass readiness and configuration management approach to integrate these airframes into the larger digitally interoperable MAGTF electronic warfare concept.



AH-1W : PROGRAMMATICS, SUSTAINMENT AND FUTURE

AH-1W:

The AH-1W SuperCobra is a combat-proven force multiplier for the MAGTF. The SuperCobra provides close air support, strike coordination and reconnaissance, armed reconnaissance, escort, forward air controller airborne, and air interdiction.

AH-1Ws are outfitted with the Night Targeting System Upgrade (NTSU), a third- generation targeting FLIR with laser designator / rangefinder and color TV camera.

Ninety AH-1Ws have been outfitted with the Tactical Video Data Link (TVDL) system, enabling aircrews to send and receive sensor video in C, L, and S bands in support of reconnaissance and close air support missions.

The AH-1W employs the Advanced Precision Kill Weapon System (APKWS) laser-guided rocket system. The 20mm linkless feed system is compatible with both the legacy and upgrade platform recently deployed, showcasing a marked increase in gun reliability.

SUSTAINMENT:

Program management and supply support agencies continue to work with our industry partners ensuring a sustainment strategy in place to provide a high state of readiness for the platform. Major current government and industry initiatives include improving component reliability and optimizing the production of spare and repair components.

PLANS:

The AH-1W will remain relevant on the battlefield through sundown.



Final Fit:

Interoperability Upgrade Roadmap:

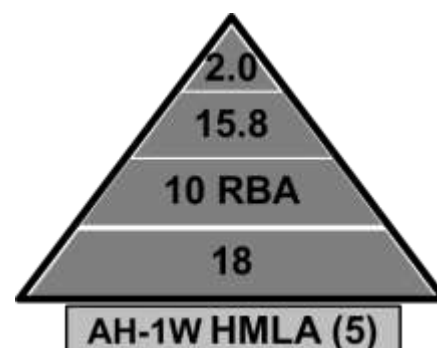
Tactical Video Data Link

Lethality Upgrade Roadmap:

Advanced Precision Kill Weapon System

Reliability Upgrade Roadmap:

Night Targeting System Upgrade
Helmet Display and Tracker System
Linkless Feed System



AH-1Z : PROGRAMMATICS, SUSTAINMENT AND FUTURE

AH-1Z:

The H-1 program replaces the AH-1W aircraft with the AH-1Z Viper. The H-1 Upgrades Program is a single acquisition program which leverages 85% commonality of major components, whereby enhancing deployability and maintainability.

The Viper is the next generation of attack aircraft. Speed, range, and payload have been increased significantly, while decreasing supportability demands, training timelines, and total ownership cost. The advanced cockpit, common to both aircraft, not only reduces operator workload and improves SA but also provides growth potential for future weapons and joint digital interoperability enhancements. The cockpit systems assimilate onboard planning, communications, digital fire control, all weather navigation, day/night targeting, and weapons systems in mirror-imaged crew stations.

The procurement objective is 189 AH-1Zs; 152 are build new aircraft (ZBN).

Three of the eight active component HMLAs have completed their Z conversion and are currently building inventory towards their full authorization of 15 aircraft.

91 AH-1Zs (Lots 1-12) are currently on contract.

42 AH-1Zs have been delivered to date.

SUSTAINMENT:

Program management and supply support agencies continue to work with our industry partners ensuring a sustainment strategy in place to provide a high state of readiness for the platform. Major current government and industry initiatives include improving component reliability, optimizing repair facility output, and establishing organic repair capability, and moving towards a performance-based approach to logistics support.

PLANS:

The details of unit conversion timelines will adjust with real time production delivery schedule updates. These forecast dates reflect the current delivery schedule.

3d MAW: AH-1Z conversion complete in July 2017

2d MAW: AH-1Z conversion begins 2018, complete by 2019

1st MAW: HMLA 367 AH-1Z conversion begins in 2017, complete by 2018

UDP / 31st MEU conversion in 2016



Final Fit:

Survivability Upgrade Roadmap:

Integrated Aircraft Survivability Equipment (ASE)

Degraded Visual Environment solutions

Advanced Threat, Missile, and Laser Warning System

Interoperability Upgrade Roadmap:

Software Reprogrammable Payload (SRP) with LINK 16,
DI FMV 2016

Lethality Upgrade Roadmap:

APKWS – 2016

JAGM – 2019

AIM-9X

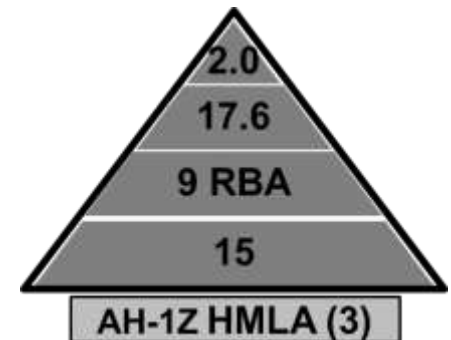
Enhanced EW capabilities

Intrepid Tiger Block 2X

Advanced Missile Warning System

Digital Rocket Launcher

TSS w/Laser Spot Tracker



Reliability Upgrade Roadmap:

Power Upgrades – 2021

Block IV Upgrade – 2021

UH-1Y : PROGRAMMATICS, SUSTAINMENT AND FUTURE

UH-1Y:

The H-1 program replaces the UH-1N aircraft with the UH-1Y Venom. The H-1 Upgrades Program is a single acquisition program which leverages 85% commonality of major components, whereby enhancing deployability and maintainability.

The Venom is the next generation of utility aircraft. Speed, range, and payload have been increased significantly, while we have decreased supportability demands, training timelines, and total ownership cost. The advanced cockpit, common to both aircraft, not only reduces operator workload and improves SA but also provides growth potential for future weapons and joint digital interoperability enhancements. The cockpit systems assimilate onboard planning, communications, digital fire control, all weather navigation, day/night targeting, and weapons systems in mirror-imaged crew stations. The UH-1Y employs the Advanced Precision Kill Weapon System (APKWS), which achieved IOC in Mar 2012.

Procurement objective is 160 UH-1Ys, with FY16 planned as the last year of USMC UH-1Y procurement.

144 UH-1Ys (Lots 1-12) are currently on contract.

117 UH-1Ys have been delivered to date.

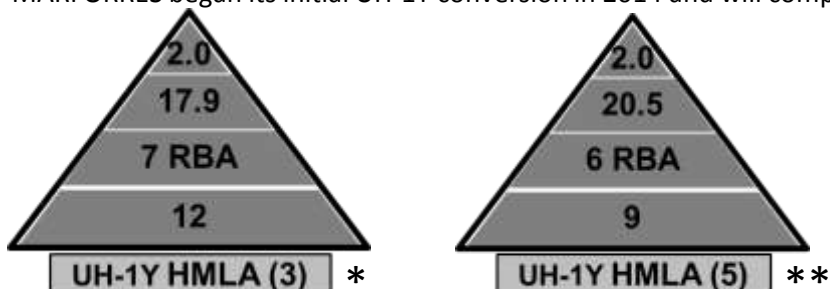
SUSTAINMENT:

Program management and supply support agencies continue to work with our industry partners ensuring a sustainment strategy in place to provide a high state of readiness for the platform. Major current government and industry initiatives include improving component reliability, optimizing repair facility output, and establishing organic repair capability, and moving towards a performance-based approach to logistics support.

PLANS:

All active squadrons have completed their initial UH-1Y conversion and are currently building inventory towards their full authorization of 12 UH-1Ys.

MARFORRES began its initial UH-1Y conversion in 2014 and will complete in 2017.



Final Fit:

Survivability Upgrade Roadmap:

Integrated Aircraft Survivability Equipment (ASE)

Degraded Visual Environment solutions

Advanced Threat, Missile, and Laser Warning System

Intrepid Tiger Block 2X

Interoperability Upgrade Roadmap:

Software Reprogrammable Payload (SRP) with LINK 16,

DI FMV 2016

Lethality Upgrade Roadmap:

APKWS

Digital Rocket Launcher

BRITE Star w/Laser Spot Tracker

Reliability Upgrade Roadmap:

Structural and Power upgrades – 2020

Block IV Upgrade – 2021

* HMLA Squadrons which have completed conversion to the AH-1Z

** HMLA Squadrons which still have the AH-1W

MARINE LIGHT ATTACK HELICOPTER (HMLA) PLAN

MARINE LIGHT/ATTACK (HMLA) PLAN

	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
TOTAL SQUADRONS / PRIMARY MISSION AIRCRAFT AUTHORIZED (PMAI) - REQUIREMENT											
Active Component											
18 AH-1W / 9 UH-1Y	4	2	1	0	0	0	0	0	0	0	0
15 AH-1Z / 12 UH-1Y	4	5	6	7	7	7	7	7	7	7	7
Reserve Component											
18 AH-1W / 9 UH-1Y	1	2	2	2	0	0	0	0	0	0	0
15 AH-1Z / 12 UH-1Y	0	0	0	0	2	2	2	2	2	2	2
	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
PRIMARY AIRCRAFT INVENTORY (PAI) PLAN - INVENTORY											
AC/RC PMAI											
AH-1W	66	66	48	36	6	0	0	0	0	0	0
AH-1Z	53	64	78	103	130	135	135	135	135	135	135
UH-1Y	108	108	108	108	108	108	108	108	108	108	108
TOTAL AH PMAI	119	130	126	139	136	135	135	135	135	135	135
TOTAL UH PMAI	108	108	108	108	108	108	108	108	108	108	108
FRS PTAI											
AH-1W	10	10	0	0	0	0	0	0	0	0	0
AH-1Z	13	14	15	15	15	15	15	15	15	15	15
UH-1Y	12	13	13	13	13	13	13	13	13	13	13
TOTAL AH PTAI	23	24	15	15	15	15	15	15	15	15	15
TOTAL UH PTAI	12	13	13	13	13	13	13	13	13	13	13
PDAI											
AH-1W	3	3	3	3	0	0	0	0	0	0	0
AH-1Z	5	5	5	5	5	5	5	5	5	5	5
UH-1Y	4	4	4	4	4	4	4	4	4	4	4
TOTAL AH PDAI	8	8	8	8	5	5	5	5	5	5	5
TOTAL UH PDAI	4	4	4	4	4	4	4	4	4	4	4
BAI/PIPE											
AH-1W	11	10	7	5	1	0	0	0	0	0	0
AH-1Z	0	0	0	0	0	25	34	34	34	34	34
UH-1Y	0	0	29	30	31	31	31	31	31	31	31
TOTAL AH BAI	11	10	7	5	1	25	34	34	34	34	34
TOTAL UH BAI	0	0	29	30	31	31	31	31	31	31	31
PMAI PER HMLA (W)	13	17	16	18	0	0	0	0	0	0	0
PMAI PER HMLA (Z)	13	13	13	15	14	15	15	15	15	15	15
PMAI PER HMLA (Y)	12	12	12	12	12	12	12	12	12	12	12
AH PAI	150	162	149	162	156	155	155	155	155	155	155
UH PAI	124	125	125	125	125	125	125	125	125	125	125

GENERAL NOTES:

- 1) TOTAL PROCUREMENT OBJECTIVE IS 160 UH-1Y AND 189 AH-1Z, FOR A TOTAL OF 349 H-1 AIRCRAFT.
- 2) THE PMAA CHANGE FROM 18 AH-1W / 9 UH-1Y TO 15 AH-1Z / 12 UH-1Y WILL BE COINCIDENT WITH THE DIVESTITURE OF THE LAST AH-1W DURING A SQUADRON'S AH-1Z CONVERSION.
- 3) PMAI WILL ADJUST WITH REAL TIME PRODUCTION DELIVERY SCHEDULE UPDATES. TIMELINES DEPICTED ABOVE REFLECT THE CURRENT DELIVERY SCHEDULE.

MARINE LIGHT ATTACK HELICOPTER (HMLA) PLAN

KEY

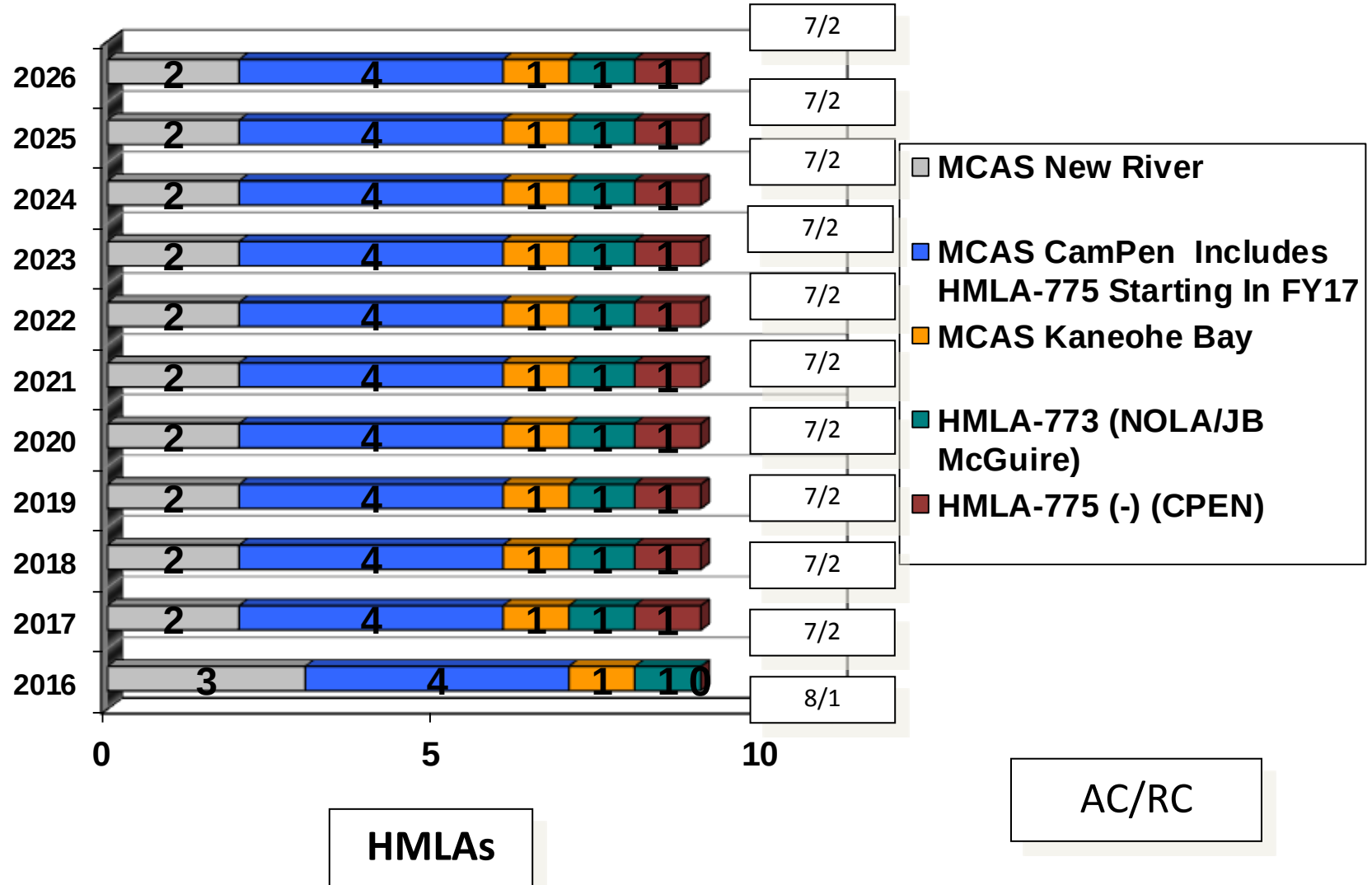
Y = YANKEE TRANSITION BEGINS
Z = ZULU TRANSITION BEGINS
X = TRANSITION TO USCG BEGINS
V = TRANSITION COMPLETE

		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	5	6	7	8						
UNIT/LOCATION	PMAI GOAL																																										
MAG-24																																											
HMLA-367	18/15 AH-1/12 UH-1					Z		V																																			
MAGTF Tasking																																											
MILCON																																											
MILCON										HANGAR 102 RENOVATION																																	
MILCON		HMLA WAREHOUSE CONSTRUCTION																																									
MAG-29																																											
HMLA-167	18/15 AH-1/12 UH-1							Z		V																																	
HMLA-269	18/15 AH-1/12 UH-1									Z		V																															
HMLA-467	18 AH-1/12 UH-1							HMLA-467 Deactivation																																			
East Coast MEU		2	4	6	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6	2								
MILCON		CALA ADDITION																																									
MILCON		CORROSION CONTROL HANGER																																									
MILCON		ORDNANCE MAGAZINE																																									
MAG-39																																											
HMLAT-303	15 AH-1Z/12 UH-1Y																																										
HMLA-169	15 AH-1Z/12 UH-1Y																																										
HMLA-267	15 AH-1Z/12 UH-1Y																																										
HMLA-369	15 AH-1Z/12 UH-1Y	Z		V																																							
HMLA-469	18/15 AH-1Z/12 UH-1Y			Z		V																																					
West Coast MEU		1	5	3	1	5	3	1	5	3	1	5	3	1	5	3	1	5	3	1	5	3	1	5	3	1	5	3	1	5	3	1	5	3	1								
31st MEU																																											
MAGTF Tasking																																											
MILCON																																											
MILCON		EXPAND HANGARS 23144 & 23170																																									
MILCON						AVIATION WAREHOUSE																																					
MILCON										LZ & HOLF LIGHTING MODERNIZATION																																	
MAG-49																																											
HMLA-773	15 AH-1/12 UH-1															Z		V																									
MAG-41																																											
HMLA-775	18/15 AH-1/12 UH-1			W/Y		V												Z		V																							

- NOTES:** 1) HMLA-775 BASED AT CAMP PENDLETON.
2) MRF-D REQUIRMENTS FILLED BY HMLA-367 STARTED IN FY-15 WITH GUAM DETS SOURCED WITHIN MFP SCHEDULED TO BEGIN FY22.
3) THE DETAILS OF UNIT CONVERSION TIMELINES WILL ADJUST WITH REAL TIME PRODUCTION DELIVERY SCHEDULE UPDATES. TIMELINES DEPICTED ABOVE REFLECT THE CURRENT PRODUCTION-DELIVERY SCHEDULE.

MARINE LIGHT ATTACK SQUADRON GEO-LOCATION

FY



Basing plans are subject to change and further environmental analysis

MARINE SEARCH AND RESCUE (SAR) PLAN

Marine aviation completes its divestiture of organic SAR capability at MCAS Yuma.

- The MCAS Cherry Point mission ended in September 2015, and our SAR divestiture will be complete with the retirement of the HH-1N in Yuma.
- The Search and Rescue Unit (SRU) in Yuma will cease operations in FY17.
- The retirement of the HH-1N in FY-17 marks the completion of a SAR divestiture action the USMC and USN began in 1996.
- Upon sundown of the HH-1N in MCAS Yuma, the Marine Corps will transition to contract SAR services.

MARINE SEARCH AND RESCUE (SAR) PLAN

CURRENT FORCE: 4 X HH-1N

FORCE GOAL: | No USMC Assets, Contract

		FY15				FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24				FY25			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
UNIT/LOCATION	POAA																																												
MCAS YUMA	4 HH-1N																																												
CONTRACT																																													

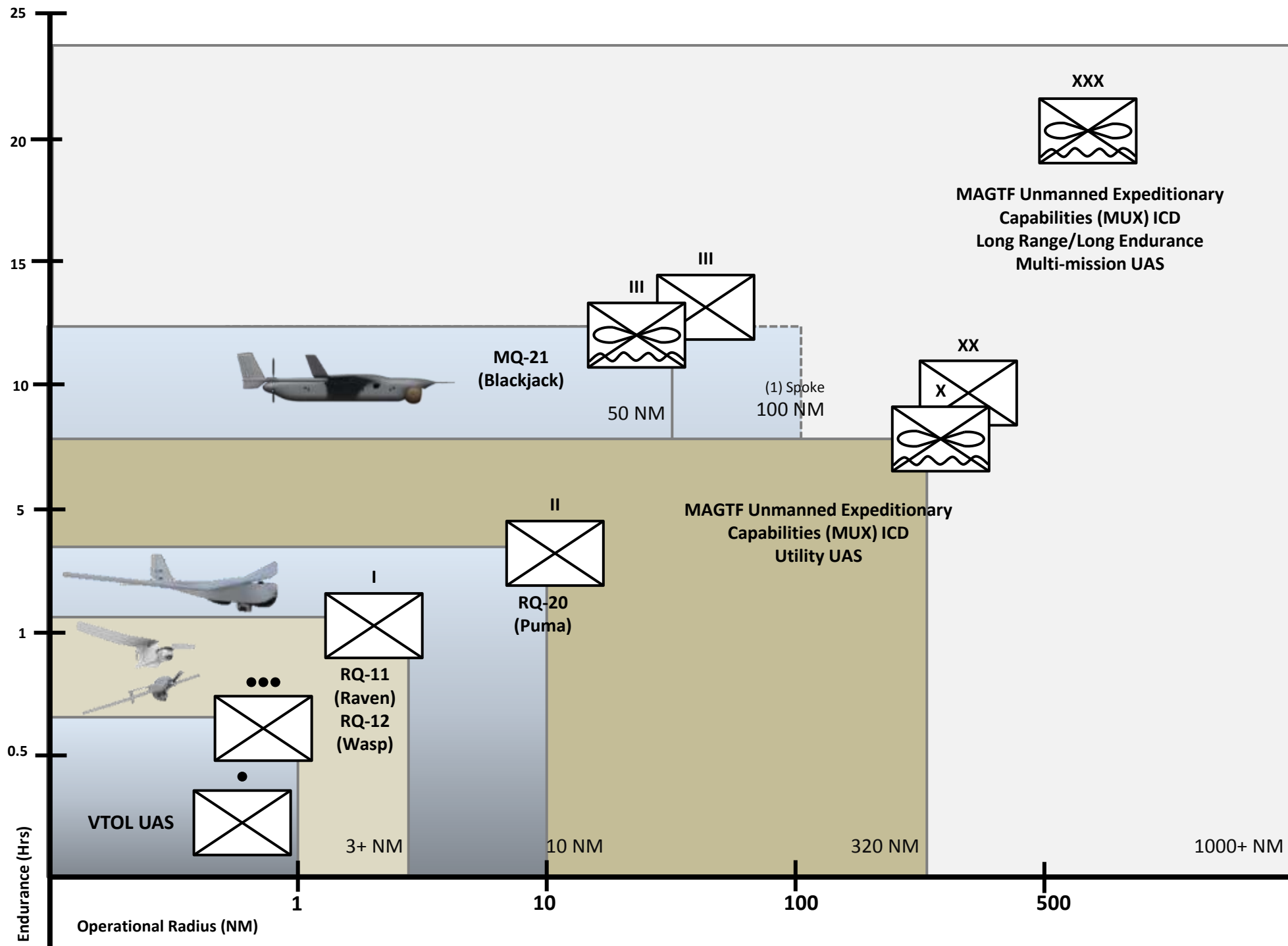
C = PLANNED CONTRACTUAL COVERAGE

	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
SAR PAI PLAN											
SAR POAI											
HH-1N	4	4	4	0	0	0	0	0	0	0	0
TOTAL USMC SAR PAI	4	4	4	0	0	0	0	0	0	0	0

2.7 MARINE UNMANNED AIRCRAFT SYSTEMS



2.7 MARINE UNMANNED AIRCRAFT SYSTEMS



MARINE UNMANNED AIRCRAFT SYSTEMS

VMU Mission Statement

The VMU mission statement was updated in April 2014 to read:

“Support the MAGTF commander by conducting electromagnetic spectrum warfare, multi-sensor reconnaissance and surveillance, supporting arms coordination and control, and facilitating the destruction of targets, day or night, under all-weather conditions, during expeditionary, joint, and combined operations.”

The current mission statement more accurately reflects the VMU’s role in the MAGTF. It lays the foundation for the incorporation of a persistent, digitally interoperable architecture for the MAGTF, the assumption of the airborne electronic warfare mission, and the execution of full spectrum offensive air support.

Operations

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.

Marine Unmanned Aircraft Squadrons Alignment

The VMUs operate and maintain Group 3 and above UAS. The realignment of VMUs from the Marine Aircraft Control Group (MACG) to the Marine Aircraft Group (MAG) was completed in 2015. This command structure aligns the VMU community with manned aviation units and enables a seamless relationship with the Marine Aviation Logistics Squadrons (MALS). Other benefits include NAE advocacy and the inculcation of over 100 years of naval aviation operating procedures and safety practices.

Marine aviation has deliberate plans to locate each VMU aboard a Marine Corps Air Station. Alignment aboard an air station will facilitate future UAS fielding and provide the necessary infrastructure for the VMUs to establish habitual relations with MALS and their Group headquarters. The following command relationships and basing decisions have been established:

Squadron	Marine Aircraft Group	Air Station
VMU-1	MAG-13	MCAS Yuma, AZ (2016)
VMU-2	MAG-14	MCAS Cherry Point, NC
VMU-3	MAG-24	MCAS Kaneohe Bay, HI
VMU-4 (-)	MAG-41	Camp Pendleton, CA
VMX-22		MCAS Yuma, AZ
VMUT (FRS)	MAG-14	MCAS Cherry Point, NC
VMU-5 (-)	MAG-41	TBD

MARINE UNMANNED AIRCRAFT SYSTEMS

Reserve Component VMUs and Training Squadron

The reserve VMU exists to augment, reinforce, and sustain the active component VMU mission. To this end, VMU-4 (-) will field RQ-7Bv2 in FY-17 and RQ-21A* in FY-19 providing operational depth to the active component. The VMUT Fleet Replacement Detachment (FRD) currently at MCAS Cherry Point will become a fully operational Fleet Replacement Squadron.

MAGTF Unmanned Expeditionary Capabilities (MUX) ICD – MEF Level Support

Recognizing our current recapitalization toward a more diverse, lethal, amphibious and middleweight expeditionary force, the Marine Corps requires a UAS that is network-enabled, digitally interoperable, and built to execute responsive, persistent, lethal, and adaptive full-spectrum operations. The MUX ICD will inform a system that provides the MEF/MEB-sized MAGTF with an advanced multi-mission platform.

In accordance with the *Department of Defense Unmanned Systems Integrated Roadmap* (FY2013-2038), the Marine Corps will seek opportunities to achieve affordable and cost-effective technical solutions in a fiscally constrained environment for its MUX solution. The concept of employment will be shipboard capable and expeditionary. It will be a multi-sensor, electronic warfare, C4 bridge, AAW and strike capability at ranges complementary to MV-22 and F-35, giving MAGTF commanders flexible, persistent, and lethal reach. It will provide scalable MAGTF support deploying as detachments or squadrons supporting commanders at the tactical, operational, and strategic levels.

The MUX solution is envisioned as a USMC and USN program of record based on leveraging technology maturation of programs and several OEM prototypes. Marine Aviation will continue to pursue opportunities to inform programmatic decisions, such as field users' evaluations, science & technology (S&T) projects, and tactical demonstrations (TACDEMOS) in conjunction with large force exercises (LFE). The DARPA Tern demonstrator system is planned to make its first flight in FY-18 as are several of the OEM prototypes.

VMX-22 and MAWTS-1 ADT&E teams will continue to conduct testing and evaluation of UAS. The intent of these opportunities is to put emerging UAS technologies into Marines' hands and allow them to employ the systems in various training or real-world scenarios.

Additionally, during these iterative development processes UAS will be utilized to evaluate software defined radios to support multiple waveforms serving as key persistent nodes in distributed network concepts.



*Note: the RQ-21A will be renamed the MQ-21A, to reflect the multirole nature of this aircraft

MARINE UNMANNED AIRCRAFT SYSTEMS

MAGTF Unmanned Expeditionary Capabilities (MUX) ICD – Utility

The Cargo Resupply UAS (CRUAS) effort began as a Military Utility Assessment (MUA) in response to a 2009 JUONS and has enhanced the Marine Corps' assault support capabilities. It has reduced the vulnerability of logistics convoys supporting Marines stationed at remote combat outposts. The Marine Corps operated the Lockheed Martin K-MAX in OEF since December 2011. With a range of 84 miles and a payload capacity of 4500 pounds, it flew over 2000 sorties and delivered over 4.4 million pounds of cargo from December 2011 to May 2014. It demonstrated a consistent 95% readiness rate and 1.5 maintenance man-hours per flight hour. Lessons learned in combat indicate that utility UAS is best suited to support widely dispersed, small team combat operations in environments with high risks to ground personnel. Lockheed Martin is currently building the K-MAX for several commercial customers – and as such has a “hot production line.”

At the conclusion of OEF the K-MAX system returned to CONUS and underwent repair and reset at the OEM. The system is currently being maintained by the OEM in Owego, NY. Aviation will transition the system to VMX-22 in FY16 to continue to refine MUX experimentation and risk reduction.

The MUX ICD will inform a material solution that provides the MAGTF commander with an autonomous ship-to-shore and COP-to-COP logistical connector overcoming surface threats and obstacles. The Marine Corps will continue to conduct science and technology research in support of the utility UAS concept to refine this capability in order to meet the needs of the LCE and the MAGTF as a whole.



MARINE UNMANNED AIRCRAFT SYSTEMS

RQ-7Bv2 Shadow – MEF/MEB Level Support

The RQ-7B Shadow replaced RQ-2 Pioneer in 2007. The Marine Corps has continued to leverage interoperability and commonality with Army Shadow units conducting similar missions. There are currently 12 systems fielded among the 4 VMUs and they are currently progressing with upgrades and fielding of the RQ-7Bv2 to be in compliance with DoD mandates for type 1 encryption on UAS. The RQ-7B is a rail launched aircraft that is dependent on a short runway for landing. The RQ-7B remains a key component to the VMUs current readiness and continued ability to support the MAGTF. As of December 2015 VMU-1 and VMU-3 have completed conversion to the RQ-7Bv2. VMU-4 is planned to complete conversion to RQ-7Bv2 in 2017. VMU-2 will maintain its current 3 systems of RQ-7Bv1 as they continue to assume more RQ-21As.

RQ-21A Blackjack – MEU/Regimental Level Support

RQ-21A provides UAS support to the Marine Expeditionary Unit, regiments, and MARSOC. RQ-21A enhances the capabilities of MEU and regimental-sized units by providing a long endurance, expeditionary, multi-mission platform that is shipboard capable. RQ-21A is also able to operate from land based forward operating bases. Characterized by its runway independence, multi-sensor, and EMS capabilities RQ-21A will enhance the MAGTF commander's battlespace awareness and influence of the electromagnetic spectrum.

With its multiple payload capacity, the RQ-21A will continue to evolve to meet the shifting priorities of the MAGTF commander. Several payloads with the appropriate size, weight, and power (SWaP) are being developed for integration on the Blackjack. Hyperspectral payloads capable of detecting explosives; EMS payloads capable of monitoring spectrum; synthetic aperture radar (SAR) / ground moving target indicator (GMTI) capable of detecting targets through clouds and tree cover; miniature precision weapons and quadcopter launch and recovery systems...these are examples of payloads in either research or development for RQ-21A.

A key enabler for realizing the full capability of the RQ-21A is its L-class amphibious carrier shipboard capability. Currently, ship installs are on-going for LPD-17 class ships and are anticipated to be completed by 3Q FY16 on LPD-17 thru 25 with LPD-20 receiving install of equipment in late FY17. Marine Aviation is pursuing RQ-21A compatibility for all ARG shipping in order to provide maximum employment flexibility for the MAGTF commander both afloat and ashore.

Initiatives are underway to increase the RQ-21A performance and capabilities. The four highest priorities for Blackjack improvements are improved sensor with laser designator, a high-reliability engine, a beyond-line-of-sight (BLOS) control capability, and an increased launch weight.

These initiatives will expand the capability and persistence of the Blackjack in the battle space and are integral to realizing the future potential of the system. We have already purchased a high reliability (GFE) engine and will integrate it in FY-18.

VMU-2 currently has (5) RQ-21A systems and is planning to support 22nd MEU in 2016 with one system and detachment of Marines. Initial Operational Capability for RQ-21A is anticipated for January of 2016 and VMU-1 will begin receiving RQ-21A systems in the summer of 2016.



MARINE UNMANNED AIRCRAFT SYSTEMS

UAS Payloads & Capabilities

Acquisition paths for payloads will be defined by three (3) phases and each marked by a decision gate. Phase I establishes the preliminary integration design concept and conduct of technology demonstration with validation of a Technology Readiness Level (TRL) 5/6. Phase II establishes full payload-to-UAS integration and achievement of TRL 7 or higher constitute the decision gate for Phase III. Phase III is program of record transition, which supports a production decision based on the exit criteria from Phase II.

For SIGINT (Spectral Bat):

In FY16 we will be deploying our first series of SIGINT/ES payloads to the MEU / SPMAGTFs as a Field User Evaluation (FUE). Additionally, in FY16 we move into a Spiral 2 SIGINT effort and will make the POR transition which will create an EW capability for the VMU.

For RADAR (Split Aces):

In FY16 we will be conducting field user evaluation on the first series of AESA RADAR payloads for MQ-21. Venues for FUEs will be a ITX and WTIs to formulate CONOPS and TPP development as well as refined hardware and software designs. Additionally, in FY16 we move into a Spiral 2 RADAR effort that increases RADAR payload capability and include key enablers such as inflight selectable communications and data link.

Others:

In FY16, we begin work on a Wide Area Persistence Surveillance capability. These are POM-18 efforts for the USMC but are currently being supported but Office of Naval Research (ONR) and Defense Advanced Research Projects Agency (DARPA).

Tactical ISR Processing, Exploitation, and Dissemination System (TIPS) Block 3

A key enabler for realizing the full capability of the regimental to MEF level family of UAS is TIPS Block 3. Currently in development, TIPS Block 3 will fuse information collected from the unmanned aircraft with information from other off board data systems. It will allow the UAS pilot to control the aircraft while fusing, displaying, and disseminating common operational picture data starting with Link 16, Simplified Electronic Warfare System Interface (SEWSI), Raptor-X, full-motion video, and other software applications. The ability to display friendly, enemy units, aircraft, targets, and signals of interest to various disadvantaged users from the squad to MEF level will be an instrumental definition of this system. All of the above listed kill-chain, digitally interoperable, and battle space awareness applications are critical to the MAGTF commander's ability to influence the EMS, integrate fires, maneuver, and shorten kill chains. TIPS Block 3 will be the interface for the fusion.

Additionally, TIPS Block 3 will significantly augment the ability of the VMU to efficiently execute the task, collect, process, exploit, and disseminate (TCPED) cycle. As the number and capability of airborne sensors on the battlefield increases, so will the amount of data that is collected. TIPS Block 3 will act as a digitally interoperable hub for the collection, cataloguing and storage of full motion video, multi-intelligence sensor data, topological data, and target information.

TIPS Block 3 will be able to measure the available bandwidth and determine the optimal means to disseminate intelligence products. Future iterations of TIPS Block 3 will use advanced algorithms to analyze the vast amount of data as it is collected and autonomously cue operators to defined areas of interest. TIPS Block 3 completes the full capability of the digitally interoperable VMU. Incorporating TIPS Block 3 into a program of record is an imperative for the UAS community.

Headquarters Marine Corps Aviation is working with PMA-263, PMA-234, and C2CEWID for this requirement.

MARINE UNMANNED AIRCRAFT SYSTEMS

Small Unit Remote Scouting System (SURSS) Family of Small UAS (FoSUAS) – Battalion/Company/Platoon Level of Support

To out-think, out-maneuver and outpace the enemy, effective leadership and decision-making at the lowest level requires decision-speed and decision-space. To build speed and space before the pivot point, small unit leaders need the most current and accurate battlespace information at their disposal.

The aim of USMC SURSS FoSUAS is to equip the squad/platoon/company /battalion level operating force maneuver units with a capable, responsive, and organic airborne battle space awareness and kinetic capability.

SURSS are man portable, all-environment, ruggedized, low-cost, and simple to operate. Ideally, SURSS shall be able to operate across the full spectrum of conflict, in every environment and in the same conditions as the front line operating forces that they support. Technology solutions that support a single-operator, multi-mission, and multi-intelligence capable platform shall be pursued whenever practicable. Additionally, Marine Aviation will pursue a VTOL, nano-VTOL and Lethal Miniature Aerial Munition System (LMAMS) capability. An open architecture common SURSS controller is envisioned for the entire small unmanned sensor portfolio; which may interface with target location, designation and hand-off systems (TLDHS) to reduce the combat load of the infantryman while facilitating responsive fires and MAGTF command and control. The current SURSS FoSUAS is made up of three UAS platforms: RQ-11B Raven, RQ-12A Wasp, and RQ-20A Puma. Headquarters Marine Corps Aviation, working with FMID, FAA, Marine Corps Installations, MARSOC, and PMA-263, will continue to streamline and identify policy, training, and innovation necessary to address these burgeoning future SURSSs requirements.

RQ-11B Raven

Raven have a mini-gimbaled payload, can be manually operated or programmed for autonomous operation, and use an enhanced digital data link. With a wingspan of 4.5 feet and a weight of 4.7 pounds, the hand-launched Raven provides aerial observation, day or night, at line-of-sight ranges up to 10 kilometers. It is equipped with color electro-optical; black and white low light; and infrared (IR) payloads, and provides small units with day/night full motion video and laser illuminator capability via a laptop-based ground control station (GCS). The rechargeable batteries in the Raven provide an endurance of up to 90 minutes.

RQ-12A Wasp

The micro sized Wasp is a ruggedized, lightweight, portable UAS ideal for platoon and squad operations. Its small size and quiet battery-driven propulsion system makes Wasp nearly undetectable. The system is fully waterproofed, has a high tolerance to wind, and is well suited for amphibious operations. The Wasp was designed for front-line day/night reconnaissance and surveillance with a weight of 2.75 pounds, wingspan of 3.3 feet, and up to 50 minutes endurance. Wasp uses the same advanced technology found in the RQ-11B, is controllable through a common GCS, and video may be viewed from RVT devices.

RQ-20A Puma

The Puma is the largest platform in the FoSUAS and is capable of integrating supplemental payloads such as communications/data relay and SIGINT devices. Puma also uses a DDL communications link and carries an electro-optical (EO) camera, infrared (IR) camera and laser illuminator on a lightweight mechanical gimbaled payload. The system is hand-launched, launchable from a vehicle while on the move, and has an optional tactical launcher for reducing launch mishaps with heavier payloads. The Puma GCS is also compatible with the Raven and Wasp GCS. The system is fully waterproof, capable of recovery on land or water (supplemental payload dependent). It weighs 13.5 pounds with an 9.2 foot wingspan and has an endurance of over 3.5 hours.

VTOL and Nano-VTOL SUAS

Future SURSS procurement strategy will move towards a more modular approach with an eye towards cost reduction and more rapid capability introduction. Development of a common ground control station (GCS) will eliminate the need to procure a GCS with every system, and allow one GCS to control multiple types of SURSSs. By moving towards standardized interfaces, the rapid technology development cycle for payloads can be capitalized upon without requiring more costly replacements of the entire system.

VTOL and nano-VTOL SURSSs will complement the capabilities of the current family of SUAS in areas where vertical obstructions or confined operations create unique challenges. Lethal Miniaturized Aerial Munitions Systems will provide an unprecedented organic precision low-yield precision strike and defensive fires capability that can be widely distributed to front line, forward deployed, and isolated/independent units. VTOL quadcopters also offer exceptional promise as expeditionary launch and recovery systems for Group 3 UAS.

MARINE UNMANNED AIRCRAFT SYSTEMS

UAS Training

The VMU community, Headquarters Marine Corps Aviation, and PMA-263 are currently in the process of standing up a Fleet Replacement Squadron (FRS) for MQ-21.

RQ-21A aircrew and maintainers require an MOS producing curriculum and school-house. Mobile Training Teams (MTT's) have been the interim solution for RQ-21A training. As RQ-21A fielding progresses, MAG-14, as the T/M/S lead, will manage the Blackjack 1000-level T&R curriculum development and training. This 1000-level training will migrate from contractor provided Mobile Training Teams (MTTs) to the VMUT FRS. PMA-263, TECOM, and CNATT will support MAG-14 with curriculum development and training execution. Additionally, Training Transfer Agreement (TTA) will transition from PMA-263 to TECOM as the lead training agent for RQ-21A.

EW fundamentals training should be stood-up outside of VMAQT-1 no later than 30 Sep 16 in order to perpetuate the expertise within the aviation combat element coincident with the EA-6B Prowler sundown. EW fundamentals curriculum migration from VMAQT-1 to a VMU-centric syllabus will be led by MAG-14 and the VMUT. This curriculum migration is critical to preserve and transition the aviation combat element's resident EW expertise from the VMAQ community to the VMU community.

Aviation Manpower will source Marines with VMU and VMAQ backgrounds to assist in this endeavor. Marine Aviation will continue to pursue EW payloads for the UAS FoUAS to ensure material solutions exist to provide full spectrum EW to the ACE.

The current simulator program of record for RQ-21A are not funded to a level commensurate with a high fidelity simulation based syllabus. A robust, networked, high fidelity simulation solution is required for RQ-21A and EW curricula in order to realize Marine Aviation's vision for the VMU FRS. To this end UAS/EW simulators and training systems will be included in the Aviation Training Systems (ATS) plan.

The VMU FRS will evolve to a unit manned with instructors and staff from across the VMU community. It will combine Marines with backgrounds in EW and UAS to ensure the 1000 level training of the VMUs is efficiently and effectively accomplished. The FRS will supervise execution of VMU WTTP and T&R for regimental to MEF level of support UASs. DOTMLPFC analysis is under way to optimize the VMU FRS construct for introduction to the Fleet by FY17.

Training and Logistics Support Activity (TALSA)

Training and Logistics Support Activities (TALSAs) to support SURSSs has been established at Camp Pendleton, CA and Camp Lejeune, NC. TALSAs reduce training costs by 70% and are responsive to operating forces' dynamic SURSS training requirements. TALSAs were also established to reduce operations and maintenance costs for fielded systems by providing a consolidated activity to manage each MEF's requirements. SURSS training and logistics support is an enduring USMC capability and requires transition from OCO to base funding. This initiative maintains Mobile Training Teams (MTT) funding for units not co-located with TALSAs.

As the role of SURSSs expands, TALSAs will increase training throughput to meet MAGTF demands by integrating military personnel with the current contractor staff. Forward Air Controllers (FACs) and Joint Terminal Attack Controllers (JTACs) will attend training as SURSSs capabilities increase. TALSAs will support the MAWTS-1 Air Officer Course in order to ensure Air Officers are aware of the latest capabilities and emerging trends with SURSSs.

FUTURE PLANS

Experimentation and Innovation

Led by MAWTS-1 and VMX-22, and in close coordination with MCTOG, MCLOG, MCWL, MARSOC, national laboratories, and industry, Aviation will continue tactical demonstrations to validate innovative uses for existing and emerging UAS technologies. The lessons learned from this experimentation will inform programmatic and employment decisions across Marine Aviation's FoUAS.

MARINE UNMANNED AIRCRAFT SYSTEMS

Joint Research and Collaboration

Programs such as the DARPA Tern, DARPA Aerial Reconfigurable Embedded System (ARES), and ONR Autonomous Aerial Cargo Utility System (AACUS) will inform future UAS capability decisions. Technologies developed in these, and other, research programs will be critically evaluated to assess feasibility for transfer to existing or future programs of record.

Key Technology Development. Aviation will pursue the following key technology areas:

Digital Interoperability. Because of their persistence, unmanned systems are perfectly suited to serve as airborne data network relays and gateways. Emerging technologies, such as SRP, will be integrated onto unmanned platforms at the earliest opportunity.

Electronic Warfare (EW). UAS are a critical component of the MAGTF EW concept. Coupling new UAS employment concepts with emerging payloads provides the Marine Corps the ability to influence the EMS providing additional critical advantages in the battle space. UAS provide the MAGTF commander with a persistent long range lethal and flexible capability.

National Airspace (NAS) Integration. The Marine Corps has taken a key role in ground based sense and avoid (GBSAA) systems for UAS. It operated the first certified GBSAA system at MCAS Cherry Point. In conjunction with DoD, NASA, and the FAA, the VMU community will continue to develop standards and procedures for UAS integration in the NAS as well as field similar systems to the rest of the MCASs that have VMU squadrons.



MARINE UNMANNED AIRCRAFT SYSTEMS

UAS SUSTAINMENT

Naval Aviation Enterprise (NAE) Inclusion

The RQ-7 is in the NAE briefing cycle, while the RQ-21A is being incorporated into the NAE and moving forward towards full NAE incorporation. RQ-21A will be fully integrated in the NAE no later than FY2017.

Current projects include:

Naval Aviation Maintenance Program (NAMP): In an effort to bring UAS into compliance with Naval Aviation Maintenance Program (NAMP), a 2014 comprehensive NAMP review was completed by HQMC Aviation and NAVAIR. This was done in order to determine which aspects of the NAMP require modification, deviation, or change so that UAS can be in compliance with established Commander, Naval Air Forces (CNAF) policy (COMNAVAIRFORINST 4790.2B). Out of this review came several recommended updates to the NAMP. The recommended updates have been processed by Commander, Naval Air Forces (CNAF) and will be reflected in the next NAMP update CY2016.

Common Maintenance Reporting System for UAS: Since the fielding of UAS to the Marine Corps, UAS have not been able to utilize Naval Aviation Logistics Command Management Information System (NALCOMIS) Optimized Organizational Maintenance Activity (OOMA). With the fielding of RQ-21A, a way forward has been established to move UAS onto NALCOMIS OOMA for NAMP compliance readiness reporting and tracking. As RQ-21A is fielded to the VMUs, it will allow NAVAIR, working with HQMC Aviation and SPAWAR, to baseline RQ-21A into NALCOMIS OOMA. The goal is to baseline RQ-21A into NALCOMIS OOMA for all VMUs by FY-17.

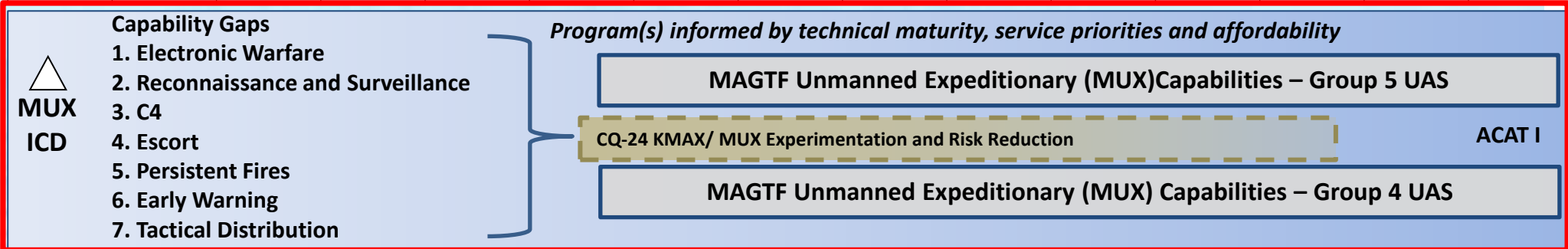
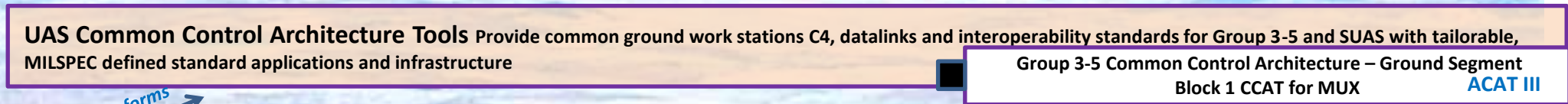
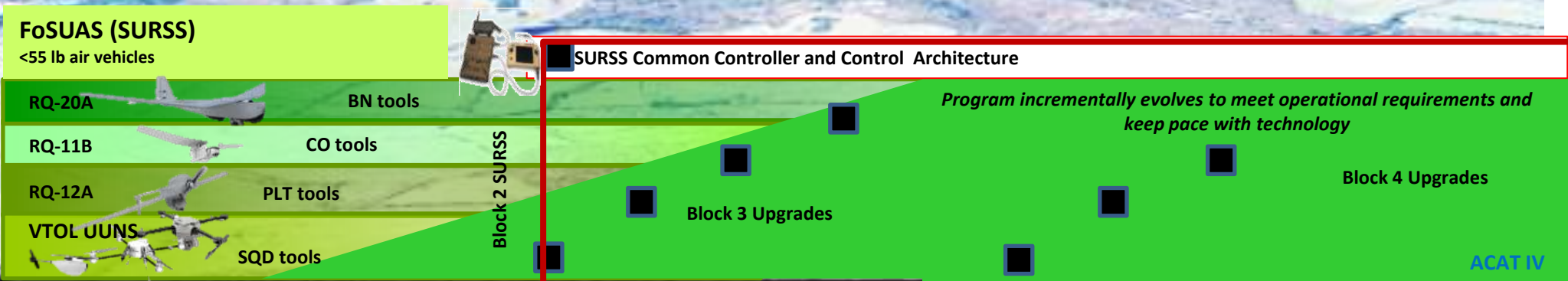
UAS Equipment Optimization

HQMC Aviation and the MARFORs conducted a comprehensive review of all ground equipment used for UAS operations. The review identified excess ground gear for a proposed Table of Equipment (T/E) allowance reduction. Moreover, certain RQ-21A Program Procured Equipment (PPE) items will not be fielded or fielded at a reduced quantity based upon the results of a thorough analysis of required equipment sets to support UAS operations. Finally, as the VMUs are aligned under the MAG, the Marine Wing Support Squadrons (MWSS) and Marine Aviation Logistics Squadrons (MALS) will provide an increased level of aviation ground support to the UAS squadrons that is commensurate to the level of support provided to fixed and rotary wing squadrons. MWSS and MALS aviation support to the UAS squadrons will be an critical enabling factor in the squadrons' ability to conduct expeditionary operations.



FAMILY OF UNMANNED AIRCRAFT SYSTEMS (FOUAS) ROADMAP

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030



MARINE UNMANNED AIRCRAFT (VMU) FIELD PLAN

	CY 2015	CY 2016	CY 2017	CY 2018	CY 2019	CY 2020	CY 2021	CY 2022-24
USMC RQ-7 PROGRAM	<u>12 Systems</u> 7 v2 5 v1	<u>10.5 Systems</u> 7 v2 3.5 v1	<u>7 Systems</u> 7 v2	<u>3 Systems</u>	<u>No systems</u>	<u>No systems</u>	<u>No systems</u>	<u>No systems</u>
USMC MQ-21 PROGRAM	<u>3 Systems</u>	<u>IOC</u> <u>8 Systems</u>	<u>12 Systems</u>	<u>16 Systems</u>	<u>20 Systems</u>	<u>25 Systems</u>	<u>30 Systems</u>	<u>32 Systems</u>
VMU-1	3 RQ-7v2	3 RQ-7v2 2 MQ-21 July Aug (4.2,4.3) 15th MEU workup	2 RQ-7v2 4 MQ-21 (4.2,4.3, 5.1,5.2) 15th MEU	0 RQ-7 6 MQ-21 (4.1 ,4.2,4.3,5.1,5.2, F4)	7 MQ-21 (4.1,4.2,4.3, 5.1,5.2, F4, F7)	8 MQ-21 4.1,4.2,4.3,5.1, 5.2, F4,F7, F11	9 MQ-21 4.1,4.2,4.3, 5.1,5.2,F4,F7, F11,16	9 MQ-21 4.1,4.2,4.3, 5.1,5.2,F4,F7, F11,16
VMU-2 No v2 conversion	3 v1 RQ-7 3 MQ-21 L1,2,3.1	1.5 v1 RQ-7 6 MQ-21 (L1,2,L3.1, 3.2,3.3, 4.1) (22/11/24 MEU)	0 RQ-7 5 MQ-21 (L2,L3.1, 3.2,3.3,4.1) (1 MQ-21 to FRD/FRS)	5 MQ-21 (L2,3.1,3.2, 3.3, F3) Move 4.1 to VMU-1	6 MQ-21 (L2,3.1,3.2, 3.3, F3, F5)	8 MQ-21 L2,3.1,3.2, 3.3, F3, F5, F12,13	9 MQ-21 L2,3.1,3.2, 3.3, F3, F5, F12,13,14	9 MQ-21 L2,3.1,3.2, 3.3, F3, F5,12,13,14
VMU-3	v2 COMPLETE 4 RQ-7v2	4 RQ-7v2	3 RQ-7v2 2 MQ-21 (5.3,5.4)	1 RQ-7v2 4 MQ-21 (5.3,5.4, F1,2)	0 RQ-7 4 MQ-21 (5.3,5.4,F1, F2)	6 MQ-21 5.3,5.4,F1,F2, F9, 10	8 MQ-21 5.3,5.4,F1,F2,F9, 10,15,17	9 MQ-21 5.3,5.4,F1,F2,F9, 10,15,17,20
VMU-4	2 RQ-7v1	2 RQ-7v1	2 RQ-7v2 Conversion	2 RQ-7v2	0 RQ-7 2 MQ-21 (F6,F8)	2 MQ-21 (F6,F8)	2 MQ-21 (F6,F8)	2 MQ-21 (F6,F8)
VMX-22				1 MQ-21 EOC	1 MQ-21 EOC	1 MQ-21 EOC	1 MQ-21 F18	1 MQ-21 F18
FT H. SHADOW (RQ-7)		Thru-put ramp down	Thru-put ramp down	Thru-put ramp down				
MAG-14 FRD/FRS EW Training (MQ-21)	FRD/MTT	VMU-1,2 Thru-put	1 MQ-21 (L1) VMU-3 Thru-put	1 MQ-21 L1 Thru-put	1 MQ-21 L1	1 MQ-21 L1	1 MQ-21 L1	1 MQ-21 L1, F19

- (1) RQ-21A system is (5) aircraft, one launcher, one SRS, (2) GCSs, and associated support equipment.
- (1) RQ-7B is (4) aircraft, one launcher, (2) GCSs, and associated support equipment.
- L = Low Rate Initial Production (LRIP) / F = Full Rate

SURSS FIELD PLAN

CURRENT FORCE:				FORCE GOAL:			
UNIT	Wasp	Raven	Puma	UNIT	Wasp	Raven	Puma
I MEF	0	100	0	I MEF	27	58	20
II MEF	0	105	0	II MEF	21	44	17
III MEF	0	54	0	III MEF	11	16	14
MARFORRES	0	87	0	MARFORRES	30	46	18
MARSOC	40	0	22	MARSOC	50	0	14
TRAINING/SUPPORT	0	17	0	TRAINING/SUPPORT	4	14	4

FIELDING SCHEDULE		FY15			FY16			FY17			FY18			FY19			FY20		
UNIT	TOTAL SYSTEMS	Wasp	Raven	Puma	Wasp	Raven	Puma	Wasp	Raven	Puma	Wasp	Raven	Puma	Wasp	Raven	Puma	Wasp	Raven	Puma
I MEF	105	13	88	0	27	82	23	27	76	23	27	70	23	27	64	23	27	57	21
II MEF	82	10	89	0	21	81	23	21	73	23	21	65	23	21	57	23	27	54	17
III MEF	41	6	44	0	11	39	14	11	34	14	11	29	14	11	24	14	9	20	13
MARFORRES	94	5	87	0	30	87	6	30	87	6	30	87	6	30	87	6	26	36	18
MARSOC	64	50	0	22	50	49	18	50	37	18	50	26	18	50	12	18	50	0	14
TRAINING/SUPPORT	17	4	17	4	4	17	6	4	17	6	4	17	6	4	17	6	4	11	4

2.8 MARINE AVIATION LOGISTICS PLAN



2.8 MARINE AVIATION LOGISTICS PLAN

The aviation logistics (AVLOG) community will continue to develop and lead operational and strategic level initiatives to improve and sustain Marine aviation material readiness. Initiatives will modernize existing and time-tested AVLOG safety and training and support strategies, as well as capitalize on emerging capabilities and technologies offered by today's commercial and military industrial base. Collectively, these efforts will enhance the ACE by improving the readiness (e.g. safety, effectiveness, reliability and availability) of Marine Corps aircraft, as well as improve the required depth and capacity of associated weapon systems, personnel and equipment. ASL leadership will pursue these objectives along three primary Lines of Effort (LOEs):

LOE 1: Deliberately target AVLOG professional development

ASL and the AVLOG community are aggressively pursuing and implementing manpower and training related changes that will transform the professional development of our AVLOG community. These initiatives include:

- Strategically assign officers and enlisted Marines to key billets
- Facilitate the orderly escalation of experience and development milestones
- Renew focus reviewing and improving MOS manuals and roadmaps
- Pre-requisite professional qualifications for promotion to Sergeant and Staff Sergeant
- Implement industry "exchanges" for selected enlisted maintenance Marines
- Increase AVLOG influence and representation in contracting officer billets
- Facilitate and foster increased participation in fleet prioritization processes
- Capitalize on and improve the newly established T&R program
- Increase Defense Acquisition Workforce Improvement Act (DAWIA) compliance/overmatch
- Optimally align DAWIA certifications with key fleet and external support billets
- Re-write, improve and standardize existing follow-on training curriculums:
  - Basic organizational structure & key processes
  - Practical application of skills & key processes (basic, intermediate and advanced)
  - Concepts & tools commensurate with squadron level responsibilities
  - Introduction to operational, strategic and joint level concepts

Maintenance Training Instructor

Originally presented as Project 21 in November 1974 as a way to identify and reward competent maintainers through a professional designation similar to civil aviation standards, the MTI program is a way to identify and train our best. We are jump-starting this program, and expect it to function as does the WTI program for officers.



MARINE AVIATION LOGISTICS PLAN

Advanced Maintenance Training 2015

This concept will develop skilled/experienced maintenance professionals capable of leading maintenance operations at home or deployed. The focus of training will be maintenance planning, manpower management, NAMP program management, deployment planning, ORM, safety, culture of compliance, and human factors.

The pilot course is scheduled for the March 2016 WTI Class.

LOE 2: Increase the depth, capacity and reach of our operations sustainment capability

Marine aviation logistics is critical to the success of the ACE. Accordingly, AVLOG capabilities will be shaped and refined in order to meet today's and tomorrow's Marine Corps aviation (and overall MAGTF) readiness requirements. Specific initiatives aimed at increasing the depth, capacity and reach of our operations sustainment capability include:

Maintenance

- Aligning maintenance operations metrics
- Identifying and sustaining requisite maintenance core capabilities
- Building, standardizing and sustaining a highly capable, mission-ready maintenance workforce
- Ensuring adequate infrastructure to execute assigned maintenance workload
- Complete IMP/IMC/PMI events on the flight line as near squadrons as possible

Supply

- Develop the Mission Essential Sub-System Matrix Strategy
- Improve accuracy of bills of material
- Champion effort to improve depot component repair performance
- Partner with DLA to conduct estimated annual demand reviews

Avionics

- Sustain dedicated sea based capability for rapid movement and employment of USMC aviation I-Level maintenance facilities supply support and personnel to sustain fixed and rotary wing aircraft operations by extending the hull life of the two dedicated Aviation Logistics Support Ships (T-AVB) 10 years beyond 2019 and 2020, respectively.
- Explore TAVB-like capabilities to meet USMC AVLOG requirements.
- Provide interjection during ESC level decisions on right sizing manpower, training and support equipment to sustain the flight-line.
- Implement I-Level and O-Level cross training.
- Endorse configuration control, tracking and distribution of pool stock weapons systems and support equipment.
- Explore opportunities to increase avionics repair capability for all TMS aircraft.
- Champion distributed laydown ISO rebalance to the Pacific



Ordnance

The rapidly changing operational environment, combined with increased operational tempo, poses challenges for the ordnance community that are magnified by the pace of technology, end strength reductions and fiscal limitations. Creative responses are required to meet these challenges. To that end, we will aggressively pursue:

- TMS Cross Training and strategic pairing of ordnance officers and chiefs
- Modernize Class V(A) support packages: MCAPP, MPSRON and MCPP-N
- Maximize efficient use of O&M,N; eliminate funding redundancies
- Communicate valid and clearly defined requirements to resource sponsors
- Advocate for automated IT solutions and additive manufacturing solutions
- Advocate for modern logistics solutions (e.g. additive Manufacturing)
- Implement CAD/PAD Fleet Returns process at all Marine Corps Air Stations.
- Reduce AAE maintenance (Level III preservation, right-sizing the MAGs)
- Improve upon expeditionary and CONUS explosives safety posture
- Review, improve and modernize formal schools course curriculum

ALIMS

- CNA Study to effectively scope responsibilities and manning requirements for I-Level and O-Level aviation information systems
- Align and synchronize efforts to Marine Corps Enterprise Network Unification Campaign Plan
- Constant communication of aviation information systems requirements to MITSCs, MCNOSC, C4, OPFOR G6 and Navy IT department
- Sustaining cybersecurity certifications for ALIMS personnel and improve information assurance for aviation information systems
- Reformat current MCO 2020.1, ALIMS SOP, to NAVMC and align to CNAF inspection policies

MARINE AVIATION LOGISTICS PLAN

LOE 3: Modernize AVLOG support strategies and expand operational capability

Today's dynamic global environment demands flexible and scalable capabilities. Increased operational tempo, split and disaggregated operations and constrained resources mandate the modernization of written doctrine and its associated enablers:

Maintenance

- Achieve an optimally trained, skilled, and ready workforce
- Improve aircraft readiness, safety, reliability, and availability posture
- Close the gap between required readiness and the associated costs
- Enhance deployed capacity & capability
- Maintain minimal logistics footprint
- Power by the Hour and Contract Maintenance Support concepts
- Organizational, Intermediate, and Depot Level processes
- Accuracy and consistency of maintenance planning processes

Supply

MALSP modernization is the AVLOG support and sustainment solution to new, demanding, and geographically disbursed requirements. It will enable the transformation of expeditionary logistics with the ability to rapidly design, load, deploy, and employ an expeditionary and geographically distributed, nodal AVLOG system tailored to sustain any TMS aircraft or mission combination. MALSP modernization will be achieved by:

- Integrating information technology capabilities to provide global visibility and management of materials and other resources
- Re-designing existing legacy aviation logistics support packages
- Identifying and establishing pre-determined logistics nodes
- Improving depot-level performance to increase Aviation Depot Level Repairable (AVDLR) component availability to support OPFOR operations.

Key components of MALSP modernization include support package formulation based upon specific combinations of TMS aircraft performing specific missions, corresponding demand profiles, buffer calculation and management, and requisitions in real time or near-real time, accurate asset tracking.

The nodes in a MALSP modernization demand-pull nodal logistics chain may include the primary MALS (PMALS); an enroute support base (ESB); a main operating base (MOB); and a forward operating base. MALSP modernization's maintenance concept is to conduct all non-essential intermediate-level maintenance at the PMALS, and only deploy specific maintenance capability to forward nodes in response to requirements not met by material and time buffers.

During high intensity conflicts, the MALSP modernization demand-pull nodal logistics chain may be augmented with maintenance capability and material and time buffers from: Aviation Logistics Support (T-AVB) Ships, Maritime Prepositioning Force (MPF) ships, Marine Corps Prepositioning Program - Norway (MCPN), and future Geographic Prepositioning Program (GPP) capability for aviation support equipment.

Avionics

Aviation Logistics Support Ship T-AVB

- Explore alternative exercises for real world training that represents present day and future engagements.
- Continue to explore Logistics Integration opportunities for MAGTF logistics support.
- Coordinate Ship-to-Ship and Ship-to-Shore concepts of employment
- Certify and modify for MV-22 operations
- Validate future MAGTF requirements and increase support beyond ground and aviation logistics requirements

Improve upon MAGTF DI and CYBER/EW through the fielding, training and utilization of the ALQ-231 Intrepid Tiger II Pod

Ordnance

We are working diligently to strengthen our relationships with service partners, resource sponsors, fleet subject matter experts and other common stakeholders in order to develop and implement modern, safe and low cost logistics initiatives. These initiatives are intended to serve as the catalysts to drive immediate training and combat capability force multipliers for the operational community. Specifically, we are seeking to deliver improved depth and capacity in an environment of limited resources and to provide additional capability options to commanders.

- Ship board and shore based aircraft hot-loading
- Fixed-wing integration of the Advanced Precision Kill Weapon System
- Development of H-1 hasty rocket pod boresight procedures
- Sling load rocket replenishment options for FARP operations
- CONOPS development for mobile FARPs and FARP replenishment
- Flight clearances for improved and additional payload combinations

MARINE AVIATION LOGISTICS PLAN

Collectively these efforts will assist operational commanders with reducing aircraft turnaround times and increase sortie generation while deliberately or reactively prosecuting targets during tactical operations. Additional benefits include, but are not limited to the following:

- Offsets the increasingly reduced F-18 flight line entitlement.
- Reduces footprint required at Forward Arming & Refueling Points (FARPs)
- Reduces mechanical problems at FARPs and FOBs
- Reduces aircraft flight hours when transiting to and from target areas
- Improves weapon flexibility, lethality and precision options

Aviation Logistics Information Management Systems (ALIMS)

- Provide uninterrupted levels of Aviation Information Systems support for Marine Aviation
- Effectively manage transition to next generation of aviation information systems equipment and personnel
- Mitigation of Aviation Information Systems transitional shortfalls
- Manageable incorporation of new aviation information systems

MAGTF Logistics Integration (MLI)

Future operating concepts and fiscal constraints are driving the need to modernize and increase the efficiency of MAGTF Logistics. In the past, the ground and aviation communities embarked on separate modernization efforts, such as Global Combat Support System-Marine Corps and Marine Aviation Logistics Support Program II. Separately, each effort did not necessarily aim for integration of the logistics function into MAGTF future operating concepts. Reviewing current practices and aligning future initiatives towards the integration of internal MAGTF logistics will minimize disparate and overlapping processes. MLI is a critical component for future success of our naval expeditionary forces.

MLI focuses on logistics standardization and optimization across the MAGTF, with specific concentration on convergent practices associated with expeditionary (afloat and/or ashore) operations. When addressing processes, technologies and people, MLI will focus on maintaining the correct balance between combat effectiveness and logistics chain management efficiency, with an ultimate goal of increasing MAGTF readiness.

On 12 September 2014, the Deputy Commandant for Aviation (DCA) and Deputy Commandant for Installations and Logistics (DC I&L) signed a charter that reaffirms the Marine Corps commitment to MLI and re-charters the MLI Group. The MLI Group addresses and prioritizes MAGTF logistics initiatives with a focus on leveraging and applying proven best practices to current logistics improvement initiatives. The MLI Group is empowered to develop specific solutions and approaches to logistics challenges and make recommendations to the DCA and DC I&L. To this end, the MLI Group is guided by four principles:



Partnership: Develop an integrated, enterprise approach to MAGTF readiness that encompasses the entire logistics chain.

Transformation: MAGTF logistics transformation harnesses the power of standardization and integration to develop a logistics enterprise that is focused on warfighter support.

Balance: Ensuring the right balance between effectiveness and efficiency, reducing cost while improving logistics responsiveness and flexibility internal & external to the MAGTF.

Change/ Risk Management: Through effective management of both change and risk, we will challenge the status quo in the areas of science and technology, policy and doctrine, business practices and processes, and training and education.

Summary

These three lines of effort will serve to focus the efforts of the AVLOG community in FY16 and beyond. The actions and initiatives will enhance readiness through improved institutional alignment, synchronization efforts, continued development of our AVLOG Marines, and a relentless focus on sustainment of our aviation platforms.

The AVLOG community remains focused on strategic and operational objectives that must be accomplished to transform Marine aviation logistics so that we better support ACE operations across the ROMO. ASL continually strives to train AVLOG Marines to be the best in the world at deploying expeditionary AVLOG capabilities that deliver and sustain aircraft readiness. Maintaining current capabilities, smartly planning for the sundown of existing platforms and introducing replacement aircraft are all areas that must be addressed. Keeping Marine aviation ever present in the skies above our Marines on the ground is our single purpose, and all that we do is a means to that end.

2.9 MARINE AVIATION GROUND SUPPORT PLAN



TODAY'S EXPEDITIONARY AVIATION GROUND SUPPORT FORCE

Enabling MAGTF Maneuver, Power Projection, Agility, Depth, and Readiness

The Marine Wing Support Squadron (MWSS) provides the functional support necessary to enable Marine aviation operations in an expeditionary environment; these capabilities are also relevant to the joint force commander, where forward basing and the rapid build up and sustainment of aviation combat power are essential.



The Marine aviation expeditionary infrastructure enabler

FUNCTIONS OF AGS

The 13 services of AGS that are listed below directly support the execution of the other six functions of Marine aviation.

- Expeditionary airfield services (EAF)
- Aircraft rescue and firefighting (ARFF)
- Aircraft and ground refueling
- Explosive ordnance disposal
- Motor transport
- Field messing
- Airfield security operations
- Essential engineer services
- Internal airfield communications
- Routine/emergency sick call
- Individual/unit training
- Chemical, biological, radiological, nuclear decontamination
- Air base commandant

A PROVEN COMBAT PEDIGREE

The importance of the MWSS and what it contributes to the commanders ability to generate and sustain combat power has been reinforced over thirteen years of conflict in both Operations IRAQI FREEDOM (OIF) and ENDURING FREEDOM (OEF). In support of MAGTF and joint/coalition operations during these two conflicts, MWSSs continuously achieved results that far exceeded doctrinal employment expectations in both space and time. The MWSSs ability to consistently maintain a high operational tempo enabled the ACE to provide a sustained level of support across the functions of Marine aviation. MWSS accomplishments during OIF and OEF include;

- Installed over 6 million square feet of expeditionary airfield surface material, which included the construction of the largest expeditionary airfield in history at FOB Dwyer in Afghanistan.
- Constructed or established over 100 forward arming and refueling points (FARPs) and dozens of tactical landing zones (TLZs) by occupying existing airfields, repurposing roads, and installing vertical takeoff and landing (VTOL) pads.
- Dispensed tens of millions of gallons of fuel to support both aviation and ground operations.
- Constructed and operated numerous forward operating bases and provided critical life support and security for both aviation and ground tenant units.
- Conducted numerous combat logistics patrols through contested areas to establish and resupply FARPs and TLZs.

These significant actions only serve to highlight the numerous accomplishments that directly contributed to the execution of thousands of combat sorties and the overall success of the missions in Iraq and Afghanistan.

In addition to supporting combat operations, MWSSs have ensured ACE participation in theatre security cooperation events have been a success.

TODAY'S EXPEDITIONARY AVIATION GROUND SUPPORT FORCE

JOINT / INTEROPERABLE

AGS facilitates the integration of joint forces by providing airfield services that are interoperable with the majority of U.S. Navy, Army, Air Force, Coast Guard, and NATO aircraft.

BIASED FOR ACTION

The MWSS maintains a bias for action, possessing ready to deploy capabilities to establish and sustain expeditionary airfields, ranging from main air bases to forward arming and refueling points. This is accomplished by occupying existing airfields, repurposing roads or other viable surfaces, or by constructing airfields by leveraging specialized engineering equipment and skills along with expeditionary airfield and landing zone (LZ) surfacing and repair systems.

SCALABLE, FLEXIBLE, AND RAPIDLY DEPLOYABLE

The MWSS maintains a scalable, flexible, and rapidly deployable posture that enables Marine aviation to conduct expeditionary operations. The MWSS is able to leverage its inherent ability to task organize to support aggregated or disaggregated aviation forces operating either from the sea or land, across the range of military operations (ROMO). This organic MWSS capability makes the MAGTF unique, increasing readiness and sortie rates of forward deployed assets and exploiting the operational advantage of Marine aviation. In short, the MWSS has an exponential effect on our aviation combat power.

RESETTING THE FORCE AND POSTURING FOR THE FUTURE

As the Marine Corps evolves to address future operating environments the MWSS will leverage Marine Corps equipment reset initiatives to achieve higher levels of materiel readiness. In addition, through an enhanced level of integration with the ground logistics community, aviation will be able to influence ground equipment fielding plans and future acquisitions. In order to maintain the expeditionary edge that AGS provides, new materiel initiatives will be pursued to close capability gaps created by aging equipment and legacy technology. Current initiatives are underway in areas such as airfield lighting and aircraft rescue and fire fighting that will enhance the ability of the MWSS to support aviation operations in expeditionary environments.



AVIATION GROUND SUPPORT MATERIEL INITIATIVES



P-19R (P-19A REPLACEMENT) (FIELDING FY17-FY20)

This initiative replaces the A/S32P-19A Aircraft Crash and Structure Fire Fighting Truck, known as the P-19A. The P-19A was introduced in 1984 with a service life of 12 years, and it has undergone two depot level rebuilds.

- The P-19A is the Marine Corps' only major aircraft fire fighting vehicle utilized at Marine Corps Air Stations and FOBs for immediate response to aircraft emergencies (primary) and structural fires (secondary).
- The new vehicle is compliant with current National Fire Protection Association (NFPA) standards for aircraft rescue and fire fighting vehicles, resulting in a vehicle optimized for operator and crew safety.
- Equipment updates and enhancements will significantly enhance the ability of ARFF Marines to fulfill their secondary mission by providing more effective base camp structural firefighting support.
- The level of drivetrain and power-pack commonality (up to 75%) with current USMC tactical vehicles (MTVR and LVSR) will result in more efficient supply and maintenance supportability. Commercial-off-the-shelf (COTS) fire fighting components will increase parts availability and sustainability. The addition of an integral auxiliary power unit (APU) will greatly reduce engine idle time during standby, resulting in increased fuel efficiency and engine longevity. The off road capability will ensure operations in austere locations-such as those supporting distributed short take-off, vertical land (STOVL) operations (DSO)-will be supported.



EAF SUSTAINMENT LIGHTING SYSTEM (SLS) (FY19-FY20)

Current EAF hard-wire lighting system utilizes 1960-era technology, is maintenance intensive, and consistently encounters logistical challenges due to parts obsolescence.

- SLS will fill a capability gap by providing mandatory runway lighting required for Category I, precision instrument flight rules (IFR) approaches. This will serve to effectively integrate Air Traffic Control (ATC) and EAF capabilities to provide a safer operational environment in degraded or reduced visibility landing environments.
- All available modern energy efficiency technology (Improved batteries, solar capability) will be leveraged to increase performance and sustainability. In addition, the new lighting system will be lighter, easily adaptable to various airfield configurations, and heat-resistant to support MV-22 and F-35 operations.

EVOLUTION OF EXPEDITIONARY AVIATION GROUND SUPPORT THROUGH 2025

ADVOCACY AND SYNERGY

The AGS Operational Advisory Group (OAG) continues to strengthen the advocacy among the AGS and ground logistics communities.

The ever-growing synergy that was created by linking the expertise of the combat support of AGS and combat service support of the logistics community, continues to serve the larger MAGTF sustainment effort. The leaders of aviation ground support and logistics employ this forum to guide the evolution of aviation ground support forces for the future.

MAINTAIN CRITICAL SUPPORT FOR MISSION ESSENTIAL TRAINING

Marine Corps Auxiliary Landing Field (MCALF) Bogue in Cape Carteret, North Carolina and the Strategic Expeditionary Landing Field (SELF) aboard Marine Corps Air Ground Combat Center (MCAGCC) in Twentynine Palms, California are premiere training sites designed to simulate the adverse conditions faced in austere operational environments.

MWSSs are able to support a multitude of T&R events, including 7000 series squadron events, all under the unique stresses associated with conducting mixed type, model, and series operations in a confined space using expeditionary surface material and lighting. Through operating these sites, the MWSS enables the accomplishment of critical mission essential T&R qualification requirements for aviation units as well.

A RESPONSIVE AND RELEVANT AVIATION COMBAT MULTIPLIER

In close coordination with MAWTS-1, the AGS community continues to align AGS TTPs with existing and emergent Marine aviation platforms such as the F-35, MV-22, MQ-21, and CH-53K, the AGS community will remain a responsive and relevant aviation combat multiplier. There are several significant efforts underway in support of this endeavor:

- Participation in the new global posture of the Marine Corps by supporting aviation operations in the reemphasis in the Pacific, SPMAGTFs and Unit Deployment Program rotations.
- Enabling the concept of DAO. This concept supports a ready force forward with rapidly employable and scalable ground support which is vital for sustaining distributed expeditionary operations.
- Publication of the MWSS T&R manual to facilitate the standardization of the unique combination of skills and equipment required to maintain a high level of readiness in assigned METs.
- Development of automated information systems (AIS) such as the EAF Design and Analysis Tool (EDAT) to standardize and expedite the design and logistical planning for expeditionary airfields.
- Conduct of a comprehensive capabilities-based assessment (CBA) for EAF and ARFF to ensure programmatics are aligned with emerging platforms and ACE employment concepts.
- Development of new concepts and procedures such as M-FARPs, to allow the MAGTF or joint commander to exploit the operational overmatch afforded by the expeditionary nature of rotary wing, tilt-rotor, and STOVL aviation operating within an anti-access / area denial environment.
- Publishing an updated version of the Marine Corps Warfighting Publication 3-21.1, *Aviation Ground Support*.
- Development of a new concept of employment for airfield damage repair (ADR) which will increase repair cycle times and improve the quality of repairs-in order to ensure faster sortie generation.

TACTICAL AIR CONTROL PARTY PLAN: PROGRAMMATICS, SUSTAINMENT AND FUTURE

TACP SUPPORT, TRAINING, AND READINESS

Joint Terminal Attack Controllers (JTAC); Forward Air Controllers (FACs); Forward Air Controllers (Airborne) (FAC(A)s); and Joint Fires Observers (JFOs) have been demanded and employed increasingly in support of USMC operations and the joint force over the last decade. As specially qualified and certified service members and aviators who, from a forward position or airborne, directed the action of combat aircraft engaged in close air support and offensive air operations, acted as an extension of the TACP, and performed autonomous terminal guidance operations (TGO), they are a high demand commodity sought after to support the ground fire support plan and have proven critical to mission accomplishment. Initial certification and refresher training for JTACs, FACs, and JFOs occurs through the period of instruction provided by instructors employed at Expeditionary Warfare Training Group (EWTG) Pacific and Atlantic. The T&R training continuum is facilitated in the fleet by air officers and SNCOs at the artillery regiments, ANGLICO, and divisions, ideally who have been designated Weapons and Tactics Instructors (8077 MOS) after completing the course at MAWTS-1 (formerly referred to as TACP(I)).

JTAC / FAC PRODUCTION AND SUSTAINMENT

The demand for having certified and qualified JTACs and FACs fielded to all levels and types of units in combat has grown significantly over the past decade. Currently there is a validated requirement for 354 JTACs and 272 FACs for a total of 626 controllers. This need translates to a requirement to produce 216 controllers annually (equal to the maximum capacity for EWTGPAC and LANT). Air support for certification and qualification for the population has grown and will continue to be more challenging. Initiatives have been and are in work to mitigate this situation; however, demand for JTACs and FACs continues to grow with expectations that the total requirement will increase again. Studies about post-OEF JTAC requirements in support of *Cooperative Strategy for 21st Century Seapower* are on-going; contract close air support (CCAS) providers exist to help offset some of the fleet air training requirements.

At the same time, given the ongoing revolution in unmanned aviation platforms increasingly providing persistent and simultaneous ISR, CAS, and EW in support of our MAGTFs and the joint force in combat, it is also essential that we continue to expand the use of these capabilities into the TACP curriculum. We must also continuously find ways to intelligently fund upgraded simulator capabilities to foster the ability to REPLACE live controls in the synthetic environment and transition CCAS into a codified and fully-funded program of record to insure consistent capacity and expanded capability for TACP training.

FUTURE

The USMC TACP, fire support, and aviation communities will work together to coordinate and align individual and collective training opportunities and fund high fidelity training environments to bolster live execution with real-world synergistic simulation. The TACP equipment kit of the future will require continual refinement driven by future warfighting requirements and technological advances. The community is investigating procuring light civil / training aircraft, as well as unmanned, long-loiter time, armed unmanned assets, to train JTACs in employing ordnance, and reviewing the T&R manuals to ensure simulators – and especially networked simulators – are fully leveraged for JTAC training.



Future Capabilities and Interoperability (JTAC Kit)

COTS tablets + GOTS software

DPSS Project Office located at NAWCWD China Lake

- 100% government-owned, government civilian software team
- Creators of PSS-SOF applications and software

KILSWITCH/APASS = Android App for Precision Fires Image Map Engine

- Users: SOCOM (NSW), MARSOC, HMX-1, DOS, FBI, AZ firefighters, USMC
- ~5000 tablets fielded since 2012, in widespread use throughout all MAGTFs
- Application is NGA validated
- Same algorithms and engines employed in NGA certified PSS-SOF and APASS applications.
- KILSWITCH capabilities will increase even further as part of the next generation Marines Fires Application and Target Handoff System v2 program of record, with fielding in early 2017.

TACP CONCEPTS AND DEFINITIONS

Joint Terminal Attack Controller (JTAC, MOS 8002)

A qualified (certified) service member who, from a forward position, directs the action of combat aircraft engaged in close air support and other offensive air operations. A qualified and current joint terminal attack controller will be recognized across DOD as capable and authorized to perform terminal attack control.

- Primary officer feeder MOSs are 0802, 7315, 0302, 1802 and 1803
- Primary enlisted feeder MOSs are 0861 and 0321.
- Must be E-5 and above.
- All these MOSs are listed on Unit TO&Es with a billet MOS of 8002.

Forward Air Controller (FAC, MOS 7502)

An officer (aviator) member of the tactical air control party who, from a forward ground or airborne position, controls aircraft in close air support of ground troops. USMC is the only service that uses the term, therefore in the joint community a FAC is a JTAC.

Forward Air Controller Airborne (FAC(A))

FAC(A)s are an airborne extension of the Tactical Air Control Party (TACP) which operates as the forward element of the Theater Air-Ground System (TAGS). JP 3-09.3 states that current and qualified FAC(A)s “will be recognized across the DOD as capable and authorized to perform terminal attack control”.

As defined in JP 1-02, DOD

Dictionary of Military and Associated Terms, a FAC(A) is defined as “a specifically trained and qualified aviation officer who exercises control from the air of aircraft engaged in close air support (CAS) of ground troops.”

USMC FAC(A) Platforms: **AH-1, UH-1, F/A-18, AV-8, F-35**

Joint Fires Observer (JFO)

Joint Fires Observer (JFO). A JFO is a trained service member qualified to request, control, and adjust surface-to-surface fires; provide timely and accurate CAS targeting information to a JTAC/FAC (A); provide such information directly to aircraft when authorized by the controlling JTAC/FAC (A); and perform autonomous terminal guidance operations.

In conjunction with a FAC, JTAC, FAC (A) a JFO can facilitate a CAS attack up to the clearance of fires which can be provided by a FAC, JTAC or FAC (A) not co-located with the JFO but who has situational awareness to facilitate the attack.

Our Corps’ objective goal is to ensure that we have one JFO for at least every rifle squad.

Weapons and Tactics Instructor (8077)

Formerly the Tactical Air Control Party Instructor TACP(I).

- A SNCO or officer graduate of the MAWTS-1 Weapons and Tactics Instructor Course.
- A WTI has completed the transformation from an individual trained in terminal attack control to an experienced aviation integrator and aviation integration training manager.

Each assigned Regimental and MEU Air Officer and ANGLICO Company Air Officer shall attend the Air Officer Course and be a certified TACP(I).

At the regimental and MEU level, TACP(I)s shall supervise the development and implementation of subordinate unit collective and individual aviation integration training and shall facilitate the training and evaluation of adjacent units. (MCO 1301.25C)

MOS 8077, Air Officer Weapons and Tactics Instructor (AirO WTI) FMOS.

Weapons and tactics instructors provide a capability to fill associated operator force billets to develop and execute a unit training program in accordance with the Weapons and Tactics Training Program (WTP). This training is focused on achieving individual training and readiness through collective operational unit training.

* 8077 MOS forthcoming in MOS manual for Air Officer Course graduates.

TACP MANNING PROGRESSION

WTI (8077)

A SNCO or Officer graduate of MAWTS-1 Air Officer Department (AOD) WTI. A WTI is an experienced aviation integrator and aviation integration training manager. All assigned Regimental and MEU Air Officers shall attend WTI.

JTAC / FAC / AIR OFFICER		JTACE	JTACI
2000 Level	2100 Level	2500 Level	
Core Skill Introduction	Core Skill Designation	Instructor Training	
At the completion of the Core Skill Introduction phase (2000 codes), TACP members meet the requirements of the JTAC MOA and are certified Joint Terminal Attack Controllers (SMOS 7502 or 8002).	The Core Skill Designation Phase (all 2100 codes) conducted at the unit level is required to fully prepare individuals to integrate aviation in support of unit operations and is required for designation as a JTAC, or FAC by the commanding officer, or designation as	JTACE: A designated SNCO or Officer who is a close air support SME at the unit level with at least one year of operational experience as a JTAC/FAC(A) who has completed an upgrade evaluation by the WTI and is designated by the unit commander.	JTACI: A JTAC who is designated an instructor of JTAC trainees in order to supervise the Core Skills Plus (2000) Phase of training JTACs. A JTACI requires at least one year of operational experience as a designated JTAC or FAC(A) prior to designation as a JTACI, and is designated by the Commander of a Marine Corps FLC that conducts JTAC/TACP Training.
	<u>Group 1 Small UAS Training</u>		
	RQ-11 Raven		
	RQ-12 Wasp		
	RQ-20 Puma		
	TALSA East - Camp Lejeune		
	TALSA West - Camp Pendleton		
JFO	Training Days: 5-10	JFOE	JFOI
2000 Level	2100 Level	2500 Level	
Core Skill Introduction	Core Skill Designation	Instructor Training	
The Core Skill Introduction (2000-level) phase provides the knowledge and skills required to perform as a basically trained JFO and to certify JFOs in accordance with the JFO MOA.	The Core Skill Designation (2100-level) phase builds on the 2000-level events, completes the preparation of individuals for combat at the unit level and is required for designation as a JFO.	JFOE: A designated Sergeant, SNCO, or officer who is a joint fires SME at the unit level, has attended the JFO course, and is a designated JTAC.	JFOI: A JFOI is a joint fires SME at a JFO-certifying schoolhouse designated to instruct all joint mission tasks (JMT) listed in the JFO MOA. A JFOI requires a minimum of one year operational experience in a joint fires duty area.

JTAC, FAC, and FAC(A) Requirement

GCE TACP T&R Requirements



TACP (JTAC/FAC) Annual Training Control Requirement: **7512**
Rotary Wing: 3324 / Fixed Wing: **4188**

*USMC must produce approximately 216 JTACs / FACs annually to meet current Table of Organization requirements.

EWG Avg CAS Asset Frag Sourcing:

~75% of total Frags filled by MILAIR
USMC Fixed Wing: 35%
USMC Rotary Wing: 30%
Contract CAS: 20%
Other Joint: 15%



This number was calculated using the Marine Expeditionary Rifle Squad Initial Capabilities Document, placing a JTAC at the rifle platoon level, and with a proposed reconnaissance capability increase to a JTAC at every team. The total number of JTACs required for the force will increase from the current 626 **to approximately 1005**.

Total FAC/JTAC: 626*	
FAC	272
JTAC	354
Active	
FAC	199
JTAC	247
Reserve	
FAC	73
JTAC	107
Total FAC(A): 142	
FW	52
RW	90

ACE FAC(A) T&R Requirements



FAC(A) Annual Training Control Requirement: **2929**
Rotary Wing: 530 / Fixed Wing: **2399**

FW control shortfall: **2408**

The number of fixed-wing controls USMC JTACs, FACs and FAC(A)s required for certification and qualification exceeds our ability to generate the sorties with current organic and contract CAS platforms in order to maintain a T 2.0 readiness level at the present JTAC/FAC manning levels;

Solutions:

- HQMC Aviation is investigating several options to include incorporating unmanned, armed group 5 UAS platforms
- The TACP Marine Corps Order will help to professionalize the JTAC MOS, and will provide rigor to manning, training, and equipping.
- We are exploring increased investment in ground simulation and linkages between ACE and GCE devices IAW TECOM's L-V-C training environment

TACTICAL AIR CONTROL PARTY STRUCTURE (182K)

Current FAC Requirement

Current JTAC Requirement

JFO Requirement

Unit Type	Distribution	A/C	R/C
Infantry Bn	24 A/C Bn 9 R/C Bn	72	27
LAR Bn	3 A/C Bn 1 R/C Bn	9	3*
Tank Bn	2 A/C Bn 1 R/C Bn	6	3
Recon	3 A/C Bn 1 A/C Bn	3	1*
Force Recon Co	3 A/C Co 1 R/C Co	3	1*
ANGLICO	3 A/C Co 3 R/C Co	24	33
MARSOC		21	N/A
Artillery Regt	3 A/C 1 R/C	3	1
Higher HQ: Inf Regt MEU	8 Regt x 2 7 MEU x 2	16 14	4* N/A
Other		28	N/A
	TOTAL	199	73

Unit Type	Distribution	A/C	R/C
LAR Bn	1st LAR: 4 2d LAR: 4 3rd LAR: 4	12	4*
Artillery Reg HQ	10th MAR: 8 11th MAR: 6 12th MAR: 3	17	4*
Artillery Bn	10th MAR: 29 11th MAR: 39 12th MAR: 10	78	27*
Recon	1st Recon: 13 2d Recon: 13 3rd Recon: 11	37 (112)	N/A
Force Recon	1st Force: 5 2d Force: 5 3rd Force: 5	15 (51)	N/A
ANGLICO	1st ANG: 16 2d ANG: 16 5th ANG: 16	48	72
MARSOC		31	N/A
Other		9	N/A
	TOTAL	247 (410)	107

Unit Type	Distribution	A/C	R/C
Infantry Bn	27/ Inf Bn	648*	243
LAR Bn	1/Plt	27	18
Tank Bn	1/Plt	10	23
Artillery	3/FO Team	216	42
	2/NGF Liaison Section	12	N/A
	HQ BTRY (LAR/Tanks)	26	N/A
Force Recon/ Recon	1/Team	111	60
ANGLICO	24/ Co	72	108
	TOTAL	1122	494

FAC(A) Requirement

Unit Type	Distro	CMMR	FAC(A)
HMLA	8 HMLA 5 x W/Y 3 x Y/Z	8 x H-1W 6 x H-1Z 4 x H-1Y	90
VMFA(AW)	4 Sqdn	6 FAC(A) crews per Sqdn	24
VMFA	8 Sqdn	2 FAC(A) per Sqdn	16
VMA	6 Sqdn	2 FAC(A) per Sqdn	12
		TOTAL	142

Notes:

- Reserve Component (RC) Table of Organization (T/O) numbers marked with an "*" do not have a Billet Identification Code (BIC) associated with them in Total Force Structure Management System (TFSMS) and represent if MARFORRES was 100% mobilization to mirror the Active Component.

-Numbers in parenthesis represent the proposed Reconnaissance Community T/O increase to one JTAC per team.

- JFO training does not require live aircraft sorties for production or sustainment. JFO total is under review.

TACTICAL AIR CONTROL PARTY FAMILY OF SYSTEMS

Target Handoff System (THS)

THS is in the process of refreshing hardware and software to enable an increase in capability with the SLATE (Smaller Lighter Ancillary TLDHS Equipment) kit and Strikelink software version 1.2, with the goal of providing a better user interface. This capability will be replaced in 2017 by the Marine Fires Application, which will be a combination of KILSWITCH and the Army's MAFIA application. THS has also assumed responsibility for the hand-held video downlink requirement and began fielding this capability in FY 2013 with the Soldier ISR Receiver (SIR) versions 2.0 and 2.5.

Common Laser Range Finder (CLRF)/Vector 21

The Common Laser Range Finder - Integrated Capability (CLRF-IC) will combine the components of the current CLRF in to a smaller lighter device. Fielding of this capability is slated for FY 2016.

Portable Laser Designator Rangefinder (PLDR)

The PLDR replaced the interim laser designator, the Ground Laser Target Designator II. The PLDR provides a laser designation capability out to 5000m at a reduced weight than previous lesser equipment. Redistribution of PLDRs and GLTD IIs is continuous to ensure units have a laser designation capability until production can increase to expected rates.

In October 2011, The Joint Terminal Attack Controller Lightweight Target Designator (JTAC-LTD) was fielded in response to an UUNS. 150 systems have been fielded.

Situational Awareness and Night Vision

AN/PVS-17/14

The AN/PVS-17 provides extended range night vision capability. AN/PVS-14 is issued as a component of the Vector 21.

Thermal Laser Spot Imager (TLSI)

The Kollsman TLSI with Enhanced Targeting Sight provides the capability to see the laser spot generated by the FAC/JTAC's laser designator or a self-lasing aircraft as well as providing thermal imaging capability.

Fielding is complete.



Thermal Imager

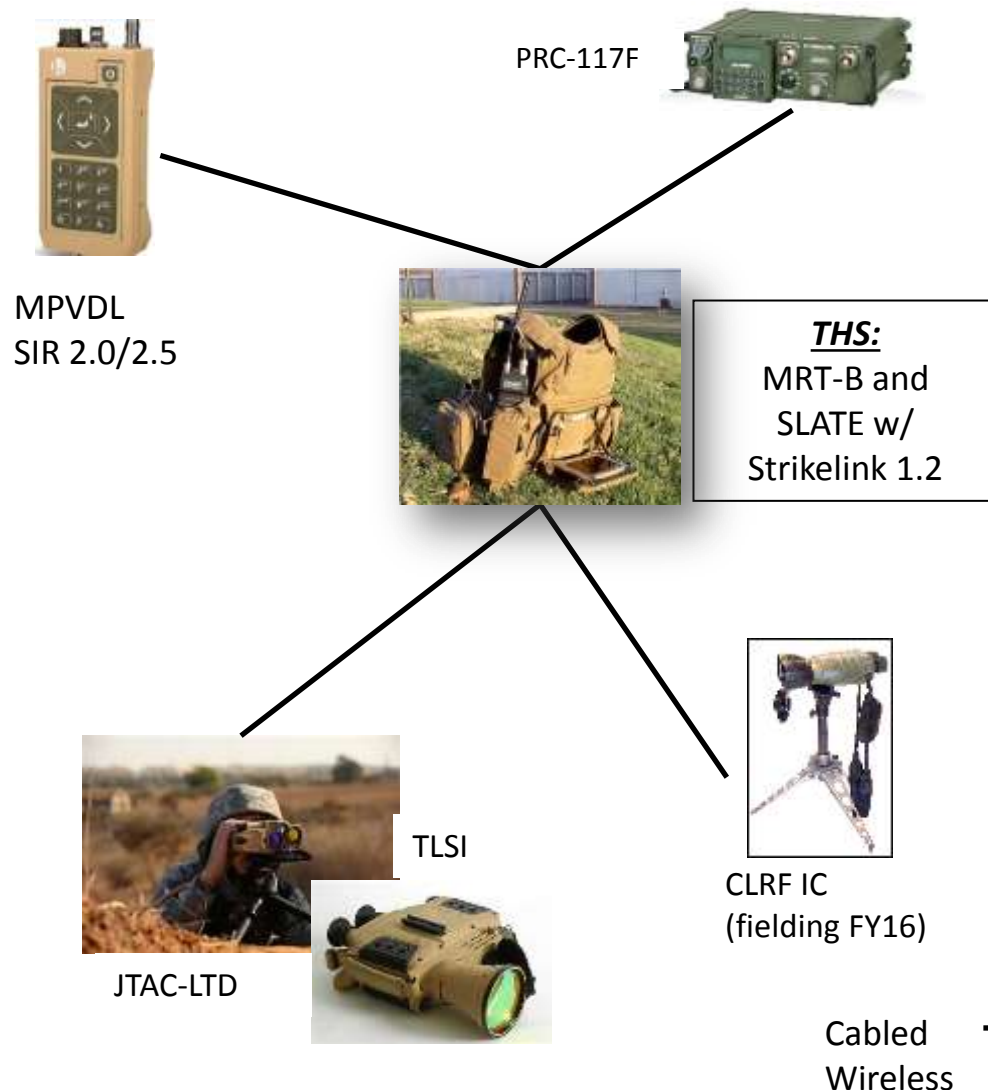
The Kollsman Long Range Thermal Imager provides the FAC/JTAC a long range target location capability for both day and night operations. Fielding to the operating forces is complete.

Video Scout (VS)

Video Scout continues to be the standard for COC video downlink operations. The Remote Video Viewing Terminal (RVVT) is undergoing a requirements re-write that will affect the procurement of a COC Video receiver capable of allowing multiple users to subscribe to multiple video signals received, on a local network. The intent is to maintain a technical family of systems approach for the non-static operator (THS operators) and static operators (COC operators).

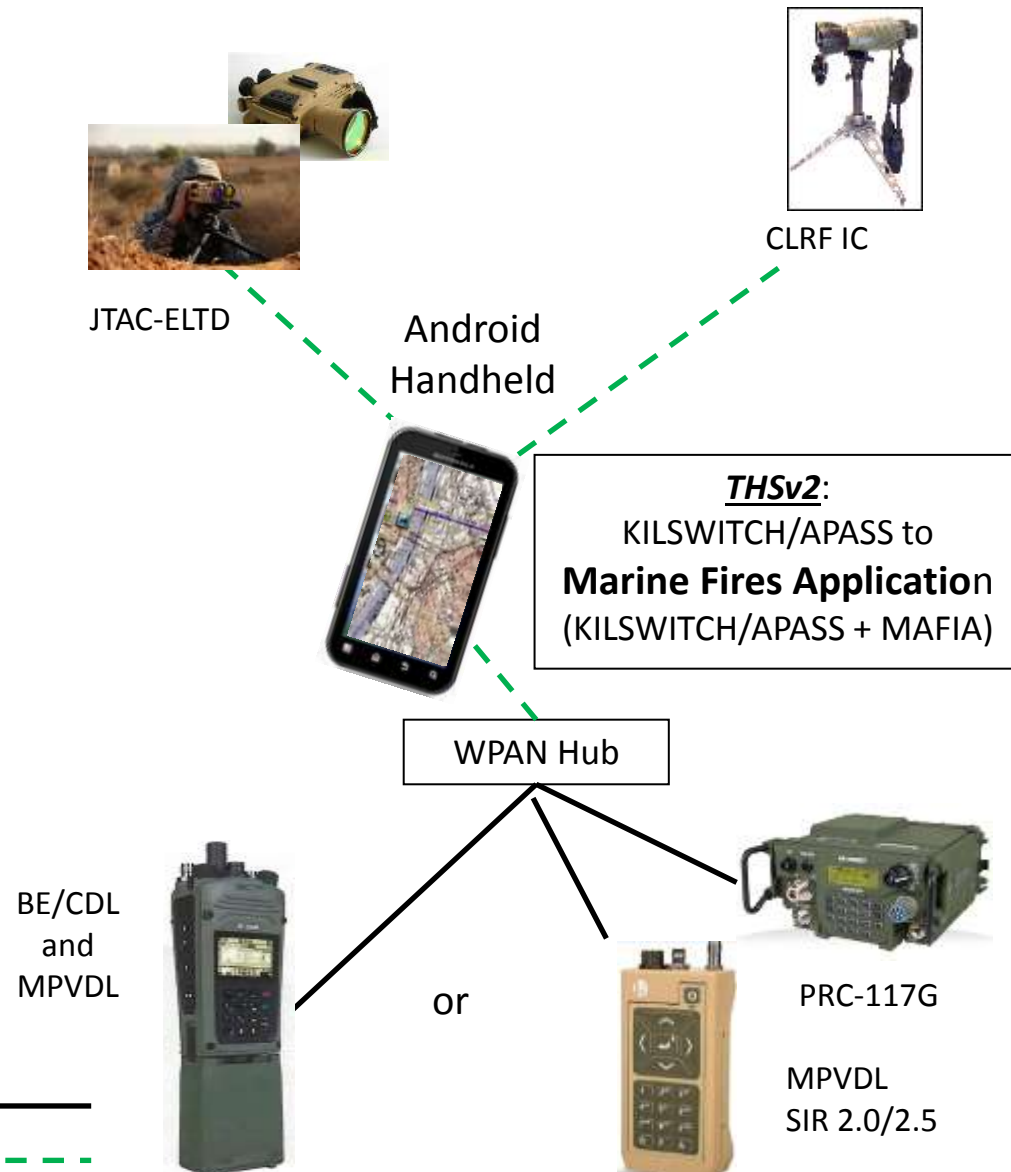
TACTICAL AIR CONTROL PARTY FAMILY OF SYSTEMS

TACP FoS Present



35 lbs operational weight for complete task capability

TACP FoS Future *



25 or less lbs operational weight for complete task capability

* The Marine Corps continues to evaluate systems and to equip TACPs to this end state. This is a critical link in the digitally interoperable MAGTF; for example, these systems must integrate with airborne systems such as SRP.

DIGITALLY AIDED CLOSE AIR SUPPORT



TACP and Tablets- Android tablets enable situational awareness and Digitally Aided Close Air Support (DACAS), with applications like Kinetic Integrated Lightweight Software Individual Tactical Combat Handheld (KILSWITCH)/Android Precision Assault Strike Suite (APASS) [pictured]. KILSWITCH/APASS is a model example of rapid innovation in support of our warfighting requirements.



"We believe that implicit communication—to communicate through mutual understanding, is a faster, more effective way to communicate...We develop this ability through familiarity and trust, which are based on a shared philosophy and shared experience." – MCDP 1



TACTICAL AIR CONTROL PARTY INITIATIVES

Near Term: Group 1 Small UAS Training

FACs and JTACs will complete group 1 small UAS training either:

- Prior to attending TACP school or
- During 2100 level training once assigned to unit

Training is conducted by the UAS TALSAs located aboard Camp Pendleton and Camp Lejeune



Far Term: UAS Expertise to the TACP

7315 (UAS Officer) infusion into the TACP:

Analysis ongoing to determine best way to gain and maintain UAS expertise at the tactical edge

- As added member of TACP (requires structure change)
- 7315s are eligible for 8002 (JTAC) MOS and associated B-billet assignments; manpower analysis ongoing

RQ-11B DDL (RAVEN) 10 days
RQ-11B DDL Difference 5 days
RQ-11B DDL Accelerated (naval aviator/UAS operator) 5 days
RQ-20A (PUMA AE) 10 days
RQ-20A Differences 5 days
RQ-20A Accelerated (naval aviator/UAS operator) 5 days
RQ-12A (WASP IV) 10 days
RQ-12A Differences 5 days
RQ-12A Accelerated (naval aviator/UAS operator) 5 days
All Environment (RQ-12A/RQ-20A) 10 days
SUAS-PM Seminar 1 day
SUAS- Instructor / Evaluator 5 days





AVIATION SCIENCE AND TECHNOLOGY STRATEGIC GUIDANCE

Introduction

The Marine aviation combat element must leverage S&T to transform into a digitally-interoperable expeditionary force which continues to dominate the air, sea, space, land, and cyberspace domains in support of MAGTF operations. Operating through the electromagnetic spectrum, the ACE must conduct effective missions for anti-air warfare, offensive air and assault support, air reconnaissance, control of aircraft and missiles, electronic /cyber warfare. Leveraging S&T, Marine aviation seeks to identify, influence, and rapidly insert capability into new and legacy airborne systems by upgrading or replacing existing systems at minimum cost. Highlighted Marine aviation S&T focus areas that require continuous S&T investments are electronic warfare (EW); cyber operations; command and control (C2); communication and networks; unmanned aircraft systems (UAS); weapons; and rotorcraft and fixed wing technologies.

Aviation S&T Strategic Guidance

Expanding DoD capability is accomplished by integrating platforms and systems and promoting interoperable to deliver increased lethal or non-lethal effects across the battlefield. By incorporating integration and interoperability tenets, DoD systems with long acquisition development cycles, point-to-point solutions, proprietary, and platform centric solutions will be minimized or eliminated. The results provide increase warfighting effectiveness and produce open architecture, common standards which enable more effective tactical systems.

Aviation S&T Sponsors

Marine aviation S&T strategic guidance describes how Marine Corps aviation must rely on scientific research to meet their current, emerging, and future needs. The Marine Corps Combat Development Command (MCCDC) and Chief of Naval Operations Air Warfare facilitate the programming, budgeting, and resources for Marine aviation programs. The Office of Naval Research (ONR), Naval Aviation Enterprise (NAE) and MCDDC advocate for the S&T funding and solutions for the Marine Corps aviation S&T programs. The Department of Army, Department of Air Force, Office of the Secretary of Defense (OSD) and Defense Advanced Research Projects Agency (DARPA), Federally Funded Research and Development Centers (FFRDCs), National Security Agency (NSA), and Central Intelligence Agency also provide significant S&T support for the future of Marine aviation.

Airborne Electronic Warfare

Marine airborne electronic warfare (EW) must continue to advance in order to detect, deny, degrade, and disrupt hostile radars and communication systems equipped with advanced digital processing and multifunction semiconductor electronics. Adversaries are developing and deploying systems at low cost, while equipping these systems with increased capabilities. Current Marine aviation electronic attack capabilities that address threats across the range of military operations are the EA-6B Prowler equipped with the AN/ALQ-99 Tactical Jamming System and the F/A-18 and AV-8B equipped with Intrepid Tiger II pods. The impending retirement of the EA-6B Prowler highlights the need for electronic warfare capabilities organic to the MAGTF.

Marine aviation must invest in airborne platforms to address major combat operations and integrate Intrepid Tiger II with rotary wing and UAS to provide electronic attack capabilities for the irregular warfare threat. To be effective across the ROMO, electronic warfare assets must be networked with ground and shipboard EW assets to form a MAGTF EW family of systems that provides a collaborate environment for information sharing, situational awareness, and electronic protection coordination. The Marine aviation electronic warfare S&T focus areas are:

- **Electronic Attack:** Develop adaptable electronic attack algorithms and techniques to defeat unknown and known communication or radar signals incorporating waveform diversity techniques that mitigate legacy jamming. Develop solid-state transmit/receive modules that provide suitable power, advanced jamming techniques, adequate number of frequency beams, and sufficient instantaneous and operational bandwidths against threats in highly dense areas.
- **Electronic Support:** Develop real- or near-real time situational awareness tools that automatically and rapidly locate, identify and classify unknown complex threat waveforms across the radio frequency, electro-optical, and infrared spectrums.
- **Electronic Protection:** Develop technologies to counter threat jammer which includes digital radio frequency memory (DRFM) technology. Develop electronic protection techniques for radar systems against threat systems employing microwave, millimeter-wave, high energy lasers, or electromagnetic pulse systems.
- **EW Service and Open Architectures:** Develop an EW service architecture that creates a government regulated and owned infrastructure based on commercial technology to enable documented and published service interfaces for platforms, networks, datalinks, weapons and sensor systems.

AVIATION SCIENCE AND TECHNOLOGY STRATEGIC GUIDANCE

Cyber Operations

Marine Corps aviation will operate jointly with allied, coalition, and homeland security forces using information networks, each of which has varying security requirements. USMC fixed, rotary and UAS systems will be employed as information systems conducting intelligence, surveillance, and reconnaissance (ISR), cyber and EW operations over the EM spectrum. The ACE must continue to develop cyber strategy to protect and defend USMC airborne assets against kinetic and non- kinetic threats. The Marine aviation cyber S&T focus areas are:

- **Cyber Security:** Develop technologies that facilitate rapid and secure information storage and sharing (down to the platform level) across multi-level security in joint and coalition operations during intermittent/limited connectivity, and in restricted and hostile environments.
- **Full Spectrum Cyber Operations:** Develop situational awareness and visualization tools to understand the extent and status of cyberspace across the air, surface, and land domains in order to plan and execute cyber operations.
- **Cyber Intrusion:** Develop technologies to protect information infrastructure from malware and other cyber threats by developing algorithms and techniques to detect, deter, or defeat the threats.
- **Cyber Defense:** Develop technologies to holistically assure information through proactive defensive measures that are not limited to conventional areas such as multi-level security, real-time automated information guards and response, cross domain solutions, inter-domain authentication, encryption, intrusion detection, prevention, and response.

Command and Control (C2)

The ACE will assimilate large volumes of information from airborne and ground tactical sensors distributed across air, land, sea, space, and cyber domains. The Common Aviation Command and Control System is a major initiative for aviation command and control. CAC2S lays the foundation for an open architecture platform to fuse and visualize airborne, ground, logistics, and intelligence data. The ACE command and control capability must evolve to provide the MAGTF commander with the ability to make timely decisions, maintain situational awareness, coordinate and disseminate information to the joint and coalition forces. Utilizing reliable tactical communication links, volumes of data will be transported and shared to provide an integrated seamless joint C2 system. The Marine aviation C2 S&T focus areas are:

- **Data fusion:** Develop technologies to fuse real, near, and non-real time data from airborne and ground sensors, and intelligence systems to provide operators with visualization tools for full situational awareness.
- **Information Flow:** Develop technologies to converge service networks to allow information to flow seamlessly and data exchange across classified and unclassified networks and for joint and coalition operations to enable net-centric military operations.
- **Secure Information:** Develop technologies to provide push/pull data across bidirectional intra-, cross-, and inter-domain authentication, encryption, and information assurance/integrity services.



AVIATION SCIENCE AND TECHNOLOGY STRATEGIC GUIDANCE

Communication and Networks

Airborne communication networks provide the backbone to reliably exchange relevant information to/from airborne, ground, ship, and ground platforms. Marine aviation requires communication networks to connect all Marine fixed, rotary, and UAS platforms with joint defense and coalition forces.

Software Reprogrammable Payload (SRP) is a single common payload module that is flexible and reconfigurable to support simultaneous missions making maximum use of available bandwidth and ensuring interoperability within joint standards and protocols providing commonality across platforms. Equipped with SRP, airborne platforms act as communication relays for over horizon missions, and interpret, translate and relay heterogeneous waveforms to platforms distributed throughout the battlefield. Marine aviators in the cockpit or on the ground will operate mobile devices and smartphones over 4G or xG wireless protocols to provide up-to-date situational awareness using advanced visualization aids.

The communications networks S&T focus areas are:

- **Software reprogrammable/cognitive payload:**
  - Develop an open architecture software programmable platform that supports multiple and emerging advanced tactical datalinks;
  - Develop cognitive technologies that enable payloads to sense the environment, select, and optimize waveforms to accomplish mission effectiveness based on predefined operational objectives.
- **Advanced Datalinks:** Develop high frequency (HF), millimeter-wave, or laser communication networks to maintain over-the-horizon, air-to-air, and air-to-ground in a SATCOM limited or denied environment.
- **Bandwidth Compression:** Develop compression or spread spectrum techniques to automatically transport large data files over limited bandwidths or over continuous or unused spectrum.
- **Survivable Networks:** Develop mobile tactical wireless networks which dynamically self-heal, self-organize in contested, multi-level security, degraded communications and jamming environments.

Unmanned Systems

Marine aviation has successfully deployed and leveraged unmanned air systems (UASs) in combat operations. The demand for dedicated UAS systems will continue to increase. The air vehicle platform and its associated payload directly determine the effectiveness of the UAS system during mission engagements. Group 1 - small UASs, Pumas, Wasp, and RQ-11 Raven – have excelled at providing ISR and communications relay but are limited in carrying larger and heavier payloads.

Employing larger UASs, such as the Group 2 MQ-21, allows larger and heavier payloads with increased capability but still limited in providing effective electronic warfare and SIGNIT capability at long distances.

Marine aviation seeks Group 3/4 UAS and unmanned cargo systems to carry larger payloads with increase multifunction capability such as EW, cyber, radar, communications, kinetic and non-kinetic payloads and logistics support. The Marine aviation unmanned systems S&T focus areas are:

- **Platforms:** Develop platform and energy technologies to enable UAS platforms to operate in all-weather environments, high altitudes, and long endurance operations from ship to maneuver.
- **Payloads:** Develop modular, standards, and open architecture technologies to enable interchangeable UAS payloads such as electro-optical/infrared, electronic warfare, cyber, signals intelligence, synthetic aperture radar, communication relays, and laser designators.
- **Autonomy:** Develop techniques to provide capabilities to reduce manning requirements, increase the level of autonomous decisions, reasoning, and learning in uncertain operational environments to successfully conduct complex mission tasks.
- **Communications:** Develop secure communication datalinks to semi or fully control UAS over-the-horizon and line-of-sight with robust encrypted protocols.

AVIATION SCIENCE AND TECHNOLOGY STRATEGIC GUIDANCE

Directed Energy Weapons

The Marine Corps is actively pursuing directed energy weapons (DEW) to provide force protection against ballistic and cruise missile defense; defense against manned and unmanned aircraft; counter-sensor applications; counter-rockets, artillery, and mortar (C-RAM); counter-man portable air defense systems (C-MANPADS); and non-lethal defense. DEW enables speed of light engagement to the targets, provides an extremely lower cost per shot compared to bullets and missiles cost per shot, and provides continuous magazine capacity to defeat hostile UAS, missiles, or mortars. The Marine Corps and the Office of Naval Research are currently investing in a Ground Based Air Defense Capability (GBAD) DEW as a counter-unmanned air systems (C-UAS) role. Mounted on a tactical vehicle, the DEW is envisioned to utilize a combination of guns and missiles, command and control (C2), and radar cueing. Marine aviation is interested in pursuing airborne DEW capability for F35 fixed, V-22, CH53 rotary wing aircraft and unmanned air systems. The Marine aviation DEW S&T focus areas are:

- **Power Generation and Energy Storage:** Develop power generation and energy storage systems to increase the wall-plug efficiency and reduce wasted heat and improve thermal efficiency.
- **Laser Systems:** Develop solid-state lasers, fiber laser systems to increase power output by investigation dielectric materials, components, and power combining techniques while reducing the laser system volume, power consumption, and weight for medium to small aircraft.
- **EM Systems:** Develop technologies to investigate EMP and high-power radio frequency (HPRF) technologies payloads for missile or unmanned air systems. for both offensive and defensive lethal and non-lethal effects.
- **Integration:** Develop interfaces and techniques to integrate laser systems with existing air platforms, develop automated techniques to coordinate and integrate with kinetic and non- kinetic weapon systems.

Degraded Visual Environment

The Marine Corps is actively pursuing technology to mitigate risk in DVE. There are three critical aspects to reducing mishaps in DVE: hover stability, symbology/cueing and sensors. The ultimate technological solution would provide a stable geo-located hover capability, intuitive cueing to drift and obstacles, and sensors which can detecting and display obstacles (wires), terrain slope, or other hazards on approach, landing, takeoff and en route phases of flight. The intent is a capability that supports multi-ship simultaneous flight operations in obscured conditions (sand, dust, snow, fog, smoke, rain, flat light, night) in a GPS-denied environment.

It will also provide a takeoff, en route, approach and landing capability throughout all operational flight envelopes to include EMCON shipboard operations. The final goal is to significantly reduce pilot and aircrew workload to operate safely in DVE and transform adverse weather conditions into a tactical advantage on the battlefield. Marine aviation continues the evolution from “owning the night” to “owning the weather” in order to support ground operations 24/7/365.

The Marine aviation DVE S&T focus areas are:

- **Advanced Sensors:** Develop compact light weight millimeter-wave and terahertz radar, and 3D flash or scanning LIDAR sensor technologies that leverage advancements in semiconductor devices and optics.
- **Flight controls:** Develop advanced techniques that automatically eliminate drift and provide hover stabilization. Develop advanced algorithms that fuse sensor data with stored terrain data to provide a clear operational vision for landing on unpredictable terrain.
- **Situational Awareness:** Develop visualization tools that provided the crew with clear and accurate symbology and visual aid for situation awareness for all types of brownout conditions.



AVIATION SCIENCE AND TECHNOLOGY STRATEGIC GUIDANCE

Aircraft Enablers

Marine aviation is also interested in pursuing additional S&T initiatives for fixed, rotary, and UAS platforms.

- **Tiltrotor/Tiltprop:** Develop advanced technologies for rotors/props as components of assault support propulsion as well as tactical UAVs. As rotorcraft/helicopters requirements grow in terms of hover load and harsh environments (heat/dust/high altitude), as well as top-end speed (i.e., MV-22 escort), advanced rotor performance enhancement (dynamic blade shaping) will garner performance as well as efficiency (fuel/load savings).
- **Heavy Lift:** Develop rotorcraft capability enhancements to sustain performance and improve high altitude operations. Develop lift technologies to provide lift well beyond this ambient pressure/temperature for all potential deployment locations. Develop technology that can increase vertical lift and increase operational radius.
- **Variable-speed air refueling drogue:** Develop technologies that enable refueling drogues to refuel fast tactical aircraft as well as slower rotorcraft.
- **Platform Protection & Weapons:** Develop technology supporting a family of low collateral damage/low energetic weapons. Existing methods of obtaining low collateral damage munitions include reducing the amount of explosive filler of existing weapons. Develop technologies to improve accuracy thereby reducing the risk of collateral damage when an appropriate lethality warhead and fuse are applied. Develop technologies that ensure weapon fusing and weapon yield is selectable from within the cockpit.
- **Composite materials:** Develop technologies for health monitoring of composite structures enabling condition based maintenance and predictive failure of composite structures on aircraft in order to reduce time in depot-level maintenance facilities as well as reducing NDI inspections. The increased use of composite structures requires an enhanced capability to rapidly make repairs to these structures in all environmental conditions (heat, cold, sand, humid, etc.)
- **Lightweight De-ice/Anti-ice capability for aircraft:** Develop technologies to provide a lightweight all de-ice/anti-ice capability for both rotor blades and fuselage that reduces both weight and electrical power requirements. Current de-ice/anti-ice capabilities are heavy due to power requirements for heating and wiring.



2.12 AVIATION TRAINING SYSTEM (ATS) PLAN



1ST MAW ATS

- MATSS Iwakuni
- MATSS Futenma
- MATSS Kaneohe Bay
- MATSS Guam - TBD



2D MAW

- MATSS Cherry Point
- MATSS New River
- MATSS Beaufort



3D MAW ATS

- MATSS Miramar
- MATSS Camp Pendleton
- MATSS Yuma

4th MAW

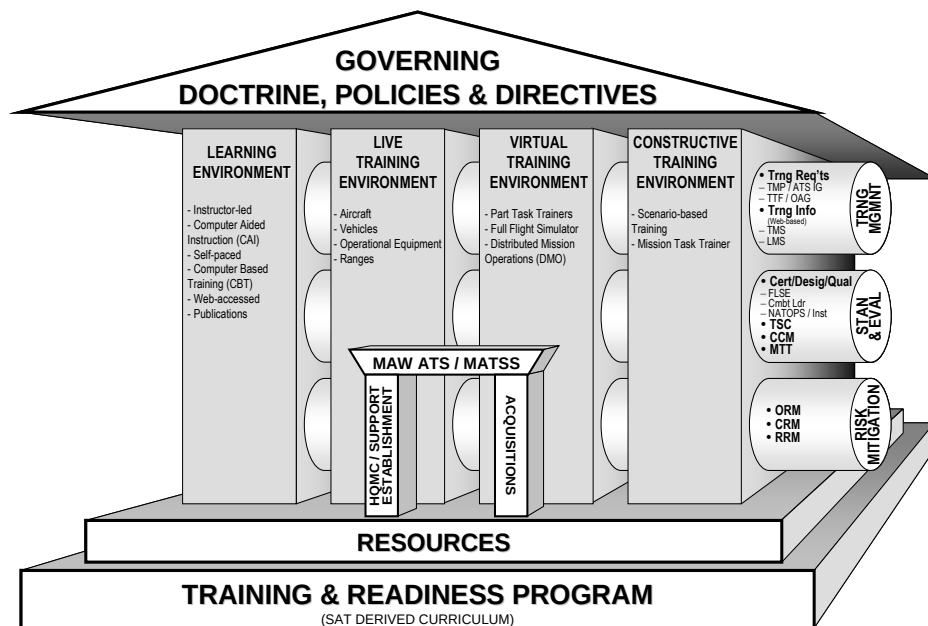
- MATSS Ft Worth
- MATSS JB McGuire-Dix-Lakehurst
- MATSS Norfolk



AVIATION TRAINING SYSTEM (ATS) PLAN

Aviation Training System (ATS) Plan

A combination of challenging operational environments, decreasing training resources and budgets, and a lower dwell to deployment ratio, requires Marine aviation to focus its training more effectively and efficiently to achieve and sustain the highest levels of combat readiness. The USMC Aviation Training System (ATS) integrates Marine aviation training processes and structures into a single, integrated training system; links training costs with readiness; and spans all Marine aviation communities. A properly integrated training system requires evolving institutionalized processes that support our missions and providing on-time delivery of tactically relevant training. With training and readiness (T&R) as its foundation, ATS provides the MAGTF commander with core and mission skill proficient combat ready units. Integrated ATS processes, governed by policy and supported by appropriate resources, provide the catalyst for incremental training system improvements. ATS integrates and coordinates policy, manpower, equipment, and fiscal requirements of post initial accession training for Marine aviation officers and enlisted personnel as well as initial accession aircrew training (Core Skill Introduction) for aviation units that conduct T/M/S specific aviation training (e.g. Fleet Replacement Squadron (FRS), KC-130J Fleet Replacement Detachments (FRD)). ATS processes and procedures shall be applicable to all current and future Marine aviation training programs to include Naval or joint-level programs in which the USMC participates. ATS is outlined in the governing policy MCO 3710.6B NAVMC 3500.14C. The ATS Systems Approach to Training (SAT) model is depicted in the following figure:



ATS Focus

ATS integrates processes and programs for training that institutionalize “operational excellence” across Marine aviation. “Operational excellence” involves increased combat readiness and preservation of personnel and assets – risk mitigation through reduction in mishap causal factors from supervisory, procedural, and human error. T&R manuals are source documents for implementing ATS. ATS is intended to:

- Provide operational commanders with a current, responsive and relevant training system for aircrew, aircraft maintenance, aviation ground support and C2 personnel.
- Develop a holistic training system across every Marine aviation community throughout the training continuum that supports aircrew (pilot / NFO / enlisted), operators and maintainers.
- Help proliferate standardization within the Marine aviation communities.
- Develop concurrency management processes to ensure the training system (curriculum, courseware and training devices) remains relevant.
- Address training and safety issues through SAT derived curricula and improved use of Risk Management (RM) and Crew Resource Management (CRM) principles.
- Utilize Marine Aviation Training System Sites (MATSS) to facilitate the ATS program.

ATS Processes

ATS is process intensive and includes the following:

- Flight/Combat Leadership Standardization and Evaluation: process of training toward and achieving certifications, qualifications and designations consolidated and standardized under the MAW ATS structure in accordance with platform and community T&R Manuals and the MAWTS-1 governing Program Guides. It is applicable to both flight leadership and non-aircrew certifications, qualifications, designations, contract instructor (CI) certifications, Naval Air Training and Operating Procedures Standardization (NATOPS) Instrument training and evaluation, as well as recurring generic training such as Instrument Ground School (IGS), CRM, (RM), and basic Navy Occupational Safety and Health (NAVOSH) or Naval Aviation Maintenance Program (NAMP) training.
- Concurrency Management (CCM): process whereby a change in tactics, aircraft/operational systems configuration, publications or procedures is evaluated to identify the impact of the change on T&R requirements. The T/M/S Simulator Essential Equipment Support Matrix (EESM) is an MCO 3500.14 mandated requirement that helps identify, track, and report simulator shortfalls. Once highlighted, appropriate and timely changes are made to curricula, courseware and devices to ensure alignment with operational systems and doctrine.

AVIATION TRAINING SYSTEM (ATS) PLAN

Training Information Management Systems: process that integrates the employment of multiple information systems under a training information architecture. Resources that support the management and integration of training information are Training Management Systems (TMS), Learning Management Systems (LMS), and the ATS SharePoint maintained by Aviation Standards Branch (ASB) at TECOM

<https://www.intranet.tecom.usmc.mil/hq/branches/atb1/ATS/default.aspx>.

The TMS tracks T&R progression and helps commanders ensure that training is conducted in accordance with appropriate orders and regulations; currency and qualification requirements are met; and RM principles are properly applied. The TMS for aircraft maintenance training is the Advanced Skills Management (ASM). Marine Sierra-Hotel Aviation Readiness Program (MSHARP) is the authorized aviation training management system to be used to track all training governed by aviation T&R manuals. For the F-35B the Autonomic Logistics Information System (ALIS) TMS is the approved TMS for aircrew and maintenance. An LMS functions as an electronic repository of specific courseware and technical manuals. The LMS for Marine aviation is the Marine Corps Aviation Learning Management System (MCALMS). The ATS website serves as a CAC enabled portal for access to other resources and training information management systems such as the LMS.

- **Risk Mitigation:** process that includes risk assessment, risk decision making, and implementation of effective risk controls. Emphasis placed on risk mitigation and aviation fundamentals during all aspects of training is required in developing and fostering a climate that promotes flight discipline and adherence to established procedures and requirements. Such a climate leads to operational excellence and mitigation of mishap causal factors. Training devices allow the control of specific elements in scenarios that enhance the exercise of risk management abilities. Risk mitigation is a by-product of professionalism and safe practices and must be stressed in all aviation training.

- **Training Management Process (TMP):** provides an effective forum for the operating forces to identify training issues across the DOTMLPF spectrum as the impetus for requirements generation and training improvement. The TMP helps determine common solutions to aviation training issues, eliminating redundant “stovepipe” solutions which are wasteful and inefficient. The TMP is focused on the needs of the warfighter through platform and community training management teams (TMT) and supported by Headquarters U.S. Marine Corp, Deputy Commandant for Aviation, Naval Air Systems Command, and industry.

MATSS MISSION:

To facilitate the execution and evolution of an integrated training system incorporating simulation devices and academic instruction and facilities, to assist with defining procurement and modification requirements through the training management process (TMP), and to assist with flight leadership program (FLP) execution and coordination of training support across Marine aviation that produces a properly trained ACE for the MAGTF. The focus of the program is on standards and performance.

The primary focus of each MAW’s ATS is the Marine Aviation Training System Site (MATSS). It directly supports execution of ATS functions for the fleet. While ATS as a whole is process intensive, the MATSS is resource and product intensive. ATS resources available at the MATSS include simulators and training devices, web-based training and learning management systems, academic courseware, electronic classrooms, and the military, civilian and contractor manpower to support, analyze, and provide input to improve training system performance. MATSS contribute the following to the ATS process: 1) simulator and academic resource usage optimization; 2) flight leadership standardization and evaluation (FLSE) support; and 3) aircraft platform and community training management team (TMT) issue advocacy. The MATSS construct has migrated across Marine aviation in the active and reserve components at thirteen sites. ATS products are continually analyzed for ways to improve Marine aviation unit readiness and technically refreshed appropriately to meet the demand for changes in the aviation training continuum with advancing technology. With increased ATS awareness the ability to leverage common solutions, coordinate and pool critical resources, and support combat leadership development across the various platforms and communities has improved exponentially. The result is two-fold: significant cost savings and cost avoidance by using a robust SAT by freeing funds for other requirements, and an enhanced training capability that substantively increases reportable combat readiness across Marine aviation and the MAGTF.

Training Future / Summary

For Marine aviation, ATS is risk mitigation that presents a game-changing opportunity. The USMC ATS MATSS shall be staffed with high quality uniformed FLSEs, Weapons and Tactics Instructors, and strike fighter tactics Instructors, as well as GS and contractor civilian support (device operators, fielded training system support personnel, contract instructors in support of all FRS and KC-130J FRD activities) to ensure the functions of ATS are carried out with success and overall combat readiness is improved across the MAGTF.

MARINE CORPS AVIATION SIMULATOR MASTER PLAN (MCASMP)

MCASMP Requirements

Marine Corps Aviation Simulator Master Plan (MCASMP) policy was initially set by DC(A) in Dec 2001 and revised in 2014. All new simulators function as a system of tactically relevant networked trainers. All new simulator procurements shall be compatible with this Simulator Master Plan at a minimum. The following are standing requirements:

- CONUS bases: section of networked simulators
- OCONUS & reserve bases: minimum of one simulator
- Marine Corps Common Visual Data Base (MCCVDb) via Navy Portable Source Initiative (NPSI) and in the future be able to run a USMC Common Gaming Area (CGA)
- Tactical Environment (TE_n) : threat, emitters, emissions, weapon flyouts, USMC and joint air/ground interoperability
- Common hardware approach across all T/M/S and community simulators to ensure a high fidelity, cross domain, platform and community distributed mission networked training capability is possible with other MAGTF and joint entities.
- Developed IAW current and/or draft T&R, Maneuver Description Guides (MDG), and NATOPS manuals

The MCASMP is intended to reduce overall procurement and sustainment training costs by procuring training devices and training media (courseware and curricula) with common hardware and software systems. The idea is to avoid the cost of developing new or platform unique type-systems; to pursue only the most promising developmental and mature technologies for training; and mitigate operational risks.

Marine aviation simulator strategy outlines an increased reliance on simulation to augment flight training and readiness. The foundation for simulator key performance parameters will be based on the ability of the training device to provide and support a multi-ship capability for similar and dissimilar platforms, the integration of aircrew training, and the ability for aviation systems to be networked with other aviation, ground, and future C2 systems to support MAGTF level integrated training. At the micro-level, the ability of CONUS and OCONUS systems to satisfy capacity, capability, and networking requirements will be essential for achieving the end state of enhanced pilot and aircrew simulator training (Reference Figure 1.0).

Fully integrated implementation of the MCASMP will foster a tipping point for Marine aviation, whereby the aviation community writ large accepts the full capacity and capability of networked, high fidelity training systems as the “norm” and crosses a threshold that its use is DEMANDED as part of complex, persistent, and scalable pre-deployment mission rehearsal training always by every unit in the fleet.

Marine Corps Aviation Virtual Warfare Center (MAVWC)

The MAVWC construct will bridge the gaps between live and synthetic training. It will support individual and unit collaborative training and mission rehearsal based upon existing aircraft/community T&R manuals. It will leverage existing mandated academics, theoretical application, and weapon systems employment. This will be accomplished by leveraging technology to link or network simulators/training devices together in a classified training environment for the accomplishment of prescribed T&R requirements. It provides for maneuver space in training and mission rehearsal for Marine aviation combat units. It provides the capability to network similar and dissimilar simulators/training devices co-located or geographically separated to support Marine Corps T&R event training/mission rehearsal to achieve combat readiness.

- Provides a foundation for the integration and interoperability of aviation and ground simulation to achieve true Marine Air Ground Task Force (MAGTF) Live Virtual and Constructive (LVC) training per the United States Marine Corps Commandant's Planning Guidance.
- Tactics, test, and fleet units will be able to develop new or improve TTPs in which to counter existing or developing threats.
- System Integration Laboratory (SIL) capabilities co-located with simulators/training devices can assist in the development and testing of future aircraft and weapon system integration and interoperability.

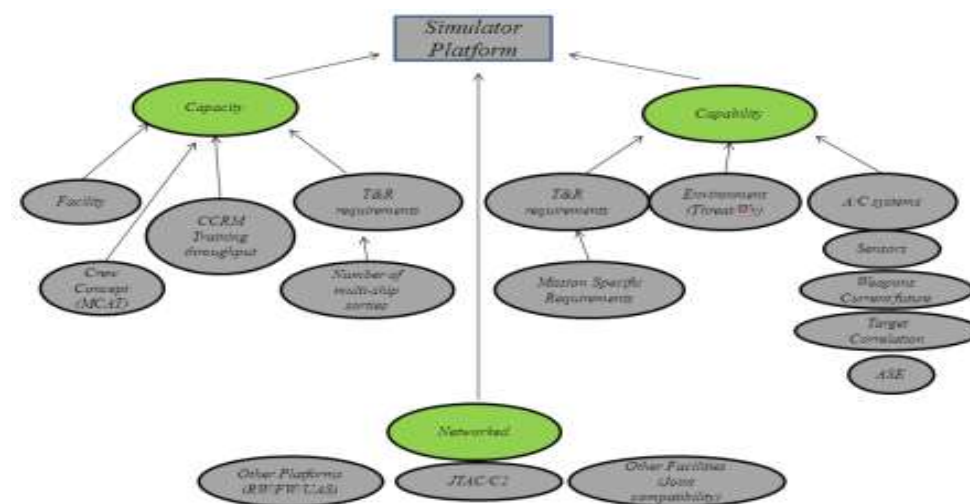


Figure 1.0

MARINE AVIATION DISTRIBUTED VIRTUAL TRAINING ENVIRONMENT (ADVTE)

Aviation Distributed Virtual Training Environment (ADVTE) is a Marine aviation-specific network

- ADVTE is an encrypted, closed-loop, persistent, simulation network under USMC administrative and operational control .
- Enables interoperability between multiple USMC Aviation Training Devices to facilitate distributed mission training.
- Provides capability to link and train virtually with other services, Joint Training and Experimentation Network (JTEn), Joint Strike Fighter (JSF), and MAGTF GCE Trainers/Equipment
- ADVTE Wide Area Network simulation data packet traffic moves across Homeland Defense Network (HDN) circuits and connects the base ATS training locations.

Designated Marine Corps Network Operations and Security Center (MCNOSC) controlled network = Persistent Wide Area Network (WAN) circuits that all ADVTE data traffic (visual/audio) moves across

Base Demarcation Point (DEMARK) = Provides the bridge node to move off station

NODE* = Secondary/Tertiary connection points (nodes) used as required to bridge to DEMARK

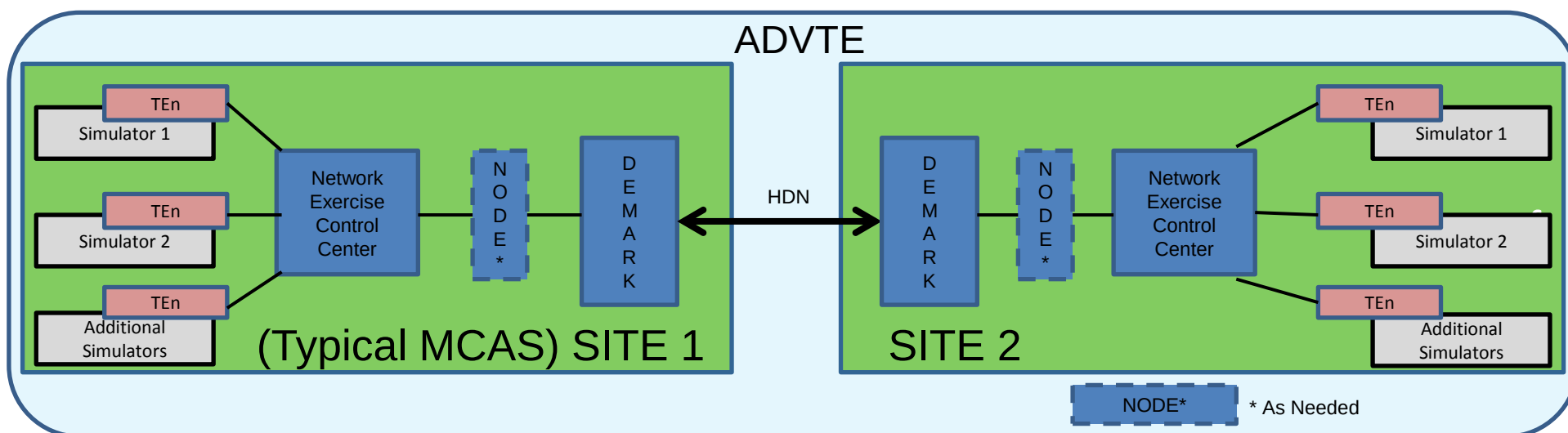
A future initiative for ADVTE is to connect and interface with the Joint Information Operations Range.

Network Exercise Control Center (NECC) is the training system connectivity “Hub”

- Provides instructor/operator and observer stations and Tactical Environment (TEn) functionality
- Provides 2D/3D visualization from any geographic location or tactical environment entity.
- Provides simulated tactical radios with the ability to communicate on multiple nets, point to point VTC Capability.
- Digitally capture for playback data streams from selectable audio and video channels to support joint brief/de-brief requirements.
- Integrates with existing Deployable Virtual Training Environment (DVTE) capability.

Tactical Environment (TEn) is non-proprietary software application that models a variety of threat systems, sensors, emissions, and weapons.

- USMC "owned" TEn provides doctrinally relevant, physics-based, real-time modeling and threat correlation.
- TEn is an HLA (High Level Architecture) compliant networking gateway with Federation Object Model (FOM) compatibility with both JFCOM and NASMP FOMs.
- Provides simulators with the capability to link to same site or offsite systems through the NECC.
- TEn Version 4.0 or higher required for ADVTE connectivity



MARINE CORPS COMMON VISUAL DATABASE

Concept of the Common Database

The concept of the Marine Corps Common Visual Database originated from the Marine Corps Aviation Simulator Master Plan (MCASMP) policy, which required all newly acquired Marine Corps Aviation Training System simulators to function together as a system of tactically relevant networked trainers, when linked. The first common databases was initially developed for and installed in a series of five Weapon Systems Trainers (WSTs) delivered to the USMC under the Marine Corps Aviation Simulator Master Plan (MCASMP) procurement in the mid-90's. The term common database identified the collective East Coast and West Coast United States visual databases installed in those same five WSTs. Under the MCASMP program, these five trainers were produced by the same contractor and, consequently, included a common visual system solution which included a common image generator (IG), display system, and run-time visual databases. The databases installed in each WST were exact copies of each other and were rendered and displayed by image generators and projectors of the exact same make and model. As a result, the training scenes presented to the trainees across these five training systems were correlated to each other. That was the origin of the common visual database concept.

The common visual database provides ATS simulators with commonality with respect to the following visual/sensor database content and features:

- Geographic region
- Terrain surface (terrain mesh and elevation)
- Imagery (two dimensional surface features)
- Fixed 3D features (buildings, vertical obstructions, etc.).
- Landing Zones (LZs, CALs, etc.)
- Terrain flight (TERF) routes
- Moving models
- Material attribution (not derived from NPSI)

Currently, the MCCVDb is comprised of a set of catalogued stand-alone individual databases corresponding to the following geographic regions:

1. Eastern United States
2. Western United States
3. Western Pacific (Westpac)
4. Afghanistan
5. Iraq and the Gulf
6. Horn of Africa (HOA)
7. Southeast Asia (4 Quadrants)
8. Hawaii (under development)
9. Other regions (small DBs)

The common visual database concept will enable robust, realistic, virtual MAGTF training

Visual database fidelity and content correlation remain key issues to optimize to ensure optimal scene accuracy and interoperability across networked simulators. The introduction of non-aviation training systems into distributed missions operations and networked training increases the complexity to ensuring aviation simulators can be successfully network with simulators designed to train ground forces thereby creating a seamless, virtual, tactically relevant MAGTF training environment and form a robust LVC training construct capable of supporting high value integrated virtual MAGTF training.

Moving forward:

- Improvements to the common visual database consisting of adding new geographic regions, and updated source files, will be necessary to support the virtual MAGTF training environment.
- The common visual database will continue to evolve in terms of geographic regions available, improved fidelity and content - specifically with regard to imagery resolution and available database features.

The Goal: To further develop a common visual database, a USMC Common Visual Synthetic Area (CVSA), that will be woven together from existing and future identified source code which is run time corrected for ATS Networked Devices and of sufficient fidelity to enable "fair fight" correlated simulated training environments. This environment will not only be used in the USMC ATS but across the MAGTF and joint services solutions to promote interoperability within ATS, the USMC GCE and Joint Distributed Mission Training (DMT) Circuits. Efforts by HQMC AVN Weapons Requirements Branch, MARCORSYSCOM, NAVAIRSYSCOM, and TECOM have been working with and will continue to develop an acceptable CVSA solution with the GCE as well as with the joint and multi-national partners. Distributed mission training environments incorporating common arenas will yield a limitless enhanced combat readiness training experience. Initial developmental focus will be in the vicinity of Twentynine Palms and the southwestern United States with synthetic augmented operational environments embedded to represent non-native other terrain and environments with maximum fidelity.

Weapons Roadmap *"Every platform a shooter"*

201620202030

TACAIR

2.75" Rockets

APKWS II



General Purpose Bombs / LJDAM

Small Diameter Bomb II



HARM / AARGM

AARGM-ER

LMAV



Rotary Wing

GAU-16 / GAU-21

LAU-61

2.75" Rockets / APKWS II



Fire and Forget 2.75" *

Hellfire

JAGM



AIM-9M

AIM-9X



Harvest HAWK

Hellfire

JAGM



Griffin



Viper Strike



tiltrotor

Gun

Enhanced Defensive Weapon *

UAS

Miniature Guided Munition *

* Funding TBD

MARINE AVIATION WEAPONS AND MUNITIONS PLAN

GAU-21 on MV-22



Marine aviation continues to develop and procure weapon systems that will increase lethality and survivability for the warfighter. Our focus of effort is to pace enhancements to the USMC weapons portfolio with platform advances by leveraging technology in order to achieve precision, discrimination, lower weight, increased kills per sortie, and commonality wherever appropriate.

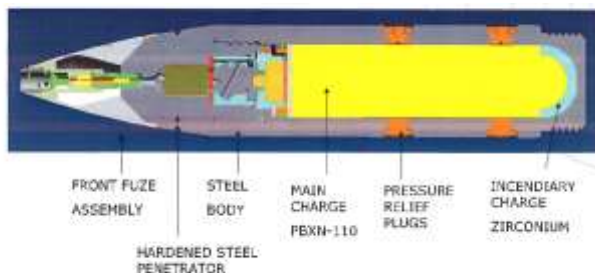
Rockets:

The Advanced Precision Kill Weapon System II (APKWS II) combined with the M151 or Mk 152 warhead in its all-up round configuration has been designated AGR-19A.

New Initiative

APKWS II integrated with the M282 Multi-Purpose Penetrator (MPP) warhead is a low-cost PGM capable of defeating light-armored vehicles and hardened structures. The M282 MPP warhead is a 2.75-inch 13.7 pound penetrating and incendiary warhead delivering penetration (40" reinforced concrete or 1" of steel), blast (over 1500 fragments), and incendiary effects (2000°F due to zirconium). APKWS II's nearly 90% hit rate, coupled with the M282 MPP warhead will provide a lower yield and lower cost choice for attacking targets otherwise serviced by Hellfire missiles or guided bombs, and provide more stowed-kills per sortie. HQMC anticipates M282 integration on H-1s with IOC in FY16.

M282 MPP Warhead



Future Requirement

Marine aviation will leverage APKWS II success by developing APKWS II for TACAIR. The AV-8B will be the first TACAIR platform to integrate APKWS II, complementing GBU-12 and Laser Maverick with a lower collateral damage weapon providing more kills per sortie. A Rapid Deployment Capability for AV-8B is currently underway, and is expected to be fielded in 1QFY16 during Operation INHERENT RESOLVE.

APKWS II with M282 against Triple Brick Wall



Missiles:

New Initiatives

To address the operational need for a TACAIR forward-firing missile, 500 legacy AGM-65F Infrared (IR) Mavericks have been purchased from the USAF and are being converted into modernized AGM-65E2 Laser Mavericks. These conversions will nearly double the current inventory of Laser Mavericks. The AGM-65E2 seeker provides F/A-18F and AV-8B with increased self-designation capability, greater chance of laser spot re-acquisition if lost due to obscurants, and a more accurate laser spot scan than the AGM-65E seeker.

MARINE AVIATION WEAPONS AND MUNITIONS PLAN

The AIM-9X Block II Sidewinder adds a lock-on –after-launch capability with data link, allowing it to be launched and then guided to a target for 360 degree engagements. The Block II+ variant will meet future requirements.

The AIM-120 Advanced Medium Range Air-to-Air Missile (AMRAAM) allows TACAIR platforms the ability for a single aircraft to engage multiple targets simultaneously through the use of its own active RADAR for terminal guidance. The D variant will provide further refinements through the inclusion of an internal GPS, an enhanced data link, improved software, and improved range and speed.

Advanced Anti-Radiation Guided Missile – Extended Range (AARGM-ER) will incorporate a new rocket motor onto AARGM in order to improve range and survivability. AARGM-ER is fully-funded for F/A-18E/F and IOC is expected in FY23, F-35B/C are objective platforms.



The Joint Air-Ground Missile (JAGM) program is fully funded and just passed the Milestone B Defense Acquisition Board. JAGM incorporates a dual-mode semi-active laser (SAL) and millimeter wave (MMW) seeker with a multi-mode fuze (height of burst, delay, and point detonate) and a shaped-charge warhead with blast-frag capabilities increasing lethality and survivability. JAGM will replace all variants of HELLFIRE and will be capable of destroying armor, maritime craft, bunkers, and buildings.

JAGM will have an increased launch acceptability region versus HELLFIRE and be more resistant to countermeasures. The MMW guidance can be activated while still on the aircraft giving the operator a fire-and-forget capability. AH-1Z IOC is expected in FY19.

JAGM fuze for Height of Burst



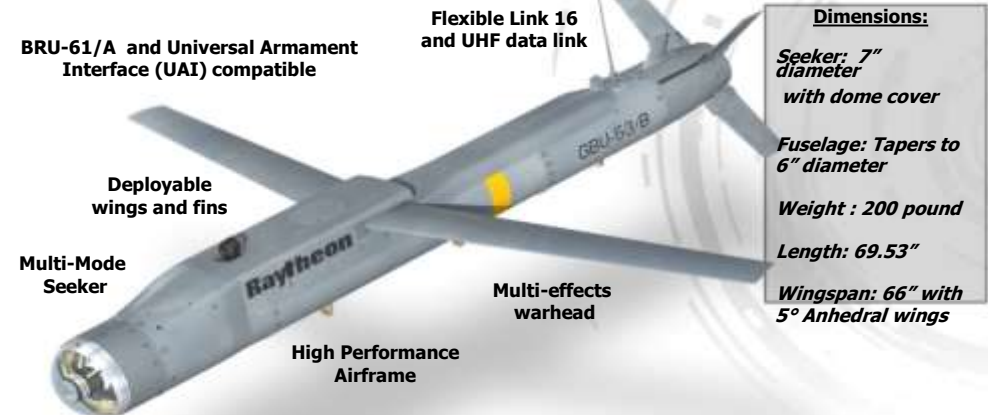
Bombs:

New Initiatives

The AGM-154 Joint Stand-Off Weapon (JSOW) C-1 is a net-enabled weapon that provides a Moving Maritime Target (MMT) capability with stand-off. JSOW C-1 will IOC on F-35C in FY23.

The GBU-53 Small Diameter Bomb II (SDB II) is a 250-pound class, precision-guided, all-weather munition that will allow the F-35B/C to carry eight internally. SDB II is a gliding, stand-off, direct-attack weapon suitable against fixed and moving targets in day, night, and adverse weather. SDB II utilizes a tri-mode SAL, MMW, and Imaging Infra-Red (IIR) seeker and is network-enabled. SDB II will IOC on the F-35B in FY21.

SMALL DIAMETER BOMB II



New Initiative

The GAU-21 Common Defensive Weapon System (CDWS) improves reliability, lethality, and rate of fire. GAU-21 CDWS prototype procurement begins in FY15 for MV-22 and FY16 for CH-53K.

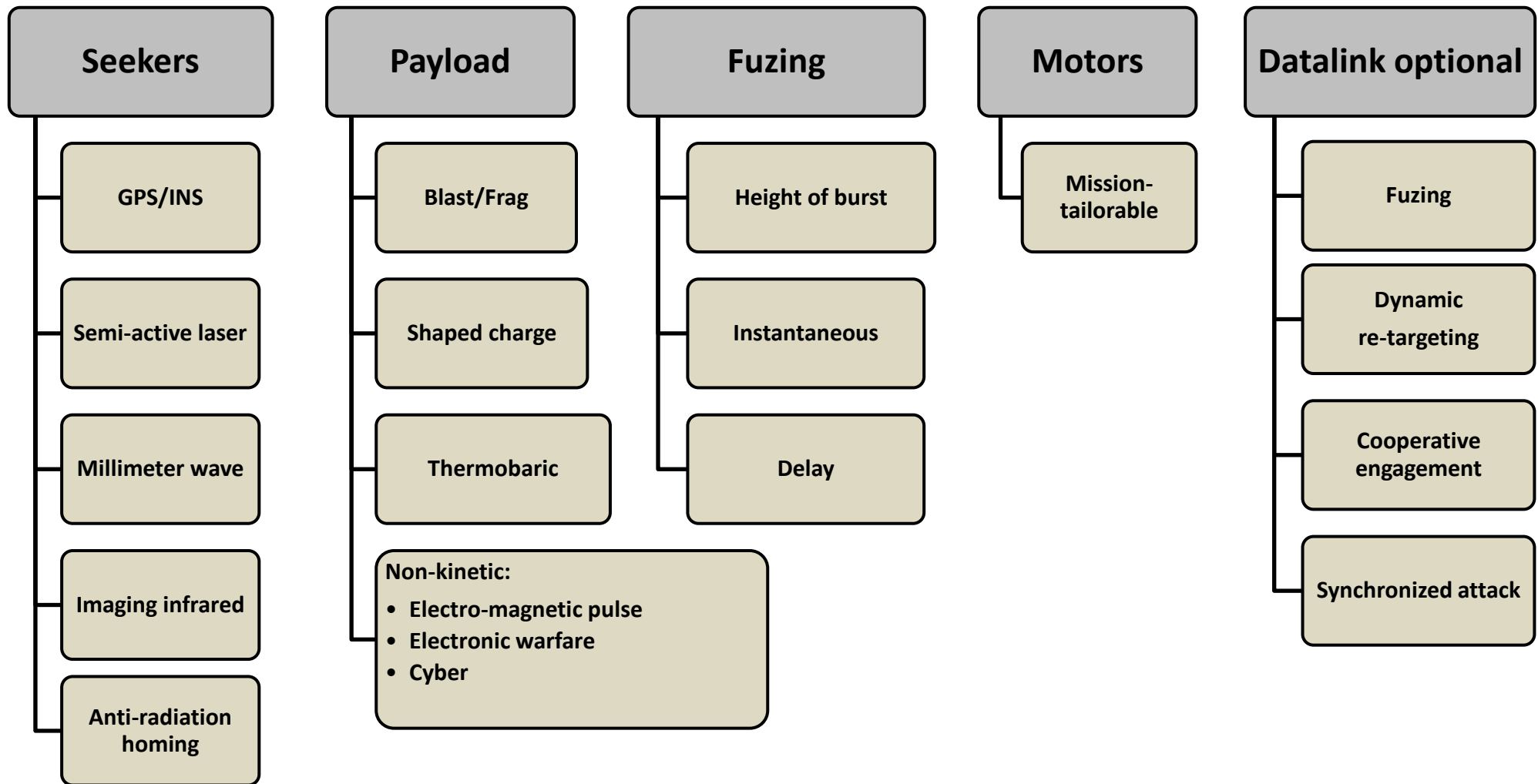
Future requirement

HQMC, in conjunction with NAVAIR, is researching improved 20mm and 25mm ammunition for air-to-ground delivery. Potential capabilities include improved point detonation, increased armor penetration, and incendiary effects.

Future Weapon Requirements:

Investment in weapons requirements for the future must leverage upon modular classes of weapons in order to support operations ranging from crisis response to major combat operations. Weapons modularity will permit the flexibility required to support the Combatant Commander's distributed forces with tactical flexibility.

Weapon Modularity



- Increased kills per sortie
- Economies of scale
- Maximize ship's fill space
- Low cost
- Counter measure resistant
- Open architecture / Reprogrammable
- Common launchers / racks / LAUs

FUTURE WEAPONS EMPLOYMENT

Improved lethality and stand-off with net-enabled weapons

The low-visibility F-35B with a payload of eight SDB II bombs carried internally will provide the MAGTF with a stand-off, all-weather capability against enemy C4I nodes, surface to air threats, and vehicles.



The future Marine Expeditionary Force will require an assortment of light-weight precision weapons with scalable lethality. As the MAGTF becomes digitally interoperable, Marine aviation will become more lethal through net-enabled weapons that take advantage of our ability to out-pace our adversaries.



FARP / Distributed STOVL Operations (DSO)

The SDB II and other net-enabled weapons will be transportable by MV-22s. The reduced weight of future weapons will provide improved battlefield lethality by supporting distributed STOVL operations.



SPMAGTF-CR Operations

Enhanced offensive weapon systems on the MV-22 will provide increased capabilities for the SPMAGTF-CR and employment options to the combatant commander.

Enhanced Cooperation on Carrier Operations

JSF and MV-22B interoperability with HMS *Queen Elizabeth* and LHD-class ships will provide robust and flexible maritime power projection for allied forces.



F/W and R/W teaming

Digital interoperability within the MAGTF will create a dilemma for our adversaries. Fixed- and rotary-wing platforms, UAS, cyber, land, and space will work in parallel to detect and destroy targets that previously enjoyed sanctuary.



AH-1Z

TACP



Improved JTAC networking

Net-enabled communications will provide increased situational awareness to the ground combat element. Radio frequency (RF) round counters integrated with digital CAS applications will provide real-time updates to JTACs.

2.14 AIRCRAFT SURVIVABILITY EQUIPMENT PLAN

The Marine Corps aviation vision for ASE is to equip all USMC aircraft with integrated aircraft survivability equipment (IASE) systems. IASE uses modular, open system architectures that are optimized to ensure survivability across the platform's full range of operations, providing threat engagement information and situational awareness across the digital battlespace.

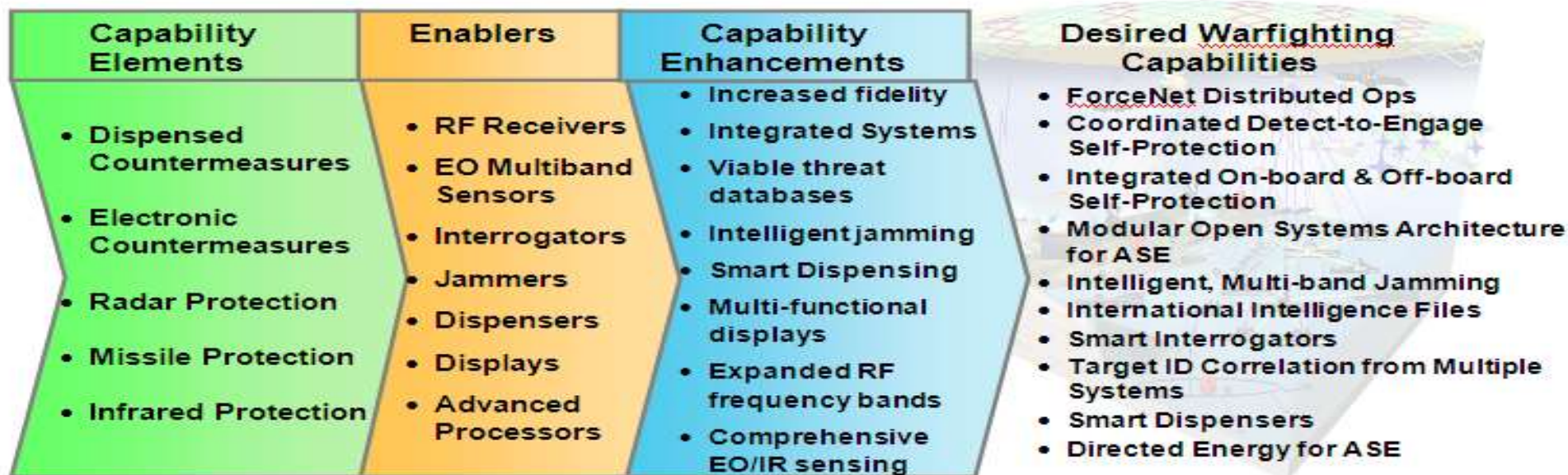
Current baseline mission sensor capabilities equip Marine Corps fixed-wing, tiltrotor and rotary-wing aircraft with a variety of situational awareness (SA) and countermeasure capabilities in the radio frequency (RF) and electro-optic (EO)/infrared (IR) spectrums. Many of these capabilities are aircraft platform-specific solutions that support each platform's required operational threat environments and contribute into platform tactics, techniques and procedure (TTPs) for susceptibility reduction.

HQMC aviation collaborates with numerous DoD and service-specific entities, including MAWTS, NAVAIR, PMA272, Joint Electronics Advanced Technology (JEAT), service aviation training commands (NSAWC), Joint Aircraft Survivability Program Office (JASPO), all service laboratories (DARPA, NRL, ONR, AFRL and ARL), and other services' science and technology development organizations to achieve desired goals.

ASE Concept and Capabilities

- Achieve susceptibility reduction through radio frequency (RF) confusion, prevent self-identification, create deceptive targets, detect radar signals, threat signatures, threat lasers, identify hostile radar detectors and detect ballistic events (such as guided missiles, unguided rockets and unguided ballistic fires, i.e. hostile fire).
- Address aircraft survivability equipment (ASE) for electronic support (ES), electronic attack (EA) and advanced electro-optic/infrared (EO/IR) sensing that enable platforms to successfully conduct operations in a battlefield.
- Employ training tactics and procedures (TTPs) and countermeasures against threats using directed RF and IR jamming, chaff dispensing, flares, decoys or other obscurants that prevent hostile weapons system effectiveness.

Capability Evolution:



Objective: Platform & Warfighter Protection

MARINE ASSAULT SUPPORT ASE PLAN

Rotary Wing/Tiltrotor ASE:

All forward-deployed assault support aircraft are 100% equipped with upgraded Missile Warning Systems (MWS) that are capable of providing unguided Hostile Fire Indication (HFI) and Countermeasure Dispensing System (CMDs) with Forward Firing (FF) Buckets and carriage of 120 expendables per aircraft (90 on tiltrotor).

- CONUS aircraft upgrades ongoing (priority given to deploying units)
  - Complete MWS sensors upgrade to latest B(V)2 configuration (Enhanced Direction of Arrival (EDOA)) with HFI.
  - Estimate completion of B(V)2 EDOA CONUS MWS upgrade: FY-16.

Advanced ASE suite:

- Priority given to most-vulnerable aircraft:
  - CH-53E: Continue improvements on MWS with AAQ-24 Two-Color IR Advanced Threat Warning (ATW).
- Expedite all other assault support aircraft:
  - H-1, V-22 and KC-130: Improve Two-Color IR ATW MWS, CMDs and develop light-weight DIRCM.
  - Improvements for Two-Color IR ATW MWS/CMDs to meet JUONS beginning Nov 2015 for IOC with MEU squadrons after OTE.
  - Development of integrated ASE capabilities that are capable of fusing all ASE threat information for improved aircrew SA as well as off-boarding threat information to networked capable A/C.

MV-22:

TTP: Reevaluate for new systems.

NEAR TERM: UV MWS software drop OFP 40 for EDOA and OFP 41 for OBIT. FF Flares development complete. FF Bucket installs ongoing. Carriage of 90 expendables.

Develop and install advanced ASE suite controller. Smart dispense and ALE-47 PowerPC Programmer upgrade.

MID TERM: Install Two-Color IR ATW MWS and DIRCM Jam-head.

LONG TERM: Integrated ASE, ALQ-231 Intrepid Tiger II (IT-II)

H-1:

TTP: Reevaluate for new systems.

NEAR TERM: UV MWS software drop OFP 40 for EDOA and OFP 41 for OBIT. Develop and install advanced ASE suite controller. Smarter dispense. IT-II (V) 3 QRA of Block '1' in FY16

MID TERM: Develop and install Two-Color IR MWS and light-weight DIRCM. Develop visually degraded environment solution.

LONG TERM: Integrated ASE.

CH-53:

TTP: Reevaluate for new systems.

NEAR TERM: Installation of Two-Color IR ATW MWS ongoing. Implement DVE Phase I solution via CSU.

MID TERM: Complete installation of Two-Color IR ATW MWS. Develop and install Advanced ASE suite controller & SMFCD.

LONG TERM: Integrated ASE.

KC-130:

TTP: Reevaluate for new systems.

NEAR TERM: MWS software drop OFP 40 for EDOA and OFP 41 for OBIT.

MID TERM: Upgrade MWS to B(V) 2: potential for IR MWS and DIRCM Jamhead. Smart dispense via AAR-47, then DoN LAIRCM. Install IRMWS and DIRCM Jamhead. ALE-47 PowerPC Programmer upgrade.

LONG TERM: Integrated ASE.

Chaff/Flares:

TTP: Reevaluate techniques for advanced threats, future AOR.

NEAR TERM: MJU-67/B fielding initial quantities, available FY17.

MID TERM: Pattern optimization to include MJU-67/B; continued incorporation of sensor data into dispense algorithms for increased effectiveness and efficiency.

LONG TERM: Development of advanced expendables in multiple domains.

Development of advanced expendables in multiple domains.

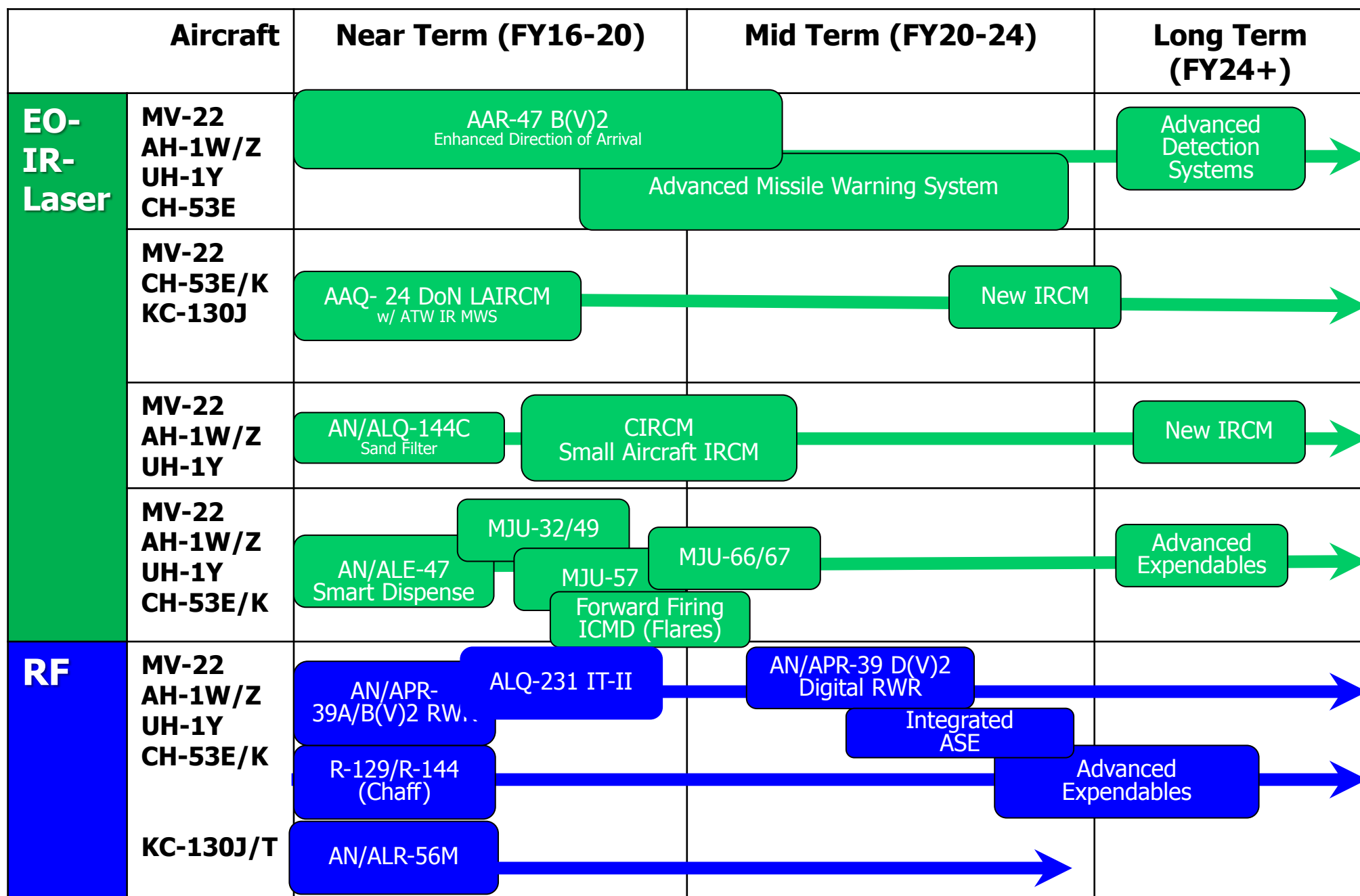
The STK-FY15-02 Helicopter Active Rocket Propelled Grenade (RPG) Protection (HARP) Future Naval Capability (FNC) product will mature and demonstrate the technology required to intercept and defeat an RPG threat at a safe range from a helicopter using an expendable countermeasure (CM). The initial transition will focus on Marine Corps rotary-wing and tiltrotor troop transport aircraft, specifically the CH-53K and the MV-22 and is planned for an FY23 IOC.

NEAR TERM: FY16-20

MID TERM: FY20-24

LONG TERM: FY24+

MARINE ASSAULT SUPPORT ASE ROADMAP



MARINE FIXED-WING ASE PLAN

Fixed-Wing ASE:

Fixed-wing aircraft are 100% equipped with defensive ECM systems, decoy dispensers and RF warning systems.

Advanced ASE suite:

- Priority given to most vulnerable aircraft.
  - F/A-18 and AV-8B: Upgrade CMDS to ALE-47 configuration and explore ALQ-214 Block upgrades.
- All platforms are evaluating mission data files for maximum effectiveness.
- Development of integrated ASE capabilities.

* Additional RF protection provided with the ALQ-231 Intrepid Tiger (IT-II) V(1) on fixed wing aircraft.

F/A-18:

TTP: Reevaluate for new systems.

NEAR TERM: Upgrade shore-based F/A-18s with ASPJ. Replacing ALQ-126B with APSJ for land based and ALQ-214 Block upgrades for TAI squadrons. Continue replacement of ALE-39 with ALE-47 in Lots 12-17. Upgrade IT-II to V(3)

MID TERM: Explore upgrade for additional BOL Countermeasure Dispensers.

AV-8B:

TTP: Reevaluate for new systems.

NEAR TERM: Complete ALE-47 PowerPC installations. Upgrade IT-II to V(3)

MID TERM: Sustain ALR-67(v)2. Explore upgrade to ALR-67(v)3 and incorporation of ALQ-165 / ASPJ.

<u>NEAR TERM:</u>	FY16-20
<u>MID TERM:</u>	FY20-24
<u>LONG TERM:</u>	FY24+

EA-6B:

TTP: Reevaluate for new systems.

NEAR TERM: Development of integrated ASE capabilities.

F-35B:

TTP: Continue development of TTPs.

NEAR TERM: Initial outfitting for expendables .

MID TERM: Advanced countermeasures development.

LONG TERM: TBD.

Chaff/Flares:

TTP: Reevaluate techniques for advanced threats, future AOR.

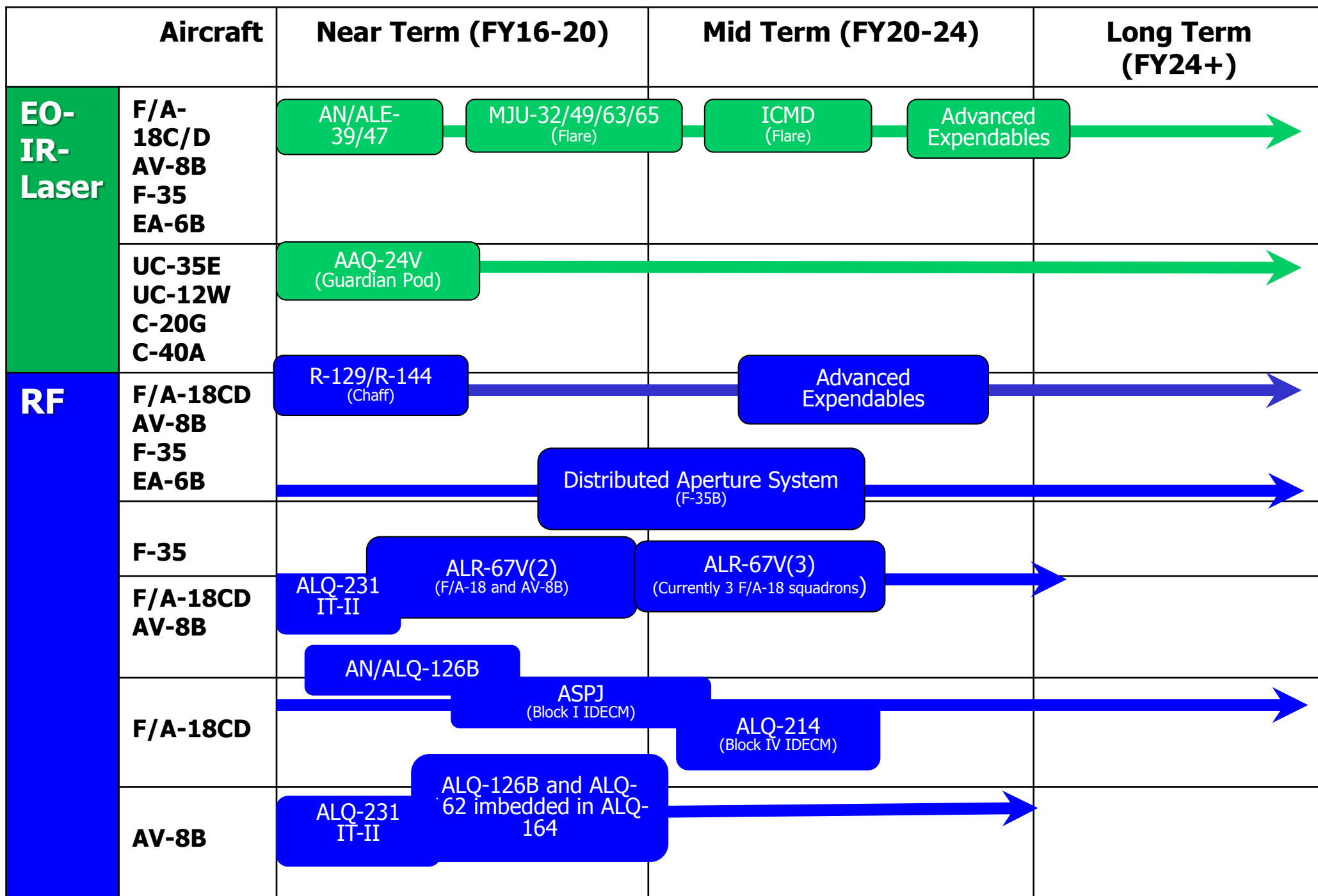
NEAR TERM: Reevaluating all mission data files for most effective dispense patterns. Evaluating MJU-67/B for fixed wing use.

MID TERM: Develop techniques for using flares and DIRCM for imaging threats. Develop and implement dispense patterns for BOL countermeasures.

LONG TERM: Development of advanced expendables, decoys and countermeasure techniques.



MARINE FIXED-WING ASE ROADMAP



OSA ASE PLAN

Operational Support Airlift (OSA) ASE:

Select OSA aircraft are equipped with defensive ECM systems, and missile warning systems. ASE will be installed on all UC-12W, UC-35D and C-20G to counter man-portable surface-to-air infrared missile threats.

UC-35D:

TTP: Continued use of current TTP.

NEAR TERM: FY12 funding 1 reserve and 3 active component ASE installs.

MID TERM: Acquisition of AAR 57/ALE 47 system for remaining 4 active component UC-35D aircraft.

LONG TERM: Sustainment and upgrade of ASE systems.

C-20G:

TTP: None.

NEAR TERM: AN/AAR-54.

MID TERM: Sustainment and upgrade of ASE system.

C-40A:

TTP: None.

NEAR TERM: Complete FAA Type/Model Flight Certification for outfitting with ALQ-24(V) Guardian Pod with Two-Color MWS.

MID TERM: Outfitting with ALQ-24 Guardian Pod.

UC-12W:

TTP: Development of TTP. Acquire and integrate 3rd ALE-47 dispenser, integrate forward firing kinematic flare retrofit for 6 x Block 1 aircraft.

MID TERM: Acquire remaining UC-12W with three dispenser configuration.



<u>NEAR TERM:</u>	FY16-20
<u>MID TERM:</u>	FY20-24
<u>LONG TERM:</u>	FY24+

2.15 OPERATIONAL SUPPORT AIRLIFT



OPERATIONAL SUPPORT AIRLIFT PLAN: PROGRAMMATICS, SUSTAINMENT AND FUTURE

OVERVIEW:

The USMC operational support airlift (OSA) fleet supports the time-sensitive air transport of high priority passengers and cargo to, within, and between theaters of war. Current fleet consists of 12 UC-12F/M/W, 12 UC-35C/D, 2 C-9B and 1 C-20G. These aircraft are distributed throughout USMC bases and stations and are actively supporting forward deployed Marine Air Ground Task Forces.

COMMUNITY IMPROVEMENTS:

USMC is invested in making the OSA fleet readily deployable throughout the world. Aviation Survivability Equipment has been integrated onto UC-12W, UC-35D and C-20G aircraft to allow operations in low-threat environments. 3rd flare dispenser for the UC-12W has been incorporated. This allows forward-firing kinematic flares, enhancing aircraft survivability. Testing and integration of night vision compatible flight station and external lighting for the UC-12W, along with an integrated satellite phone capability, enhancing forward deployed capability and dynamic tasking through beyond-line-of-sight communications will be incorporated on 2 of 7 aircraft. Funding needs to be identified for the remaining 5 aircraft.

TRANSITION PLAN:

The UC-12W transition has five legacy UC-12F/M aircraft remaining to be replaced. This transition, along with continued use of low-density, high-demand UC-35C/D aircraft will posture the Marine Corps to support the forward deployed MAGTFs with air mobility. Service life of the Marine Corps obsolete and expensive-to-operate C-9B aircraft expires in 2025. In order to continue this mission, the C-40A replacement aircraft requires funding as soon as possible, but NLT in 2022. The Marine Corps continues to investigate funding strategies to support the earliest possible delivery of the C-40A.

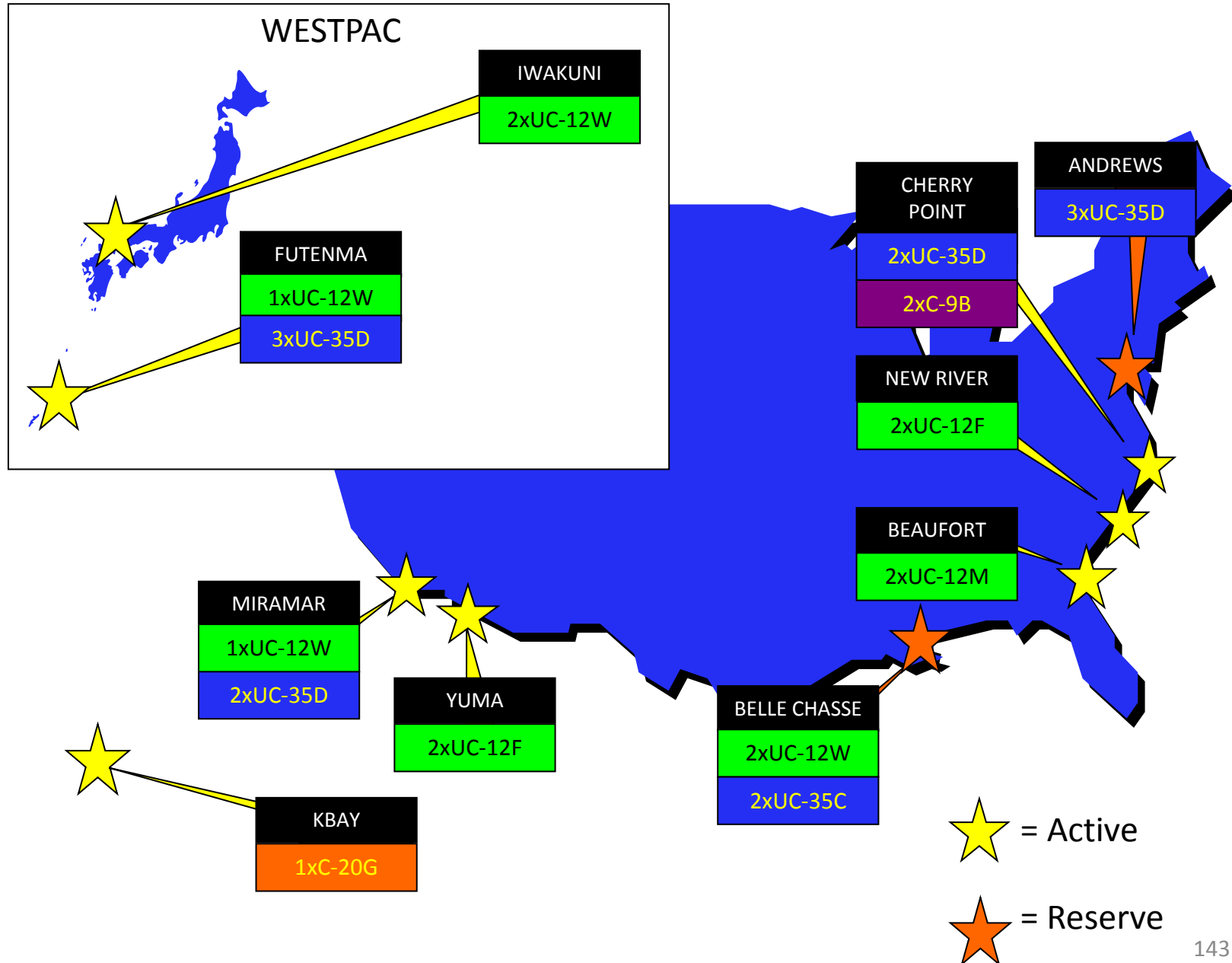
- UC-35C/D & C-20G do not have an established service life limit, and USMC will continue to operate until sustainment costs become prohibitive.

FUTURE:

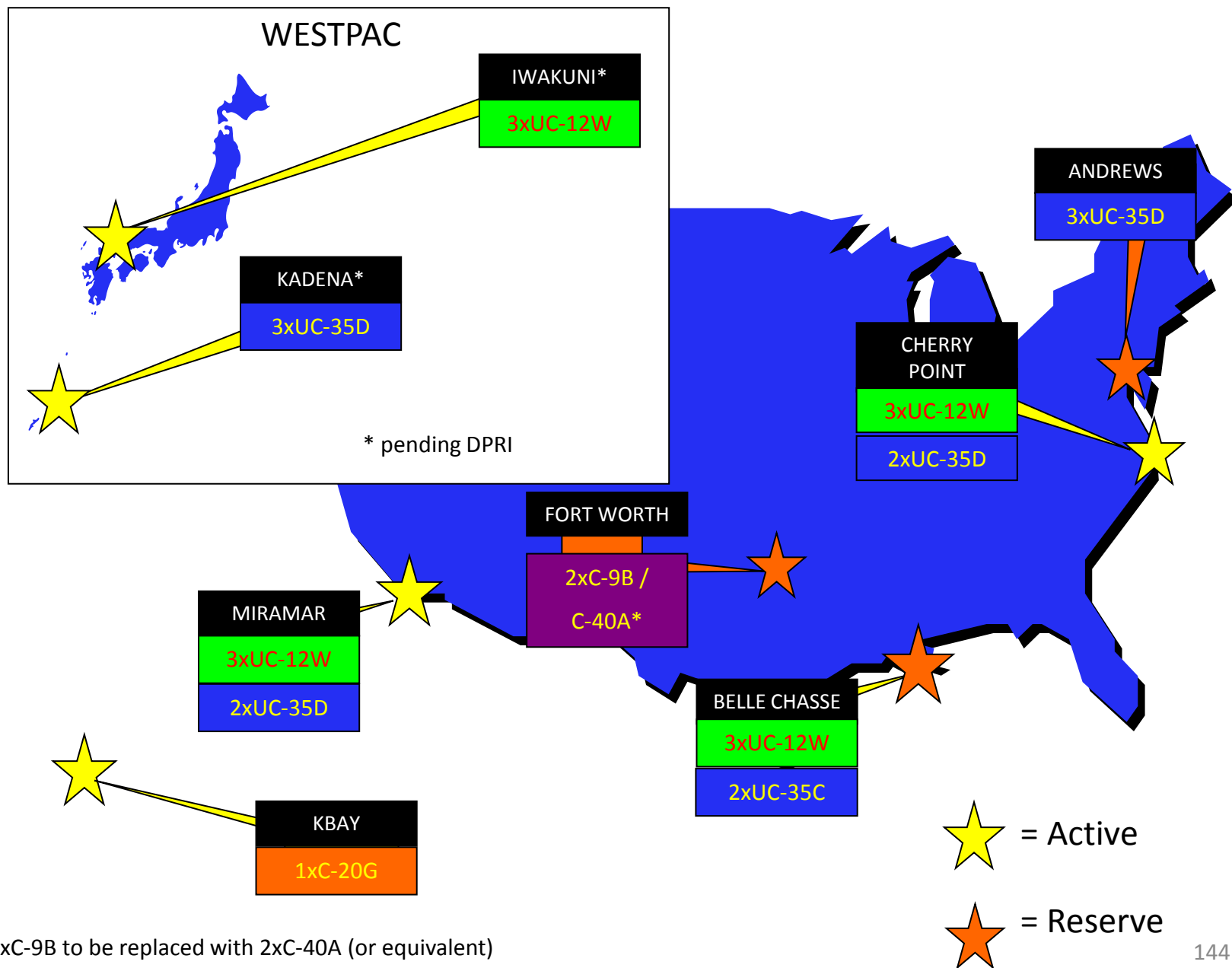
The shift in national strategy and emerging operating concepts such as the expanded use of Special Purpose Marine Air Ground Task Forces, disaggregated Marine Expeditionary Units and distributed operations continues to increase demand for air mobility. To satisfy this need, the Deputy Commandant for Aviation (DCA) will expand the use of Operational Support Airlift assets outside of the continental United States. DCA intent is to provide advocacy, oversight and standards for aviation-specific issues for OSA operations, aircraft and aircrew through the MAW CGs and in close coordination with the Deputy Commandant for Installations and Logistics. Beginning in FY16, CONUS air stations will consolidate OSA assets. The divestiture of SAR will enable VMR Det New River and Beaufort assets to consolidate in Cherry Point under VMR-1. VMR Det Yuma assets will move to Miramar in 3QFY17. Included in these consolidation efforts, the C-9Bs will be transferred to 4th MAW and based out JRB Fort Worth in FY17 in order to maximize sustainment efficiencies as soon as the C-40A is delivered.



FY16 USMC OSA LAYDOWN



PROPOSED USMC OSA LAYDOWN



MARINE OPERATIONAL SUPPORT AIRLIFT (OSA) PLAN

	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
POAI PLAN											
UC-12F/M	6	6	5	5	5	5	5	5	3	0	0
UC-12W	6	6	7	7	7	7	7	7	9	12	12
UC-35C/D	12	12	12	12	12	12	12	12	12	12	12
C-20G	1	1	1	1	1	1	1	1	1	1	1
C-9B	2	2	2	2	2	2	2	2	0	0	0
C-40A	0	0	0	0	0	0	0	2	2	2	2
TOTAL POAI	27	27	27	27	27	27	27	29	27	27	27
BAI PLAN											
UC-12W	1	1	0	0	0	0	0	0	0	0	0
TOTAL BAI	1	1	0	0	0	0	0	0	0	0	0
TOTAL	28	28	27	27	27	27	27	29	27	27	27

GENERAL NOTE:

UC-12W delivered in FY16 will be BAI until extended range and 3rd countermeasure dispenser modifications are complete for all of the 6 Block I aircraft.

MARINE OPERATIONAL SUPPORT AIRLIFT (OSA) PLAN

CURRENT FORCE:		12 UC-35C/D				FORCE GOAL:		12 UC-35 Extended Range Replacement Aircraft			
		12 UC-12F/M/W						12 UC-12W			
		1 C-20G						1 C-20 Replacement Aircraft			
		2 C-9B						2 C-40A			

D = Divestiture

T = Transition

MARINE OSA TRANSITION



 Has Aircraft Survivability Equipment (ASE)

 Will have Aircraft Survivability Equipment



Photo by Ted Carlson

RESERVE INTEGRATION AND THE TOTAL FORCE

“We will employ a total force approach to meet the Marine Corps’ force generation requirements. We will pursue policies and operational practices to better develop and access the skill, knowledge, and expertise of Marines in the Reserve component.”

-Marine Corps Vision and Strategy 2025

AUGMENT, REINFORCE AND SUSTAIN THE ACTIVE COMPONENT

The 4th Marine Aircraft Wing’s (4th MAW) mission is to augment, reinforce and sustain the active component as an operational aircraft wing under a total force construct. In order to maintain the total force, reserve aviation must be postured to meet CCDR requirements on an immediate, sustained and enduring basis. As the draw-down, sequestration and resulting fiscal austerity continues, reserve aviation units must be fully prepared for the current fight, creating options and decision space for the Commandant and national leaders. 4th MAW will remain postured as an *operational* aircraft wing, prepared to “fight today’s fight with today’s forces” as an integrated member of America’s expeditionary force in readiness.

LINES OF OPERATION

In addition to its role as a force provider for aviation operations around the globe, 4th MAW units remain engaged in providing support along predefined lines of operation to include:

1. **THE CURRENT FIGHT:** 4th MAW continues to integrate and deploy aviation forces in support of the current fight to meet our national security objectives. 4th MAW will aggressively man, train, and equip units for expeditious deployment and sustained combat operations as directed by the Commandant of the Marine Corps. Current operations include sustained VMR UC-35D and UC-12W deployments in support of MARCENT and MARFOREUR as well as VMGR operations across the globe.

2. **UNIT DEPLOYMENT PROGRAM:** 4th MAW will support the Unit Deployment Program by providing OPTEMPO relief for the active component as required. Recent examples include the HMH-772 (-) and VMFA-112 deployments to MCAS Futenma and MCAS Iwakuni, Japan in FY2014.

3. **THEATER SECURITY COOPERATION:** 4th MAW remains postured to provide forces to meet combatant commander demand for forces in support of our allies and partner nations around the globe. Recent deployments included units and individual augments in support of SPMAGTF- Africa, SPMAGTF- Crisis Response and Africa Partnership Station 2013.

4. **PRE-DEPLOYMENT TRAINING:** 4th MAW will continue to support training for units preparing for deployment. Examples include recurring support for the Integrated Training Exercises (ITX) aboard MCAGCC Twentynine Palms, California, Weapons and Tactics Instructor (WTI) Course aboard MCAS Yuma, AZ, and MARSOC’s Exercise Raven at both East and West Coast training venues.

5. **OPLANS/CONPLANS:** 4th MAW remains postured to support both OPLAN/CONPLAN exercises and contingency operations. 4th MAW’s Aviation Command and Control Team (AC2T) trains and regularly deploys detachments and individual augments in support of CENTCOM Combined Air Operations Center (CAOC) requirements to include Battle Director and Marine Liaison Officer billets. Additionally, 4th MAW supports 1st MAW exercises throughout the PACOM AOR to include augment support for Exercises ULCHI FREEDOM GUARDIAN, KEY RESOLVE, AND TERMINAL FURY.

6. **STAFFS:** 4th MAW remains postured to provide highly-qualified individual staff officers to augment and reinforce JTF, MARFOR, MEF, MEB and MEU command elements in support of the current fight.

7. **SHOCK ABSORBER:** 4th MAW conducts daily distributed operations and serves as the “shock absorber” for the active MAWs by providing regular frag support for all three MEFs, MARSOC, and TECOM. 4TH MAW is the model for developing enduring and habitual relationships with active component forces.

AVPLAN RESERVE INTEGRATED STRATEGY (AVRIS)

ALIGNING AND SYNCHRONIZING THE TOTAL FORCE

The success of the Marine Corps' total force construct is based on enduring and habitual relationships, standardized TTPs and common platforms. By ensuring the reserve and active components share common aircraft, equipment and TTPs; the Marine Corps truly fosters an interoperable total force approach". Maintaining commonality is fundamental to recruiting, sustaining and employing this essential capability.

Programmed transitions include:

KC-130J: The accelerated transition to the KC-130J remains the number one reserve aviation priority for HQMC. VMGR-234 received their first aircraft during the 2nd Quarter of FY2014 and achieved IOC during the 4th Quarter FY2015 with five KC-130J on hand. KC-130T personnel, equipment, and "best of breed" aircraft transferred to VMGR-452 to preserve capability until VMGR-452 transitions to the KC-130J.

UH-1Y/AH-1Z: HMLA-773 (-) completed its transition to the UH-1Y during the 1st quarter FY2015. Transition to the AH-1Z remains programmed for FY2020. HMLA-773(-) consolidation from three to two sites during the 1st quarter of FY2016. The reasons for consolidation are to capitalize on cost efficiencies, improve recruitment, better align with the East Coast active component and improve the unit's command and control. In addition, HMLA-775 (-) will reactivate aboard MCAS Camp Pendleton during the 1st Quarter of FY2017, adding strategic depth to reserve aviation and preserving HMLA operational capacity in support of the total force.

MV-22B: VMM-764's transition aboard MCAS Miramar remains on-track to reach FOC in FY2016. A strong recruiting base and the close proximity to West Coast forces are fueling this success. In addition, HMM-774 successfully retired the last CH-46E in the Marine Corps inventory in August 2015, marking the end of an era in Marine Corps aviation. HMM-774 transitioned to VMM-774 during the 1st quarter of FY2016 aboard NS Norfolk, where it remains best positioned to sustain reserve recruiting requirements and support East Coast forces.

RQ-21A: VMU-4 (-) will transition to RQ-7B V2 (Tactical Common Data Link) in FY2017. VMU-4 (-) will transition to the RQ-21A in FY2021 to provide operational depth for this high demand / low density asset. In the long-term, VMU-5 (-) is planned to activate in FY2023 to provide additional flexibility and depth to the VMU community.

F-5F/N: With VMFT-401 scheduled to fly the F-5F/N into the foreseeable future, several upgrades are planned to maintain the currency and relevancy of this platform. Establishment of an East Coast based VMFT-401 Detachment is under analysis based on the availability of additional F-5N airframes and structure in order to support continued legacy TACAIR and emerging JSF training requirements.

OSA: 4TH MAW will continue to play a pivotal role in the OSA community. As part of the plan to "operationalize" OSA, during FY2016 VMR Det Belle Chasse and VMR Det Andrews will redesignate as VMR-4 and VMR-5, respectively. Establishing the remaining CONUS-based OSA assets under the MAWs remains under analysis based on availability of additional structure.

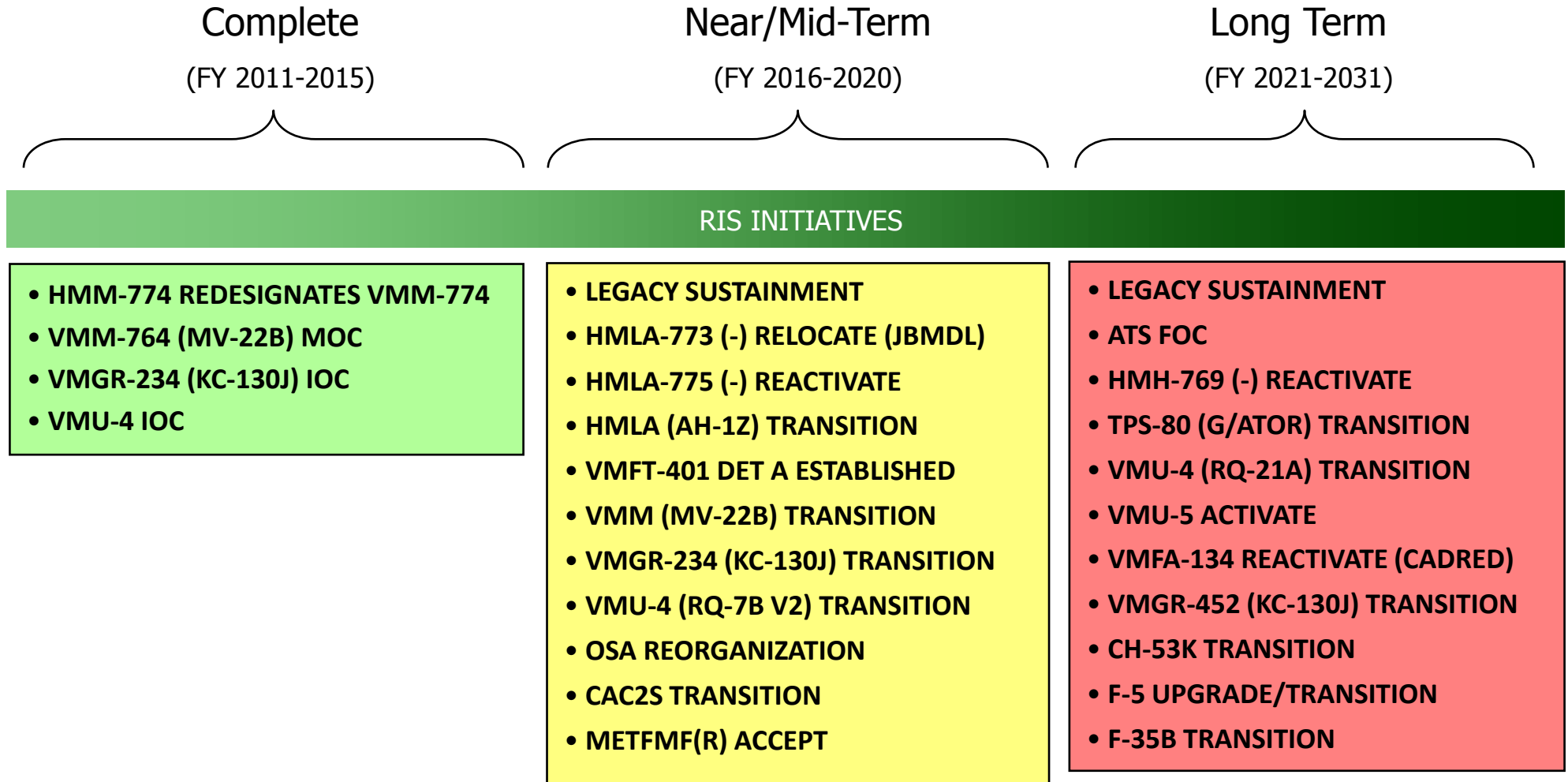
G/ATOR: To maintain interoperable command and control systems with the active component and update outdated capabilities, 4TH MAW will transition to the TPS-80 G/ATOR beginning in FY2019.

CH-53K: At the start of the CH-53K transition in FY2019, HMM-772 (-) will return to its full T/E of CH-53E aircraft, followed by the reactivation of HMM-769 (-) aboard MCAS Miramar in FY2023. Both squadrons will eventually transition to the CH-53K beginning in FY2029.

F-35B: The proposed transition of VMFA-112 and VMFA-134 to the JSF remains a critical part of the TACAIR roadmap and 4th MAW's ability to augment, reinforce, and sustain the active component.

Aviation Training Systems (ATS): 4th MAW continues to aggressively pursue procurement of flight training devices as part of ongoing and programmed transitions to next generation aircraft. Funding for the majority of these systems has been provided through annual National Guard and reserve equipment appropriations.

AVRIS OVERVIEW



Reserve Aviation Strategic Goals

- Uninterrupted levels of support in all six functions of Marine aviation
  - Manageable transition to next generation aircraft/equipment/personnel
    - Mitigation of legacy transitional shortfalls
      - Augmentation and reinforcement of AC across 4th MAW lines of operation

AVRIS IMPLEMENTATION TIMELINE



MARINE COMPOSITE TRAINING SQUADRON CONCEPT

MARINE COMPOSITE TRAINING SQUADRON CONCEPT

USMC fixed wing adversary and fleet Tactical Air Control Party (TACP) and Forward Air Controller (Airborne) (FAC(A)) training requirements will persist, and likely grow. Headquarters Marine Corps Aviation is examining alternatives and solutions for these high demand/low density adversary and CAS training platforms.

The Marine Corps composite training squadron concept could address those needs. This squadron, likely in 4th MAW, would provide low cost, regionally distributed adversary and light attack-capable fixed-wing airframes to support fleet aviation and TACP/FAC(A) production, while improving readiness across the MAGTF.

Compositing two different aircraft regionally will support crucial local training requirements:

- The F-5 (or similar aircraft) will support fixed-wing adversary support for fixed- and rotary-wing squadrons, as well as for LAAD and command and control training.
- The turboprop aircraft and/or unmanned platform will augment close air support training for TACP and FAC(A)

SQUADRON COMPOSITION AND SUSTAINMENT

The USMC F-5 current fleet has a service life plan that extends the current platforms to 2025 (see F-5 Plan). Research is underway to examine low-cost turbo propeller aircraft alternatives to employ alongside the F-5. Marine aviation is examining options to purchase and/or lease contractor-owned and -maintained airframes that will be operated by USMC aviators from the composite training squadron and local flying units.

CAPACITY AND ACCESSIBILITY

Current USMC inventory is 12 F-5s assigned to VMFT-401 at MCAS Yuma that execute detachments to away sites for training support.



Marine aviation is researching the requisite manning and logistics to expand adversary and TACP/FAC(A) capacity and capability while improving accessibility by placing permanent squadrons at MCAS Beaufort, MCAS Cherry Point, and MCAS Miramar.

CAPABILITY

The current configuration and future upgrades to the F-5 do not meet all MAGTF requirements for F-35 and F/A-18, but these aircraft can effectively service many fixed wing, rotary wing DACM, GBAD, and C2 training needs (see F-5 Plan). Additionally, an ordnance-employing light attack turbo prop airframe with variable communication and sensor suites will help support all air and ground terminal attack control training requirements as well.

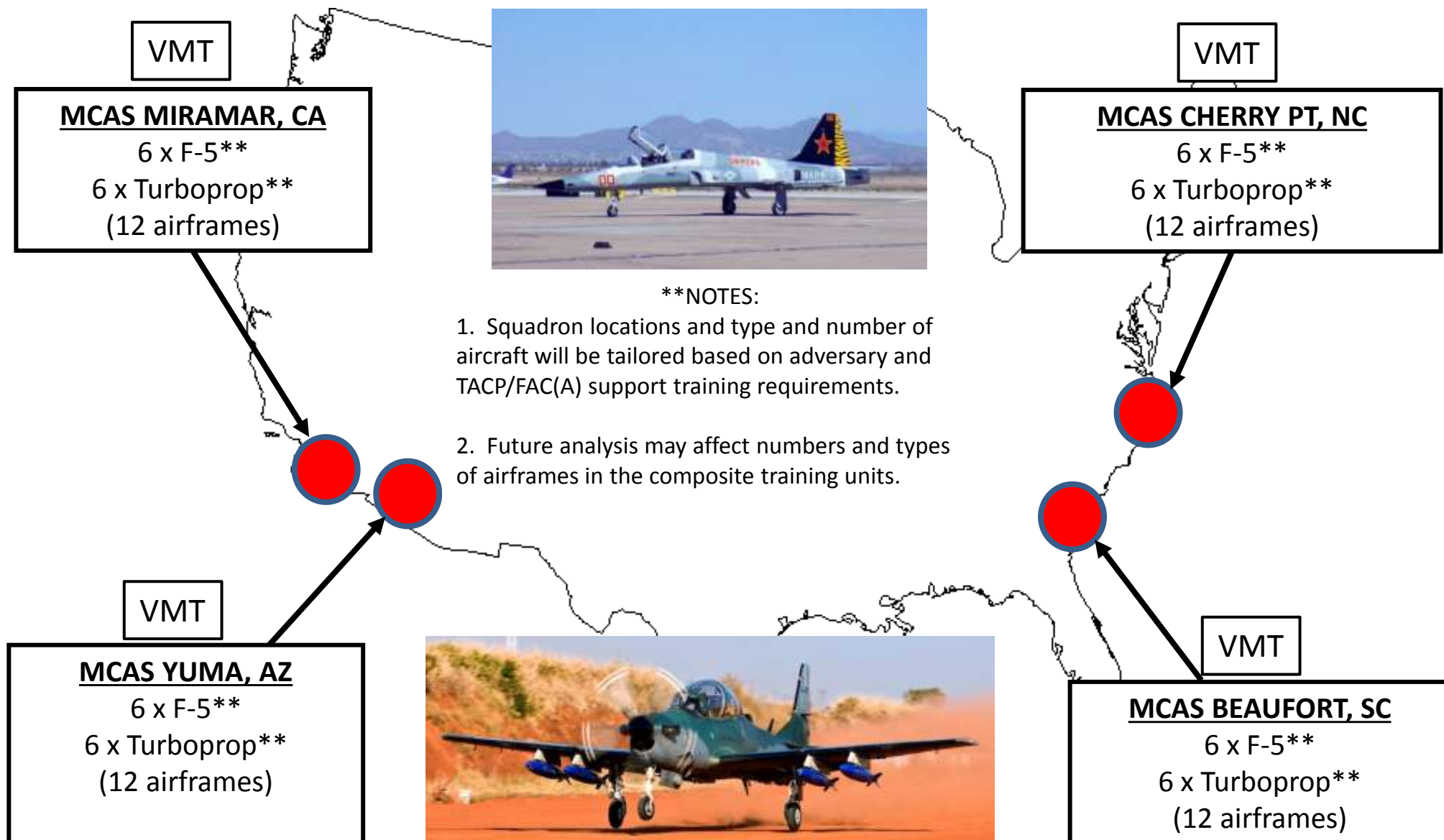
FUTURE

Procurement of numerous F-5s with significant service life remaining along with leasing or procuring a light ordnance capable turbo prop would allow the USMC to meet, with a combination of organic assets and contracted solutions, most requirements for adversary training and appropriately augment close air support for TACP and FAC(A) training.



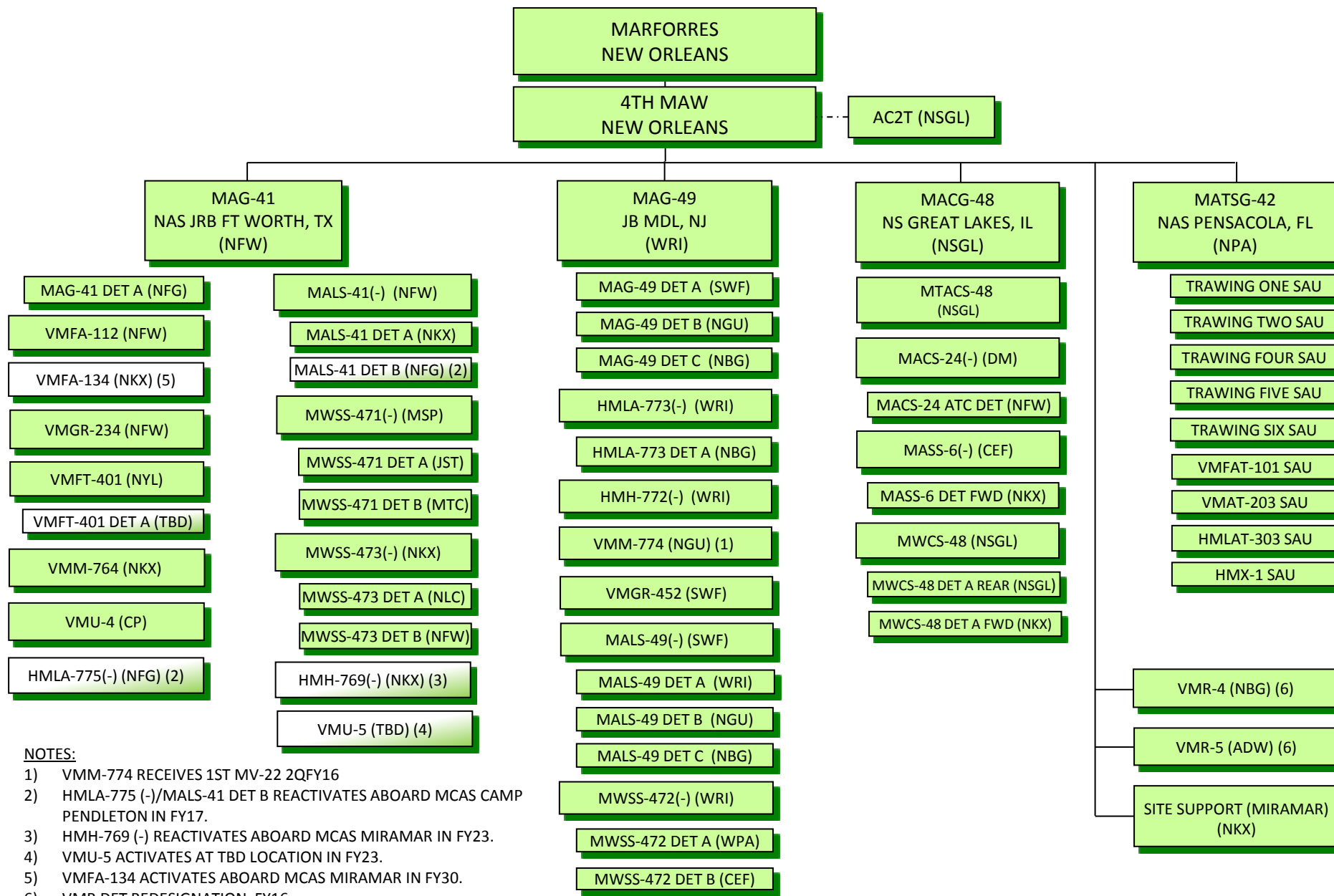
* The turboprop aircraft shown here represents a possible option and does not indicate the solution.

MARINE COMPOSITE TRAINING SQUADRON CONCEPT



--- Command relationships, manning, and basing are subject to change following further analysis ---

4TH MAW ORGANIZATIONAL CHART



ADW – Joint Base Andrews, MD
MTC – Selfridge ANGB, MI
NKX – MCAS Miramar, CA
WPA – Wyoming, PA

BKF – Buckley AFB, CO
MSP – Minneapolis, MN
NLC – NAS Lemoore, CA
WRI – Joint Base McGuire-Dix-Lakehurst, NJ

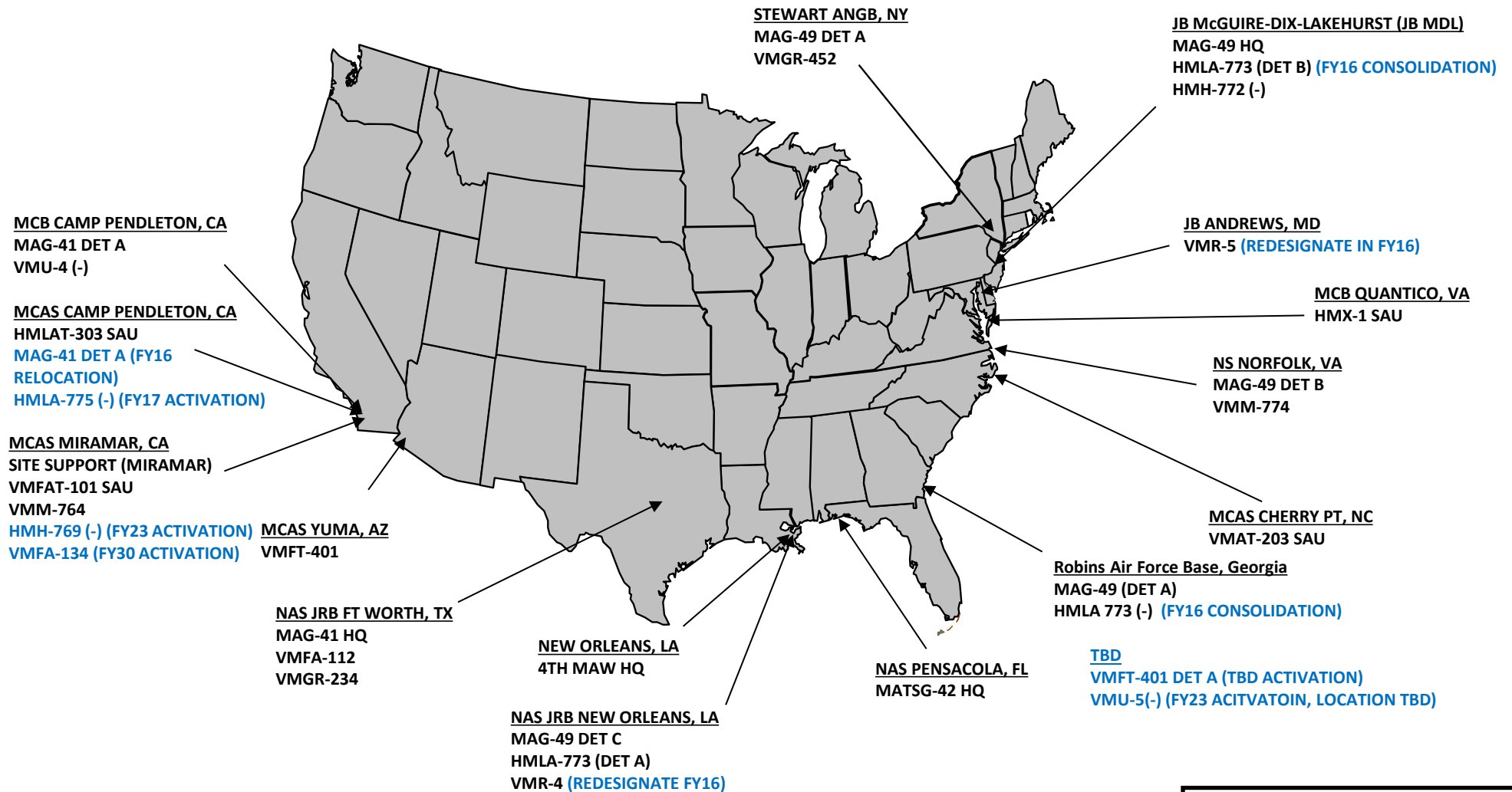
CEF – Westover ARB, MA
NBG – NAS JRB New Orleans, LA
NPA – NAS Pensacola, FL

CP – MCB Camp Pendleton, CA
NFG – MCAS Camp Pendleton, CA
NSGL – NS Great Lakes, IL

DM – Dam Neck/Oceana, VA
NFW – NAS JRB Fort Worth, TX
NYL – MCAS Yuma, AZ

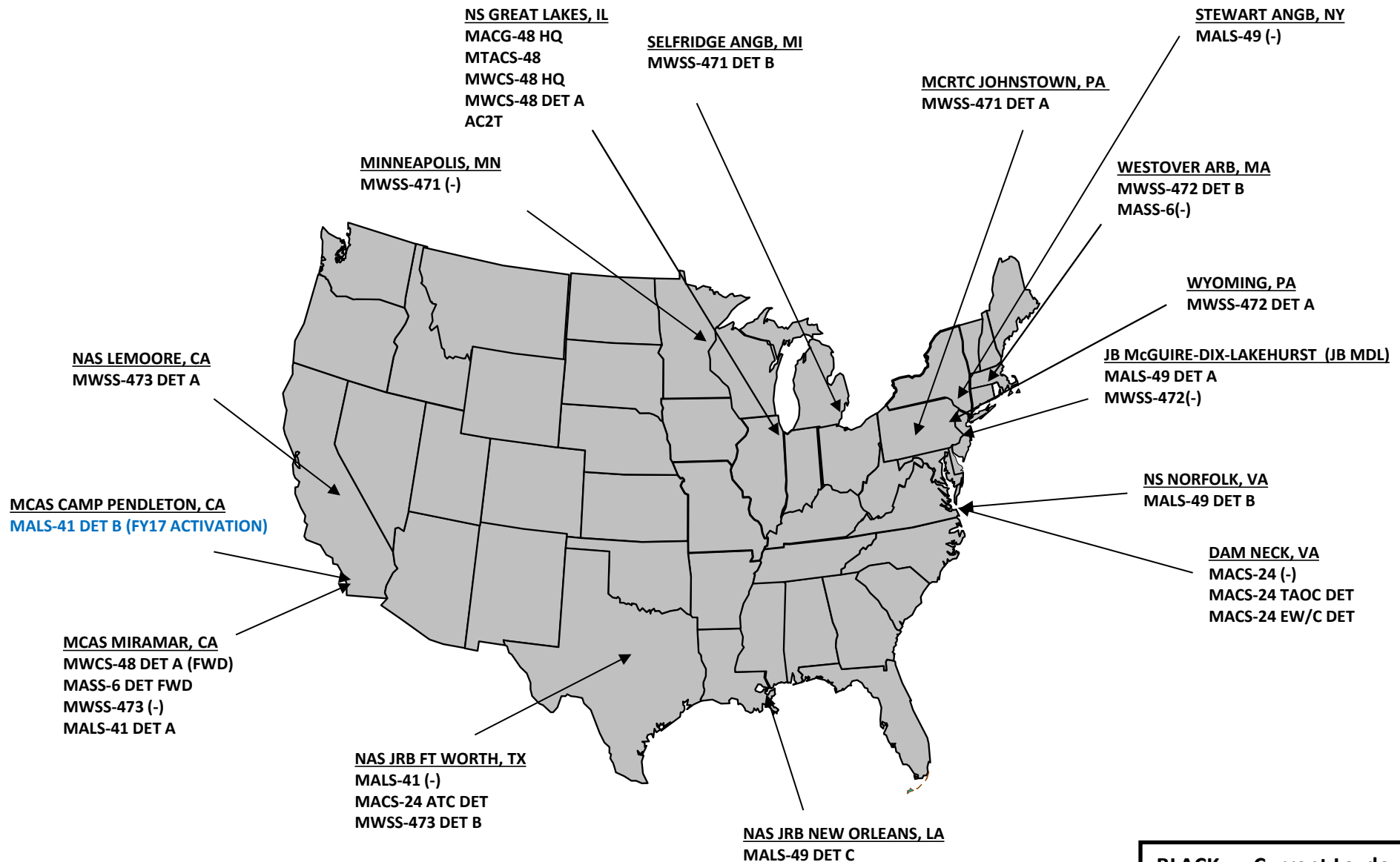
JST – Johnstown, PA
NGU – NS Norfolk, VA
SWF – Stewart ANGB, NY

4TH MAW FLYING SQUADRON AND GROUP LAYDOWN



BLACK = Current Laydown
Blue = Future Restructuring

4TH MAW AGS, MACCS, AND MALS LAYDOWN



BLACK = Current Laydown
Blue = Future Restructuring



MARINE HELICOPTER SQUADRON ONE

Marine Helicopter Squadron One (HMX-1) was established 1 December 1947 as an experimental unit tasked with testing and evaluating military helicopters, when rotary wing flight was still in its infancy.

Founded to test tactics, techniques, procedures, and equipment, HMX-1 has since then become synonymous with helicopter transport of the President of the United States. HMX-1's missions include the worldwide transportation for the President of the United States, transportation within the national capital region of the Vice President of the United States, members of the President's cabinet, and visiting heads of state. Additionally HMX-1 provides support for the Commanding General, Marine Corps Combat Development Command and continues to conduct operational test and evaluation for rotary wing presidential lift aircraft.

Marine aviation has been a force in transition for the past ten plus years and, like the rest of the fleet, HMX-1 has been part of this evolving force. Historically HMX-1 has been a four T/M/S squadron flying the VH-3D, VH-60N, CH-53E, and CH-46E aircraft. However, beginning in FY11 HMX-1 began the preparatory work to not only aid the Fleet Marine Force in their transition efforts but also posture themselves for their own success. The first step was divesting of their heavy lift aircraft and transitioning to an all CH-46E support element. Executed in less than nine months this move provided much needed CH-53E assets to the fleet while posturing the squadron for their own MV-22B transition. In FY13 HMX-1 began the one-year transition from CH-46E to the MV-22B. This was completed during the 4th Qtr FY14 providing HMX-1 with 12 MV-22B aircraft for presidential support.

The final component of the HMX-1 transformation is the Presidential Helicopter Replacement Program (VXX). The VXX will replace both the VH-3D and VH-60N aircraft. The VXX program entered the JCIDS process in FY09 with the JROC-approved Initial Capabilities Document (ICD). Since that time the program has completed the analysis of alternatives (AoA) phase and has a JROC-approved Capability Development Document (CDD). Source selection efforts began during 3rd Qtr FY13 and the program achieved MS B during 2nd Qtr FY14. Shortly thereafter, the Sikorsky S-92 was selected and designated the VH-92A.

The introduction of the VH-92A into HMX-1 operational missions will begin in 2020 with steady deliveries through 2023, coupled with commensurate retirement of in-service assets.

In addition to these aircraft transitions HMX-1 will be updating their training systems to reflect the Marine aviation training vision. As part of this update the squadron replaced its aging VH-60N Aircraft Procedures Trainer (APT) with a VH-60N Containerized Flight Training Device (CFTD.) In support of the MV-22B transition, HMX-1 added two MV-22B CFTDs to their training system. The addition of these CFTDs has incorporated an expanded and more detailed visual database, upgraded graphics presentation, and more representative flight models to better replicate the characteristics of the actual aircraft they represent. To further reduce flight time on the VH aircraft the squadron will also be receiving two training aircraft during FY16, one TH-3D and one TH-60N.

MARINE HELICOPTER SQUADRON ONE: PROGRAMMATICS, SUSTAINMENT AND FUTURE

VH-3D/VH-60N:

The VH-3D/VH-60N have consistently and reliably supported the office of the President of the United States for decades. Deployed worldwide at a moment's notice, these aircraft provide a vital service ensuring the safe and timely travel of each president, his family, and Cabinet officials.

SUSTAINMENT

VH-3D/VH-60N SERVICE LIFE EXTENSION PROGRAM (SLEP):

The VH-3D/VH-60N will undergo a Service Life Extension Program (SLEP) beginning in FY15 which will extend the service life by 4,000 flight hours (each airframe). This SLEP is part of the necessary sustainment plan to maintain these aircraft until their planned replacement beginning in FY20.

In addition to the SLEP both aircraft will also receive planned upgrades and sustainment modifications in order to ensure mission effectiveness during this transition period. Some of these programs include weight reduction efforts, communications upgrades, and upgrading the VH-60N to the 401C engine to improve high altitude performance.

FUTURE

PRESIDENTIAL HELICOPTER REPLACEMENT PROGRAM (VXX):

The VXX will replace both the VH-3D and VH-60N aircraft. The VXX program entered the JCIDS process in FY09 with the JROC approved Initial Capabilities Document (ICD). Since that time the program has completed the AoA phase and has a JROC-approved CDD. Source selection efforts began during 3rd Qtr FY13 and the program achieved MS B during 2nd Qtr FY14. Shortly thereafter, the Sikorsky S-92 was selected and designated the VH-92A. The introduction of the VH-92A into HMX-1 operational missions will begin in 2020 with steady deliveries through 2023, coupled with commensurate retirement of in-service assets.



UPGRADE ROADMAP:

VH-3D

- Weight reduction program
- Abbreviated Cockpit Upgrade Program
  - 1st install FY16
- Wide Band Line of Sight
- Service Life Extension Program (FY15)
- Training asset development (TH-3D)
  - Estimated delivery 1st Qtr FY16

VH-60N

- 401C engine upgrade
  - In-progress upgrade
  - Planned completion 1st Qtr FY16
- Service Life Extension Program (FY15)
- Training asset development (TH-60N)
  - Estimated delivery 1st Qtr FY16

FUTURE INITIATIVES:

- Presidential Helicopter Replacement Program (VH-92A)
  - Planned IOC 4th Qtr FY20
  - Planned FOC 4th Qtr FY22

VH-92A PRESIDENTIAL HELICOPTER



VH-92 Customization for Executive Transport

Standard S-92 Features

- S-92 Rotor Ice Protection System (RIPS)
- S-92 RIPS warm weather kit
- VIP Finish
- Cabin Cold Weather Heat
- Rear Entry
- Aux Pneumatic "Buddy Start"
- Enhanced Active Vibration Control
- Cockpit Cold Weather Heat

Customized S-92 Features

- Utility hydraulic distribution
- Environmental Control System

VH Unique Features

- Fuel Jettison
- Environmental Control System Fresh Air Inlet
- EMI/EMP Hardening
- Avionics/Electrical modifications

MARINE HELICOPTER SQUADRON ONE (HMX-1) PLAN

CURRENT FORCE: VH-3D X 11
VH-60N X 8
MV-22B X 12
TH-3D X 1
TH-60N X 1

FORCE GOAL: VH-92A x 21
MV-22B X 14

		FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24				FY25				FY26			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
UNIT/LOCATION	TAI																																												
HMX-1 QUANTICO	11 x VH-3D																																												
	8 x VH-60N																																												
	21 x VH-92A																																												
	1 x TH-60N																																												
	1 x TH-3D																																												
	14 x MV-22B																																												

H = VH AIRCRAFT TRANSITION BEGINS
X = VH AIRCRAFT TRANSITION COMPLETE

D = TH-60N DIVESTING
D = TH-3D DIVESTING

	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26
AIRCRAFT TYPE/TAI											
VH-3D	11	11	11	11	11	8	0	0	0	0	0
VH-60N	8	8	8	8	8	8	6	0	0	0	0
VH-92A	0	0	0	3	4	8	15	21	21	21	21
TH-3D	1	1	1	1	0	0	0	0	0	0	0
TH-60N	1	1	1	1	1	1	0	0	0	0	0
MV-22B	14	14	14	14	14	14	14	14	14	14	14
TOTAL HMX-1 TAI	35	35	35	38	38	39	35	35	35	35	35

GENERAL NOTES:

- 1) HMX-1 is located at MCAF Quantico, VA.
- 2) The 13th and 14th MV-22B aircraft are part of the overall USMC MV-22B community BAI and are depicted here for operational planning considerations.

TAI – Total Aircraft Inventory

- Aircraft assigned to operating forces for mission, training, test, or maintenance functions
- Inclusive of mission, back-up, attrition, training, and depot aircraft

Basing plans are subject to change and further environmental analysis



MARINE OPERATIONAL TEST AND EVALUATION SQUADRON TWENTY-TWO



Marine aviation is making significant improvements to the way we conduct operational testing, support concept development, and lead cutting edge experimentation for the aviation combat element (ACE) of the future. Initially created to complete operational testing on the MV-22 Osprey, the mission of Marine Operational Test and Evaluation Squadron 22 (VMX-22) is expanding to include all manned, unmanned platforms, and aviation command and control systems along with aviation support equipment of tomorrow's ACE.

These changes will enhance Marine aviation's ability to deliver warfighting tools to Marines and ensure that our aviation systems meet today and tomorrow's needs. Additionally, the physical co-location of VMX-22 with Marine Aviation Weapons and Tactics Squadron 1 (MAWTS-1) in Yuma, Arizona will ensure the rapid development of tactics, techniques, and procedures (TTPs) and improve our ability to support experiments and tactical demonstrations of cutting edge technologies. VMX-22 will continue to support the Commander, Operational Test and Evaluation Force and Marine Corps Operational Test and Evaluation Activity.

UAS: We will build on the lessons learned from using unmanned cargo delivery aircraft in Afghanistan by assigning the UAS we used in OEF for cargo to VMX-22 in Yuma. We will continue to expand the capability of unmanned aerial logistics support to the MAGTF in a wider variety of employment scenarios than used in Afghanistan and we will also investigate adding BLOS, sensor and weapons capability to the K-MAX to allow it to fill a utility role.

In 2015, VMX-22 assumed responsibility for operational testing and experimentation of unmanned systems, beginning with the MQ-21 Blackjack. In support of the Initial Operational Test and Evaluation (IOT&E) of the MQ-21, VMX-22 will operate a single system of five air vehicles in MCAS Yuma, AZ. Multiple advanced payloads are currently in development for the MQ-21 to meet MAGTF specific requirements for signals intelligence, electronic warfare, cyber warfare, communications and data relay, and kinetic fires. VMX-22 will be ideally postured to test future payloads as they are introduced. The co-location with MAWTS-1 (and VMU-1 in 2016) will ensure rapid development of TTP's associated with new weapons systems of the MQ-21 and follow-on unmanned aerial systems.



MV-22: In 2015, VMX-22 supported LHD OT-1 for the F-35B by demonstrating the movement of the F-135 power module to/from USS *Wasp*, and conducted operational testing in support of the Defensive Weapon System, Blue Force Tracker II, and GAU-21 systems.

We are building a permanent composite aviation combat element dedicated to operational testing and experimentation. At Yuma now: headquarters element; MV-22B; UH-1Y; AH-1W; AH-1Z; UAS; and an AC2 division.

VMX-22 has a CH-53E detachment at MCAS New River; an F-35B detachment at Edwards Air Force Base; G/ATOR and CAC2S supporting MCOTEA operational test. MQ-21 arrives at MCAS Yuma for VMX-22 in March-April 2016.



MARINE OPERATIONAL TEST AND EVALUATION SQUADRON TWENTY-TWO



Marine Air Command and Control Systems: VMX-22 was assigned as the lead squadron supporting testing on MACCS equipment. In concert with this direction the Aviation Command and Control (AC2) division was stood up within VMX-22. The AC2 division is tasked with ensuring future C2 systems will provide operationally suitable equipment that is interoperable with the rest of the MAGTF and meet warfighter requirements. VMX-22 AC2 division in collaboration with MAWTS-1 C3 division will support the evaluation of future concepts and technology for digital interoperability (DI), integrated fire control, counter-UAS, directed energy and multi-functional agencies. In 2015 the AC2 division supported multiple demonstrations including efforts with KC-130J, CH-53E and MV-22B, in support of the 15th MEU and SPMAGTF-CR. AC2 Division also analyzed small adjunct sensors networked with a directed energy weapon to counter UAS. VMX-22 AC2 continues to support the development of the CAC2S phase 2 system and TPS-80 G/ATOR by participating in integrated testing at MCTSSA, Camp Pendleton, CA and support in the training and fleet introduction of the TPS-80 G/ATOR at MCAS Yuma with MACS-1.

CH-53: VMX-22's two CH-53E aircraft will remain at MCAS New River and continue to support operational and developmental testing. Additionally, the CH-53 division supports MARCORSYSCOM through the validation and certification of joint external and internal loads. VMX-22 will support the development of the CH-53K by participation in integrated testing at Sikorsky's West Palm Beach, FL facility and assist in the training and standup of our first CH-53K fleet squadron in MCAS New River. Once the CH-53K fleet introduction is complete, the VMX-22 CH-53E/K Det will join the VMX-22 main body in Yuma with two CH-53E and two CH-53K aircraft.

F-35B: VMX-22 Det Edwards accepted four F-35B Lightning II aircraft in 2014, and has a pilot assigned to the 461st Test Squadron for integrated testing. The Det recently led the LHD OT-1 assessment onboard USS *Wasp* in support of Marine Corps IOC declaration for VMFA-121, and is preparing for ED-1 at Twentynine Palms in 2016. As part of the Joint Strike Fighter Operational Test Team (JOTT) at Edwards AFB, the detachment continues to train and receive aircraft modifications required for IOT&E of the F-35B that is scheduled to begin in 2017. The detachment will grow to six aircraft through the IOT&E of the F-35B.

Following the completion of IOT&E, the F-35Bs will transition from Edwards AFB to MCAS Yuma to join the VMX-22 aviation combat element. The detachment also supports initial tactics development as new software and weapon systems capabilities are introduced, and concept of employment for amphibious and expeditionary operations.

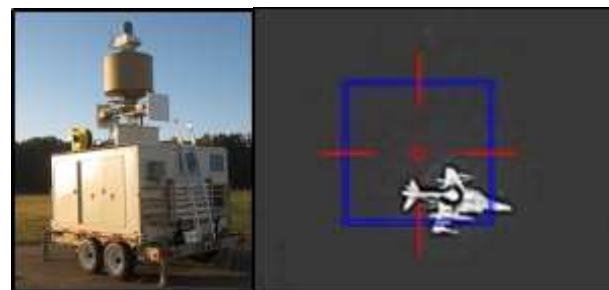


H-1: In 2015, two AH-1Z, one AH-1W, and two UH-1Y operational testing aircraft relocated from VX-9 at NAS China Lake, CA and joined VMX-22 in MCAS Yuma, AZ. By co-locating our Venom, Viper, and Super Cobra test aircraft with VMX-22, we improve the integrated MAGTF ACE testing and support the continued development of digital fires systems for rotary wing assets.

New River to Yuma

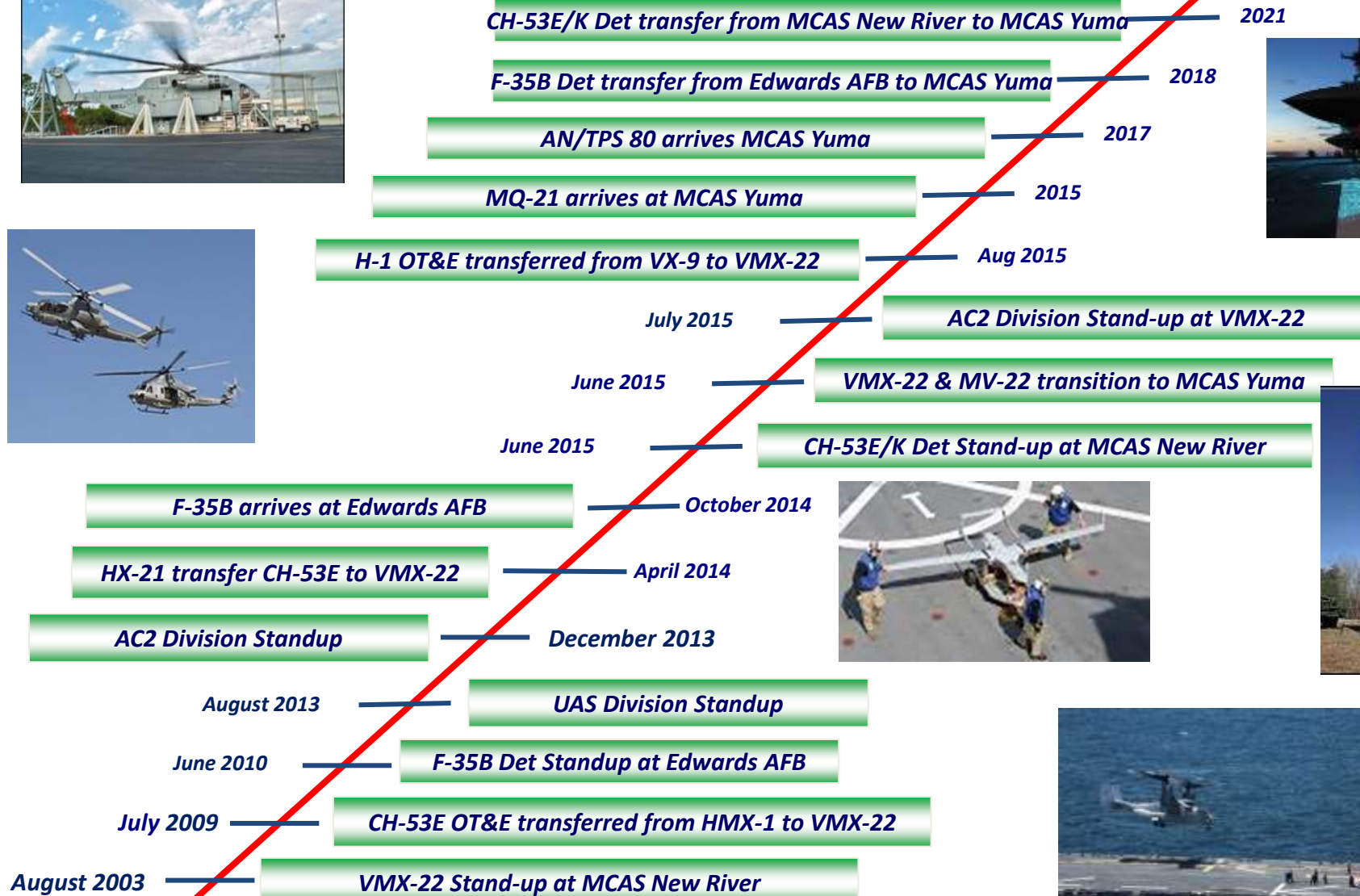
Improvements to the way we test and develop tactics for Marine aircraft and aviation systems will have a long lasting positive contribution to the future MAGTF. The current VMX-22 support for digital interoperability tactical demonstrations and experiments in support of the 15th MEU and SPMAGTF-CR are two examples of how we can best use our operational test aircraft and skilled personnel to make rapid developments in the way we will fight our future wars.

The relocation of VMX-22 from New River to Yuma is about more than simply finding efficiencies by the integration of test platforms, it is about ensuring that our aircraft and weapons systems can fight together as a single team with increased lethality, improved safety, and incorporation of cutting edge technologies to command and control Marine aviation in support of the MAGTF.





VMX-22 TRANSFORMATION AND MOVEMENT TO MCAS YUMA





MARINE AVIATION WEAPONS AND TACTICS SQUADRON ONE



MAWTS-1

The origin of MAWTS-1 may be traced to the aftermath of World War II when Marine pilots were first assigned to Navy Composite Squadrons (VCs). These squadrons, operating from shore bases and carriers, were assigned the special weapons delivery mission. Special Weapons Training Units (SWTUs) were formed to provide necessary training to the attack squadrons. In response to their growing mission, the size of the SWTUs was increased, and they were redesignated as Marine Air Weapons Training Units, MAWTULant at Cherry Point, North Carolina, and MAWTUPac at El Toro, California.

In 1975, a study group was formed at Headquarters Marine Corps to determine requirements for the enhancement and standardization of aviation training. A series of recommendations, labeled as numbered projects, were made to the head of Marine aviation and to CMC in early 1976. Project 19 recommended establishment of the Weapons and Tactics Training Program (WTP) for all of Marine aviation.

The cornerstone of the WTP was the development of a graduate-level Weapons and Tactics Instructor (WTI) Course and the placement of WTI graduates in training billets in every tactical unit in Marine Corps aviation. Consolidated WTI Courses were subsequently conducted at Marine Corps Air Station, Yuma, Arizona, by a combined MAWTU staff in May 1977 and February 1978. Due to the overwhelming success of the consolidated WTI Courses, the Commandant of the Marine Corps commissioned Marine Aviation Weapons and Tactics Squadron One at Marine Corps Air Station, Yuma, Arizona, on 1 June 1978.

MAWTS-1's mission is to provide standardized graduate-level advanced tactical training for Marine aviation and assists in the development and employment of aviation weapons and tactics. Advanced tactical training is accomplished through two Weapons and Tactics Instructor (WTI) Courses and two Marine Division Leader Tactics Courses each year, as well as home station fleet support throughout the year.

MAWTS-1 provides assistance to Headquarters Marine Corps, industry, and the Systems Commands in the development and employment of aviation weapons and tactics through the Aviation Development, Tactics and Evaluation (ADT&E) department. ADT&E's enduring mission to develop weapon systems requirements, create concepts of operation, manage Marine aviation doctrine, and conduct tactical demonstrations (TACDEMOS) of advanced emerging concepts keeps Marine aviation engaged at the forefront of combat tactics.



Among these is the convergence of cyber and electronic warfare. MAWTS-1 is currently pursuing new and innovative techniques in the application of both kinetic and non-kinetic combined arms in support of MAGTF objectives. The WTI course integrates the Cyber Electronic Warfare Coordination Cell (CEWCC) to plan and execute non-kinetic fires supporting major evolutions throughout the WTI course.

Centers of Excellence

MAWTS-1 is partnering with the Marine Corps Tactics and Operations Group (MCTOG) and the Marine Corps Logistics Operations Group (MCLOG) to create a MAGTF Weapons School environment, responsible for the development of individual advanced tactical training, as well as exercise design supporting the MAGTF Training Program. This construct creates both an individual and collective training environment supported by a MEB-level operational scenario, allowing our Marines to train in an O PLAN-informed environment and perform with acumen across the spectrum of conflict.

Additionally, the combined arms integration of the WTI course and Talon exercise (TALONEX) continues to provide exceptional infantry battalion live fire training as part of the MAGTF Training Program.

MARINE AVIATION WEAPONS AND TACTICS SQUADRON ONE



Weapons and Tactics Instructor (WTI) Course

MAWTS-1's semi-annual training venue, the Weapons and Tactics Instructor Course, is the Marine Corps' only service-level exercise that provides students and supporting units the full spectrum of combat operations - from small unit inserts to noncombatant evacuation operations (NEOs) to infantry battalion heliborne lifts into the heart of a sophisticated enemy's battlespace to the highest-threat strike and air-to-air combat profiles. Exposing the prospective WTIs to the unique array of capabilities our MAGTF possesses is the hallmark of this training program.

Aside from a rigorous academic curriculum, students participate in numerous graduate level exercises that integrate all six functions of Marine aviation. These evolutions, such as anti-air warfare, air base ground defense, assault support tactics, offensive air support, and ground based air defense culminate in a series of final exercises that integrate joint, conventional and special operations forces.



WTI continues to serve as the best live and simulated training venue for the Marine Air Control Group and the largest training exercise for which employs a Marine Air Command and Control System (MACCS). The MACG deploys with more than 900 personnel and over 90 million dollars' worth of equipment.

During WTI, MACCS agencies are challenged with constantly moving across the WTI battlespace and controlling an area of operations encompassing more than 150,000 square miles. The number of live aircraft sorties and the sheer size of the exercise is why WTI continues to serve as the best training venue to support MACCS developmental and operational testing. Common Aviation Command and Control System (CAC2S) Phase II will continue developmental testing during WTI 1-16 and IOT&E during WTI 2-16. As the system of record for the TACC, TAOC, DASC, ATC, and LAAD, CAC2S will better enable MAGTF, naval, and joint interoperability via the exchange of digital data across air, sea and land domains. MAWTS-1 looks forward to the future as we transform the MACCS.



MARINE AVIATION WEAPONS AND TACTICS SQUADRON ONE

CONCEPT EXPERIMENTATION



As the Marine Corps pursues new concepts, MAWTS-1 continues to define and standardize the training the ACE requires to support future MAGTF operations. The strategic environment compels the Marine Corps to operate in an increasingly distributed fashion. In order to respond rapidly to dispersed global threats, we are moving toward a model wherein infantry units deploy as battalions and employ as companies. We are beginning to think of units as small as the company landing team (CLT) as separate maneuver elements. Marine aviation is central to dispersed and effective maneuver elements and enables such rapid response now. With aviation weapons systems like the KC-130J, F-35B, MV-22, and MQ-21, the MAGTF will be equipped to quickly respond to crisis across the range of military operations.

MAWTS-1 facilitates experimentation and collaboration across multiple venues, honing our collective skills when embarking for long range crisis response. MAWTS-1 continues to partner with The Basic School during each WTI course, executing long range missions in support of the Infantry Officers Course through the Talon Reach exercises. These events are also supported by MCTOG and MCLOG and form the nucleus for advanced digital interoperability experimentation. They feature collaborative planning between the GCE, LCE and ACE, introducing the infantry officers to enhanced situational awareness enroute and while on the objective. These missions capitalize on the unique capabilities of Marine aviation's range and speed to deliver more effective, lethal, and survivable long-range operations.

During the WTI course the MV-22, CH-53E and KC-130J communities further explore our range of capabilities within this arena while conducting a humanitarian assistance and embassy reinforcement missions between Yuma and Las Cruces, New Mexico – nearly 500 miles. The ADT&E department takes advantage of the evolutions to demonstrate multiple airborne and ground networks connected with commercial level encryption (Black Core Network).

Black Core establishes and interconnects Link 16, TTNT, NET-T, and ANW2 networks through Miniature Aircraft Instrumentation System (Mini-AIS) installed on the MV-22 and CH-53. This connectivity provides troop commanders enhanced situational awareness via Wi-Fi networked tablets, expanded C3, limited gateway functionality and mesh network range extension to the CEWCC and TACC. Additionally, this venue provides a practical application to conduct radio frequency identification (RFID) operations in order to track Marines and logistical support, and then disseminate the data across the tactical networks.



MARINE AVIATION WEAPONS AND TACTICS SQUADRON ONE



C3

MAWTS-1 continues to spearhead innovating concepts to increase our lethality via the command, control, and communications (C3) department. With the employment of the Advanced Simulation Combat Operations Trainer (ASCOT), MAWTS-1 increases the scope and depth of knowledge of our command and control Marines in the live / virtual / constructive (LVC) environment.

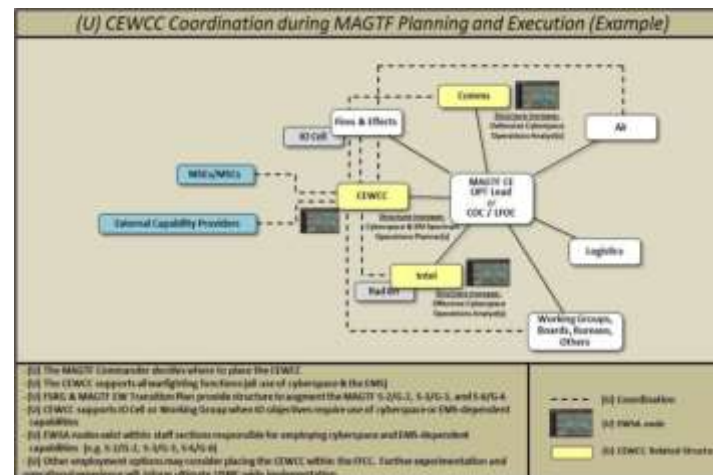
Additionally, during previous WTI courses, a composite detachment of DASC and TAOC Marines combined to perform a proof-of-concept for future MACCS agency employment called the Multifunction Air Operations Center (MAOC). With the return of CAC2S to WTI in 2016, we will continue to experiment with this concept, demonstrating the capability to C2 WTI evolutions using this common set of equipment. MAWTS-1 C3 and VMX-22 are partnering to collect data and lessons learned in support of HQMC Aviation's future MACCS roadmap.

The G/ATOR is an expeditionary radar able to detect and track low-observable/low-radar cross-section targets such as guided rockets, artillery, mortars, and missiles; this system also provides a new level of protection to ground forces. MAWTS-1's C3 Department is deeply involved in implementing CAC2S as a ground-based gateway, fusing real-, near-real, and non-real-time data derived from the F-35, RQ-21, G/ATOR, and other inputs into an integrated tactical picture providing the ground combat element new levels of situational awareness and advanced decision support tools.

The new systems of the Marine air command and control system allow the MAGTF commander to "see" and exploit opportunities with speed and precision.

Cyber Electronic Warfare

The WTI Course now features a fully-staffed Cyberspace / Electronic Warfare Coordination Center (CEWCC) during the execution phase, with key support from the MACGs, Marine Corps Information Operations Center (MCIOC), Marine Corps Forces Cyberspace Command (MARFORCYBER), Marine Corps Forces Special Operations Command (MARFOSOC), and Radio Battalion. Integrating curricula from C3, GCD, AOD, UAS and Prowler Divisions, as well as some new Spectrum-unique academics, the WTI course now validates the efficacy and relevance of the curriculum for our target communities: 7588 Prowler ECMOs, 7315/7314 UAS EW specialists, 06xx and 26xx Cyberspace and EW (offensive and defensive) experts, 8834 / 0550 Information Operations experts, and 8866 MAGTF Space Officers. PWTIs are now being exposed to the planning, coordination and C2 of various aspects of cyberspace, electronic warfare, information operations, spectrum management and MAGTF space operations. CEWCC vignettes are deeply integrated in every aspect of WTI execution, and execution on the Joint Information Operations / Cyberspace Range (JIOR) enables combined live kinetic and non-kinetic operations over a realistic network-in-depth, in support of live operating forces and across the full spectrum of the OPLAN-aligned WTI scenario.



MARINE AVIATION WEAPONS AND TACTICS SQUADRON ONE



Trusted Handheld Tablets

MAWTS-1 continues to issue Trusted Handheld (TH2) tablets to the students during WTI courses. The tablets are intended for use during both the academic and execution phases of the course. The tablets augment the student's ability to study the courseware, take examinations, plan flight evolutions, and execute missions. The tablets are information assurance (IA) compliant and were provided by Marine Corps Systems Command. They operate on an unclassified closed wireless network. The tablet demonstration paves the way for future expansion of tablet computing across the Marine Corps.

Defense of the Expeditionary Airfield

WTI continues to incorporate air base ground defense operations through the defense of the expeditionary airfield (DEAF) 1 & 2 evolutions. The focus of training is on integration of live aircraft into the ground defense plan while conducting simulated CAS using unqualified controllers. Another key objective is to demonstrate the ability of defense forces to separate friendly forces from enemy once the enemy is inside the perimeter. MCLOG has been involved providing guest instructors who demonstrate the intricacies of how to run a combat operations center. A portion of the AGS department academic instruction is completed at MCLOG's classrooms in Twentynine Palms, CA by the staff members of MCLOG. This instruction continues to strengthen the collaborative efforts between these institutions.



Distributed Operations

The Assault Support and Aviation Ground Support departments continue to refine the procedures for the conduct of distributed operations missions with STOVAL aircraft at Laguna Army Airfield. MV-22B aircraft conduct ADGR and weapons reload for the AV-8B, increasing the number of sorties sent to the objective area executing offensive air support. This falls in line with the F-35B's desired capability to fight in anti-access/area denial (A2/AD) environments. With the F-35B, our MEUs and MEBs will have a fifth-generation low observable strike and sensor platform providing a unique and critical role in joint forcible entry operations.



Distributed operations are also well-rehearsed during separate evolutions involving reactive forward arming and refueling points (FARPs) supporting AH-1 and UH-1 aircraft sorties. These rapidly deployable FARPS relocate on call based on the enemy situation and mission requirements providing fuel and ordnance to Marine attack and utility helicopters.

MARINE AVIATION WEAPONS AND TACTICS SQUADRON ONE



Air Officer Course

Air Officer WTI started as a five week embedded course based on OIF 1 after-actions to train forward air controllers (FACs) to be better Air Officers for fleet units. It has since grown to a full seven-week, MOS- producing course intended for MEU and regimental air officers. The primary focus is integrating aviation capabilities within the ground combat element. Additionally the course trains each graduate to be a JTAC evaluator and program manager, empowered to develop a cadre of professional terminal controllers and aviation integrators.

During the WTI exercise each prospective instructor has the opportunity to control close air support in day and night conditions in urban and rural environments, integrated with indirect fires and maneuver. In addition to the live controls, the course includes a robust simulation phase integrating multiple controllers using the distributed virtual training environment (DVTE) and supporting arms virtual trainer (SAVT) into complex CAS scenarios. At the conclusion of WTI, each graduate is certified as a WTI and receives the 8077 MOS.



MARINE AVIATION WEAPONS AND TACTICS SQUADRON ONE



Tactical Risk Management

Since 2005, MAWTS-1 has been striving to reshape the thinking of tactical leaders in Marine aviation. They have made risk management an inherent part of the way we train, operate, and fight. A program called Tactical Risk Management (TRM) was started in 2004 as a result of a spike in aviation mishaps. An analysis of the causal factors for these mishaps indicated that the spike was not due to enemy action, despite the significant combat operations that the Marine Corps was involved in at the time. Mistakes or errors in judgement were the main causes of Marine aviation mishaps - indicating the need to examine and develop tactics to counter these "blue threats."

MAWTS-1 restructured the curriculum during their semi-annual Weapons and Tactics Instructor (WTI) course to include instructing students how to balance the blue threat and the red threat during mission planning and execution. Ultimately, WTI graduates return to their squadrons and foster a culture of excellence in risk management and tactical execution across the fleet.

Tactical Risk Management is a two-day lecture series conducted during every WTI course. The course builds on the fundamentals of ORM by presenting the students with various safety topics through the lens of mission effectiveness. TRM teaches the students that a tactically sound plan is an inherently safe plan. The principles taught during TRM are risk management, ethics, leadership, human performance, aerodynamics, managing red and blue threats, and professionalism in their trade. WTI students understand their role in managing risk is necessary to enhance mission effectiveness by preventing injury to personnel and damage to critical assets.

TRM principles are reinforced throughout the execution phase. MAWTS-1 requires students come up with a mitigation strategy and brief the red and blue threat (risk to mission/risk to force) during every confirmation brief. During mission planning the WTI students are asked if their plan is tactically sound and executable with the assets that have been allocated to the mission. If not, then they fine tune their plan until the red and blue threats are mitigated appropriately. Risk management is inherent to the mission planning conducted during WTI.

The curriculum is constantly transforming as the blue threats change on the battlefield. The next set of changes to the TRM curriculum will be based on an analysis of the DoD Human Factors Analysis and Classification System (HFACS) codes most frequently identified in aviation mishaps. Some of the most prevalent blue threats include complacency, communicating critical information, making adequate real-time risk assessments, and following published procedures. The course will bring in new relevant guest speakers presenting both a civilian and

military perspective for managing high risk activities. MAWTS-1 intends to incorporate a sports psychologist to help WTI students learn how to operate at their peak potential. They will learn how to take care of themselves mentally and physically so that they are always prepared for the challenges that the Marine Corps will present to them.

MAWTS-1 will also include several mentorship sessions with their students where they will talk about identifying hazards and preventing mishaps in a small group setting. Guest speakers that have experienced Marine Corps mishaps will speak to the students about lessons learned from their experience. The students will also review the most recent mishaps and the causal factors that were identified through investigation.

Marine Corps aircraft are national assets; their preservation is essential to continued success on the battlefields of tomorrow. Reshaping the thinking of future tactical leaders will transform the culture of aviation to include an appreciation for the development and execution of blue threat tactics - ultimately enhancing tactical excellence fleet wide while preserving assets.



MARINE AVIATION WEAPONS AND TACTICS SQUADRON ONE



F-35 Integration

During WTI 1-14, the initial F-35B sorties were flown in support of the course. In every course since, the staff has continued to integrate additional F-35 participation, incorporating anti-air warfare, deep air support, close air support, electronic warfare, and assault support escort missions. With the July 2015 IOC declaration of VMFA-121, MAWTS-1 is positioned to take the next step towards a complete F-35 student syllabus. The WTI 1-16 Course Catalog now includes the F-35B/C specific academic and evolution syllabi, and with support from 3d MAW and MAG-13, WTI 1-16 will be the first class to test this plan. The two MAWTS-1 F-35B instructors will execute the syllabi in the fall with the ultimate goal of executing WTI 2-16 with F-35B students.



Summary

While there are many “new and different” aspects of the WTI course, the central core persists as world class and unique. MAWTS-1 remains the weapons school of the Marine Corps, dedicated to meeting the needs of the operating forces. We continue to focus on relevance and responsiveness, with a bias towards innovation and tactical excellence. Ultimately, the goal is to continue to produce graduates who are well prepared to fight and win our nation's battles.

3.5

NAVAL AVIATION ENTERPRISE

Naval Aviation Enterprise & Current Readiness Mission: Advance and sustain naval aviation warfighting capabilities and readiness at best possible cost...today and in the future.

The mission of the naval aviation enterprise is unchanged: to keep naval aviation a warfighting force. It brings to bear the right capabilities, capacity, and wholeness for fighting and winning. Advancing and sustaining these core functions at an affordable cost is smart, prudent, and responsible.

Naval aviation with an enterprise approach ensures a team effort dedicated to working together and committed to open information sharing and process improvement across naval aviation stakeholder organizations. This way of doing business must be ingrained throughout naval aviation. It significantly and measurably improves our ability to deliver warfighting readiness more efficiently. It leads to a better understanding of our operational costs and readiness degraders from the deckplate to the flag and general officer level. It facilitates better informed resource decisions for the overall good of the entire naval aviation enterprise.

Within the NAE, it is our mission to intelligently optimize those resources to meet today's and tomorrow's threats.

Marine aviation commanders and leaders – in concert with the naval aviation enterprise – will plan, execute, and manage the current readiness (CR) process in order to maximize equipment and personnel readiness. The focus must be on optimizing material resource allocations and expenditures while minimizing logistics downtime and delays. Leaders will conduct CR operations to align Marine aviation with enabling organizations. The purpose of this alignment is to predictably and effectively achieve required levels of readiness to produce core competent aviation units (squadrons / detachments) for warfighting missions.

Goals: The goal of Marine aviation is to attain and maintain combat readiness to support expeditionary maneuver warfare while at the same time preserving and conserving Marines and equipment. Embedded within this combat readiness goal is the ability to plan for crises and/or contingency operations, and the capacity to deploy rapidly, effectively, and efficiently on short notice. The specific goals are as follows:

- Increase aircraft readiness
  - Increase aircraft availability
  - Increase in-reporting (IR) rates / Decrease out-of-reporting (OOR) rates
  - Increase depot throughput
- Reduce workload on Marines
- Understand and manage costs and schedule
- Extend service life for legacy aircraft / achieve programmed service life for new platforms
- Improve health of organizational and intermediate level maintenance departments
- Increase sortie generation and combat power
- Increase reliability of aircraft, components, and logistics process



NAVAL AVIATION ENTERPRISE / CURRENT READINESS IMPROVEMENT PROGRAM

The Goal - A Core Competent Unit: The most direct measurable output of the CR process is the production of readiness: T-2.0. The design of CR, therefore, is to support mission essential task (MET)-based output standards that are consistent with a core competent unit (squadron or detachment).

Key Performance Indicators (KPIs): To create consistent and integrated performance-based measurements, type/model/series (TMS) teams have determined which processes should be measured, what metrics would be used for the analysis, and which of those metrics are to be considered key performance indicators (KPIs).

-Pilot Training: T-Rating shows the TMS pilot training readiness based on unit inputs to the Defense Readiness Reporting System – Marine Corps (DRRS-MC). TMSs are funded to a T-Rating of 2.0

-Trained Maintenance Manpower: Maintainer core competency (MCC), the maintenance department's technical ability to maintain aircraft, is central to producing Ready for Tasking (RFT) aircraft. MCC includes, at a minimum, qualifications and licensing, collateral duty inspector (CDI), collateral duty quality assurance representative (CDQAR), aircraft sign off, and so forth to conduct the assigned number of maintenance shifts.

-Ready for Tasking (RFT): A main goal of the CR cross-functional team (CFT) is being able to provide the appropriate amount of RFT resources to support a squadron's current mission.

-Aircraft Life Management: Proper management of aircraft utilization ensures airframes attain the expected service life, including managing airframe usage within an acceptable range of life-limiting parameters (flight hours, fatigue, etc.).

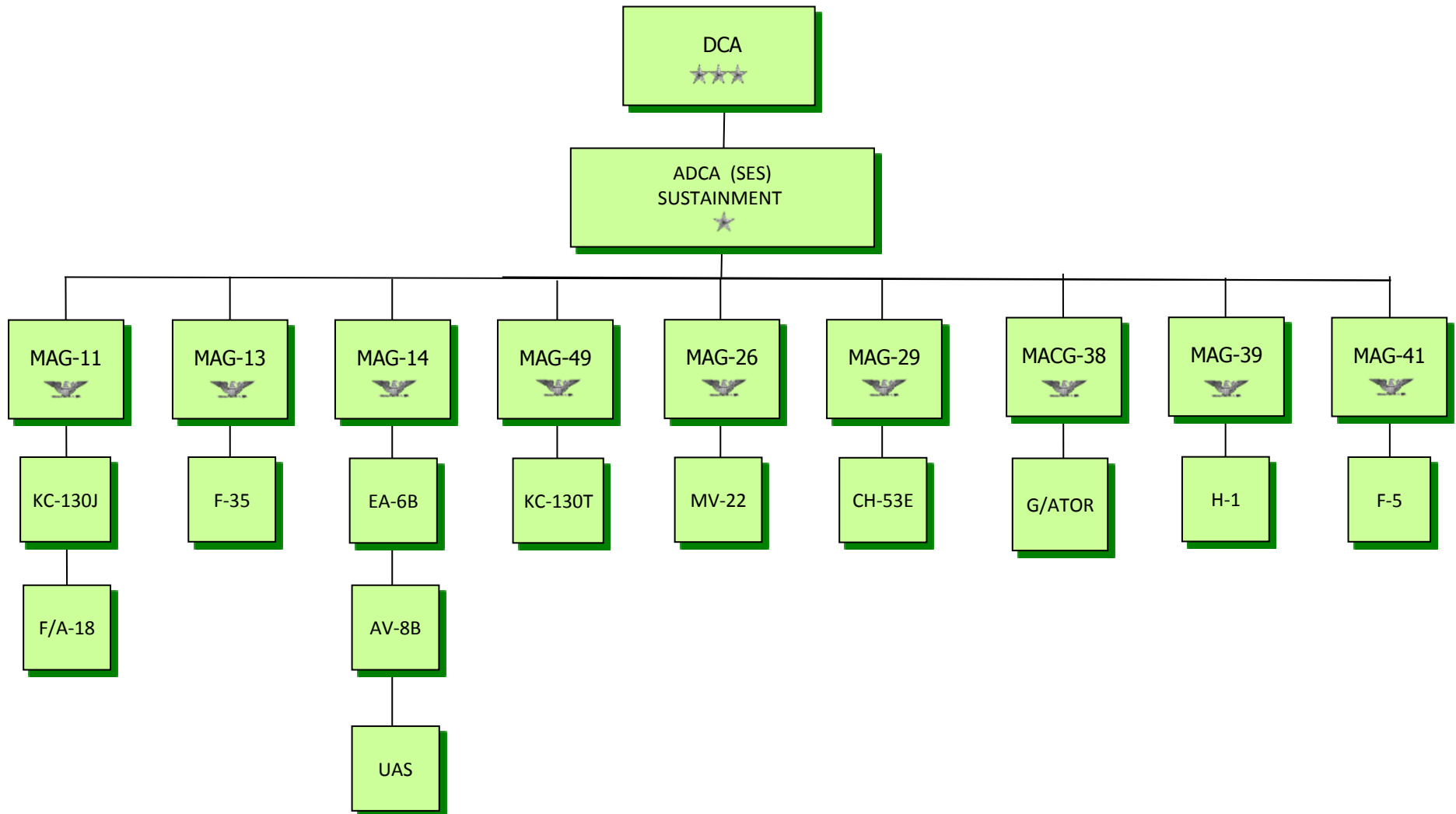
-Flight Hour Cost-Per-Hour: The goal of the NAE is to produce readiness and RFT aircraft while efficiently managing cost. In order to meet this goal, TMS teams must be aware and critical of the rate at which, and how, fiscal resources are expended.

The Future of the NAE: In order to reach these goals, the following stakeholder actions will be critical to the success of naval aviation:

- Improve readiness of each TMS to service targets
- Reduce Cost Per Flight Hour (CPFH) by the percentage assigned for each TMS while meeting readiness requirements
- Develop methodology for managing fully burdened operating and support (O&S) costs
- Apply O&S cost reduction initiative across all TMS platforms
- Implement the Integrated Logistics Support Management System (ILSMS) tool across all TMS Program Offices
- Expand Commander, Fleet Readiness Center (COMFRC) Aviation Rapid Action Team (ARAT) process to all TMS Teams
- Streamline depot business operations
- Program executive office (PEO)/program manager (PM) address future O&S costs in new acquisitions
- Modify TMS briefs
  - Shorten the briefs to focus on exactly what flag/general officers need to know/can impact/desire as needed
  - Provide mid-cycle reviews every four months after the Air Board
  - Provide focus on both key readiness degraders and cost initiatives/progress
- Increase PM engagement in submission of affordability initiatives Future Readiness (FR) CFT



MARINE AVIATION TYPE/ MODEL/ SERIES LEADS

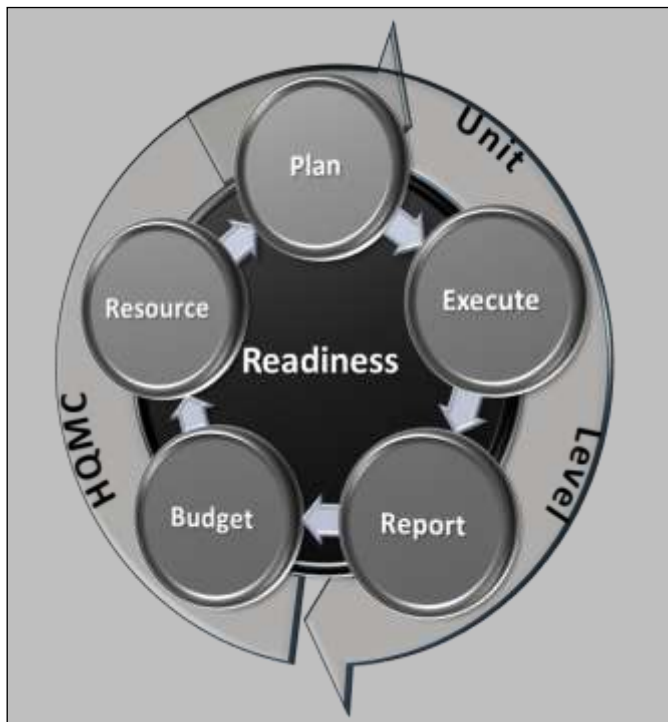


3.6 AVIATION TRAINING AND READINESS PROGRAM

Marine aviation must be prepared to respond to operational tasking around the world. Its effectiveness is directly related to unit sortie generation capability, the ability to command and control aviation assets, and our ability to train mission skill-proficient crews and combat leaders in a standardized manner to meet Mission Essential Task List output standards.

Aviation Training and Readiness Program

The Marine aviation training and readiness (T&R) program aligns with Department of Defense (DoD) and joint requirements by prescribing training standards required to develop core competent units that can fulfill operational requirements of combatant commanders. The T&R program implements a comprehensive, capabilities-based training system providing mission skill-proficient crews and combat flight leaders to MAGTF and combatant commanders. The T&R program has been updated to identify training resource requirements and assist in HQMC planning and budgeting. The Marine aviation T&R program structure, unit readiness reporting methods, and training resources requirements' contribution to force readiness is depicted below.

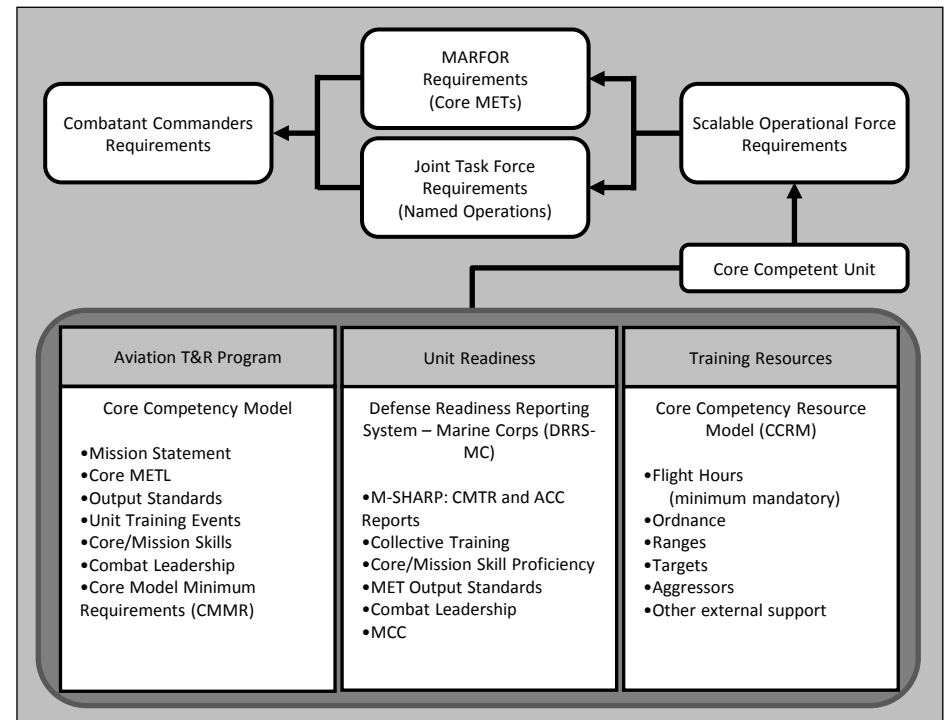


T&R Program Manual

NAVMC 3500.14C, *Aviation Training and Readiness (T&R) Program Manual*, outlines the standards, regulations and policies regarding the training of Marine Corps aircrew; command and control; airfield emergency and operations services; and meteorological and oceanographic personnel.

The foundation of every Marine aviation community T&R is the Commandant of the Marine Corps-approved Core Competency Model. The Core Competency Model establishes the basic structure around which each T&R program is created and links the following:

- Mission statement
- Mission Essential Task List (METL)
- Core Model Minimum Requirement (CMMR)
- Unit Core Capability (MET Output Standards)
- Core/Mission Skill Proficiency (CSP/MSP), Crew CMMR, and combat leadership (CL) requirements



AVIATION TRAINING AND READINESS PROGRAM

Mission Essential Task List

Each aviation community has a unique Mission Essential Task List (METL) which captures the capabilities for which a unit was designed. The METL is composed of Mission Essential Tasks (METs) derived and validated from the Marine Corps Task List. Each unit-specific MET is defined as either Core (primary capability) or Core Plus (on demand or theater specific capability) and forms the basis for community T&R development.

Mission Skills

T&R Program Manual establishes a framework whereby training is composed of essential events that act as enablers for advanced skills and events known as “mission skills.” Mission skills are linked to METs. Aircrew who are trained to standard in MET-specific mission skills enable a unit to execute that MET.

MET to Core/Mission/Core Plus Skill Matrix

The MET to Core/Mission/Core Plus Skill Matrix ensures that skills are linked to METs, thus laying a firm foundation for both training program structure and accurate readiness reporting. This matrix is produced in each T&R manual and represents the training required to satisfy MET training and readiness requirements. It is in the mission skills-to-MET correlation where a commander can best gauge the readiness of his unit to accomplish a specific MET.

MET to Core/Mission/Core Plus Skill Matrix

METL	CORE SKILLS 2000 PHASE							MISSION SKILLS 3000 PHASE				
	AS (H)	LEN	IN	LAT	SEC FORM	DIV FORM	IR TR	ALT	CEL	BAR	BER	ED
MCT 1.3.3.3.2 Conduct Aviation Ops From Expeditionary Shore-Based Sites	X						X	X				
MCT 1.3.4.1 Conduct Combat Assault Transport	X	X	X	X	X	X	X		X			
MCT 1.3.4.2 Conduct Air-to-Air Refueling	X		X		X	X	X			X		
MCT 1.3.4.2.1 Provide Aviation Delivered Ground Refueling	X										X	
MCT 4.3.4 Conduct Air Delivery	X		X		X	X	X					X

Sortie-Based Training Program

The Marine Aviation Sortie-Based Training Program (SBTP) enables squadron commanders to develop their unit's TEEP and train mission skill-proficient aircrew and combat leaders to their T/M/S T&R Core Model Minimum Requirement (CMMR) to maintain a T-2 level of readiness. A T-2 level of readiness allows a unit to fully execute its Mission Essential Task output standards in support of a Marine Air-Ground Task Force or joint force commander.

An annual SBTP forecast is developed at the squadron level, then reviewed and approved through the MAG/MAW/MCI/MARFOR/DCA chain of command. Unit SBTP forecasts shall be submitted by each respective MARFOR NLT 1 September to HQMC Aviation Plans and Policies each year for the following fiscal year (FY) or as specified by the SBTP Message.

HQMC Aviation Plans and Policy (APP) consolidates the MARFOR-approved inputs into a single Marine aviation SBTP by T/M/S.

Monthly Unit SBTP Execution Submission: the monthly unit SBTP execution report provides Marine aviation organizations at all levels the required data to track unit SBTPs and FHP execution.

M-SHARP SBTP Forecast/Execution Reports

The screenshot displays the M-SHARP SBTP Forecast/Execution Reports interface. It is divided into two main sections: 'SBTP Forecast' and 'SBTP Execution'. Both sections show a summary of total tasks and a detailed breakdown by skill category. The 'SBTP Forecast' section includes a table with columns for various skills and their status. The 'SBTP Execution' section includes a table with columns for various skills and their execution status. Both sections also include a summary of total tasks and a breakdown by skill category.

AVIATION TRAINING AND READINESS PROGRAM

Marine Corps Sierra-Hotel Aviation Readiness Program (MSHARP)

M-SHARP provides Marine aviation units a user-friendly, comprehensive web-based system with robust training management, scheduling, event tracking, and objective operational risk management capabilities. M-SHARP is the USMC authoritative data source for a multitude of Marine aviation training and readiness data points and utilizes an aviation data warehouse to archive historical data for enhanced trend analysis across a variety of aviation related areas of interest.

Marine aviation has made great advances in M-SHARP schedule automation preventing commanders' scheduling of delinquent or unqualified aircrew for an event without requisite skills, proficiency, or supervision.

The next step on Marine aviation's automated training management roadmap increases functionality for flying squadrons and the sustained use of M-SHARP by MACCS and METOC units. TECOM (ASB) is responsible for the management of M-SHARP.

Squadrons' utilization and data assurance levels are reported monthly and are critical to the validation and verification process. Level 1 data ensures squadrons' utilization of M-SHARP is proper and the data is valid.

Defense Readiness Reporting System – Marine Corps (DRRS-MC)

DRRS-MC captures the present state of a unit's personnel, equipment, resources and METL ability (training). It is a resourcing, force sourcing, and readiness tool that feeds DRRS-Strategic. Marine aviation can assess DRRS-MC METL ability through the development of highly objective T&R standards and the use of MSHARP. M-SHARP provides various tools to assess a near real-time picture of a unit's aircrew readiness and provides the commander a ready-reference to better inform the DRRS-MC assessment.



FLYING HOUR PROGRAM (FHP) AND CORE COMPETENCY RESOURCE MODEL (CCRM)

Marine Corps flying hour program management is detailed in MCO 3125.1B.

The term “flying hour program” refers to the allocation and obligation of funds from the Operation and Maintenance, Navy (OMN) and Operation and Maintenance, Navy Reserve (OMNR) accounts appropriated to the Marine Corps for the operation and maintenance of Marine Corps aircraft.

Marine Corps flight operations management is composed of two elements: the Sortie Based Training Program (SBTP) and the FHP. The SBTP is the commander’s execution tool while the FHP, which provides policy, guidance, and responsibilities for the execution of the Marine Corps flight hours, is the HQMC’s budgeting tool. It is important to stress that the SBTP is the foundation for all that we do, while the FHP is a measuring tool used by OPNAV to allocate resources. All commanders shall use all available resources to ensure their commands are trained per the current editions of the appropriate type/model/series T&R manuals. Key sections of the FHP order include:

- Marine Corps Flying Hour Programs
- Marine Corps Unit CCRM Guidelines
- Marine Corps Sortie Based Training Program
- Marine Corps FHP Reporting

Marine Corps Flying Hour Programs

Schedule A: Tactical Aircraft (TACAIR) FHP

Deployable active component (AC) fixed-wing, rotary-wing and tiltrotor squadrons. Activated reserve component (RC) squadrons will also be funded from the gaining MARFOR TACAIR FHP.

Schedule B: Fleet Air Training (FAT) FHP

All Marine Corps fleet replacement squadrons (FRS).

Schedule C: Fleet Air Support (FAS) FHP

Deployable and non-deployable AC operational support aircraft (OSA), SAR, HMX-1, VMX-22, and VMFT-401 aircraft.

Schedule D: Reserve FHP

Deployable and non-deployable RC FW/RW/TR squadrons and OSA aircraft.

Management of FHP Cost Growth

Due to increased operational tempo necessitated by Overseas Contingency Operations (OCO), USMC FHP Contract Maintenance Support (CMS) experienced significant cost growth. In an effort to mitigate these increases, the Deputy Commandant of the Marine Corps for Aviation released the ‘Marine Corps Aviation Flying Hour Program Contract Policy and Guidance’ message (312009ZMar10). This message directs that CMS-related reports be submitted quarterly and each level of command reviews its funded contracts for efficacy and necessity and eliminate those without requirement.

Core Competency Resource Model (CCRM)

CG, Training and Education Command (TECOM) Aviation Training Division Branch (ATB) is the custodian of the CCRM for each T/M/S. The CCRM directly links the FHP, T&R syllabi, and the readiness reporting system (DRRS-MC) in order to generate annual flying hour and sortie requirements (including training, support, or operational sorties) for T-2.0 readiness level. The Deputy Commandant for Aviation uses CCRM data as the primary guide/validation tool when providing annual TACAIR FHP inputs to the USN OP-20 budgeting document.

Marine Corps SBTP Guidance

In recent years the Marine Corps FHP experienced a negative trend in SBTP baseline flight hour execution. The divergence between the annual CCRM modeled training requirement and the execution of SBTP flight hours is typically due to aircraft availability, increased mission and T&R requirements. This has resulted in an unfavorable optic in a pressurized budget environment potentially placing funding for the T-2.0 flight hour requirement.

In order to promote accurate and executable SBTPs that successfully achieve readiness goals that mirror the CCRM requirements, HQMC Aviation Plans, Policy, & Budget branch released the ‘FY14 Marine Corps Aviation SBTP Guidance’ message (241123ZJUL13). This message defines the CCRM and SBTP, describes the utility of the Operational Forecasting tool to assist in the development of a unit’s SBTP, and outlines those data points and variables that shall be factored into an accurate and executable SBTP. 184

MARINE CORPS FLYING HOUR PROGRAM

Presidential Budget (PB) FY16

Fleet Aircraft FHP Requirement by T/M/S

T/M/S	Hours
AV-8B	17,024
MV-22B	36,532
F-35	6,978
CH-53E	25,081
KC-130J	21,395
AH-1W	16,267
AH-1Z	9,800
UH-1Y	18,243
F/A-18A/C/D	33,504
EA-6B	3,978
TOTAL	188,802

*Schedule A
Source: PB-16 v3549 for
FY16-20



Schedule	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20
Fleet aircraft (TACAIR) Hours	191,526	188,802	187,403	189,622	192,568	190,669
Fleet Replacement Squadron (FRS) Aircraft Hours	28,008	30,710	29,571	29,297	28,577	26,772
Fleet Air Support Aircraft Hours	28,349	28,460	28,617	28,914	29,753	29,039
Reserve aircraft Hours	28,070	28,382	28,261	28,200	28,592	30,225
USMC FHP TOTAL BUDGETED HOURS	275,953	276,354	273,852	276,033	279,490	276,705

Source: Ex-OP20 v3624 for FY15, PB-16 v3549 for FY16-20

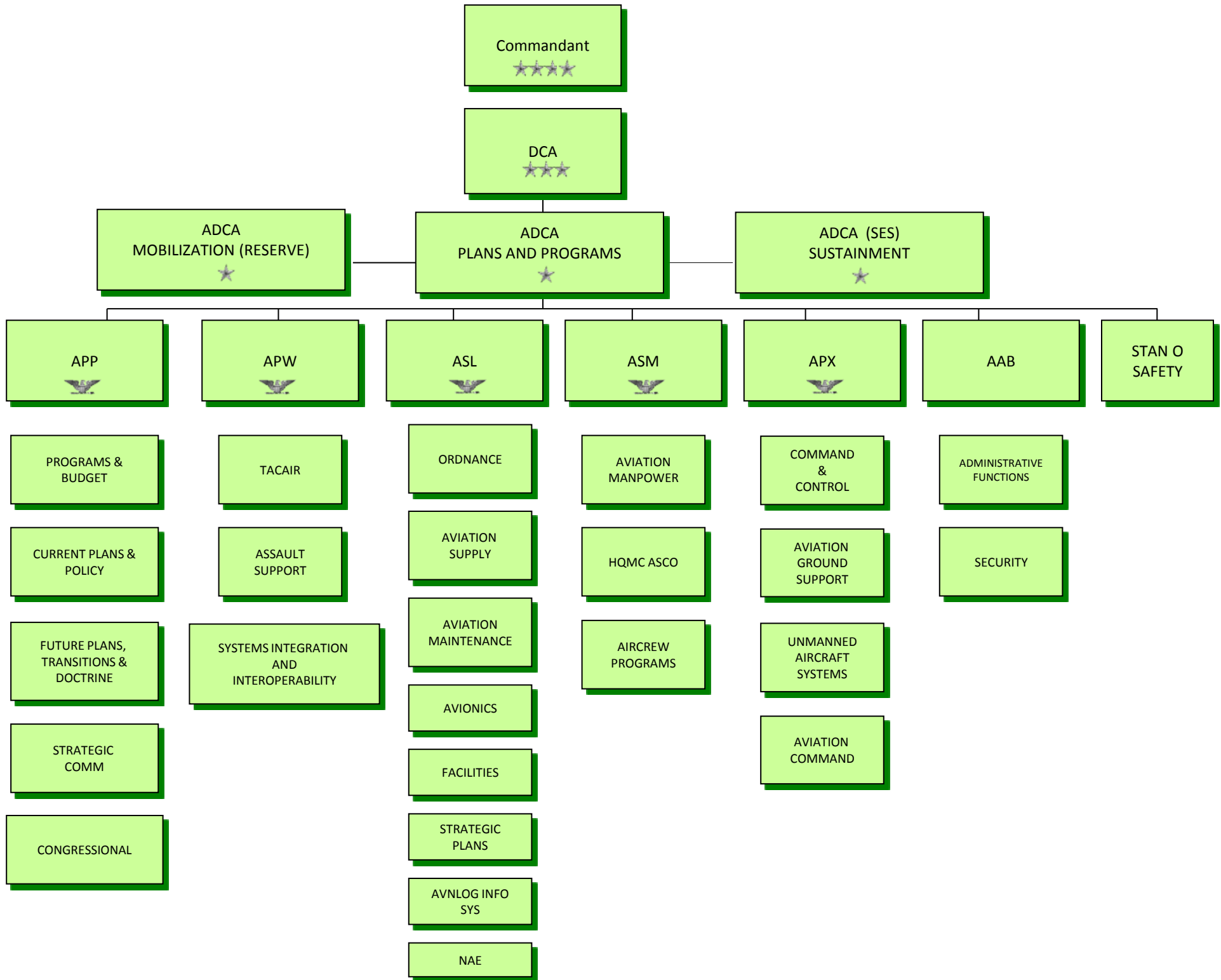
MARINE AVIATION AIRCRAFT INVENTORY

T/M/S	CURRENT INVENTORY	AVERAGE AGE
AH-1W	123	24.70
AH-1Z	37	3.74
AV-8B	114	19.29
C-20G	2	21.08
C-9B	2	32.79
CH-53E	149	27.22
EA-6B	27	28.59
F-35B	36	2.14
F-5F	1	37.08
F-5N	11	34.44
FA-18A	55	28.99
FA-18B	7	30.80
FA-18C	119	22.58
FA-18D	92	21.68
HH-1N	4	43.02
HH-46E	4	45.54
KC-130J	48	8.58
KC-130T	16	25.37
MV-22B	240	4.78
RQ-21A	2	1.20
RQ-7B	40	6.36
T-34C	3	37.22
TAV-8B	16	26.01
UC-12F	4	28.72
UC-12M	4	27.54
UC-12W	6	4.80
UC-35C	2	15.70
UC-35D	10	11.14
UH-1Y	112	3.41
UH-3D	1	47.41
UH-60N	1	14.58
VH-3D	11	39.86
VH-60N	8	27.12



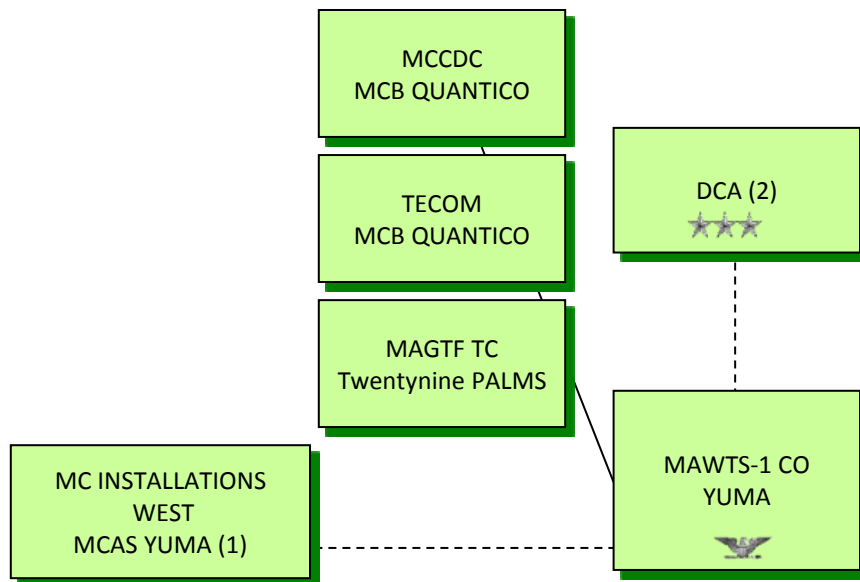
3.7

HEADQUARTERS MARINE CORPS AVIATION ORGANIZATIONAL CHARTS

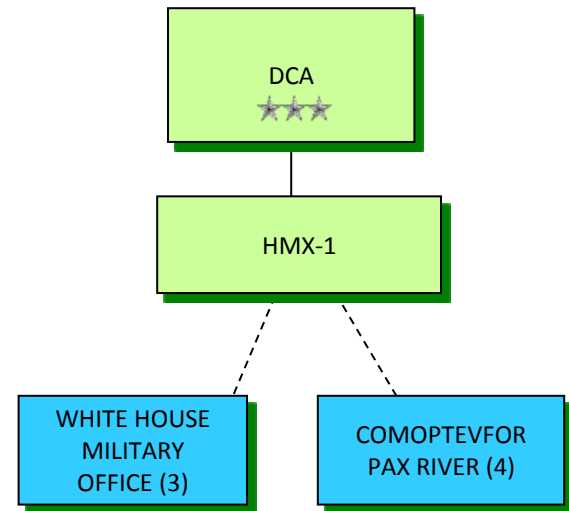


AVIATION-UNIQUE ORGANIZATIONAL CHARTS

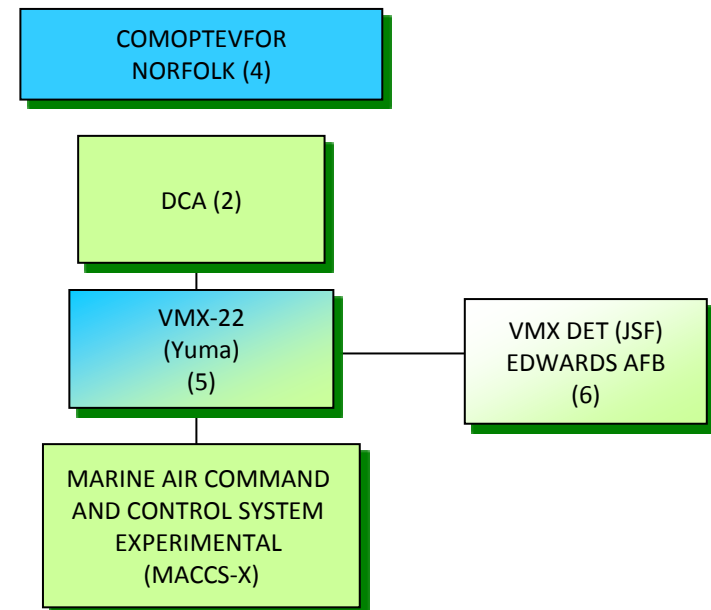
MARINE AVIATION WEAPONS AND TACTICS SQUADRON ONE



MARINE HELICOPTER SQUADRON ONE



MARINE OPERATIONAL TEST AND EVALUATION SQUADRON TWENTY-TWO

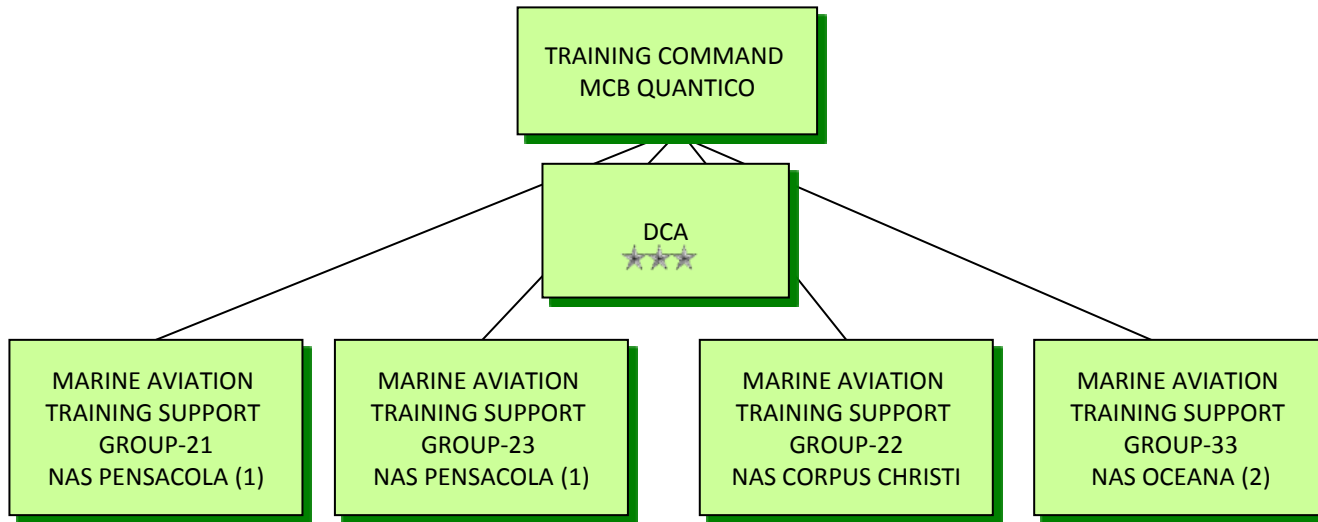


NOTES:

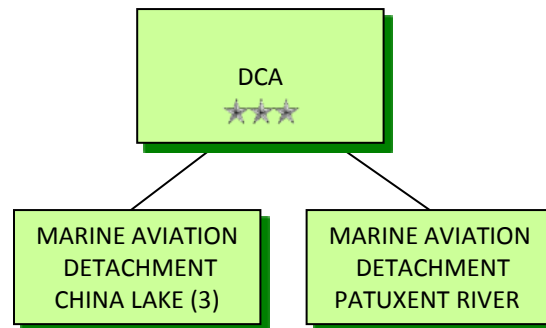
- 1) FISCAL/COMPTROLLER SUPPORT.
- 2) ADVOCATE
- 3) TASKING FOR PRESIDENTIAL MISSIONS.
- 4) OPCON FOR OPERATIONAL TEST MISSIONS.
- 5) VMX-22 RE-LOCATED TO MCAS YUMA IN 2015.
- 6) VMX DET (JSF) RE-LOCATES TO MCAS YUMA AT COMPLETION OF JSF SYSTEM DESIGN AND DEVELOPMENT (SDD) 2018 (EST).

AVIATION-UNIQUE ORGANIZATIONAL CHARTS

MARINE AVIATION TRAINING SUPPORT GROUPS (MATSGs)



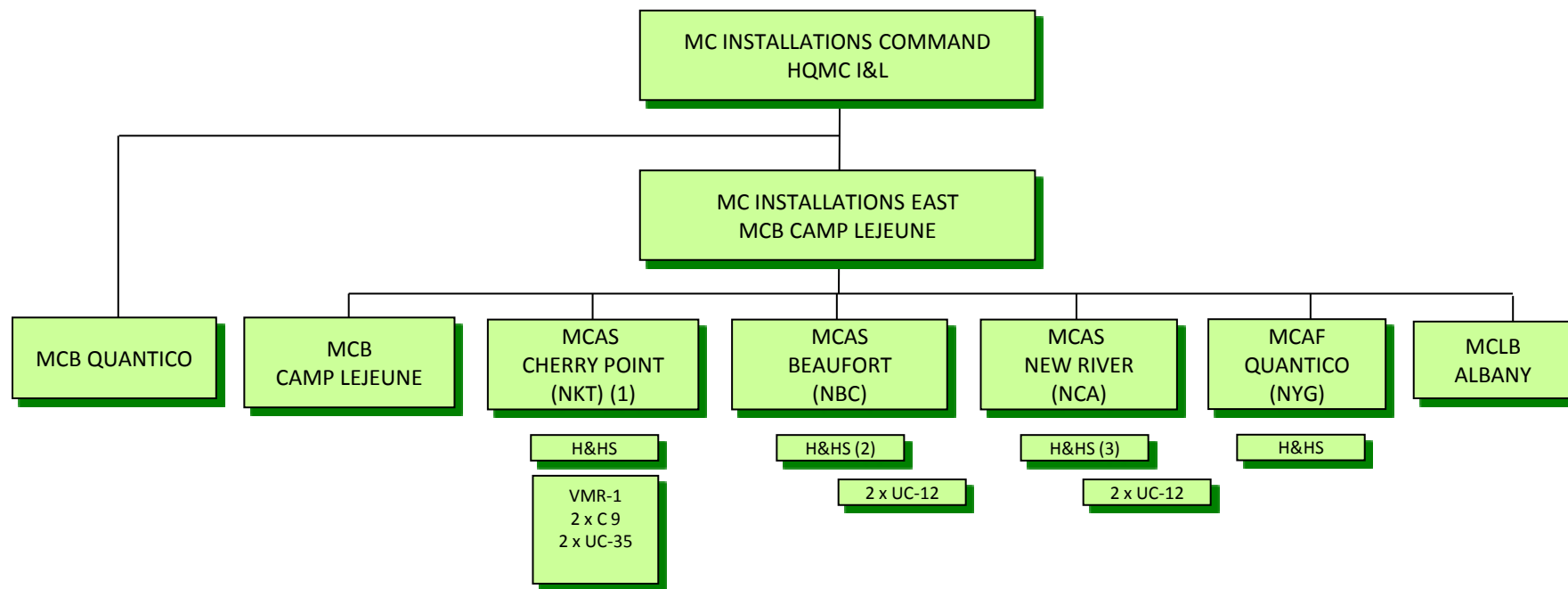
MARINE AVIATION DETACHMENTS (MADs)



NOTES:

- 1) MATSG-21 AND MATSG-23 COLOCATED
- 2) MATSG-33 CLOSES IN FY 16.
- 3) MAD CHINA LAKE IS CURRENTLY O-6 COMMAND; IN FY 2017, MAD CHINA LAKE BECOMES O-5 COMMAND REPORTING TO MAD PATUXENT RIVER.

CURRENT MARINE CORPS INSTALLATIONS EAST ORGANIZATIONAL CHART

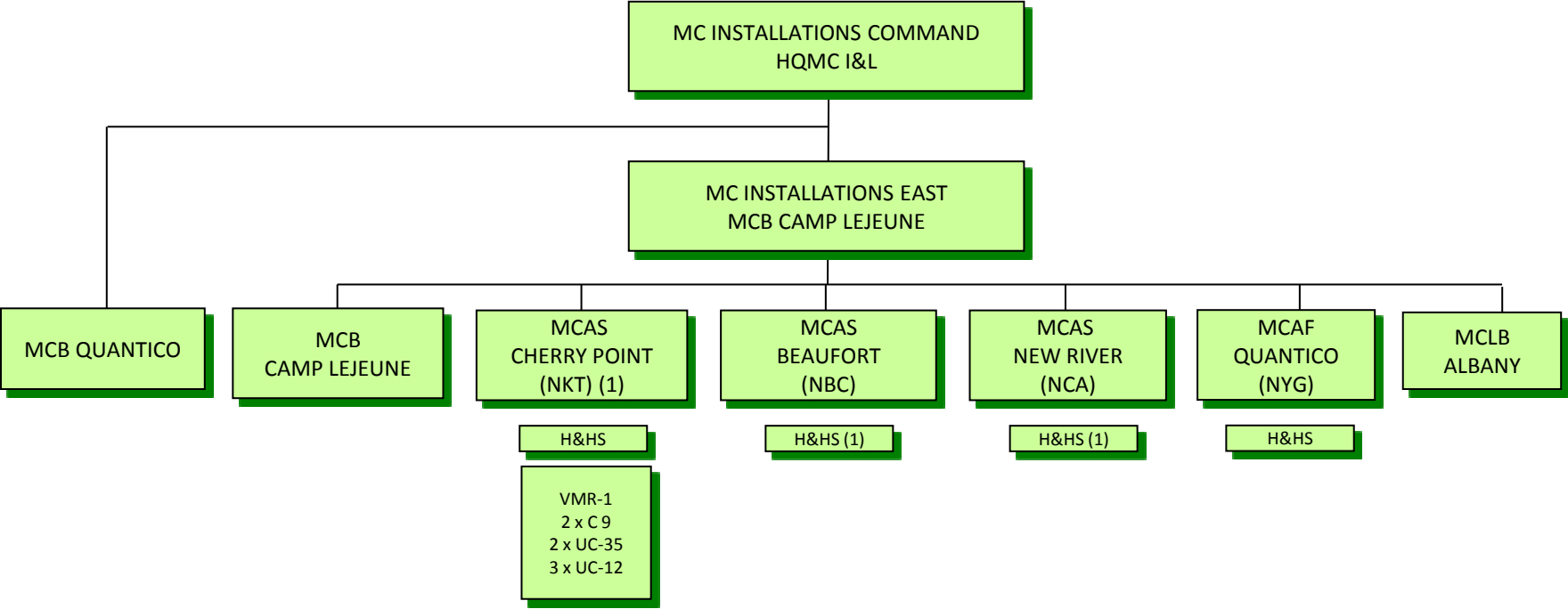


NOTES:

- 1) VMR-1 IS AN ACTIVE DUTY SQUADRON ASSIGNED TO MCI EAST STATIONED AT MCAS CHERRY POINT.
- 2) H&HS MCAS BEAUFORT 2 X UC-12M.
- 3) H&HS MCAS NEW RIVER 2 X UC-12F.

* Air station commanding officers have advocacy relationship with wing commander and staff for prioritization and planning for aviation issues.

FUTURE MARINE CORPS INSTALLATIONS EAST ORGANIZATIONAL CHART

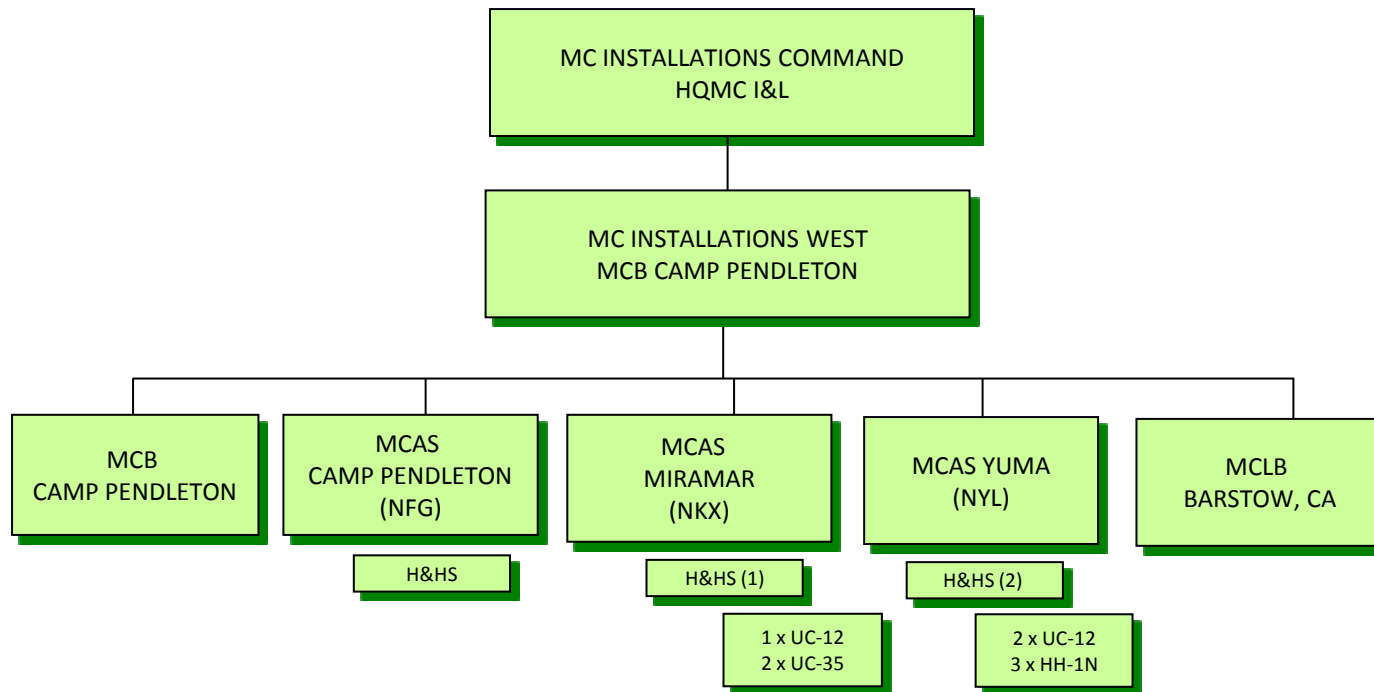


NOTE:

1) DCA INITIATIVE: CONSOLIDATE OSA ASSETS FROM BEAUFORT AND NEW RIVER UNDER VMR-1 IN CHERRY POINT (4 UC-12)

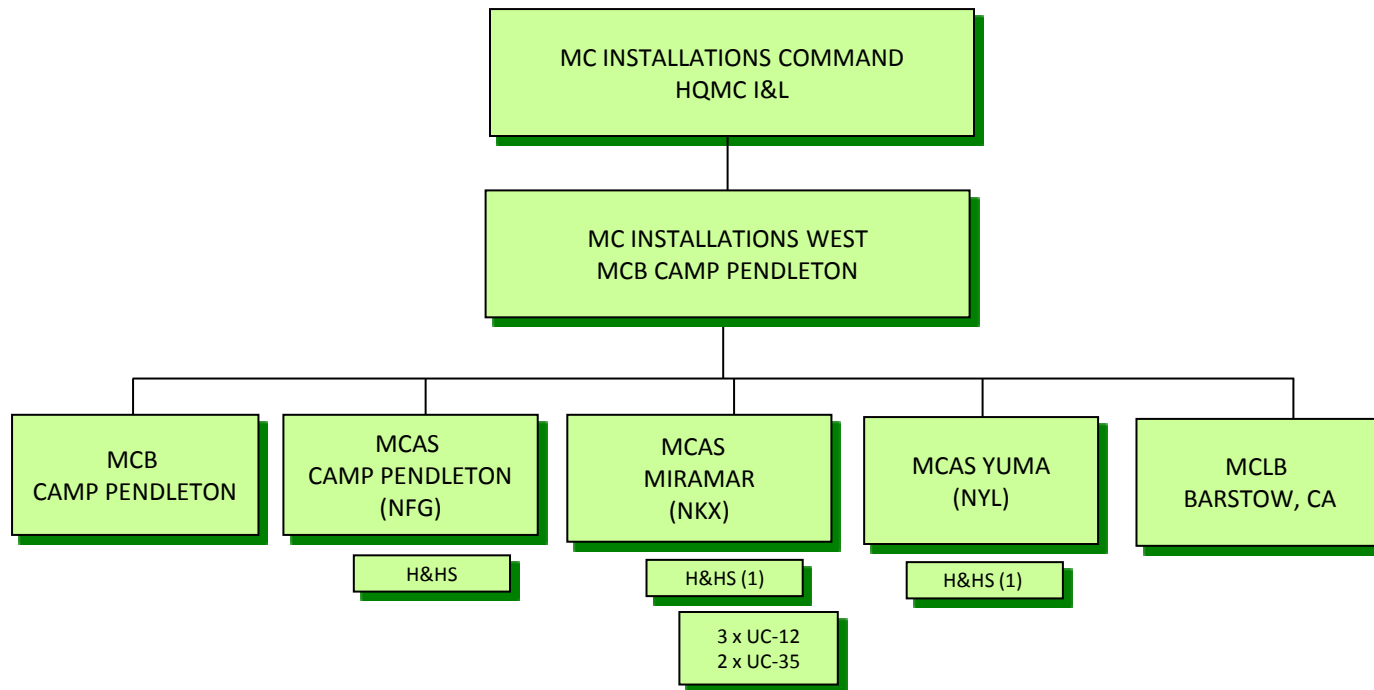
* Air station commanding officers have advocacy relationship with wing commander and staff for prioritization and planning for aviation issues.

CURRENT MARINE CORPS INSTALLATIONS WEST ORGANIZATIONAL CHART



* Air station commanding officers have advocacy relationship with wing commander and staff for prioritization and planning for aviation issues.

FUTURE MARINE CORPS INSTALLATIONS WEST ORGANIZATIONAL CHART

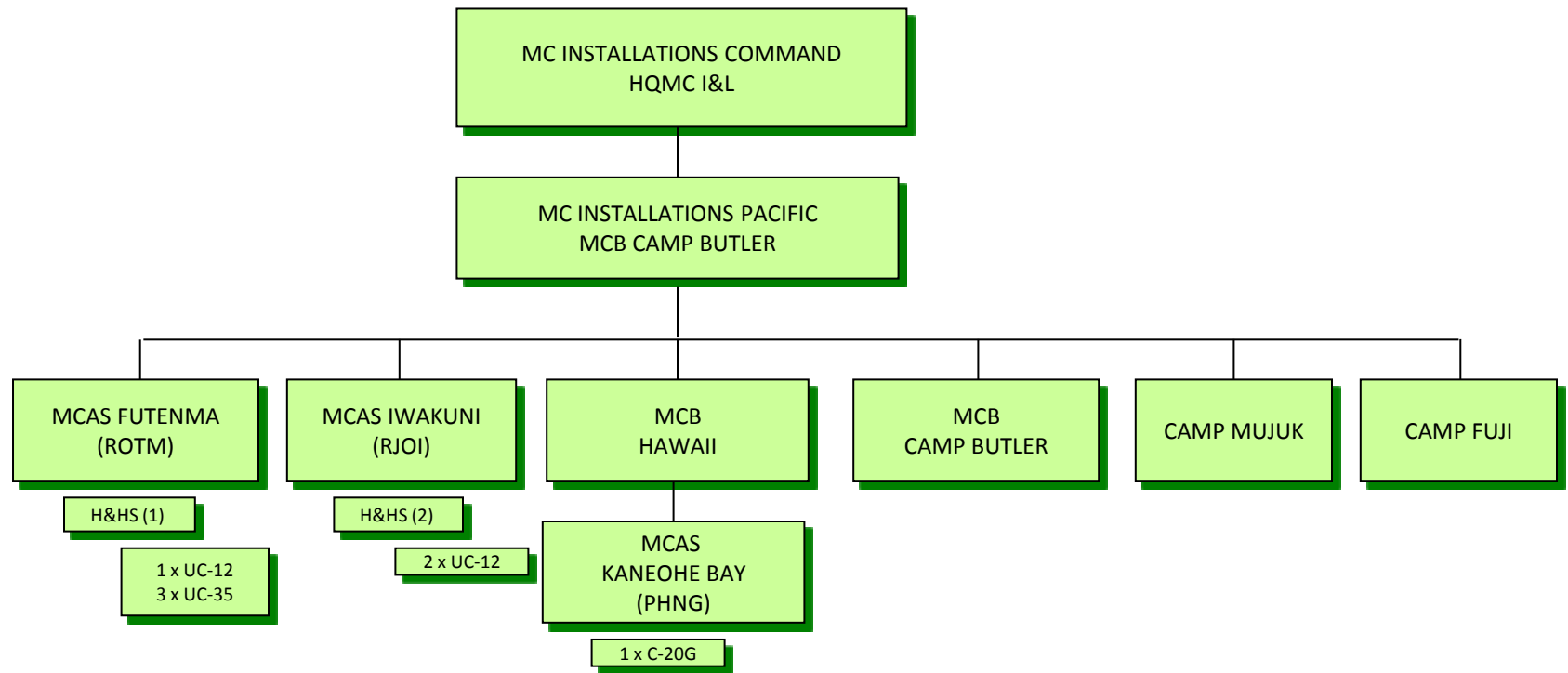


NOTE:

- 1) UPON DIVESTURE OF SAR, MCAS YUMA OSA ASSETS WILL CONSOLIDATE AT MCAS MIRAMAR.

* Air station commanding officers have advocacy relationship with wing commander and staff for prioritization and planning for aviation issues.

CURRENT MARINE CORPS INSTALLATIONS PACIFIC ORGANIZATIONAL CHART

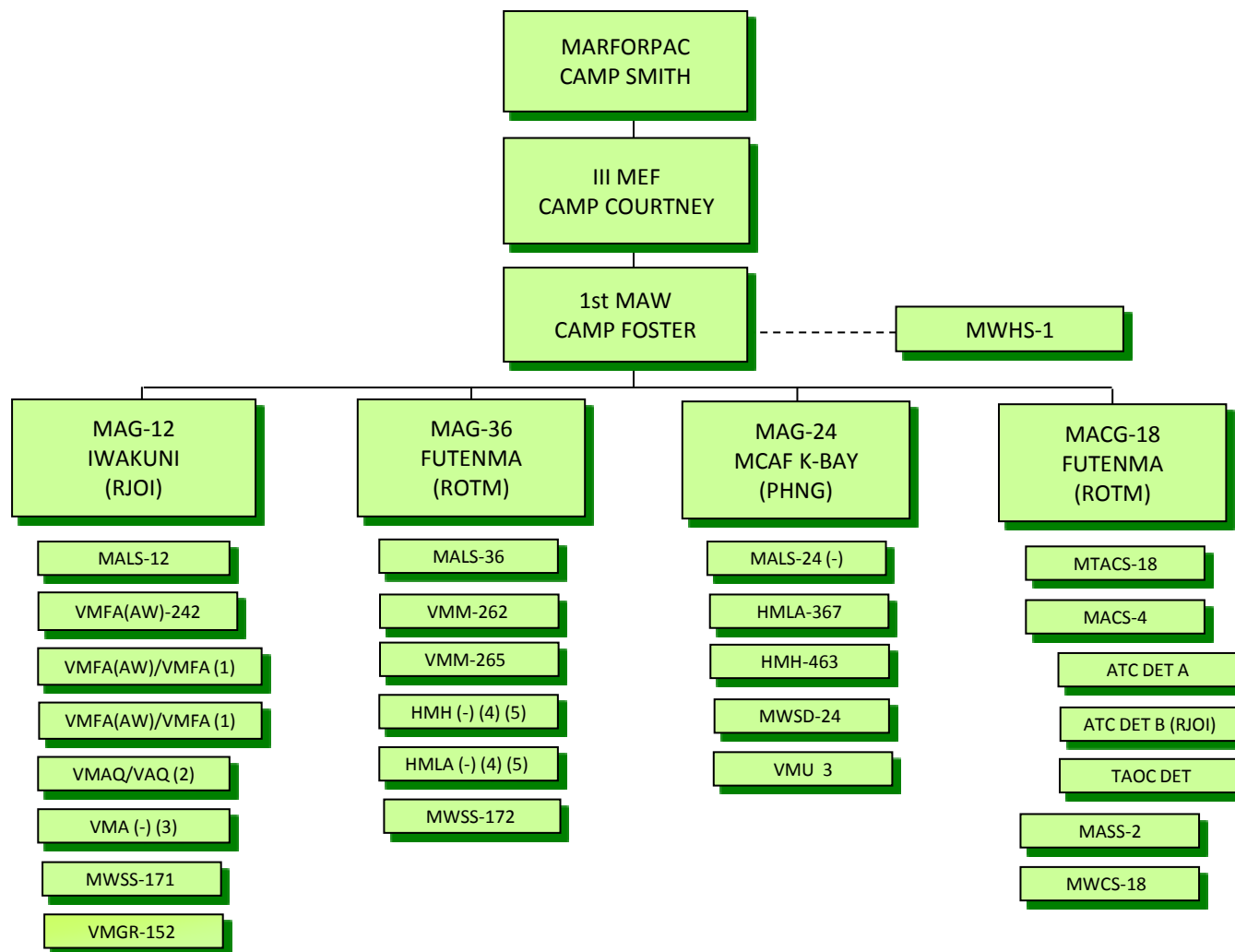


NOTES:

- 1) H&HS MCAS FUTENMA OPERATES 1 X UC-12W EQUIPPED WITH EXTENDED RANGE TANKS.
- 2) H&HS MCAS IWAKUNI OPERATES 1 X UC-12W NOT EQUIPPED WITH EXTENDED RANGE TANKS AND 1 X UC-12W EQUIPPED WITH EXTENDED RANGE TANKS.

* Air station commanding officers have advocacy relationship with wing commander and staff for prioritization and planning for aviation issues.

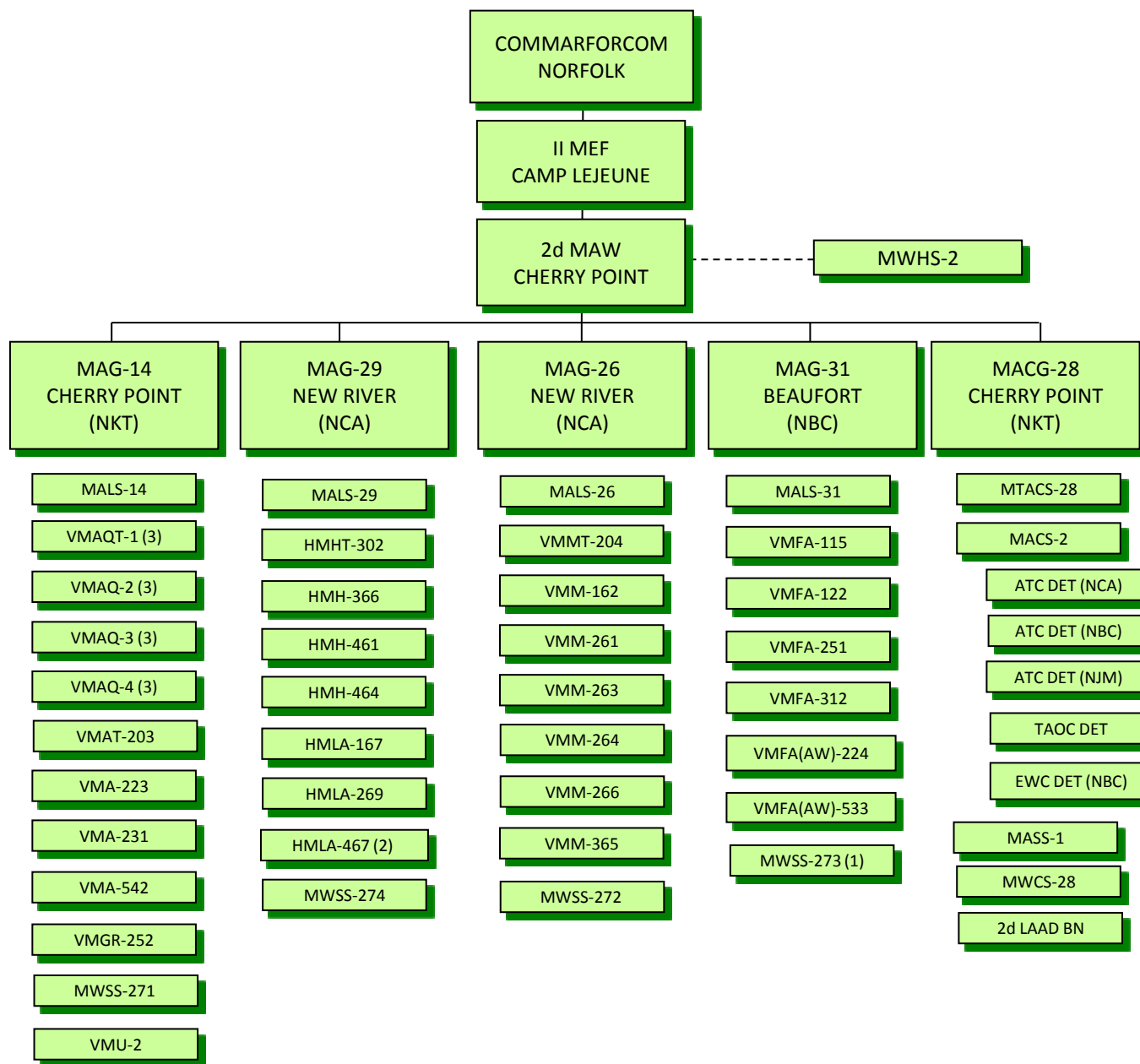
FY15 MARFORPAC/1st MAW ORGANIZATIONAL CHART



NOTES:

- 1) UDP SQUADRON SOURCED FROM 2d/3d MAW.
- 2) UDP SQUADRON SOURCED THROUGH GFMP (USMC/USN SQUADRON).
- 3) UDP SQUADRON (-) ISO 31ST MEU
- 4) UDP SQUADRON TYPICALLY SOURCED FROM 3d MAW.
- 5) 31ST MEU DETACHMENT SOURCED BY 1stMAW/3dMAW.

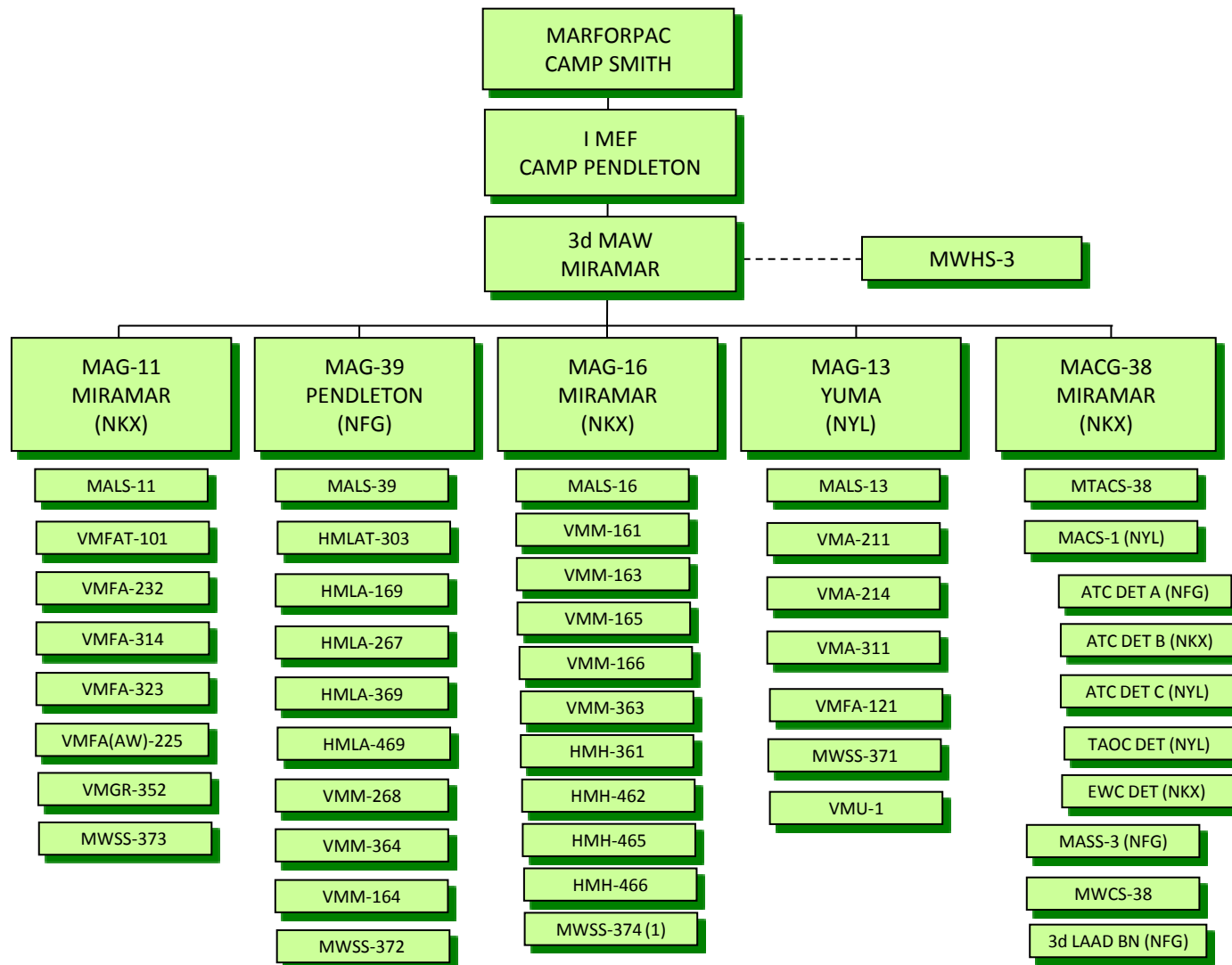
FY15 MARFORCOM/2d MAW ORGANIZATIONAL CHART



NOTES:

1. MWSS-273 BECOMES MWSD-31 IN FY-17.
2. HMLA-467 DISESTABLISHES IN FY16.
3. VMAQ SQUADRONS SUNDOWN PLAN: VMAQT-1 in FY16; VMAQ-4 in FY17; VMAQ-3 in FY18; VMAQ-2 in FY19

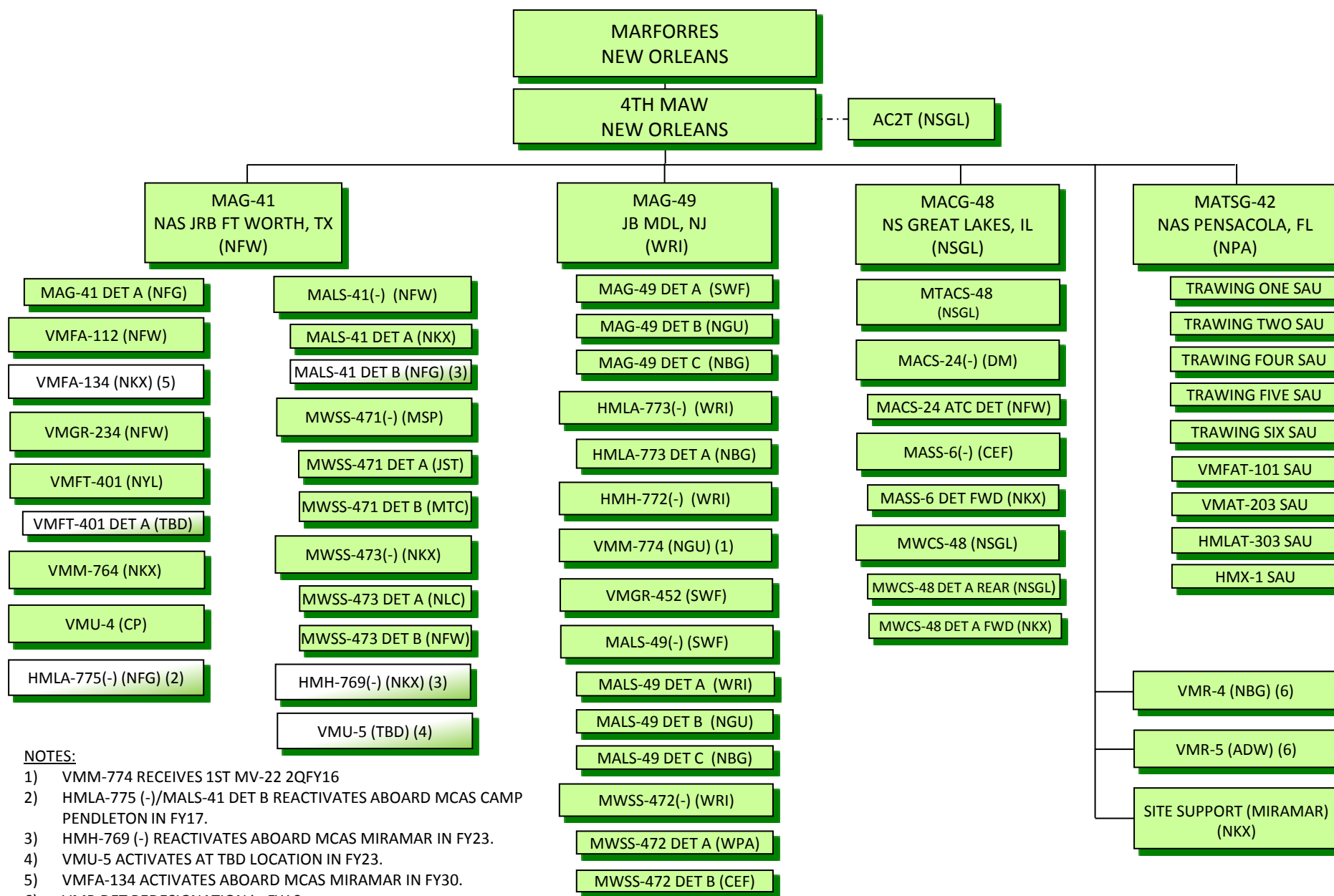
FY15 MARFORPAC/3d MAW ORGANIZATIONAL CHART



NOTES:

1) MWSS-374 BECOMES MWSS-374 (-) IN FY17

4TH MAW ORGANIZATIONAL CHART



ADW – Joint Base Andrews, MD
MTC – Selfridge ANGB, MI
NKX – MCAS Miramar, CA
WPA – Wyoming, PA

BKF – Buckley AFB, CO
MSP – Minneapolis, MN
NLC – NAS Lemoore, CA
WRI – Joint Base McGuire-Dix-Lakehurst, NJ

CEF – Westover ARB, MA
NBG – NAS JRB New Orleans, LA
NPA – NAS Pensacola, FL

CP – MCB Camp Pendleton, CA
NFG – MCAS Camp Pendleton, CA
NSGL – NS Great Lakes, IL

DM – Dam Neck/Oceana, VA
NFW – NAS JRB Fort Worth, TX
NYL – MCAS Yuma, AZ

JST – Johnstown, PA
NGU – NS Norfolk, VA
SWF – Stewart ANGB, NY



AVIATION MANPOWER

Marine Aviation Manpower Plans

The focus of aviation manpower is to improve current and future readiness through active management of structure and associated aviation policy. Aviation Marines continue to stay highly engaged at home and abroad. Operational tempo, legacy aircraft reset, and fleet upgrades continue to present challenges to managing manpower in a fiscally constrained environment. In particular, Company Grade manpower shortfalls due to draw-down force shaping measures and delays in pilot production further taxed aviation readiness recovery. HQMC Aviation is working with M&RA and Training Command on top-down solutions. Additionally, bottom-up approaches are being utilized with surveys and Operational Advisory Groups that provide feedback and input from the fleet on where HQMC Aviation devotes its advocacy efforts toward.

End Strength

The Marine Corps' end-strength has solidified at 182,000 active duty Marines. Meanwhile, aviation's current operational needs, continued transitions, and future force requirements were factored into the Force Optimization Review Group's (FORG) strategy that supports our current end-strength level. With no anticipated growth in end-strength, aviation structure will need to be managed with the understanding that any increase in structure is at the expense of another community. Any structure changes must result in a net zero change to USMC manpower.

Aviation Structure

In FY15, 40,687 active duty Marines had primary military occupational specialties (PMOS) that were aviation and aviation support-related. Over 22,000 pieces of the Marine Corps structure are used within our fleet aviation units. Management of this structure is aimed at optimization in order to support the attainment of readiness that ensures success for our operational units while also meeting the needs for transitioning platforms and training institutions.

MOS Initiative

The Deputy Commandant for Aviation has instituted an initiative that will assign additional MOSs (AMOS) to aviation designations and qualifications that contribute to the enhancement of combat readiness. As our enlisted and Marine officers attain flight leadership, instructor and maintenance inspector

ratings, MOSs will be assigned to them to ensure their assignments to the correct units, and in order to have a metric of the health of aviation.

Historically, aviation readiness has been inextricably linked to qualifications and designation of our personnel. The MOS Initiative intends to improve our readiness through the creation of metrics that prevent inefficient manning and staffing while also creating opportunities for directed retention incentives of our Marines who have attained advanced qualifications.

Force of the Future

Optimizing structure is only a portion of the equation. We demand much from our Marines and we will continue to do so as our Marines begin to operate and maintain our transitioning platforms with more complex technologies. As we look at how to better train, man and equip our units to succeed operationally, we are seeking ways to improve the training institutions that provide aviation Marines with the proper training to work on our evolving equipment while also reducing timeline inadequacies that reduce our Marines impact on operational units.

With the ever increasing resource demand to train and equipment our Marines, it is absolutely imperative that we continue to recruit, train, educate and RETAIN our best and brightest.



MANPOWER CHANGES WITH A TRANSITIONING FORCE

HQMC Aviation Manpower and Support (ASM), Total Force Structure Division (TFSD) and Manpower and Reserve Affairs (M&RA) continue to manage finite resources to meet the expanding requirements associated with our transition plans and the operational requirements of our force.

The Deputy Commandant for Aviation advocated for first- tour aviators to spend a dedicate period of years in their fleet squadrons before those aviators become eligible for PCS orders. The goal is to maximize the return on investment while also allowing for their professional growth and maturity in their primary MOS.

The TACAIR community has felt the greatest shortfalls in manpower. Solutions are in place to mitigate these current gaps. Through improved maintenance and resources in our training commands, the target for improved “normal” pilot production is FY18.

F-35 Transition

Manpower requirements have been programmed to support all squadron transitions from legacy TACAIR T/M/S's (F/A-18A/C/D, EA-6B and AV-8B) to F-35 and the activation of FRS squadrons through the end of the transition. The first F-35B FRS (VMFAT-501) is located at MCAS Beaufort, while F-35B/C maintenance training is located at the Joint Integrated Training Center (JITC), Eglin AFB. F-35C FRS training is conducted at VFA-101 at Eglin AFB. VMX-22 has assumed the mission of F-35B OT&E.

Transition manpower plans are designed to support manpower requirements for the introduction of F-35 squadrons while maintaining legacy TMS capability. Aviation will continue to convene F-35 transition selection boards to harvest



fleet experience to meet squadron staffing requirements. The FY16 Transition/Conversion board selected nine aviators from all TACAIR T/M/S's. This year we will select our first two pure F-35 aviators from flight school.

F/A-18A/C/D FRS Training

VMFAT-101, an O-6 command, serves as the Marine Corps' sole F/A-18 aircrew producer for CAT I aviators with the divestiture of VFA-106's legacy production in FY18.

VFA-106 will maintain a small cadre of Marine instructor pilots to support CAT training, as well as refresher training for aviators returning to the fleet. VMFAT-101 student production will decrease beginning in FY19 with Weapons Systems Officers and with pilots in FY22.

EA-6B Sundown and EW Way Ahead

Sundown of the EA-6B commences in FY16 with VMAQT-1. Each subsequent year a Prowler squadron will stand down until completion in FY19. The management and redistribution of the VMAQ structure and its personnel will be closely monitored to ensure operational readiness is maintained while also responsibly managing the career paths of those that stay in the community through its final sundown. This will be accomplished through the continued use of the Transition/Conversion board process and re-designation process of MMOA-3 to fill gaps in manpower.

MAGTF EW is the Marine Corps' comprehensive plan to address post-EA-6B Prowler EW requirements. MAGTF EW will be an integration of manned and unmanned EW capabilities. These capabilities fill operational requirements and also provide the retention of the EW corporate knowledge that is currently held within the VMAQ community.

KC-130J Conversion

With the active component fully transitioned to the J model KC-130, the reserve component will continue transitioning to the KC-130J through its procurement life cycle. Additionally, as KC-130 pilots continue their training as Fire Control Officers (FCO) in the Harvest HAWK variant of the armed KC-130J, their capability will expand while minimizing the manpower impact on the squadrons and on Marine aviation.

MANPOWER INITIATIVES WITH A TRANSITIONING FORCE

MV-22 Transition

Active-duty Marine Aircraft Wings' HMM-to-VMM transitions are complete and the transitional focus is now on the reserve squadrons. The move of two 3d MAW VMM squadrons to Hawaii is continuing. This move will provide a greater distribution of the MV-22 manpower structure across the globe, to better position and capitalize on Osprey capabilities while also improving deployment-to-dwell ratios.

The detachment capabilities of the MV-22 community continues to expand and further highlights efforts to allow commanders to match the appropriate force against our operational requirements in order to optimize our manpower resources. As the community progresses to fill its ranks and to meet the growth of an additional squadron on both east and west coast, deployment to dwell ratio is expected to increase which will allow our personnel and equipment more time to rest, refit, train and inevitably increase operational readiness.

The annual transition/conversion board process for fixed and rotary-wing pilots from outside the MV-22 community for transition to the MV-22 platform is under review as the MOS-producing capability of the FRS becomes saturated. B-billets for officers and enlisted will continue to be staffed by MMOA and MMEA as community health improves. As the VMM community continues to mature, manpower requirements will continue to be evaluated and improved as required.

UH-1Y/AH-1Z Conversion

The conversion to the UH-1Y is complete in both active and reserve components of Marine aviation. The AH-1Z conversion is still underway with the sequence remaining 3d MAW, 1st MAW, 2d MAW, and then 4th MAW. As of the summer of 2015, 3d MAW has 42 UH-1Y aircraft and 34 AH-1Z aircraft. 2d MAW has 26 UH-1Y aircraft, and will begin converting to the AH-1Z in the



third quarter of FY18. HMLA-469 is next to convert to the AH-1Z aircraft in FY16, followed by HMLA-367.

The change in Primary Mission Aircraft Authorization (PMAA) mix of HMLA squadrons to 15 AH-1Z and 12 UH-1Y has created an opportunity for growth in UH-1Y pilot production. Transition/conversion boards will continue to provide opportunities to fill available UH-1Y positions.

HMLA-467 is scheduled for deactivation at the end of FY16 while HMLA-775 will be reactivated as the second reserve HMLA in FY17. The AH-1W production ends at HMLAT-303 in Q1 of FY19. The AH-1W pilot population will continue to be closely monitored to ensure appropriate career progression opportunities are available and communicated as its sundown nears.

CH-53K Transition

The CH-53K transition is scheduled for 2d MAW, 1st MAW, 3d MAW and then 4th MAW. Due to a shallow procurement ramp, the first squadron transition will take four years. Once HMH-366 has completed its transition, squadron transitions will take 18 months with two squadrons transitioning at a time.

The CH-53K is scheduled to achieve IOC in FY19. In order to ensure a successful IOC, a large contingent of pilots and maintainers who participated in the initial operational test of the CH-53K at VMX-22 will transition to HMH-366, the first operational CH-53K squadron.

In order to capitalize on lessons learned from previous transitions and minimize reliance on contract maintenance, a maintenance training support detachment was established in West Palm Beach, Florida. Upon completion of the maintenance detachment assignment, these Sikorsky engineer-trained Marines will be assigned throughout the CH-53K fleet to pass on their expertise.

MANPOWER INITIATIVES WITH A TRANSITIONING FORCE

UAS Transition

The Marine Unmanned Aerial Vehicle Squadron (VMU) tables of organization are structured and manned to support the RQ-7 Shadow, MQ-21 Blackjack, and now the Training and Logistics Support Activity (TALSA) for the Small Unmanned Aircraft Systems (SUAS). Previously staffed by contractor support personnel, the TALSA will now be manned and led by VMU-trained Marines in order to continue the training, maintenance and development of SUAS throughout the Marine Corps.

A Fleet Replacement Detachment and eventually squadron for the Blackjack is standing up at MCAS Cherry Point. The VMU FRD/S is intended to provide an MOS - producing school for the Blackjack as the Marine Corps proliferates its inventory with these new systems.

In FY16, VMU-1 completes its relocation from MCAGCC Twenty-nine Palms, CA to MCAS Yuma, AZ. This move will provide more support to VMU-1 through its physical location adjacent to its parent MAG, MAWTS-1, VMX-22 and the Yuma Training Range Complex.



Marine Aviation Training Support Groups

Marine aviation will reduce time to train and increase the capabilities of our Marines entering into fleet aviation. We are concerned about staffing shortfalls in our Marine Aviation Training Support Groups (MATSG). We know Marine aviation MOS production's linkage to fleet readiness; efforts are underway to improve instructor staffing.

Additionally, efforts are underway to implement tiltrotor training modifications that reduce time to train by up to ten weeks while also reducing resource requirements. Also underway is a review of the introductory flight syllabus (IFS). The goal is to ensure IFS maximizes its value to our future student naval aviators and student naval flight officers.

The last initiative under review is to reduce overall time to train for rotary wing aviators while also increasing the rotary wing hours to the syllabus. This effort falls in line with the overall goal of getting our Marines into fleet aviation faster, while ensuring that the standards are upheld or improved. The Deputy Commandant for Aviation will continue to work closely with our Navy brethren to ensure our Marines' time and training is optimized.

PERSONNEL EXCHANGE PROGRAM

Personnel Exchange Program (PEP)

The Marine Corps shares aviation exchange billets with our sister services, allies, and partners. In addition to these billets, the Marine Corps continues to expand exchange programs to share tactical experience and operational employment concepts for a new generation of aircraft, unmanned aircraft systems, and C2 technology. Applicants for PEP billets are thoroughly screened to ensure they are the most competitive and qualified individuals to represent their service and country. Tables 4-2 depicts current USMC aviation exchanges. More information can be found on the HQMC Aviation website.

<http://www.aviation.marines.mil/Branches/ManpowerandSupport/PersonnelExchange.aspx>

Current Aviation Exchanges

Country/Service	USMC Billets with Foreign Nation or Inter-Service	Foreign Nation or Inter-service Billet with USMC
Australia	ARH Tiger (RAA)	AH-1 (MAG-39)
	F/A-18 (RAAF)	F/A-18 (MAG-31)
	F/A-18 Maintenance Officer (RAAF)	F/A-18 Maintenance Officer (VMFAT-101)
	Air Traffic Control (RAAF)	Air Traffic Control (MACG-38)
Canada	CC-130 (CAF)	KC-130J (VMGR-252)
	F/A-18 (CAF)	F/A-18 (MAG-31)
Finland	F/A-18 (FINAF)	F/A-18 (VMFAT-101)
Italy	AV-8B (ITN)	AV-8B (MAG-14)
Spain	AV-8B (SPN)	AV-8B (MAG-13)
United Kingdom	C-130 (RAF) - A400 IN 2019	KC-130J (VMGR-352)
	Mk4 Sea King (RN)	MV-22 (MAG-26)
	Mk7 Lynx (RM)	AH-1 (MAG-39)
	Air Defense Control (RAF)	Air Defense Control (MAWTS-1)
	Typhoon F2 (RAF)	F/A-18 (VMFAT-101)
	JSF Staff Exchange (RAF Air Cmd)	JSF Staff Exchange (HQMC AVN)
	Chinook (RAF)	CH-53 (HMHT-302)
	UAS (RN)	UAS (VMU-2)
United States Air Force	MC-130 (Cannon AFB)	KC-130J (VMGR-252)
	EC-130 EWO (Davis-Monthan AFB)	EA-6B ECMO (MAG-14)
	F-35 (Nellis AFB)	F-35 (Fill in 2017)
	JTAC (AGOS/JFCC) (Nellis AFB)	JTAC (EWTGPAC)
	HH-60G (Davis-Monthan AFB)	UH-1Y (MAG-39)
	Air Traffic Control (Eglin AFB)	Air Traffic Control (MACG-38)
	Air Defense Control (Hill AFB)	Air Defense Control (MACG-38)
	F-16 (Shaw AFB)	F-5 (VMFT-401)
	F-16 (Luke AFB)	F/A-18 (MAG-31)
	CV-22 (Eglin AFB)	MV-22 (MAWTS-1)
	CV-22 (Cannon AFB)	MV-22 (Fill in 2019)
United States Army	AH-6 (160th)	AH-1 (MAWTS-1)
United States Navy	F/A-18 (NSAWC, NAS Fallon)	F/A-18 (MAWTS-1)

TABLE 4-2



- 4.1 Platform Quick Reference “Quad” Charts
- 4.2 Marine Corps Air Station Facilities / MILCON
- 4.3 Aviation Training Systems Roadmap



Program Description

The Joint Strike Fighter brings strategic agility, operational flexibility and tactical supremacy to the MAGTF and represents the centerpiece of Marine aviation transformation. The F-35B unites 5th generation stealth, precision weapons and multi-spectral sensors with the expeditionary responsiveness of a Short Take-off and Vertical Landing (STOVL) fighter-attack platform. The F-35C provides additional flexibility and persistence operating from aircraft carriers.

The F-35 in 2015:

- 38 aircraft delivered into Marine Corps service
- 2 USMC squadrons in place
- Block 3F DT underway
- CMC declared F-35B IOC in July 2015
- First planned deployment: Spring 2017

F-35 B/C Lightning II

Transition Task Force (TTF) and Cross Functional Teams (CFT)

- CFT 1: Test and Training
- CFT 2: Organization and Manpower
- CFT 3A: Maintenance/Logistics
- CFT 3B: Installations/Facilities/Environmental
- CFT 4: Requirements
- CFT 5: Autonomic Logistics Information System (ALIS) integration

Working Issues

Program Update

- F-35B has flown more than 9000 sorties and over 13000 flight hours
- F-35B completed 3 successful ship test trials in 2011, 2013, and 2015
- F-35C completed successful ship test trials in 2014
- VMFAT-501 commenced flight operations in May 2012
  - Squadron received 12th aircraft in April of 2014
- VMFA-121 commenced flight operations in Jan of 2013
  - Received its 16th aircraft in December of 2013



- Combat radius: F-35B = 450 nm; F-35C = 600 nm
- Internal fuel: F-35B = 14,000 pounds; F-35C = 20,000 pounds
- Ordnance load-out: F-35B = 15,000 pounds; F-35C = 18,000 pounds
- Internal carriage: F-35B 2 x 1,000 pound class + 2 x AIM-120 AMRAAM
F-35C 2 x 2,000 pound class + 2 x AIM-120 AMRAAM
- Max gross weight: F-35B = 61,500 pounds; F-35C = 70,400
- Cruise speed w/ attack payload: .94M / Top speed: 1.6M
- Offensive systems: APG-81 radar, Electro Optical Targeting System (EOTS)
- Defensive systems: advanced Electronic Warfare / Electronic Protection (EP/EW), electro-optical Distributed Aperture System (DAS)
- Network systems: Link 16, VMF, Multi-function Advanced Data Link (MADL)
- Low observable, 360° integrated fused sensor information
- Current software load is 2B / 3i : initial combat capability
- Aircraft will be full combat capable in August 2017.

Performance / Systems

Program Description

VMFA Mission: Support the MAGTF commander by destroying surface targets and enemy aircraft, and escorting friendly aircraft, day or night under all weather conditions during expeditionary, joint, or combined operations.

F/A-18

- Active: 11 Squadrons
- FRS: 1 Squadron
- Reserve: 1 Squadron

Enduring Missions Both Coasts

- TAI: 3 squadrons
- UDP: 2 rotational squadrons + 1 assigned squadron
- SPMAGTF-CR-CC: 1 rotational squadron commitment shared with AV-8B

Contingency Operations

- TBD

F/A-18A-D Hornet

F/A-18 Inventory managed to support JSF transition

Structural Life Management Program Goals (minimum)

- SLEP Phase B complete
- 6,000 hrs → 10,000 hrs
- 2000 Traps → 2700 (1500 B/D)
- 8,300 landings → 14,500 (20,000 B/D)
- .78 FLE → 1.0 FLE (via 421 CBR+)

Mission System Goals to meet AVPLAN Requirements

- HOL Mission Computer and upgraded displays
- G4 LITENING
- Digital CAS Interoperability – Gen 5 radio with 27C
- EW Suite - ALR-67(v3) and ALQ-214
- JHMCS - Complete
- LINK 16 - Complete
- AIM-120D and AIM-9X Block II

Working Issues

Program Update

- F/A-18A+/C/D Inventory Issues
  - SLAP Phase II, SLEP Phase A and B complete
  - Phase C (ECP Kit installs begin in FY2014)
- ECP-583 (A++, C+)
  - A++ complete
  - C+: 30 aircraft FY16 to FY19
- APG-73 RUG II Expand 4/5 (F/A-18D)
  - All-weather enhanced target resolution capability
- Litening Targeting Pod
  - Generation IV, A/A MSI integration
- Electronic Warfare
  - ALR-67v3
  - ALQ-214
  - **Intrepid Tiger II V 1 Block X**
- Weapons
  - **APKWS**
  - **Net Enabled Weapons study**
  - AIM-9X Block II
  - AIM-120D



- Combat radius: 500+ nm (900+ km)
- Seating capacity/crew options:
  - Model F/A-18A+/C: one-seat (pilot-only)
  - Model F/A-18D: two-seats (pilot/WSO)
- Dimensions: length 56 ft (17.1 m), wing span 40 ft (12.3 m), height 15.3 ft (4.7 m)
- Propulsion: two F404-GE-402 engines, each with 18,000 pounds of thrust
- Top speed: Mach 1.8 (Cruise 0.78M – 0.85M)
- Aircraft gross weight: 24,000-25,000 pounds (13,700 pounds external weapons and fuel payload)
- Armament: Air – Air
  - AIM-9, AIM-120, AIM-7, 20mm Gun
- Armament: Air – Ground
  - 20mm Gun, Rockets, GP bombs, Laser Guided, GPS weapons, Dual Mode
- Sensors:
  - APG-65/73 RADAR, Litening FLIR, Advanced Tactical Air Reconnaissance System (ATARS on F/A-18D only)
- Electronic Warfare:
  - ALE-39 / 47, ALQ-126B / 165 / 214, ALR-67v(2) / v(3)

Performance / Systems

Program Description

VMA Mission: Support the MAGTF commander by destroying surface targets and escorting friendly aircraft, day or night under all weather conditions during expeditionary, joint, or combined operations.

AV-8B:

- Active: 6 Squadrons/96 Aircraft
(becoming 5/96 in June 2016)
- FRS: 1 Squadron/30 Aircraft
- Test: 4 Aircraft
- FS Custody: 1 Aircraft (Day attack configuration)
- Total: 130 Aircraft

Enduring Missions

- MEU: 12 Aircraft deployed / 12 in work ups
- UDP: 8 Aircraft deployed ISO 31st MEU
- SPMAGTF-CENT: 10 aircraft (biennial rotation with F/A-18)

Program Update

- Tactical Data Link
  - Link 16 UUNS being routed from CD&I to MROC
  - WTI 2-14 TacDemo utilized TTNT in TPOD to provide L16 picture to pilots and Full Motion Video to embarked troop commander in MV-22; further development in future WTI TacDemos
  - Digital Video Recorder – funded drop-in replacement
- Digital Improved Triple Ejector Rack (DITER)
- Airborne VMF Terminal (AVT) procurement and installs
- CNS/ATM
  - RNP/RNAV funded for non-precision GPS approach
  - IFF Mode 5/S – partially funded replacement for current APX-100
- Stores
  - AIM-120 A/B/C
  - APKWS II – integration efforts in work
  - AIM-9X
  - Intrepid Tiger II V 1 Block X



AV-8B Harrier

- Airframe/Engine Sustainment
  - Close Ready Basic Aircraft (RBA) gap
    - Readiness Management Program/Engineering support
  - Sustain Engine Readiness Goal
    - Material availability/sustained production
  - Post-production support to address obsolescence mitigation
- Warfighter relevance upgrades to meet operational requirement
- Funded Tactical Relevance upgrades
  - H6.2 OFP Upgrade
    - Initial Link 16 capability
    - RNP/RNAV (GPS approach)
    - Mission Planning update
  - H7.0 OFP Upgrade
    - Full Link 16 capability
    - Weapons modernization

Combat Radius: ~300nm (500nm w/tanks)

Weapons Stations: 7

Empty Weight: 14,912 pounds

Max Gross Weight: 32,000 pounds

Propulsion: Rolls Royce F402-RR-408 turbo fan providing 23,400 pounds of thrust

Top Speed: 585 KCAS/1.0 IMN

Armament: 500/1000-pound GPS/Laser/General Purpose Bombs, CBU-99/100, CBU-78, MK-77, 2.75/5.0 inch rockets, AGM-65E, AIM-120B, AIM-9M, GAU-12

Sensors: APG-65 RADAR, AN/AAQ-28 LITENING Pod, NavFLIR, Dual-mode tracker

Electronic Warfare: ALE-47 ECM, ALR-67 RWR, ALQ-164 DECM Pod

Network Systems: Automatic Target Handoff System/VMF, LITENING C-band video downlink, Intrepid Tiger II

Working Issues

Performance / Systems

Program Descriptions

MAGTF EW Mission: Support the MAGTF commander by conducting airborne electronic warfare, day or night, under all weather conditions during expeditionary, joint, or combined operations. Increase combat survivability of ground forces, assault support and strike aircraft & weapons by denying, degrading, disrupting the enemy's ability to target and engage our forces.

EA-6B

- 3 operational squadrons of 6 aircraft
- 1 fleet replacement squadron of 6 aircraft
- Transition to ICAP III completed in 2012
- Program of record into 2019

MAGTF EW

Intrepid Tiger II (ALQ-231)

- AV-8B, F/A18, AH/UH series aircraft
- 116 pods for counter-comms and IW RF target sets
- Technology and capacity to field radar variant of Intrepid Tiger II
- MV-22 and KC-130 in development

EA-6B Prowler and AEA Systems

MAGTF EW

- ICD approved

EA-6B

- ICAP III transition complete
- VMAQT-1 (FRS) FOC April 2014, deactivation FY16

ALQ-231 Intrepid Tiger II

- EOC of Block '0' pod conducted in OEF in 2012
- MEU focused –
  - Organic EW capability
  - Currently deployed on AV-8B and F/A-18
  - (V) 1. Deployed on AV-8B and F/A-18 aircraft
  - (V) 2. **Planned UAS variant**
  - (V) 3. Rotary-wing, UH-1Y EOC FY16

Program Update

EA-6B:

- Fully funded ICAP III Block 7 upgrades

ALQ-231 Intrepid Tiger II:

- Continued development of AH/UH variant of Intrepid Tiger II
- Program to field radar variant of Intrepid Tiger II (Block X)
- **Program to field UAS variant of Intrepid Tiger II (V2)**

F-35B:

- **Expansion of inherent JSF EW capabilities and target sets**



- Combat Radius – 30 min. out; 1 hr. 45 min. TOS - 30 min RTB; 20 min. reserve
- Weapons Stations - 5
- Top Speed – Subsonic
- Empty Weight – 34,000 pounds
- Max Gross Weight & Use Payload – 61,500 pounds
- Cruise Speed w/ Attack Payload – 0.86 IMN with Stores
- Offensive Systems –ICAP III ALQ-218 Receiver and ALQ-99 pods; USQ-113 Communications Jammer; AGM-88 HARM; LITENING Pod; ALE-43 Bulk Chaff Pod
- Defensive Systems – ALE-47
- Network Systems - Multi-functional Info Distribution System (MIDS) with Link 16; Integrated Broadcast System (IBS)

Working Issues

Performance / Systems

Program Description

Mission: Support the MAGTF commander by providing air-to-air refueling and assault support. The installation of the bolt-on/bolt-off Harvest HAWK ISR Weapon Mission Kit enables the KC-130J to conduct multi-sensor imagery, reconnaissance (MIR), target acquisition, indirect and direct fires adjustment, battlefield damage assessment and destroy surface targets day or night under all weather conditions during expeditionary, joint, or combined operations.

Program Update

- USMC Program of Record (POR): 79 KC-130J aircraft (TOAI)
  - 3 active squadrons of 15 KC-130Js (PMAI)
  - 2 reserve squadrons of 12 KC-130Js (PMAI)
  - 9 pipeline assets (BAI), (1) asset T&E (PDAI)
- 48 KC-130J aircraft delivered as of the date of this publication.
  - 3 additional aircraft scheduled for delivery in FY16
  - 4 additional aircraft funded
  - 24 aircraft short of POR
- Survivability Upgrade Roadmap:
  - AAQ-24B(V)25 DoN LAIRCM/ATW
- Interoperability Upgrade Roadmap:
  - Dual Vortex (Harvest HAWK)
  - Block 7.0/8.1 with Link 16
  - SRP
  - EO/IR Sensor



KC-130J Hercules

- 4th MAW KC-130J Transition: Accelerated KJ procurement to transition reserve component VMGR squadrons from the KC-130T to the KC-130J aircraft
- Procurement and integration delays of the C-130J block upgrade 7.0/8.1 will impact compliance with CNS/ATM mandates.
- MILCON transition to an all Marine aircrew training solution requires Fuselage Trainers (FuT), Cockpit Procedure Trainers (CPT), and Observer Trainers (ObsT).
- PFPS Mission Planning transition to JMPS.

- Range (20,000-pound Payload) . . . . . 3,250 nm
- Empty Weight . . . . . 91,000 pounds
- Fuel Capacity . . . . . 58,500 pounds
- Maximum Normal Takeoff Weight (2.0g). . . . . 164,000 pounds
- Maximum Cruise Speed . . . . . 320 kts
- Cruise Ceiling . . . . . 25,000 ft
- Fuel Offload @ 1200nm / 20,000 ft . . . . . 30,000 pounds
- Passenger Capacity (Ground Troops) 92
- Paratroop Capacity 64
- Air Ambulance Litter Capacity 74

Defensive Electronic Countermeasures:

- Radar Warning Receiver (RWR) AN/ALR-56M
- Advanced Missile Warning System and Laser Detecting Set .. AN/AAR-47(V)2
- Advanced Countermeasure Dispenser System (CMDS) AN/ALE-47
- Advanced IR Countermeasure System . . . . . AN/ALQ-157 version 2

- SATCOM BLOS.....Hatchmount KuSS antenna

Working Issues

Performance / Systems

Program Description

Mission: Support the MAGTF commander by conducting intelligence, surveillance, reconnaissance, target acquisition, indirect and direct fires adjustment, battlefield damage assessment and destroying surface targets day or night, under all weather conditions, during expeditionary, joint, or combined operations.

Description: The USMC has fielded a bolt-on/bolt-off ISR/weapon mission kit for use on existing KC-130J aircraft. This mission kit is designed to rapidly re-configure a KC-130J aircraft with the appropriate modifications (A-kit) into a platform capable of performing persistent Multi-sensor Imagery Reconnaissance (MIR) and Close Air Support (CAS).

The Harvest HAWK mission kit enables the aircraft to deliver precision fires using Hellfire, as well as Griffin and Viper Strike, Stand Off Precision Guided Munitions (SOPGM). The Harvest HAWK mission kit is designed as a complementary capability that takes advantage of the aircraft's extended range and endurance.

Program Update

Status: The capability first deployed in support of OEF in October, 2010 and has experienced overwhelming success in theater. Feedback from supported units is outstanding.

Ten aircraft have been modified with A-kits to accept the Harvest HAWK mission D-kit and six mission D-kits have been delivered to the Fleet. MROC Decision Memorandum 19-2012 stated the baseline Harvest HAWK requirement is for continuous support to OEF with one mission kit, satisfied through six full (A+D) kits; three kits at 2nd MAW and three kits at 3rd MAW, and that global sourcing of Harvest HAWK assets will be required to support Westpac contingencies.

Harvest HAWK capability is postured to support each CONUS-based MEF as directed.



KC-130J Harvest HAWK

Future upgrades (FY16 and beyond):

- Relocate wing-mounted sensor to aircraft chin
- Regain additional 18k pound fuel capacity.
- Upgrade Mission Operators Pallet
- Hellfire P+ compatibility.
- Full Motion Video (FMV)/Common Tactical Data Link.
- Digitally Aided CAS.
- JAGM

- Combat Radius . . . . . 300 nm
- On-station time at radius. . . . . 8+hrs
- Maximum Speed . . . . . 250 kts
- Operational Ceiling . . . . . 25,000 ft

Systems:

- Sensor . . . . . AN/AAQ-30 Target Sight System (TSS) FLIR/Camera, 3rd Gen Mid Wave FLIR with Color Camera optimizes D/R/I ranges, Laser Range Finder and Designator

- Fire Control . . . . . Lockheed Martin Littoral Combat Ship Fire Control Station (FCS), SOCOM Battle Management System (BMS)

Weapons: (2 Air to Ground Weapons Stations)

- (4) wing-mounted AGM-114 Hellfire
- (2) shot pressurized SOPGM launcher integrated into right hand paratroop door

- Interoperability: . . . . . AN/ARC-210 HAVEQUICK/ SINCGARS Radio, UHF frequency hopping system, SATCOM, Rover IV Down Link

Working Issues

Performance / Systems

Program Description

Mission: Support the MAGTF commander by providing air-to-air refueling, assault support, day or night, under all weather conditions during expeditionary, joint, or combined operations.

Program Update

KC-130J Transition: 4th MAW KC-130Ts will be sold via FMS or retired as KC-130Js are delivered. VMGR-234 (Fort Worth, TX) has transitioned to the KC-130J as of August 2015, followed by VMGR-452 (Newburgh, NY).

- Projected IOC (5 KC-130Js):
  - VMGR-452 – FY21
- Projected FOC: (12 KC-130Js):
  - VMGR-234 – FY20
  - VMGR-452 – FY25

NOTE: KC-130Ts will continue to operate in 4th MAW until the reserve KC-130J transition timeline can be defined



KC-130T Hercules

- KC-130T Parts Obsolescence/Readiness Extension: Due to KC-130J procurement delays, the USMC is investing in upgrades as a bridge to KC-130J transition.
  - Electronic Propeller Control System
  - Engine Indicator Display System
  - Weather RADAR
  - GPS
  - TACAN
- Tactical Systems Operator End of Mission: POA&M to manage sundown of existing inventory of Warrant Officer and Enlisted Tactical Systems Operators.

- Range (20,000-pound Payload) . . . . . 3,000 nm
- Empty Weight . . . . . 87,000 pounds
- Fuel Capacity . . . . . 58,500 pounds
- Maximum Normal Takeoff Weight (2.0g) . . . . . 155,000 pounds
- Maximum Cruise Speed . . . . . 300 kts
- Cruise Ceiling . . . . . 25,000 ft
- Fuel Offload @ 1200nm / 20,000 ft . . . . . 30,000 pounds
- Passenger Capacity (Ground Troops) 92
- Paratroop Capacity 64
- Air Ambulance Litter Capacity 74

Defensive Electronic Countermeasures:

- Radar Warning Receiver (RWR) . . . . . AN/APR-39A(V)2
- Advanced Missile Warning System and Laser Detecting Set . . AN/AAR-47(V)2
- Advanced Countermeasure Dispenser System (CMDS) AN/ALE-47
- Advanced IR Countermeasure System . . . . . AN/ALQ-157A(V)1

Working Issues

Performance / Systems

Program Description

The V-22 is the world's first production tiltrotor aircraft. Unlike any aircraft before it, the V-22 successfully blends the vertical flight capabilities of helicopters with the speed, range, altitude and endurance of fixed-wing transports.

The incredible effectiveness and survivability of this versatile aircraft have been demonstrated time and again, from land-based operations in Iraq, Afghanistan and Special Purpose MAGTFs to sea-based operations in Haiti and Libya.

The future of expeditionary operations and crisis response will leverage the speed and flexibility of the V-22. Marine Air-Ground Task Force commanders will have an expanded area of influence due to the enhanced capabilities of the cornerstone of the aviation combat element, the MV-22.

MV-22B Osprey

- Detachment capability for all VMMs (Manpower, Equipment, Training)
- Facilities, readiness and sustainability for the growing fleet
- Aircraft Survivability Equipment upgrades
- Software Reprogrammable Payload (SRP) with Link 16
- Adding mission kits to support expanded mission sets (Aerial Refueling, enhanced defensive weapons)
- Extended range (Aft Sponson, Additional receivers KC-10/KC-46)

Working Issues

Program Update

Survivability Upgrade Roadmap:

UUNS DON LAIRCM – 2016 (SPMAGTF)

JUONS DON LAIRCM – 2017 (MEU)

RF Threat Protection System

Interoperability Upgrade Roadmap:

Iridium SATCOM in FY17 to provide Beyond Line Of Sight (BLOS) C2 capabilities.

Software Reprogrammable Payload (SRP) with a gateway functionality will be available in FY20 and will incorporate an enhanced situational awareness through voice, data, still photos, and video

Airborne gateway functionality for multiple waveforms, initially including Link 16, ANW2, TTNT, and BE-CDL

Radio frequency identification (RFID) of cargo and personnel to be fielded with SRP

Lethality Upgrade Roadmap:

V-22 Aerial Refueling System (VARS)

Traffic Collision and Avoidance System (TCAS)

Enhanced Weapon System; Medium range immediate suppression

TFLIR; Advanced Targeting Sensor (ATS) with EO/IR optics, Laser Target Designator and Ranging (LTD-R), IR Marker, and Video Data Link (VDL)

Reliability Upgrade Roadmap:

Open Architecture / Modular Avionics

Electrical System Redesign

- Combat Radius: 325nm
- Empty Weight : 35,000 pounds
- Max Gross Weight: 52,600 pounds VTOL / 57,000 pounds STO
- Payload: Internal / External - 24 passengers / 12 litters / 12,500 pounds
- Top Speed: 280 KCAS
- Cruise Speed: 266 KCAS
- Defensive Systems: AAR-47 B(V)2, APR-39 C(V)2, ALE-47, M240D 7.62 / GAU-16 Ramp Gun, GAU-17 IDWS



Performance / Systems

Program Description

The H-1 program replaces the UH-1N and AH-1W aircraft with the AH-1Z “Viper” and the UH-1Y “Venom”. The H-1 Upgrades Program is a single acquisition program which leverages 85% commonality of major components, enhancing deployability and maintainability.

The Venom is the next generation of utility aircraft. Speed, range, and payload have been increased significantly, while decreasing supportability demands, training timelines, and total ownership cost. The advanced cockpit is common to both aircraft, reduces operator workload, improves SA, and provides growth potential for future weapons and joint digital interoperability enhancements.

The cockpit systems assimilate onboard planning, communications, digital fire control, all weather navigation, day/night targeting, and weapons systems in mirror-imaged crew stations.

Procurement objective is 160 UH-1Ys, with FY16 planned as the last year of USMC UH-1Y procurement.

UH-1Y Venom

144 UH-1Ys (Lots 1-12) on contract

- 119 aircraft delivered to date
- All active and reserve component HMLAs have complete initial conversion and are currently building inventory towards their full authorization of 12 UH-1Ys.

Full Motion Video (FMV)

- Fleet Installations to commence 3rd Qtr. 2016

Advanced Precision Kill Weapon System (APKWS)

- The UH-1Y employs the Advanced Precision Kill Weapon System (APKWS)

Program Update

- Interoperability Upgrade Roadmap: Blue Force Tracking, **Software Reprogrammable Payload (SRP) with LINK 16**, FMV – 2016
- **Relevancy Enhancements: Structural / power upgrades – 2021**
- **Reliability Upgrade Roadmap:– 2021**
- Lethality Upgrade Roadmap: APKWS, Advanced Missile Warning System, **DRL Digital Rocket Pod**, Brite Star w/Laser Spot Tracker
- Future Upgrades:
  - Integrated Aircraft Survivability Equipment (ASE)
  - **Degraded Visual Environment solutions**
  - Advanced Threat, Missile, and Laser Warning System



- Combat Radius*: 119 nm
- Weapons Stations: Two
- Empty Weight: 11,700 pounds
- Max Gross Weight: 18,500 pounds
- Use Payload (HOGES): 5,930 pounds
- Cruise Speed: 139 kts
- Offensive Systems: 2.75-inch rockets, fixed forward or crew served 7.62mm/GAU-17A gun and or crew served M240D/GAU-16/GAU-21 machine guns
- Defensive Systems: AAR-47, ALE-47, and APR-39

* (Mission radius with eight combat loaded troops, 5 minute mid-mission HOGES, 10 minutes on station, and 20 minute fuel reserve)

Working Issues

Performance / Systems

Program Description

The AH-1W “Super Cobra” is a combat proven force multiplier for the MAGTF. The Super Cobra provides close air support, strike coordination and reconnaissance, armed reconnaissance, escort, forward air controller airborne, and air interdiction.

The Marine Corps has flown the AH-1W since 1986, with the last AH-1W delivery occurring in 1998. The AH-1W will be replaced by the AH-1Z as part of the H-1 Upgrades Program combined with the UH-1Y.

Although the AH-1Z achieved Initial Operational Capability in 2011, the AH-1W will remain in service until 2021.

Program Update

- AH-1Ws are outfitted with the Night Targeting System Upgrade (NTSU), a 3rd Generation Targeting FLIR with Laser Designator / Rangefinder and color TV camera, which has made significant contributions to the quality of offensive air support provided during Operation Enduring Freedom.
- 90 AH-1Ws have been outfitted with the Tactical Video Data Link (TVDL) system, enabling aircrews to send and receive sensor Full Motion Video (FMV) in C, L, and S Bands in support of reconnaissance and close air support missions.
- The AH-1W employs the Advanced Precision Kill Weapon System (APKWS) laser guided rocket system which achieved Initial Operational Capability (IOC) in Mar 2012.
- The 20mm Linkless Feed System recently deployed to contingency operations has increased gun reliability.
  - Systems forward fit to AH-1Z



AH-1W Super Cobra

The AH-1W will remain relevant through the end of its service life through the incorporation of the systems below:

Helmet Display and Tracker System (HDTs)

- Full Rate production approved Jul 2012
- Fleet installs continue through 2015

Night Targeting System Upgrade

- GFE Reliability kits

Advanced Precision Kill Weapon System (APKWS) laser guided rocket system

- Combat Radius*: 58 nm
  - Weapons Stations: Four
  - Empty Weight: 10,750 pounds
  - Max Gross Weight: 14,750 pounds
  - Useful Payload (HOG): 3,986 pounds
  - Cruise Speed : 131 kts
  - Offensive Systems: 20mm cannon, 2.75 rockets (to include APKWS), TOW, HELLFIRE with multiple warhead configurations and AIM-9 Sidewinder
  - Defensive Systems: AAR-47, ALE-47 Dual Dispenser Pods, ALQ-144, and APR-39
- * (Combat radius includes 30 minutes time on station and a 20 min fuel reserve)

Working Issues

Performance / Systems

Program Description

The H-1 program replaces the UH-1N and AH-1W aircraft with the AH-1Z “Viper” and the UH-1Y “Venom”. The H-1 Upgrades Program is a single Acquisition Program which leverages 85% commonality of major components, thereby enhancing deployability and maintainability.

The Viper is the next generation of attack aircraft. Speed, range, and payload have been increased significantly, while decreasing supportability demands, training timelines, and total ownership cost. The advanced cockpit is common to both aircraft, reduces operator workload, improves SA, and provides growth potential for future weapons and joint digital interoperability enhancements.

The cockpit systems assimilate onboard planning, communications, digital fire control, all weather navigation, day/night targeting, and weapons systems in mirror-imaged crew stations.

The procurement objective is 189 AH-1Zs; 152 are build new aircraft (ZBN).

AH-1Z Viper

92 AH-1Zs (Lots 1-12) are currently on contract.

- 42 AH-1Zs have been delivered to date.

Advanced Precision Kill Weapon System (APKWS)

- APKWS Initial Operational Capability (IOC) scheduled 1st Qtr. 2016
- Laser guided rocket system:
- Full Motion Video (FMV)
- Fleet installations to commence 3rd Qtr. 2016
- The AH-1Z achieved Full Rate Production (FRP) on 28 Nov 2010 and Initial Operational Capability on 24 Feb 2011.
- First deployment of the AH-1Z occurred in the Fall of 2011 as part of the 11th MEU. It was also the first “all upgrades” detachment in which the AH-1Z and UH-1Y deploy alongside one another, showcasing the advantages of 85% commonality.
- Three of the eight active component HMLAs have completed their Z conversion, and are currently building inventory towards their full authorization of 15 aircraft
- Reserve component HMLAs will begin their Z conversion in FY19.

Working Issues

Program Update

- Interoperability Upgrade Roadmap: Blue Force Tracking, **Software Reprogrammable Payload (SRP) with LINK 16**, DI FMV – 2016
- **Relevancy Enhancements: Power Upgrade – 2021**
- **Reliability Upgrade Roadmap:– 2021**
- Lethality Upgrade Roadmap: APKWS, JAGM Advanced Missile Warning System, **Digital Rocket Pod**, TSS w/Laser Spot Tracker
- Future Upgrades:
  - Integrated Aircraft Survivability Equipment (ASE)
  - Degraded Visual Environment solutions
  - Advanced Threat, Missile, and Laser Warning System
  - Enhanced EW capability



- Combat Radius*: 139 nm
  - Weapons Stations: Six
  - Empty Weight: 11,700 pounds
  - Max Gross Weight : 18,500 pounds
  - Useful Payload (HOG): 5,764 pounds
  - Cruise Speed: 139 kts
  - Offensive Systems: 20mm cannon, 2.75 rockets, HELLFIRE with multiple warhead configurations and AIM-9 Sidewinder
  - Defensive Systems: AAR-47 B(V)2, ALE-47, and APR-39
- * (Combat radius includes (8) HELLFIRE, (14) 2.75” rockets, (650) 20mm, 120 chaff and flare, 30 minutes time on station and 20 minute fuel reserve)

Performance / Systems

Program Description

The CH-53E is a heavy lift helicopter designed to transport heavy equipment and supplies during the ship-to-shore movement of an amphibious assault and during subsequent operations ashore.

The aircraft is capable of transporting 32,000 pounds externally at a cruise speed of 100 KIAS to a range of 50 NM, hover for 5 minutes, and return. The CH-53E was derived from an engineering change proposal to the twin-engine CH-53D. Improvements include the addition of a third engine to give the aircraft the ability to lift the majority of the Fleet Marine Force's equipment, a dual point cargo hook system, improved main rotor blades, and composite tail rotor blades. A dual digital automatic flight control system and engine anti-ice system give the aircraft an all-weather capability.

The helicopter seats 32 passengers in its normal configuration and has provisions to carry 55 passengers with centerline seats installed. With the dual point hook systems, it can carry external loads at increased airspeeds due to the stability achieved with the dual point system.

Program Update

Interoperability Upgrade Roadmap:

Software Reprogrammable Payload (SRP) with LINK 16

Reliability Upgrade Roadmap:

Integrated Mechanical Diagnostics System, 419 Engine Upgrade (increases payload by 5000 to 8000 pounds), Engine Reliability Improvement Plan (ERIP)
Prognostic/Diagnostic Based Maintenance Engine Nacelles, Kapton Wiring Replacement

Avionics Upgrade Roadmap:

Critical Systems Upgrade: Mode V IFF, Master Zeroize Switch, GPS Inertial Navigation System (INS), Brown Out Symbolology Set (BOSS), Embedded SATCOM, Smart Multifunction Color Display (SMFCD), Day Heads-up Display (HUD) **Degraded Visual Environment (DVE) Phases 2 and 3**

Future Upgrades:

Integrated Aircraft Survivability Equipment (ASE), Degraded Visual Environment solutions
Advanced Threat Warner Missile Warner/Laser Warning

CH-53E Super Stallion

- Complete Directional IR Countermeasures (DIRCM) installations
- Complete Integrated Mechanical Diagnostic System (IMDS) installations
- Critical Survivability Upgrade (CSU): DIRCM threat message to CDNU, Smart Dispensing, Forward Firing Buckets, Lightweight Armor, SMFCD, Day/Night HUD symbology for DVE, EGI data on 1553 Data bus, AAR-47 Hostile Fire Indication.
- Hot Day Performance Upgrade: Upgrading GE T64-416A to GE T64-419
- Fleet Common Operational Environment (FCOE) became operational, Jul 2012. (This analytical center conducts trend analysis on IMDS and MAF data to support Condition Based Maintenance)
- Condition Based Maintenance study: Analyze IMDS data to develop models that will predict component failures. Maintenance is based on component history and real-time operation vice inspection cycles based solely on hours or days since last inspection.
- Continue analyzing sustainment requirements until CH-53K transition.

- Max range 540 nm; max endurance: 4 hours (unrefueled) / indefinite (HAAR)
- Empty Weight: 37,500 pounds



- Max Weight on Wheels: 69,750 pounds
- Max Gross Weight with External load: 73,500 pounds
- Internal Load: 32 troops or 24 litter patients or 7 40"x48" Warehouse pallets
- External Load: Hook rated to 36,000 pounds
- Flight Controls: Mechanical
- External Hook system: Single-point or Dual-point hook system
- Max Speed: 150 kts
- Armament: 2 XM-218 or 2 GAU-21 .50 caliber machine guns, 1 Ramp-mount GAU-21 .50 caliber machine gun
- ASE: DIRCM, AAR-47(v)2, ALE-47, Dual Dispensing Pods, APR-39
- Network Systems: FBCB2 Blue Force Tracker

Working Issues

Performance / Systems

Program Description

The CH-53K new build helicopter is the only marinized helicopter that can lift 100% of the Marine Corps equipment designed for vertical lift from amphibious shipping to inland objectives under high altitude and hot atmospheric conditions. The aircraft will be capable of externally transporting 27,000 pounds to a range of 110 NM in support of the baseline MEB and is the only heavy lift helicopter currently being developed within DoD.

CH-53K system and capability improvements include : the T408-GE-400 7500 SHP engine, 88,000 pounds max gross weight airborne, low maintenance drive train and rotorhead, 4th generation composite rotor blades, CAAS cockpit, triple hook capability, integrated cargo pallet locking system, and the first DoD heavy-lift rotorcraft aircraft compatible with the Air Mobility Command (AMC) 463L pallet. The CH-53K is designed to reduce logistics shipboard footprint, reduce operating costs per aircraft, reduce direct maintenance man hours per flight hours, and significantly reduce threat vulnerable area compared to the CH-53E.



CH-53K King Stallion

- Sikorsky and PMA-261 in concert with Fleet Subject Matter Experts (SMEs) and HQMC Aviation currently staffing courseware development to support Training & Readiness Manuals
- Lessons learned from CH-53E Fleet Common Operating Environment (FCOE) to support CH-53K Integrated Vehicle Health Monitoring System, leveraging predictive Condition Based Maintenance
- CH-53K Transition Task Force meeting biannually to implement lessons learned for H-1/V-22 transitions to affect seamless transition of the CH-53K to the Marine Corps' operational forces
- On the horizon: Capability Production Document (CPD), and Milestone "C"

Working Issues

Program Update

- Acquisition Procurement Baseline (APB) approved Apr 2013, Program of Record (POR) 200 aircraft
- Entered DT Dec 2013
- Ground Test Vehicle (GTV) Bare Head Light Off and bladed turn in 2014.
- Engineering Demonstration Model (EDM) 1 and 3 in systems check-out for flight and EDM 2 and 4 are in final stages of build.
- System Demonstration Test Article (SDTA) 1-3 in assembly, SDTA 4 in build at vendors. SDTA 5 and 6 full contract pending FY 2016.
- First flight conducted October 27, 2015
- Milestone C (LRIP authorization) scheduled for FY 2017
- Initial Operational Capability (IOC) scheduled for FY 2019
- Full Operational Capability (FOC) scheduled for FY 2028

- Max range 454 nm; Endurance: 4 hours (unrefueled) / indefinite (HAAR)
- Empty Weight: 43,750 pounds
- Max Weight on Wheels: 74,000 pounds
- Max Gross Weight with External load: 88,000 pounds
- Internal Load: 30 troops or 24 litter patients, or 12 x 40"x48" Warehouse Pallets, 2 x 463L Pallets (Full) or 5 x 463L Pallets (Half)
- External Load: Hook rated to 36,000 pounds
- Flight Controls: Fly-by-Wire
- External Hook system: Triple hook system (ability to independently lift and release three separate external loads)
- Max Speed: 170 kts
- Armament: 3 GAU-21 .50 caliber machine guns
- ASE: Directional IR Countermeasures (DIRCM), APR-39(C)V2, ALE-47
- Network Systems: Link 16, VMF, SATCOM

Performance / Systems

Program Descriptions

HMX-1 Mission: Provide helicopter transportation for the President of the United States, Vice President of the United States, members of the president's cabinet, and foreign dignitaries, as directed by the Director, White House Military Office (WHMO).

- VH-3D - 11 aircraft
- VH-60N - 8 aircraft
- MV-22B - 14 aircraft
- TH-3D – 1 aircraft
- TH-60N – 1 aircraft

Program Update

Presidential Helicopter Replacement Program (VH-92A)

- JROC approved ICD Aug 2009
- AoA kick-off Feb 2010
- AoA completed Feb 2012
- JROC approved CDD Nov 2012
- Source Selection Activities began 3rd Qtr FY13
- MS B 2nd Qtr FY14
- EMD contract award 3rd Qtr FY14
  - 2 test articles
- IOC planned for 2020
- FOC planned for 2022
  - 21 production aircraft



Presidential Aircraft

VH-3D

- Weight reduction program
- Abbreviated Cockpit Upgrade Program
- Wide Band Line of Sight
- Service Life Extension Program planned FY15
  - Additional 4000 hours useful life
- Training asset development (TH-3D)

VH-60N

- 401C Engine Upgrade
- Service Life Extension Program planned FY13
  - Additional 4000 hours useful life
- Training asset development (TH-60N)

Max Ranges

VH-3D - 90 nm
VH-60N - 200 nm

Max Gross Weight:

- VH-3D – 21,500 pounds
- VH-60N – 22,000 pounds

Cruise Speed:

- VH-3D – 120 kts
- VH-60N – 150 kts

Passenger Load:

- VH-3D – 10 (plus pilot, co-pilot, and crew chief)
- VH-60N – 10 (plus pilot, co-pilot, crew chief, and Communication Systems Operator (CSO))

Working Issues

Performance / Systems

Program Description

- The MAGTF UAS Expeditionary Capability (MUX) ICD will inform a material solution that will provide sea-based, high altitude, persistent capability with ranges complimentary to MV-22 and F-35 missions.
- Envisioned as USMC/USN POR and teaming with N99
- Scalable MAGTF support; deploy as detachments or squadrons.
- Based on leverage and technical maturation of DARPA Tern/ONR program.

MAGTF UAS Expeditionary Capability (MUX) ICD

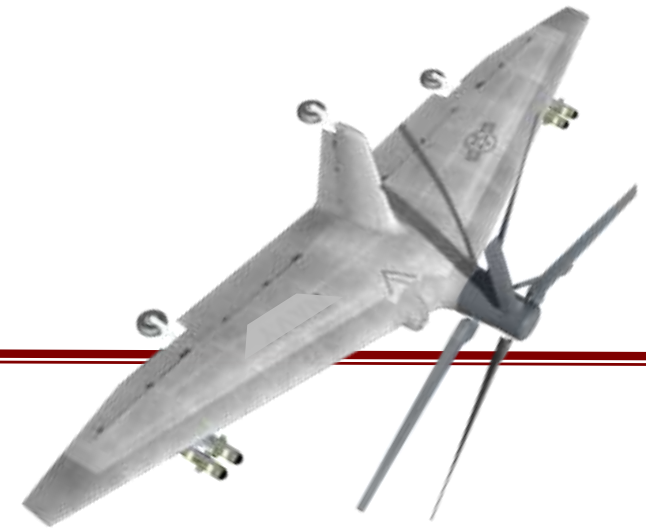
Aviation and OPNAV will conduct Pre MS A Acquisition Start up activities to include:

- Teaming with vendors to develop specifications, formal Technology Readiness Assessment (TRA), and develop the Life Cycle Cost estimates.
- Identify technology maturation efforts needed to augment DARPA/ONR concept demonstrator to assess viability of aircraft for USMC missions.

Working Issues

Program Update

- Technology demonstration flight in 2018.
- EOC in 2024
- IOC in 2026



- Multi-mission, long range, BLOS to fulfill missions in the battlespace awareness, EMSO, C4 bridge, target acquisition, and strike roles.
- Ship-board capable
- High-altitude - 30k'
- 24hr orbit at 600nm for 10 days with 2 aircraft

System Specifications

Program Description

- CMC directed development of an “Immediate Cargo UAS” capability to “get trucks off the road.” Cargo UAS was in response to 2009 UUNS and JUONS: USMC was designated lead service.
- The JUONS requested vertical lift capable of carrying external loads of greater than 750 pounds / resupplying up to 6000 pounds per day on 108 nm day /night operations.
- A GOCO Cargo UAS contract awarded to two vendors: Boeing A160 Hummingbird and Kaman/Lockheed Martin K-MAX.
- Both vendors scheduled for Quick Reaction Assessment (QRA) in August 2011; only K-MAX completed.
- The K-MAX system went forward to OEF as part of the Military Users Assessment (MUA).

MAGTF UAS Expeditionary Capability (MUX) ICD (Utility)

- The MUX ICD will help inform a material solution that provides the MAGTF commander with an autonomous tactical distribution and transportation capability.
- USMC owns 2 KMAX systems and they are currently at OEM in Owego NY.
- Move two K-MAX aircraft to VMX-22, Yuma, AZ in 2016 to continue experimentation and risk reduction.

Working Issues

Program Update

- K-MAX deployed for a six month Military Utility Assessment (MUA) to OEF in 1Q FY12; due to its success , that deployment continued for three years.
- With a range of 84 miles and a payload capacity of 4500 pounds, it has flown over 2000 sorties and delivered over 4.4 million pounds of cargo from December 2011 to May 2014.



- Combat radius – 84 nm (with cargo)
- Top speed – 80 kts
- Delivery accuracy – 10m grid, homing beacon, drop on coordinates.
- Payload Capability – 4500 pounds at 12,000’ MSL.

System Specifications

Program Description

- Primarily an aerial reconnaissance system supporting target acquisition, command & control and battlespace awareness support to the MEB or MEU commander and their subordinate units.
- In 2005, the Marine Requirements Oversight Council validated an urgent need for aerial reconnaissance support to the MEB/MEU level MAGTF. Source selection completed in 4th Qtr FY10 and Insitu MQ-21 Integrator was selected.
- Each VMU squadron will possess nine systems with each system comprised of five air vehicles and two ground control stations. Capable of operating ashore and from ships in support of MEU/ARG.

MQ-21 Blackjack

- System is currently being fielded throughout all four VMUs; completion projected in FY-22.
- Fleet Replacement Squadron is progressing toward a FY-17 FOC.

Working Issues

Program Update

- VMU-2 currently has five systems.
- VMU-1 scheduled to receive first system in FY-16.
- Fleet Replacement Detachment (FRD) scheduled to receive first system in FY-17.
- All three active squadrons receive 6 systems by FY-20.



- MQ-21 is a rail-launched, Sky Hook Recovery System (SRS) aircraft.
- 5 aircraft, one launcher, one SRS, 2 Integrated Trailer-ECU-Generator (ITEG) associated support equipment and 4 HMMVS constitute (1) RQ-21A system
- Combat radius – 50 nm (control envelope)
- Extended operational range (employing a “hub and spoke”) is 50-100 nm
- Payload – EO/IR/IR Marker/Laser range finder; with future payload capabilities of EW, Laser designator, SAR, GMTI. 25lb useful load (fuel and payload)
- Automated Identification System (AIS)

System Specifications

Program Description

- Primarily an aerial reconnaissance system supporting target acquisition and designation, command & control and ISR support to the MEF commander and his subordinate units.
- Marine Corps procurement began in 2007 through an existing Army UAS program, the Chairman of the Joint Requirements Oversight Council (JROC) signed the Mission Need Statement (MNS) for this capability in 1990. In 2007, Marine Requirements Oversight Council (MROC) adopted JROC documents and authorized procurement to replace RQ-2 Pioneer UAS.
- Each VMU squadron possesses three RQ-7B systems with each system comprised four air vehicles and two ground control stations. VMUs are organized to provide up to three detachments of 50 Marines each providing up to 12 hours of daily support or deploy as an intact squadron to provide continuous 24 hour daily support.

RQ-7Bv2 Shadow

- TCDL (Tactical Common Data Link) initiative provides mandated Type 1 encrypted data link for C2 and FMV downlinks.
- TCDL has been fully fielded to VMU-1 and VMU-3; further fielding and training continues through FY-18 for VMU-4.

Working Issues

Program Update

- V2 Shadow - Tactical Common Datalink (TCDL)
  - NSA Type 1 encrypted primary datalink
  - STANAG message compliance



- Combat radius – 67nm
- Max Gross weight – 467 pounds
- Payload – POP 300D, EO/IR/IR marker/laser designator
- Rail launched / Runway and arresting gear recovered.

System Specifications

Program Description

The Small Unit Remote Scouting System includes the RQ-12A Wasp, RQ-11B Raven, and RQ-20A Puma as the foundational tier of the USMC UAS Family of Systems.

Organic to select regiments and battalions from the GCE, LCE, and ACE, these hand-launched systems are typically employed at the company level and below to provide day/night RSTA for small units across the range of military operations. Wasp (2.2 pounds) and Raven (4.2 pounds) are man-portable while Puma (13 pounds) is typically employed from vehicles or static positions due to its size.

Each system includes a laptop-based ground control station and a number of Wasp, Raven, and/or Puma unmanned aircraft.

RQ-11B, RQ-12A, RQ-20A (SURSS)

- Program office is continually working to fund and complete procurement to AAO.
- Efforts to increase RDT&E funding to develop new payloads and improve capabilities are essential in satisfying the demand signal for SURSS.



Working Issues

Program Update

- RQ-11 Raven fully fielded to AAO requirement
- RQ-12 Wasp procured to AAO requirement , fielding in progress
- Developing additional payloads for EW, Laser Designator and Communications relay
- Developing common ground station



RQ-11B Raven



RQ-12A Wasp IV

RQ-11B

Battery Powered
5-10 km range
44 kts Vmax
60-90 min endurance
150 – 1000 ft AGL
10,000 ft MSL
Gimbaled EO/IR, laser po

RQ-12A

Battery Powered
2.5-5 km range
45 kts Vmax
50+min endurance
500 ft AGL
10,000 ft MSL
Gimbaled EO/IR , laser pointer

RQ-20A

Battery Powered
10-20 km range
40 kts Vmax
120min endurance
500 ft AGL
10,500 ft MSL
Gimbaled EO/IR, laser pointer,
EW payload

System Specifications

Program Description

- Both products are COTS, selected based on market research of available potential solutions
- Very small, lightweight, organic ISR asset capable of operation in confined areas where vertical launch and recovery is necessary. Capable of operations in a wide range of environmental conditions.
- User: MARSOC

Program Update

- Received final MROC approval (DM 03-2015) for MARSOC U-UNS
- Fielded to MARSOC units Jan 2014
- Incremental approach phased with MARSOC orbits (deployments)
- Future procurements based on results of field user evaluations

VTOL/Nano VTOL

- No funding identified for further procurement and sustainment
- Awaiting clarification of requirements for MAGTF units



SkyRanger (VTOL)

SkyRanger
Battery Powered
5 km range
35 kts Vmax
50 min endurance
15,000 ft MSL
1,500 ft AGL
Gimbaled EO/IR



Mk-2 Gen 3 Instant Eye (Nano)

InstantEye
Battery Powered
2 km range
30 kts Vmax
30 min endurance
12,000 ft MSL
1,500 ft AGL
1 axis Gimbaled EO/IR

Working Issues

System Specifications

CURRENT

- Operational Support Airlift (OSA) supports the MAGTF commander by providing time-sensitive air transport of high priority passengers and cargo between and within theaters of war, day and night, under all weather conditions, during expeditionary, joint or combined operations
- The Marine Corps currently operates 27 OSA aircraft*:
  - 1 x C-20G
  - 2 x C-9B
  - 12 x UC-12F/M/W
  - 12 x UC-35C/D

* (3) aircraft remain forward deployed ISO SPMAGTF requirements

FUTURE

- MROC endorsed OSA Master Plan recapitalizes OSA:
  - 1 x C-20RA
  - 2 x C-40A
  - 12 x UC-12W
  - 12 UC-35RA
    - C-9B will not be recapitalized, eliminating requirement for C-40A
- Consolidation of CONUS OSA aircraft and personnel:
  - Enduring SPMAGTF requirements cannot be sustained under the current construct
  - Plan consolidates active component CONUS based OSA assets aboard MCAS Cherry Point and MCAS Miramar – reduction of 3 sites
  - Creates a sustainable, deployable construct
  - Active/reserve component construct under analysis

OSA

FY16 UPDATES

- UC-12W Transition:
  - 1 of 6 required aircraft delivers in fall of 2016.
- UC-12W Upgrades:
  - 3rd ASE Dispenser
    - All aircraft funded (1 of 6 complete)
  - Extended Range (ER) Tanks
    - Increases range from 1500 – 2400 NM
    - (4) of (6) aircraft currently equipped
    - Remaining (2) aircraft are funded for completion by 4QFY15
  - NVIS Compatibility (Interior and Exterior)
    - (2) aircraft funded for completion 2QFY16
  - Satellite Phone
    - (2) aircraft funded for completion 2QFY16
- UC-35D ASE
  - (7) of (10) aircraft currently equipped
  - Remaining 3 aircraft are funded for completion by 4QFY16
- C-9B Divestiture
  - To be complete no later than 2025
- OSA assets cannot operate from Futenma Replacement Facility
- WESTPAC relocation alternatives currently under review

Program Description

Mission: Provide time sensitive air transport of high priority passengers and cargo between and within a theater of war.

Description:

- Military version based on GulfStream IV twin engine jet
- Capable of transporting 26 passengers or 6,000 pounds of cargo
- Operational range of 4,250 nautical miles
- 8 passengers
- \$68 million (new cost)
- 19 years old (acquired in FY93)

C-20G

- Acquisition of “like in kind” aircraft to replace legacy C-20G.
- Sustaining C-20G readiness until replacement aircraft acquisition complete.
- **CNS-ATM compliance**
  - **MANDATE: Future Air Navigation Systems 1/A. Prototype certification on Navy GIV (Acft 094) planned for 2nd QTR 2016. Automatic Dependent Surveillance –Broadcast out to DO 260B standard required by 2020.**
  - **Requires APN-5 funding in FY16/17**

Working Issues

Program Update

Marine aviation intent is to replace with “like in kind” aircraft.

- FY-10 depot level maintenance program transition to “on condition” maintenance regime to extend aircraft service life.
- FY-11 equipped aircraft with AN/AAQ24V infrared countermeasure capability for defense against man portable IR missile threat .



- Range: 4,250 NM with 8 Passengers
- Crew: 2 pilots, 2 crewmen
- Length: 88 ft 4 in
- Wingspan: 77 ft 10 in
- Height: 24 ft 5 in
- Max takeoff weight: 73,200 pounds
- Empty weight: 35,500 pound
- Powerplant: 2× Rolls-Royce Tay turbofans
- Max Speed: M.85/459 KIAS
- Cruise Speed: M.85/459 KIAS

Performance / Systems

Program Description

Mission: Provide time sensitive air transport of high priority passengers and cargo between and within a theater of war.

Description:

- Boeing / McDonnell Douglass C-9B
- Capable of transporting 90 passengers
- 20,000 pounds of cargo
- Operational range of 1,740 nautical miles
- Average Age: 33

C-9B

- Sustaining C9B until divestiture
- FAA SFAR 88 Fuel Tank compliance is complete
- UNS-1FW funded, projected completion in 1st QTR 16
- TCAS 7.1 funded, projected completion in 1st QTR 16
- **CNS-ATM**
  - **MANDATE: Automatic Dependent Surveillance- Broadcast out to DO 260B standard by 2020.**
  - **Requires APN-5 funding in FY-17/18**

Working Issues

Program Update

Marine aviation intent is to divest of the (2) C-9s.

- Mandate: Based on the current 510 month airframe life our A/C reach life limits:
  - 161529 March 2025
  - 161530 April 2025



- Range: 1,740 NM with 20,000 pounds
- 2,500 NM with 5,000 pounds
- Crew: 5 to 8
- Length: 119 ft 3 in
- Wingspan: 93 ft 5 in
- Height: 27 ft 6 in
- Max takeoff weight: 110,000 pounds
- Empty weight: 59,700 pounds
- Powerplant: 2× P&W JT8D-9 turbofan
- Max Speed: M.84/340 KIAS
- Cruise Speed: M.78/485 KTAS

Performance / Systems

Program Description

Mission: Provide time sensitive air transport of high priority passengers and cargo (limited cargo capability) between and within a theater of war.

Description:

- UC-35C/D twin engine turbofan
- Capable of transporting 7 passengers or 1,500 pounds of cargo
- Operational range of 700 nautical miles
- Cost: \$9M (new cost)
- Acquired: FY98-06

UC-35C/D Citation

- Acquisition of "Super Mid-Size" class aircraft
- Fleet submission of Universal Needs Statement for improved range and payload
- Install ASE "A-Kits" in remaining UC-35D assets
  - (7) aircraft complete
- CNS-ATM compliance
  - MANDATE: Block III Avionics modification includes Future Air Navigation Systems 1/A and Automatic Dependent Surveillance – Broadcast out to DO 260B standard. Prototype certification planned completion 1st QTR 16. Retrofit of remaining aircraft in FY16.
  - Requires APN-5 funding in FY16

Working Issues

Program Update

Marine aviation intent is to replace current (12) UC-35C/D aircraft with (12) "Super Mid-Size" class transport with improved range and payload capabilities.



- Range: 1,300 NM Max Range
- 700 NM with 7 Passengers
- Crew: 2
- Length: 48 ft 11 in
- Wingspan: 52 ft 2 in
- Height: 15 ft 0 in
- Max takeoff weight: 16,300 pounds for C/ 16,830 for D
- Empty weight: 9,395 pounds for C / 10,642 for D
- Powerplant: 2× P&WC JT15-D turboprops
- Cruise Speed: M.755/420 KTAS

Performance / Systems

Program Description

Mission: Provide time-sensitive air transport of high priority passengers and cargo between and within a theater of war.

Description:

- Beechcraft UC12F/M (King Air 200)
- Twin engine turbo-prop
- Capable of transporting 7 passengers
- 1,500 pounds of cargo
- Operational range of 700 nautical miles
- Cost: \$6M (new cost)
- Average Age: 24 Yrs

UC-12F/M Huron

- Acquisition of 5 X USMC UC-12W aircraft to replace legacy UC-12F/M
- Sustaining UC-12F/M readiness until UC-12W acquisition complete
- CNS-ATM compliance
  - Mandate Automatic Dependent Surveillance- Broadcast Out to DO 260B standard by 2020.
  - Funding Requires APN-5 funding in FY-17/18
- No install of Aircraft Survivability Equipment for legacy UC-12F/M planned
  - - Negative impact to payload

Working Issues

Program Update

Marine aviation intent is to replace all UC-12F/M with the UC-12W Huron.



- Range: 1,200 NM Max Range
700 NM with 7 Passengers
- Crew: 2
- Length: 43 feet 10 inches
- Wingspan: 54 ft 6 in
- Height: 15ft 0 in
- Max takeoff weight: 12,500 pounds
- Empty weight: 7,755 pounds
- Powerplant: 2x P&WC PT6A-41/42 turbo-prop
- Max Speed: 294 KIAS

Performance / Systems

Program Description

Mission: Provide time sensitive air transport of high priority passengers and cargo between and within a theater of war.

Description:

- Capable of transporting 8 passengers
- 2,500 pounds of cargo
- Operational range of 1,500 nautical miles
- ASE installed
- CNS/ATM compliant
- RVSM compliant
- Cargo door
- Cost: \$15.1M

UC-12W Huron

- Acquisition of 5 x UC-12W aircraft to replace legacy UC-12F/M
- Retrofit Extended Range Tanks for remaining (2) Block I aircraft
- Prototype of the 3rd dispenser forward firing - kinematic flares has been certified
  - Complete remaining (5) Block I aircraft
  - Aircraft 7 will be delivered with 3rd dispenser installed
- Investigating potential requirements for GPS Anti-Jam technology
- CNS-ATM compliance
  - Mandate Automatic Dependent Surveillance- Broadcast out to DO 260B standard by 2020.
  - Funding Requires APN-5 funding in FY-17/18

Working Issues

Program Update

Marine aviation intent is to replace all UC-12F/M with the UC-12W Huron.



- Range: 2,100 NM Max Range
1500 NM with 8 Passengers
- Crew: 2
- Length: 46 feet 8 inches
- Wingspan: 57 ft 11 in
- Height: 14ft 4 in
- Max takeoff weight: 16,500 pounds
- Empty weight: 10,200 pounds
- Powerplant: 2x P&WC PT6A-60A turbo-prop
- Max Speed: 300 KIAS

Performance / Systems

Program Description

CAC2S Increment I provides the command and control system to process, display, and distribute air and ground data from sensors, other C2 nodes, and aircraft for the ACE commander to effectively command, control, direct and coordinate air operations in support of the MAGTF and joint force.

- CAC2S is an ACAT IAC MAIS program providing aviation command centers, air defense and air support operation centers
- Key Performance Parameters: Net Ready and Data Fusion
- Common hardware, software, equipment, and facilities
- Modular and scalable
- Interoperable with MACCS organic sensors and weapons systems; fosters joint interoperability

CAC2S

CAC2S Increment I is separated into two phases. Phase 1, currently fielded, focused on core aviation C2 capabilities. Phase 2, under development, will achieve the full CPD requirements of the TACC, TAOC and DASC.

Phase 1:

- Combines non and near real-time data to provide a combined air/ground Common Tactical Picture, communications, and operations facility.

Phase 2:

- Fuses real-time, near, and non real-time data
- Provides data fusion and sensor integration to TACC/TAOC/DASC
- Provides common HW/SW to TACC/TAOC/ DASC

Working Issues

Program Update

- Phase 1
  - All (20) Phase 1 systems have been fielded to the MASS, MACS, MTACS and Air Control Training Squadron (ACTS).
- Phase 2
  - Contract awarded to General Dynamics for 3 year development effort: IOC FY-17
  - DT: Fall WTI 2015. IOT&E: Spring WTI 2016.
  - AAO (50) Aviation Command and Control Systems (AC2S)
  - (75) Communication Subsystems (CS)
- Phase 2: CDR Q1FY14
- Phase 2: MS-C completed Q2FY15
- Phase 2: IOT&E Q2FY16



- Increment I replaces equipment within:
  - TACC (176 seats)
  - TAOC (17 seats)
  - DASC (17seats)
- Operational Impact
  - Provide connectivity between ACE and GCE networks
  - Integrated air and ground picture providing critical battlespace awareness to the MAGTF
  - Sensor network provides real time composite air picture
  - Increases echeloning options between MACCS units
  - Agencies not tethered to sensors

Performance / Systems

Capability

- Key enabler of GCE and ACE success on the battlefield – essential for identifying and destroying threats.
- Ability to detect low observable radar cross-section air threats for the MAGTF (UAS, Cruise Missiles, and RAM).
- Contributor to the Navy's Cooperative Engagement Capability (CEC) network in defense of the amphibious sea-base.
- Increases MAGTF situational awareness for enemy indirect fire positions via AFATDS and CAC2S.
- Transportable via CH-53 and MV-22.

Program Update

Designated ACAT IC in AT&L ADM 28 Oct 2011

Milestone C decision: March 2014

G/ATOR Block 1 and 2 IOC & FOC

- GB1: Feb 2017 – Feb 2018
- GB2: 2018/2019
- GB1 & GB2 FOC: 2024

G/ATOR Block 4: Unfunded

Production:

- LRIP 1 & 2 (6 Systems) under contract

G/ATOR

The G/ATOR program consists of four blocks, three of which require procurement & fielding of systems.

- G/ATOR Block 1 - Air Defense/Surveillance Radar (ADSR), replaces the AN/UPS-3 Tactical Defense Alert Radar, the AN/MPQ-62 Continuous Wave Acquisition Radar, and the AN/TPS-63 Air Surveillance radar.
- G/ATOR Block 2 - Ground Weapons Locating Radar (GWLR), replaces the AN/TPQ-46 Counter-Battery/Target Acquisition Radar.
- G/ATOR Block 3 – Software updates to improve tracking of low Radar Cross Section targets, Electronic Protection capabilities & Combat Identification capabilities.
- G/ATOR Block 4 - Expeditionary Airport Surveillance Radar (EASR) will replace the AN/TPS-73 Airport Surveillance Radar.



- G/ATOR Block 1: Air Defense/Surveillance Radar (ADSR) Qty 17
- G/ATOR Block 2: Ground Weapons Locating Radar (GWLR) Qty 28
- G/ATOR Block 4: Expeditionary Airport Surveillance Radar (EASR) Qty 12
AAO Qty 57

Program Description

Performance / Systems

AN/TPN-31A (V) 7 Program Description

The AN/TPN-31A(V)7 is a fully autonomous Airport Surveillance Radar and Precision Approach Radar air traffic control system. When combined with the AN/TSQ-263 Tactical Terminal Control System, it allows the Marine Air Traffic Control Detachment to provide the full range of radar services.

- 2004 Army ORD adopted: ASPARCS over cost and delayed.
- 2007 System identified as complementary to legacy MATCALS.
- Bridging system until G/ATOR and CAC2S.
- Replaced legacy MATCALS with fielding of extended range of version 7
- Rapidly deployable, HMMWV based system transportable with organic USMC assets.

Marine Air Traffic Control

•The AN/TRN-47(V)2 Airfield Mobile TACAN (AMTAC) is a highly mobile, rapidly deployable navigational aid, capable of providing navigational assistance in a GPS denied environment. Provides range and bearing information for navigational assistance and forms the basis of non-precision approaches in supported airfields.

- Replaces AN/TRN-44, ISO-container based TACAN
- Entire system on one trailer
- Power supplied by fielded generators
- Increased deployability with no loss in capability

AN/TRN-47(V)2 Program Description

Program Update

In Operations Support/Sustainment Phase of Acquisition Life Cycle

- Total systems: 15
  - IOC – FY07
  - FOC – FY13
- ECP
  - Range Extension - In fielding. Increases primary radar range from 25NM and 10,000 feet to 60 NM and 60,000 feet.
  - ATNAVICS Tactical Data Link – Receive only to begin fielding in FY16. Planned two-way system in development.
  - Mode 5 – Developed jointly with Army lead. Installation to commence in FY16.



Currently in testing as an ECP to the AN/TRN-47 portable TACAN

- ECP Part 1 to be complete in FY16
- ECP Part 2 to commence in 3rd Quarter FY16
- Initial fielding planned for FY17



Program Update

Program Description

The Composite Tracking Network (CTN) system will distribute composite tracking data to Command and Control (C2) and weapon systems participating in a Cooperative Engagement Capability (CEC) network. The system will significantly contribute to real-time situational awareness and facilitate weapons engagements supported by fire quality track data.

- ACAT III designation in Nov 01
- MDA: Program Executive Office, Land Systems-1 Feb 12
- USMC led with US Navy and US Army cooperation
- The CTN program is executing a single-step to full capability acquisition strategy by integrating Commercial Off-the-Shelf (COTS) and Non-Development Item (NDI) subsystems
- AAO: 10 systems

CTN

- Money put back into the CTN POM to support CAB-E array antenna development, procurement and fielding in 2017 through 2019 will ensure continued connectivity with Navy CEC.
- The NIFC-CA Flag Steering Committee (FSC) was briefed on CTN/TPS-80 operational concepts in June of 2015. The NIFC-CA FSC is looking to include CTN & TPS-80 into NIFC-CA concepts.
- CTN supporting CAC2S DT & IOT&E in FY-16.
- The Formal Test Qualification (FQT) Test Readiness Review (TRR) for Software Baselines 2.1.10.10 (Aegis Baseline9C.1), 2.1.10.12 (Advanced Hawkeye), and 2.1.10.14 (CTN (USG-4B/USG-9B) was conducted on 03, September 2015 with the test beginning on 10, Sept 2015.

Working Issues

Program Update

- MS C Decision (Oct 08)
- FOT&E (Jul-Aug 10)
- FOC: Jun FY 16
- Fielded MACS-1,2,4, and MCCES
- AN/MSQ A(V)1 FUE (Aug12)
- CARD/LCCE & APB Update (Oct 12)
- AAO revised from 25 to 10 (Jan 24th, 2014)



- System performing at WTI – Establishment of CTN/CEC network between E-2C, TPS-59 and TPS-80 at WTI
- Fielding : 10 systems – Currently FOC
- CTN will have two-way data transmission once CAC2S phase II is fielded

Performance / Systems

Program Description

Marine aviation requires a replacement weapon system for the current Program of Record, the Stinger missile, to mitigate the capability gap versus low observable/low radar cross-section threats (UASs/cruise missiles). To fill this gap, Marine aviation initiated an Office of Naval Research (ONR), Science & Technology (S&T), GBAD, On-the-Move (OTM), High Energy Laser (HEL) program (\$39M).

Following completion of the ONR S&T GBAD HEL initiative (FY13-17) and with the successful demonstration of this High Energy Laser capability, Marine aviation will evaluate, transition and incorporate this technology into a Program of Record (PoR).

Ultimately, Marine aviation intends to vehicle mount integrated kinetic (missile/gun system) and non-kinetic (directed energy) weapons to provide continuous, low altitude air defense of High Value Asset (HVA) Aircraft, Combat Operation Centers (MEF COC, ACE TACC, Division COC's) and Tactical Assembly Areas.

LAAD

- Technology Transition Agreement (TTA) Level B: Signature by Aviation Expeditionary Enablers, Office of Naval Research (ONR), Program Executive Officer Land Systems (PEO LS) and Force Protection Integration Division (FPID) July FY14.
- Technology Transition Agreement Level A: Signature by APX, ONR, PEO LS and FPID FY16.
- Demonstration of vehicle mounted High Energy Laser engagement – FY15
- Development & demonstration of High Energy laser engagement & radar by FY16.
- Demonstration of integrated prototype at Black Dart FY 16 & 17.
- Transitions to a Ground Based Air Defense Program of Record with a technology readiness level (TRL) of 6 during FY18.

Working Issues

Program Update

Three (3) High Energy demonstrations scheduled for FY 15/16 and FY17.

FY15 (Initial): 10kw High Energy Laser mounted on a HMMWV with full detect to engage sequence. C2 vehicle, sensor and HEL Weapon Vehicle will be at pre-determined locations to negate UAV.

FY16 (At the Halt): 30Kw High Energy Laser mounted on a HMMWV with final system components. Vehicles will drive to pre-determined locations. C2 and High Energy Laser vehicles will receive UAV tracks while OTM to negate UAV.

FY17 (At the Pause): 30Kw High Energy Laser mounted on a HMMWV with final system components. Vehicles will receive UAV tracks while OTM. System operational in real time to negate multiple UAVs.



- GBAD HEL performance includes a HEL cueing source, C2 system, and a GBAD HEL Weapon System.
  - GBAD HEL weapon consists of a solid state ruggedized, expeditionary HEL mounted on a light tactical vehicle with a power source capable of supporting HEL target engagement rates during a joint engagement sequence (JES).
- The GBAD HEL concept demonstrator will be developed and provided to the transition sponsor to advise the formal acquisition of the GBAD Program of Record.

Performance / Systems

Program Description

The AN/TPS-59A(V)3 radar is the Marine Corps' only transportable, solid-state, L-band, long range, 3-dimensional, air surveillance, and TBM-capable radar.

The AN/TPS-59A(V)3 is the principal air surveillance radar of the MAGTF, used to support aviation command and control required for sustained operations ashore and as part of a joint theater air and missile defense architecture.

- Fielded in 1985: Upgraded in 1998 (Theater Ballistic Missile capability).
- Upgraded to A(V)3 designation in 2011 to address obsolescence within the Control/Signal Processor Shelter.
- Post production sustainment efforts keep radar viable against threats.
- Contributes to CEC/CTN networks by providing early warning track data that enables weapons platforms to engage at their maximum kinematic range.
- Supports ground sensor TBM data requirement to IAMD network via C2 node (Link 16).
- IAMD defense in depth, persistent surveillance-threat detection

AN/TPS-59A(V)3

• HQMC DCA guidance to sustain radar to 2035. Addressed by Program Office through incremental Engineering Change Proposals and Tech Refresh Initiatives to address Diminishing Manufacturing Sources (DMS) and Obsolescence.

Key Sustainment Metrics:

- Implement IFF Mode 5 technical solution per DoD mandates
- Mitigate obsolescence/DMSMS and issues in array power supply, receiver and exciter cabinets & control shelter op/console/servers
- Increase reliability availability and maintainability (RAM)
- Maintain same frequency and signal strength
- Improve mobility and survivability
- Reduce power requirements and weight

Program Update

In operations support / sustainment phase of acquisition life cycle

- Post Production Modification II (MK XIIA, IFF Mode 5, and Array Power Cabinet Technical Refresh)
  - IOC = Dec 2016
  - FOC = Sep 2017
- On-going ECPs to address obsolescence :
  - Antenna transmitter group ECPs
  - Radar console/servers tech refresh
  - Information Assurance & SW Integration
  - ECCM updates (HW & SW)
  - Shelter Tech refresh (limited)
  - TBM SW improvements
  - RES development



MACS-4	1 MAW	2	
MACS-2	2 MAW	2	
MACS-1	3 MAW	2	
MACS-24	4 MAW	2	
MCTSSA	Camp Pendleton, CA	1	
MCCES	Twentynine Palms, CA		1
Depot	Tobyhanna, PA	1	
Total		11	

Working Issues

Performance / Systems

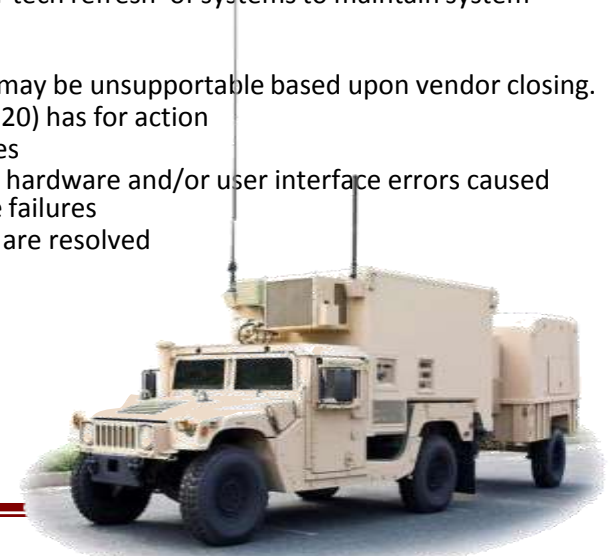
Program Update

The METMF (R) NEXGEN is a highly mobile, fully integrated, FORCENet compliant USMC tactical meteorological support system that is replacing the METMF (R) legacy system. The system delivers relevant, timely METOC products and mission impact assessments via Common Operating Picture to the MAGTF.

- 6 of the 8 funded systems have been delivered to the ATC Dets.
  - Funding shortfall for (3) systems remains = ~\$14M
  - A new competitive contract must be awarded once funding is realized
- MACG-48 delivery ~Q2FY16
- System exercised at three past WTI evolutions
- One METMF(R) NEXGEN supporting SPMAGTF
- NEXGEN supported deployments/exercises
  - Continues to provided METOC support to aviation and SPMAGTF operations around the world.

Top 2 Identified Issues

- Funding Issues
  - ~\$14M OP/N to procure three (3) NEXGENS organic to the INTEL BNs
  - ~\$7.5M OM/N required to sustain the NEXGEN program across the FYDP
  - ~\$4M.4 OP/N for tech refresh of systems to maintain system baseline
- Viper Generator issue
  - OEM Generator may be unsupportable based upon vendor closing.
  - The ISEA (PMW120) has for action
- Software/Hardware issues
  - ISEA determined hardware and/or user interface errors caused perceived software failures
  - Hardware issues are resolved



METMF(R) NEXGEN

Location	Contract Delivery Date	Smiths Delivery Date	Govt Acceptance Date	SOVT / Training	MILCON Complete?
MCAS Futenma, Okinawa - MACG-18 Det A	11/20/2012	11/20/2012	11/30/2012	8/1/2013	No
MCAS Miramar, CA - MACG-38 Det B	11/30/2012	11/30/2012	12/21/2012	12/1/2012	No
SSC PAC – ISEA	12/31/2012	12/12/2012	1/24/2013	N/A	Yes
MCAF Boque Field, NC - MACG-28 Det C	4/30/2013	4/26/2013	6/14/2013	6/1/2013	No
NAS Pensacola, FL	6/13/2013	5/21/2013	5/30/2013	5/21/2013	Yes
MCAS New River, NC - MACG-28 Det B	5/31/2013	5/29/2013	6/14/2013	6/1/2013	No
MCAS Yuma, AZ - MACG-38 Det C	6/28/2013	7/1/2013	7/20/2013	7/1/2013	No
MCAS Iwakuni, Japan - MACG-18 Det B	7/23/2013	7/15/2013	7/25/2013	8/1/2013	Yes
MCAS Camp Pendleton, CA - MACG-38 Det A	7/07/2014	7/07/2014	8/1/2014	10/1/2014	N/A
MCAS Beaufort, SC - MACG-28 Det A	7/31/2014	7/31/2014	9/22/2014	2/16/2015	N/A
NAS JRB Fort Worth Tx, MACG-48 Det A	9/25/2015	TBD	TBD	TBD	N/A
1 st Intelligence BN, Camp Pendleton CA	Unfunded Requirement				
2 nd Intelligence BN, Camp Lejeune, NC					
3 rd Intelligence BN, Camp Hanson, Okinawa					

Program Description

This initiative replaces the A/S32P-19A Aircraft Crash and Structure Fire Fighting Truck, TAMCN D1064, known as the P-19A. The P-19A, introduced into service in 1984, with a service life of 12 years, has undergone depot level rebuild two times.

- The P-19A is the Marine Corps' only major aircraft fire fighting vehicle, utilized at Marine Corps Air Stations and Forward Operating Bases for immediate response to aircraft emergencies (primary) and structural fires (secondary).
- At 30 years of service, the P-19A faces parts obsolescence, frame fatiguing, and possesses 1984-era mechanical and fire fighting technology.
- The P-19R is compliant with current National Fire Protection Association (NFPA) standards for aircraft rescue and fire fighting vehicles, resulting in a vehicle optimized for crew/operator safety and fire fighting effectiveness.
- The P-19R drivetrain and power-pack maintains up to is 75% commonality with current USMC tactical vehicles (MTVR and LVSR), resulting in greater logistical and maintenance supportability. COTS fire fighting components (Pierce Mfg.) will increase parts availability and sustainability.

P-19A Replacement (P-19R)

- P-19A Replacement initial operational capability (IOC) is planned for Fiscal Year (FY) 2017. IOC is achieved when one MAW has received a complete issue of P-19A Replacements, the assigned mechanics and crews have received initial training at the Operator/Crew, Field and Sustainment levels and sufficient repair parts are in place to support operations.
- P-19A Replacement full operational capability (FOC) is desired by FY 2020 to meet the Approved Acquisition Objective (AAO) of 164.
- MARCORSYSCOM and I&L proceeding with the SLEP of MWSS and MCAS P-19As to extend service life .

Working Issues

Program Update

- Training Curriculum Overview March 2015.
- Milestone "C" achieved on 31 March 2015.
- Field User Evaluation planned for November 2015.

Chart reflects current funding profile as of 4 Feb 2014

APPN	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY13-19
RDTEN	\$6.5	\$9.0	\$1.6	\$0	\$0	\$0	\$0	\$9.0
PMC	\$0	\$16.9	\$11.0	\$30.1	\$33.1	\$16.0	\$16.3	\$123.4
OMMC	\$0	\$6.0	\$1.1	\$1.2	\$1.5	\$1.5	\$1.6	\$7.5
OTHER	\$0	\$0	\$0	\$949	\$966	\$984	\$1.0	\$3,9
TOTAL	\$6.5	\$18.4	\$13.7	\$32.2	\$35.5	\$18.5	\$18.9	\$143.8



- 4-man crew
- 1,000 gallon water tank, 130 gallon foam concentrate tank
- Approximately 75% parts commonality between P-19R, LVSR, and MTVR
- Proven MTVR Transmission and chassis powered by LVSR engine
- EPA approved chemical firefighting agent (minimum of 500 pounds)
- National Fire Protection Association Standard 414 compliant
- JP-8 capable with range of 150 miles @ 55 mph
- 0 to 50 mph in 25 seconds or less
- Alternate Power Unit (APU) to reduce engine idle time
- Capability to draft water from a static supply source (structural panel-equipped)

Performance / Systems

Program Description

Current EAF hard-wire lighting system utilizes 1960-era technology, is maintenance intensive, and consistently encounters logistical challenges due to parts obsolescence.

- The EAF SLS will make use of all available modern energy efficiency technology (Improved batteries, solar capability, etc.).
- SLS will be lighter, easily adaptable to various airfield configurations, and heat-resistant IOT support MV-22 and F-35B operations.
- EAF SLS will fill existing capability gap by providing the visual cues required for CAT I, precision IFR approaches. Effectively “marrying” MACG and EAF capabilities to provide a safer operational environment for our aviators.

EAF Sustainment Lighting System (SLS)



Program Update

TY\$M	FY13	FY14	FY15	FY16	FY17	FY18	FY14-18
OPN		--	--	--	--	0.0	0.0
POM 14 Req		--	--	--	--	23.1	23.1
Delta		--	--	--	--	-23.1	-23.1
TY\$M	FY13	FY14	FY15	FY16	FY17	FY18	FY14-18
RDTEN	3.1	7.6	20.3	15.0	11.0	0.0	59.2
POM 14 Req		5.2	9.3	18.2	19.5	10.1	67.6
Delta		2.4	11.2	-3.2	-8.5	-10.1	-8.2
TY\$M	FY13	FY14	FY15	FY16	FY17	FY18	FY14-18
Total Delta		2.4	11.2	-3.2	-8.5	-33.2	-31.3

Working Issues

- Milestone “B” achieved on 5 December 2014
- Milestone “C” slated for 15 February 2019
- Initial operational capability (IOC) is expected on 11 December 2019
- Full operational capability (FOC) is expected on 13 August 2020

Current state of the USMC Aviation Training System

- Marine aviation will have significant growth in fielded simulators from 94 currently to 175 by the end of FY 19
- Currently 54 are enabled for local or wide area networked Distributed Mission Training (DMT) over the Aviation Distributed Virtual Training Environment (ADVTE).
- The Marine Corps Automated Learning System (MCALMS) is the program of record that delivers courseware over via an approved .mil architecture – First GENSER MCALMS local server has been delivered to Miramar for F/A-18
- T&R simulation requirements account for 15-37% in the core and mission skill phase on average for USMC aviation platforms; several incorporate over 50-90% simulation in the basic skill, mission and core skill, and flight leadership development syllabi

Future AVPLAN FY15-25

- All new and upgraded trainers have USMC TEn and core database architecture enabling cross Type/Model/Series, community, and network circuit connectivity via ADVTE.
  - Of the 175 devices projected in the ATS by FY19, over 120 are programmed to be connected to ADVTE (H-1, V-22, H-53 E/K, F/A-18, F-35, UAS, KC-130, and AV8B)
- ADTVE next generation and the TEn Technical Refreshers (TR) will target:
  - Integration of 1st and 4th MAW into the ADVTE architecture
  - Creation of a USMC Common Visual Synthetic Area (CVSA)
  - Upgrades and updates to the TEn hard/software interface
- MCALMS upgrades will allow for local and central database access and more tailored courseware delivery

Aviation Training Systems

- Delivering higher fidelity simulation:
  - New acquisition and technical refreshes of existing devices using future modeling and simulation industry technology
  - Development of a USMC CVSA of sufficient fidelity to enable “fair fight” correlated simulated training environments; Goal to promote interoperability within ATS, the USMC GCE and joint DMT Circuits.
  - Improved threat and weapons databases and interfaces
- Restructuring of existing simulator policies and orders to capitalize on the current and future USMC simulator and ATS assets (classrooms, Brief/Debrief spaces, mission planning spaces, training devices etc.) which will cement the uniformed and civilian manpower requirements that critically support the ATS mission.
- Improving MCALMS, enabling local and central updating and tailored instruction delivery

ATS Process incorporates:

- *Flight Leadership Standardization and Evaluation* – rigorous platform evaluation under the governing T&R and MAWTS-1 Program Guides
- *Concurrency Management* – evaluating and adjusting curricula, systems, and courseware for changes in platform/OFP and tactics
- *Training Information Management Systems* – MSHARP and ASM spiral development to track training, and MCALMS to deliver courseware
- *Risk Mitigation* – promoted by flight leadership discipline and adherence to established procedures and requirements
- *Training Management Process* – forum to identify and present training issues across DOTMLPF to efficiently and holistically develop funding strategies and solutions within formal requirements process

4.2 MARINE CORPS AIR STATION FACILITIES AND MILITARY CONSTRUCTION PLAN

Aviation military construction (MILCON) projects are essential to achieving the Commandant's vision for Marine Corps aviation. MILCON projects enable IOC fielding for introducing new weapon systems, such as the CH-53K, RQ-21A, and F-35B to the operational forces and training commands. MILCON designs will focus on flexibility of use to allow new weapon systems, squadron relocations, and re-designations to serve MAGTF requirements as they evolve over time. Marine Corps aviation's new weapon systems have a much greater range and more robust capabilities than legacy platforms. As a result, the use of air station facilities, ranges, and air space may differ to accommodate these enhanced capabilities.

Marine Corps air stations and air facilities must remain viable in the future. Where possible, existing physical assets will be used as a bridge to the full funding and construction of MILCON programs. The introduction of F-35B and other weapon systems will require additional MILCON resources to ensure programmatic and operational risk to both Marine Corps aviation and the Marine Corps as a whole are mitigated. Consequently, Marine aviation has planned MILCON projects which validate the commitment to establish a JSF capability within the MEFs as per the TACAIR Transition Plan. Some risk can be accepted in order to move forward with the modernization of the force, but the resources must eventually be found to recapitalize air stations.

The MILCON, DPRI, and host nation projects listed in the following tables represent projects required for the realization of the current AVPLAN, air safety or required to address some deficiencies. The project tables represent a snapshot in time, are subject to change and include pure AVPLAN and regular air station projects.



MCI EAST								
QUANTICO AIR FACILITY			CHERRY POINT, CONT.			BEAUFORT		
FY14	P-1406	ATC TX/RX RELOCATION	FY21	P-203	AVIATION ARNAMENT SHOP	FY13	P-456	SIMULATED LHD DECK
FY16	P-647	ATFP GATE	FY22	P-234	F-35 MAINTENANCE TRAINING FACILITY	FY13	P-459	RECYCLE/HAZWASTE FACILITY
CHERRY POINT			FY22	P-205	VERTICAL LANDING PAD IMPROVEMENTS	FY14	P-465	AIRCRAFT HANGAR - VMFA
FY13	P-163	MASS-1 COMPLEX	FY22	P-206	ARM/DEARM PADS	FY14	P-473	TOWNSEND BOMBING RANGE ACQ - PH 1
FY15	P-193	WATER SYSTEMS UPGRADES & IMPROVE	FY22	P-207	GROUND SUPPORT EQUIPMENT SHOP	FY14	AM00037	LAUREL BAY ELEM/MIDDLE SCHOOL
FY16	P-194	UAS FACILITIES EXPANSION	FY22	P-209	ENGINE MAINTENANCE FACILITY	FY15	DLA 1606	JET FUEL STORAGE & PIPELINE REPLACE
FY16	P-229	KC-130 FUSELAGE TRAINER	FY22	P-226	MALS 14 MAINT HANGAR / MAG14 HQs	FY16	P-474	TOWNSEND BOMBING RANGE ACQ - PH 2
FY17	P-224	CENTRAL HEATING PLANT CONV	FY24	P-200	F-35 HANGAR (2 MODULES)	FY17	P-464	AIRCRAFT HANGAR - VMFAT
FY18	P-233	LHD TOWER - BOGUE	FY27	P-201	F-35 HANGAR (1 MODULE)	FY18	P-475	AIRCRAFT HANGAR - VMFAT
FY18	P-235	FLIGHTLINE UTILITIES/INFRASTRUCTURE	NEW RIVER			FY18	P-477	JET FUEL SYSTEM CAPACITY EXPANSION
FY18	P-222	AIRFIELD SECURITY IMPROVEMENTS	FY14	P-726	REGIONAL COMM STATION	FY18	P-484	F-35 MAINTENANCE TRAINING FACILITY
FY18	P-658	INDOOR FITNESS FACILITY	FY14	P-676	CH-53K MAINTENANCE TRAINING	FY18	P-457	CRYOGENICS FACILITY
FY18	P-130	MWSS MOTOR TRANS & COMM SHOP	FY14	P-674	CORROSION CONTROL HANGAR	FY18	P-485	F-35 ALT MISSION EQUIPMENT STORAGE
FY18	P-134	PHYSICAL SECURITY & ORD SAFETY	FY16	P-729	OPERATIONAL TRAINER FACILITY	FY19	P-476	REGIONAL COMMUNICATIONS CENTER
FY18	P-173	MWCS DETACHMENT FACILITY	FY16	P-686	ATC FACILITY ADDITION	FY19	P-458	LAUREL BAY FIRE STATION
FY18	P-129	MACS-2 OPERATIONS & MAINTENANCE	FY18	P-389	GROUP HEAD QUARTERS MAG-29	FY19	P-487	CLIMATE CONTROLLED WAREHOUSE
FY18	P-080	ATLANTIC FIELD SECURITY	FY18	P-690	STATION ARMORY	FY20	P-480	UPGRADE COMM INFRASTRUCTURE
FY18	P-196	RIFLE RANGE OPERATIONS BUILDING	FY18	P-709	ORDNANCE STORAGE	FY20	P-471	MAG-31 HEADQUARTERS
FY18	P-143	PHYSICAL SECURITY - MAINGATE	FY18	P-706	SQUADRON WAREHOUSE	FY20	P-482	MACS-2 VEHICLE STORAGE & MAINT FAC
FY19	P-223	POTABLE WATER WELLS	FY18	P-724	LIBRARY AND EDUCATION CENTER	FY21	P-488	WAREHOUSE
FY19	P-227	CONSTRUCT TARGET BERMS AT BT-11	FY18	P-713	THEATER	FY21	P-481	MRAP STORAGE AND MAINTENANCE FAC
FY19	P-199	F-35 HANGAR (2 MODULES)	FY18	P675	MASTER STORMWATER FEATURE	FY21	P-483	RUNWAY OVERRUNS
FY19	P-232	CALA BERM	FY18	P-718	CHIMP WAREHOUSE	FY22	P-462	F-35B ASSAULT STRIP
FY20	P-149	GUIDED MISSILE INTEGRATION FACILITY	FY19	P-366	CH-53K BRIDGE CRANE UPGRADES	FY22	P-479	EXPEDITIONARY CONSTRUCT COMPLEX
FY20	P-204	TRAINING AND SIMULATOR FACILITY	FY19	P-378	CH-53K REPLACE AS3905	FY22	P-478	STATION MAINTENANCE COMPLEX
FY20	P-167	ORDNANCE MAGAZINES	FY19	P-635	OSPREY SUPPORT CENTER	FY23	P-489	WAREHOUSE
FY20	P-562	POST OFFICE	FY19	P-689	RWY 23 CLEAR ZONE BRIDGE	FY23	P-486	ORDNANCE CONTROL BUNKERS
FY20	P-210	MCALF BOGUE AIRFIELD IMPROVEMENTS	FY19	P-721	MALS ADDITION	FY23	P-440	AIR EMBARKATION FACILITY
FY20	P-228	ATC TOWER & AIRFIELD OPS	FY20	P-712	DOUGLASS GATE SECURITY UPGRADE	FY23	P-461	MARINE & FAMILY READINESS CENTER
FY21	P-197	F-35 HANGAR (2 MODULES)	FY21	P-386	REPLACE AS4108			
FY21	P-142	FIRE STATIONS	FY22	P-660	REPLACE AS515			
FY21	P-162	SECURITY OFFICE	FY23	P666	REPLACE AS518			
FY21	P-202	SUPPORT EQUIPMENT STORAGE	FY24	P672	REPLACE AS4106			

MCI WEST								
YUMA			YUMA, CONT.			MCAS PENDLETON & MCB PENDLETON (AIR SUPPORT)		
FY12	P-575	ALF PH I	FY21	P-589	VL PAD	FY11	PA111	MAINT HANGAR EXPAND (ARMORY)
FY13	P-378	SECURITY OPERATIONS FACILITY	FY21	P-616	LOX/N2 FACILITY	FY12	PA114	MV-22 DOUBLE HANGAR REPLACEMENT
FY15	P-617	MALS-13 FACILITIES UPGRADES (F-35)	FY21	P-619	F-35B MAINTENANCE TRAINER FACILITY	FY16	PA1607MR	CONSTRUCT SIM ROOMS IN B-23194
FY16	P-602	MAWTS-1 CALA MAINT COMPLEX PH I	FY22	P-605	UAS HANGAR (GROUP 4/5)	FY16	PA132	ORDNANCE BUILD UP FACILITY
FY17	P-612	VMX-22 MAINT HANGAR (MV-22/CH-53K)	FY22	P-553	POST OFFICE	FY18	PA120	DOUBLE HANGAR EXPANSION
FY17	P-539	ENLISTED DINING FACILITY	FY22	P-587	TAXIWAY UPGRADES	FY18	PA134	MULTI-PLATFORM AVN SIM FACILITY
FY18	P-596	HANGAR 95 RENOVATIONS (F-35)	FY22	P-598	CONSOLIDATED CHILLER FACILITY	FY20	PA123	INTERSECTION SAFETY IMPROVEMENTS
FY18	P-504	CONSOLIDATED STATION ARMORY	FY22	P-591	WATER TREATMENT FACILITY	FY20	PA133	AVIATION LOGISTICS FACILITIES
FY18	P-364	PHYSICAL FITNESS CENTER	MIRAMAR			FY20	PA121	PERIMETER PARKING
FY18	P-527	WATER SURVIVAL TRAINING TANK	FY13	P-181	HANGAR 5 MODIFICATION	FY20	PA138	MARINE AVIATION LOGISTICS FAC
FY18	P-538	BEQ (F-35)	FY14	P-308	POL PIPELINE	FY20	PE121	CONVERT LHA DECK TO CONCRETE
FY18	P-501	FIRE STATION	FY14	P-906	ENERGY SECURITY AND MICROGRID	FY20	PE1056	LHD PAD MODERNIZATION
FY18	P-421	STUDENT QUARTERS BOQ	FY16	P-242	DEHUM SYSTEM AVIATION ARMAMENT	FY20	PE1057	VTOL PAD MODERNIZATION
FY19	P-606	UAS AVIATION LOG SUPPORT COMPLEX	FY18	P-200	KC130 FUS EACTS	FY20	PE1058	HOLF RUNWAY LIGHTING IMPROVE
FY19	P-604	GROUP 3 UAS OPERATIONS FAC	FY18	P-198	F-35 AIRCRAFT MAINT HANGAR A			
FY19	P-568	CLC-16 COMPOUND	FY18	P-203	F-35 AIRCRAFT PARKING APRON			
FY19	P-579	AVIATION MAINTENANCE STORAGE FAC	FY18	P-238	F-35 AIRFIELD SECURITY			
FY19	P-536	MAG/MALS/STATION HQ FACILITY (F-35)	FY18	P-249	F-35 COMM BUILDING & INFRA UPGRADE			
FY19	P-551	AIRCRAFT MAINT HANGAR (F-35)	FY18	P-256	CONVERT BUILDING 8671 INTO HANGAR			
FY20	P-600	MAINT BUILT IN TEST PADS (F-35)	FY19	P-210	F-35 SIMULATOR FACILITY			
FY20	P-640	AIRFIELD DUST ABATEMENT	FY19	P-222	F-35 VERTICAL LANDING PADS			
FY20	P-531	TAC AIR COMMAND CENTER	FY19	P-205	PLESS AVE ROAD EXTENSION			
FY20	P-446	CONSOLIDATED ORDNANCE DISPOSAL	FY19	P-225	AIRFIELD TAXIWAY			
FY20	P-576	ALF PH II (F-35)	FY20	P-244	MATCU OPERATIONS BUILDING			
FY20	P-419	LIFELONG LEARNING CENTER	FY21	P-193	BACHELORS ENLISTED QUARTERS			
FY20	P-450	RELIGIOUS EDUCATION CENTER ADD	FY21	P-204	VEHICULAR BRIDGE			
FY20	P-493	RUNWAY 3R/21L EXTENSION	FY22	P-201	F-35 AIRCRAFT MAINT HANGAR B			
FY20	P-503	TRANSIENT QUARTERS	FY22	P-254	F-35 ENGINE REPAIR FAC (CERF)			
FY20	P-542	MWSS-371 RELOCATION	FY23	P-258	HANGAR 3 MOD & ADDITION			
FY21	P-532	SECURE ACCESS CONTROL FACILITY	FY23	P-190	TACTICAL COMM OPS & TRAINING FAC			
FY21	P-614	AIRFIELD LIGHTING AND POWER	FY23	P-191	TACTICAL AIR CONTROL EQUIPMENT FAC			
FY21	P-570	AIRCRAFT MAINT HANGAR (F-35)	FY23	P-194	ARMORY ADDITION			
FY21	P-572	COMPOSITE REPAIR FACILITY (F-35)	FY24	P-216	RUNWAY 24R PHASE 1			
FY21	P-580	FLIGHT LINE PARKING STRUCTURE (F-35)	FY25	P-234	RUNWAY 24R PHASE 2			
FY21	P-585	RUNWAY UPGRADES (F-35)	FY27	P-202	F-35 AIRCRAFT MAINTENANCE HANGAR C			

MCI PAC								
Kaneohe Bay			Okinawa IE Shima			Iwakuni (DPRI)		
FY12	P-822	MCAS OPERATIONS COMPLEX	FY15	P-801	LHD PRACTICE SITE IMPROVEMENTS	2013	MC159T	MAG12/CVW-5 HQ BUILDING
FY13	P-904	MV-22 HANGAR & INFRASTRUCTURE	OKINAWA CONSOLIDATION PROGRAM (DPRI)			2013	MC305T	LOX STORAGE
FY13	P-905	AIRCRAFT STAGING AREA (MV-22)	TBD	TBD	1st MAW HQS FACILITY	2014	MC948	FIRE DRILL PIT (JFIP)
FY14	P-907	MV-22 PRKG APRON/INFRA (2ND SQD)	TBD	TBD	MTACS-18 AIR SURVEILLANCE RADAR FAC	2014	MC403	MWSS 171 FUEL STORAGE SHED (JFIP)
FY14	P-908	MV-22 HANGAR (2ND VMM SQND)	TBD	TBD	MACG-18 AND MWCS-18 HQS FACILITY	2014	MC407	CSSD-36 MAINT COMPOUND (JFIP)
FY14	P-863	HMLA HANGAR RENOVATION	TBD	TBD	MWCS-18 WAREHOUSE	2014	MC165T	CVW-5 HANGAR
FY14	P-884	MISSION SUPPORT FACILITY (ATS)	TBD	TBD	MWCS-18 AUTO SHOP	2014	MC166T	CVW-5 AIRCRAFT HANGAR
FY14	P-864	MALS AIRCRAFT MAINT EXPANSION	TBD	TBD	BEQ (E6-E9) COURTNEY	2015	MC173T	VMGR-152 APRON, WASHRACK & RINSE
FY15	P-861	VMU INFRASTRUCTURE UPGRADES	TBD	TBD	BEQ (E1-E5) COURTNEY	2015	MC167T	CVW-5 MAINT HANGAR
FY15	P-924	MV22 EIS TRAFFIC MITIGATION	TBD	TBD	BOQ COURTNEY	2015	MC175T	CONSOLIDATED MAINTENANCE HANGAR
FY16	P-902	AIRFIELD LIGHTING AND ELEC UPGRADES	TBD	TBD	ENLISTED DINING HALL CAMP COURTNEY	2015	MC158T	OPERATIONAL TRAINERS COMPLEX
FY16	P-910	BACHELOR ENLISTED QUARTERS PH I	TBD	TBD	MACS-4 HEADQUARTERS FACILITY	2015	MC255T	FLIGHT LINE INFRASTRUCTURE
FY18	P-913	MAG-24 ARMORY EXPANSION	TBD	TBD	MACS-4 ELECTRONICS MAINT FACILITY	2015	MC360T	RANGE COMMUNICATION FACILITY
FY17	P-887	LHD PAD CONV & MV22 LZ IMPRVMNTS	TBD	TBD	MACS-4 WAREHOUSE	2015	MC975T	ORDNACE OPERATIONS FIELD OFFICE
FY18	P-929	VMU OPERATIONS SUPPORT SHED (WAAF)	TBD	TBD	BEQ (E1-E5) HANSEN	2016	MC164T	STATION/VISTING AC APRON & SUPPORT
FY18	P-946	MALS CORROSION CONTROL HANGAR	TBD	TBD	BEQ (E6-E9) HANSEN	2016	MC948T	AIRFIELD FIRE TRAINING FACILITY PH2
FY18	P-911	BACHELOR ENLISTED QUARTERS PH II	TBD	TBD	BACHELOR OFFICER QUARTERS HANSEN	2016	MC194T	JP5 FUEL STORAGE
FY19	P-916	MV-22/HMLA WAREHOUSE	OKINAWA FUTENMA REPLACEMENT FACILITY (DPRI)			2016	MC908T	HAZADOUS CARGO LOADING AREA
FY19	P-836	MAG-24 HQ AND PARKING BUILDING	FY21	MC1566T	MAINTENANCE HANGAR (HMH)	2016	MC0135	STATION AIRCRAFT MAINT HANAGER
FY18	P-915	MCCS SELF STORAGE	FY21	MC1563T	MAINTENANCE HANGAR (VMM1)	2016	MC263T	CVW-5 MAINTENANCE TEST AREA
FY18	P-928	PTA AMMUNITION STORAGE	FY24	MC1530T	RUNWAY	2016	MC936T	STATION AIR CARGO TERMINAL
FY18	P-774	PTA EQUIPMENT STORAGE	FY24	MC1531T	TAXIWAY	2017	MC320T	FLIGHT LINE PERIMETER FENCING
FY18	P-936	VAN PAD MODERNIZATION	FY24	MC1551T	AIRFIELD PARKING APRON	GUAM - ANDERSON AB (DPRI)		
FY18	P-912	BACHELOR ENLISTED QUARTERS PH III	FY25	MC1562T	CORROSION CONTROL HANGAR	2013	P101A	AAFB NR PARKING PH II
FY18	P-926	MALS ORDNANCE STORAGE	FY25	MC1564T	MAINTENANCE HANGAR (VMM2)	2014	J-200	AAFB NR UTILITIES PH II
FY19	P-891	HANGAR 102 MODERNIZATION	FY25	MC1565T	MAINTENANCE HANGAR (HMLA)	2014	P-109	AIRCRAFT HANGAR #1
FY21	P-882	RUNWAY CLEAR ZONE & AIRFIELD IMPRV	FY25	MC1567T	MAINTENANCE HANGAR (FRC WP/MALS)	2015	P-230	GSE SHOPS
FY21	P-876	AIRFIELD SECURITYUPGRADE	FY25	MC1568T	MAINTENANCE HANGAR (OSA)	2015	P-240	MWSS FACILITIES
FY25	P-883	RUNWAY UNDERPASS	IWAKUNI			2017	P-601	AIRCRAFT HANGAR #2
OKINAWA MCAS FUTENMA			FY13	P-995	ACFT MAINT HANGAR IMPROVEMENTS	2017	P-250	MALS FACILITIES
2013	MC1304	UPGRADE STORM DRAINAGE	FY13	P-996	VTOL PAD - NORTH	2017	P-260	CORR CONTROL HANGAR
2013	MC1308	FIRE STATION GENERATOR	FY14	P-945	TYPE III HYDRANT FUELING STYEM (DESC)	2019	P-270	ACE GYM & DINING
2013	MC1310	AIR TRAFFIC CONTROL GENERATOR	FY17	P-994	ALT TRUCK FUEL RECEIPT SYSTEM (DESC)	2019	P-295	ORDNANCE OPS
FY14	P-201	AIRFIELD SECURITY FENCE	FY18	P-1006	KC130J FUS EACT	2019	P-280	AIR OPS BLDG
FY15	P-213	HANGAR & RINSE FACILITY MODERN	FY18	P-1005	VTOL PAD – SOUTH	2022	P-290	EARTH MAG
FY18	P-205	AIRCRAFT RUNWAY OVERRUN	FY18	P-1000	ACFT MAINT HANGAR IMPROVE, SOUTH	MFR MILCON -- VARIOUS LOCATIONS		
FY18	P-214	JP-5 FUEL TRUCK OFF-LOAD (DLA)	FY19	P-993	PROVIDE T-5 CAPABLE PIER (DESC)	FY20	P-430	KC130J SIM BLDG ADD TO ANG SIM
OKINAWA MARINE WING LIAISON KADENA			FY18	P-992	BULK FUEL STRG TANKS-PACOM (DESC)			
FY15	P-803	AIRCRAFT MAINT HANGAR ALTS & SAPF	FY20	P-1001	ACFT MAINT HANGAR IMPROVE, NORTH			
FY16	P-809	MODERNIZE APRON FOR F-35						
FY17	P-807	AIRCRAFT MAINTENANCE COMPLEX						
FY18	P-810	MWLK BARRACKS						

245

4.3 AVIATION TRAINING SYSTEMS ROADMAP



MARINE AVIATION DISTRIBUTED VIRTUAL TRAINING ENVIRONMENT (ADVTE)

Networked Training

Networked training began with the execution of the MCASMP and is a growing part of T&R execution across several platforms which directly contributes to Aircrew Combat Readiness and Flight Leadership Development. MATSS incorporate Network Exercise Command Center (NECC) hubs, which are linked to other MATSS, MEF battle simulation centers, and to the Joint National Training Capability (JNTC) through nationwide network infrastructure. These NECCs are currently used to develop, plan, rehearse, execute, and review scenario-based network training events for local and distributed aviation and limited integrated ground training. Future upgrades and modifications will target wider intra- and inter-service joint exercise distributed training.

Live/Virtual/Constructive (LVC) Goals

High-fidelity networked simulators incorporated with instrumented and embedded training systems support individual and collective T&R and LVC training yielding:

- Increased Core Skill, Mission Skill, Core Plus Skill and Mission Proficiency.
- Systems training capability for multi-ship, multi-type, multi-community in support of small scale distributed mission training to Large Scale Exercises (LSE).
- Improved flight safety through expanded CRM opportunities.
- Lower recurrent training costs (in APN and OM&N).
- MAGTF integration with ground and command and control simulation devices.

ADVTE & NECC ROADMAP

Common Integrated Products Team Lead: Kent Campbell PH: 407 380-4237 e-mail: kent.compbell@navy.mil

Location					FY15				FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24				FY25			
T/M/S	Type Sim	COG Name	Last Tech Ref Date	IA Cert	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
ADVTE CONNECTIVITY (WIDE AREA NETWORK)																																																
MCAS Cherry Point			N/A	2015																																												
MCAS New River			N/A	2015																																												
Cherry Pt/New River LAN/WAN			N/A	2015																																												
Miramar/Pendleton LAN/WAN			N/A	2015																																												
Yuma/Beaufort LAN/WAN			N/A	2015																																												
4th MAW LAN/WAN			N/A	TBD																																												
K-Bay LAN/WAN			N/A	TBD																																												
Iwakuni LAN/WAN			N/A	TBD																																												
Okinawa LAN/WAN			N/A	TBD																																												
MCAS NEW RIVER																																																
NECC ¹	2H157-4		N/A	2015																																												
MCAS CHERRY POINT																																																
NECC ²	2H157-1		N/A	2015																																												
MCAS MIRAMAR																																																
NECC ²	2H157-2		N/A	2015																																												
MCAS CAMP PENDLETON																																																
NECC ¹	2H157-3		N/A	2015																																												
MCAS BEAUFORT																																																
NECC ³	2H157-6		N/A	2015																																												
MCAS YUMA																																																
NECC ³	2H157-5		N/A	2015																																												
1st MAW																																																
NECC	2H157-7		N/A	TBD																																												
4th MAW																																																
NECC	2H157-8		N/A	TBD																																												

Roadmap Legend

	Trainer Operational
	New Build
	Trainer Down for Mod/Upgrade
	Planned Device Disposal
	Trainer Relocation

MARINE COMMON AIRCREW TRAINER (MCAT) ROADMAP

APMTS: Kent Campbell PH: 407-380-4237 e-mail: kent.campbell@navy.mil

[illegible]

Roadmap Legend

	Trainer Operational
	New Build
	Trainer Down for Mod/Upgrade
	Planned Device Disposal
	Trainer Relocation

*: MCAT-P1/2 are demonstrator/prototype/proof of concept training devices

NOTE 1: Devices require NGREA funding and Office of Marine Forces Reserve Approval

	Trainer Operational
	New Build
	Trainer Down for Mod/Upgrade
	Planned Device Disposal
	Trainer Relocation

UAS RQ-7 INTEGRATED/UNIVERSAL MISSION SIMULATOR ROADMAP

Assistant Program Manager, Training Systems: Don Sheehan PH: 301-757-0421 e-mail: donald.sheehan@navy.mil

T/M/S	Type Sim	COG Name	Db	TEn	Last Tech Ref Date	IA Cert	FY15				FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24				FY25			
							1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Kaneohe Bay																																																		
RQ-7B	IMS (#3)	2F217			N/A	02-14																																												
RQ-7Bv2	UMS(#3)	2F240		TBD	N/A	TBD																																												
RQ-7Bv2	UMS (#4)	2F240		TBD	N/A	TBD																																												
29 Palms																																																		
RQ-7B	IMS (#1)	2F217			N/A	02-14																																												
RQ-7Bv2	UMS (#1)	2F240		TBD	N/A	TBD																																												
RQ-7Bv2	UMS (#2)	2F240		TBD	N/A	TBD																																												
Cherry Point																																																		
RQ-7B	IMS (#2)	2F217			N/A	02-14																																												
RQ-7Bv2	UMS (#5)	2F240		TBD	N/A	TBD																																												
Pendleton																																																		
RQ-7B	IMS (#5)	2F217			N/A	02-14																																												
RQ-7Bv2	UMS (#6)	2F240		TBD	N/A	TBD																																												

Roadmap Legend

	Trainer Operational
	New Build
	Trainer Down for Mod/Upgrade
	Planned Device Disposal
	Trainer Relocation

VH AIRCREW TRAINING SYSTEMS ROADMAP

Training Integrated Products Team Lead: Robert Peterson PH: 301 757 8956 e-mail: rob.peterson@navy.mil

T/M/S	Type Sim	COG Name	Db	TEn	Last Tech Ref Date	IA Cert	FY15				FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24				FY25																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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VH-3D	APT	2F180	ESUSA V1.	v4.0	12-Aug	12-Sep																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				</

Roadmap Legend

	Trainer Operational
	New Build
	Trainer Down for Mod/Upgrade

	Planned Device Disposal
	Trainer Relocation

Note 1: Trainer Disposals are pre-decisional

MV-22 AIRCREW TRAINING SYSTEMS ROADMAP

Integrated Products Team Lead: Mary Beth Rodriguez

PH: (301) 757-8158

e-mail: mary.b.rodriguez1@navy.mil

T/M/S	Type Sim	COG Name	Db	TEn	Last Tech Ref Date	IA Cert	FY15				FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24				FY25																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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MV-22	FFS-1	2F182	NPSI, Note 1	v5.01C	2015	2015																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											

Roadmap Legend

	Trainer Operational
	New Build
	Trainer Down for Mod/Upgrade
	Planned Device Disposal
	Trainer Relocation

Notes (These databases include:)

Note 1: East Coast, West Coast, Bridgeport Summer/Winter, Iraq, Afghanistan

Note 2: Note 1 plus WestPac

Note 3: Note 2 plus Wash DC, Hawaii

Note 4: NGREA funded

CH-53E AIRCREW TRAINING SYSTEMS ROADMAP																																																		
Assistant Program Manager, Training Systems: Mark Elliott PH: 301-342-6688 e-mail: Mark.Elliott@navy.mil																																																		
T/M/S	Type Sim	COG Name	Db	TEn	Last Tech Ref Date	IA Cert	FY15				FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24				FY25			
							1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
NEW RIVER																																																		
CH-53E	WST	2F174-1	Aechelon	v5.0	2008	Mar 12																																												
CH-53E	APT	2F190-1	Aechelon	v5.0	2010	Nov 11																																												
CH-53E	EAET/AET	2H164-1	Aechelon	v5.0	NA	TBD																																												
FUTENMA																																																		
CH-53E	APT	2F171	Aechelon	v4.0	2009	TBD																																												
MIRAMAR																																																		
CH-53E	WST	2F174-2	Aechelon	v5.0	2009	Oct 11																																												
CH-53E	APT	2F190-2	Aechelon	v5.0	2011	Nov 11																																												
CH-53E	EAET/AET	2H164-2	Aechelon	v5.0	NA	TBD																																												
KANE OHE BAY																																																		
CH-53E	CFTD	2F220	Aechelon	v5.0	2012	TBD																																												
CH-53E	EAET	2H164-3	Aechelon	v5.0	NA	TBD																																												
JB MCGUIRE-DIX LAKEHURST																																																		
CH-53E	FTD	2F239	Aechelon	v5.0	NA	TBD																																												
CH-53K AIRCREW TRAINING SYSTEMS ROADMAP																																																		
Assistant Program Manager, Training Systems: Mark Elliott PH: 301 342-6688 e-mail: Mark.Elliott@navy.mil																																																		
T/M/S	TYPE SIM	COG Name	Db	TEn	Last Tech Ref Date	IA Cert	FY15				FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24				FY25			
							1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
NEW RIVER																																																		
CH-53K	CFTD #1	2F243	Aechelon	v5.x																																														
CH-53K	CFTD #2																																																	
CH-53K	AMSPTT																																																	
CH-53K	CLT #1																																																	
CH-53K	CFTD #3																																																	
CH-53K	FTD #4																																																	
CH-53K	FTD #5																																																	

	Trainer Operational
	New Build
	Trainer Down for Mod/Upgrade



Planned Device Disposal Trainer Relocation

H-1 AIRCREW TRAINING SYSTEMS ROADMAP

Training Integrated Products Team Lead: Mark Eagles PH: 301-995-3716 e-mail: mark.eagles@navy.mil

T/M/S	Type Sim	COG Name	Db	TEn	Last Tech Ref Date	IA Cert	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
							1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
KANEHOE BAY																	
AH-1W	APT	2F170 S/N 3	NPSI Note-2	v4.0	Jan 2012	In Work											
UH-1Y	FTD	2F196B S/N 3	NPSI Note-2	v4.0	New (Lot 3)	2014											
AH-1Z	FTD	2F227 S/N 1	NPSI Note-2	v4.0	New (Lot 4)	2017											
CAMP PENDLETON																	
AH-1W	APT	2F170 S/N 1	Ft. Rucker Note-3	v4.0	Feb 2012	In Work											
AH-1W	WST	2F136A S/N 2	PSI/NPSI Note-1	v4.0	Oct 2005	Aug 2011											
AH-1Z	FTD	2F197 S/N 1	NPSI Note-2	v4.0	New	Nov 2011											
AH-1Z	FFS	2F215 S/N 1	NPSI Note-2	v4.0	New	Nov 2011											
UH-1Y	FFS	2F206 S/N 1	NPSI Note-2	v4.0	New	2014											
UH-1Y	FTD	2F196B S/N 2	NPSI Note-2	v4.0	New (Lot 3)	2014											
UH-1Y	CPT	2C84 S/N 1	N/A	N/A	New	Sep 2011											
AH-1Z	CPT	2C83 S/N 1	N/A	N/A	New	Sep 2011											
UH-1Y	CPT	11H184	N/A	N/A	New	Sep 2011											
AH-1Z	CPT	11H185	N/A	N/A	New	Sep 2011											
NEW RIVER																	
AH-1W	WST	2F136A S/N 1	PSI/NPSI Note-1	v4.0	Oct 2005	May 2010											
UH-1Y	FTD	2F196 S/N 1	NPSI Note-2	v4.0	New	Mar 2012											
AH-1Z	FTD	2F197B S/N 2	NPSI Note-2	v4.0	New (Lot 3)	2016											
UH-1Y	FTD	2F226 S/N 1	NPSI Note-2	v4.0	New (Lot 4)	2017											
AH-1Z	FTD	2F227 S/N 2	NPSI Note-2	v4.0	New (Lot 5)	2019											
ROBINS AFB																	
AH-1W	APT	2F170 S/N 2	NPSI Note-2, 6	v4.0	Aug 2012	Dec 2012											
BELLE CHASSE																	
AH-1W	APT	2F170 S/N 2	NPSI Note-2, 6	v4.0	Aug 2012	Dec 2012											
UH-1Y	FTD	2F226 S/N 2	NPSI Note-2	v4.0	New (Lot 4)	2017											
AH-1Z	FTD	XFXXX S/N X			Lot 5												
MCGUIRE																	
AH-1W	APT	2F170 S/N 1	NPSI Note-2, 5	v4.0	Feb 2012	In Work											
UH-1Y	FTD	2F196B S/N 4	NPSI Note-2	v4.0	New (Lot 4)	2017											
AH-1Z	FTD	2F227 S/N 3	NPSI Note-2	v4.0	New (Lot 5)	2019											

Roadmap Legend

	Trainer Operational
	New Build
	Trainer Down for Mod/Upgrade
	Planned Device Disposal
	Trainer Relocation
	Proposed/Unfunded

Note 1: VITAL-9 Image Generator (IG) with areas: EC, WC, NY, Bridgeport, Okinawa, Mediterranean, Panama, & Norway

Note 2: VITAL-X IG with gamng areas : NPSI (EC, WC, Bridgeport, Iraq, Afghanistan)

Note 3: Aechelon IG with gaming areas: NPSI (EC, WC, WestPac, Iraq, Afghanistan, Southeast Asia, and Horn of Africa)

Note 4: Aechelon IG with gaming areas: NPSI (EC, WC, WestPac, Iraq, Afghanistan)

Note 5: Trnr Move to JRB MDL - unfunded move for MARFORRES, O&M/NR

Note 6: Device move to New Orleans - unfunded move for MARFORRES, O&M/NR

Note 7: Currently unfunded

KC-130 AIRCREW TRAINING SYSTEMS ROADMAP

Assistant Program Manager, Training Systems: John Fuller   PH: 301-995-3796   e-mail: john.fuller@navy.mil

PH: 301-995-3796

e-mail: john.fuller@navy.mil

[illegible]

Roadmap Legend

Trainer Operational
 New Build
 Trainer Down for Mod/Upgrade
 Planned Device Disposal
 Trainer Relocation

Notes (These databases include:)

- 1 - East & West Coasts, Bridgeport, Afghanistan and Iraq
- 2 - Reserve trainers are funded with NGREA; and funding for trainers other than the Ft Worth trainers has not been identified at this time. Stewart ANGB Trainers are unfunded
- 3 - Dates for 2F199-3 Move and Tech Refresh are notional
- 4 - Iwakuni FuT is TBD at this time

EA-6B AIRCREW TRAINING SYSTEMS ROADMAP

Assistant Program Manager, Training Systems: TBD

T/M/S	Type Sim	COG Name	Db	TEn	Last Tech Ref Date	IA Cert	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
							1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
CHERRY POINT																	
EA-6B	TTT	15E43 (I3)		FY13	FY11	FY13	BLK7										
EA-6B	OF/NT	2F143 (I2)		4.0	FY08	TBD											
EA-6B	OF/NT	2F185 (I3)		FY13	FY10	FY13	BLK7										
EA-6B	WST	2F188 (I3)		FY13	FY12	FY14											
IWAKUNI																	
EA-6B	WST	2F178 (I2)		N/A	FY10	N/A											

Roadmap Legend

	Trainer Operational
	New Build
	Trainer Down for Mod/Upgrade

	Planned Device Disposal
	Trainer Relocation

AV-8B AIRCREW TRAINING SYSTEMS ROADMAP

Assistant Program Manager, Training Systems: Brian Trago PH: 407-380-4719 e-mail: brian.trago@navy.mil

T/M/S	Type Sim	COG Name	Db	TEn	Last Tech Ref Date	IA Cert	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
							1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
CHERRY POINT																	
AV-8B	WST	2F150F-1	NPSI Note-	Rev 5.0.1C	Jun-10	Mar-12											
AV-8B	WST	2F150F-2	NPSI Note-	Rev 5.0.1C	Aug-12	Mar-12										Notional	
AV-8B	WST	2F150F-4	NPSI Note-	Rev 5.0.1C	Mar-11	Mar-12											
AV-8B	MTT	15A23	evice uniqu	No	Jun-05	No											
AV-8B	DMRT (6)	TBD	TBD	TBD	N/A	FY18											
YUMA																	
AV-8B	WST	2F150F-3	NPSI Note-	Rev 5.0.1C	Dec-10	Feb-12								Notional			
AV-8B	WST	2F150F-5	NPSI Note-	Rev 5.0.1C	Dec 09	Feb-12								Notional			
AV-8B	MTT	15A23	evice uniqu	No	Jun-05	No											
AV-8B	DMRT (2)	TBD	TBD	TBD	N/A	FY18											

Roadmap Legend

	Trainer Operational
	New Build
	Trainer Down for Mod/Upgrade

	Planned Device Disposal
	Trainer Relocation

Visual Database Notes:

Note 1: Q3D IG, NPSI-compliant Vis DB, gaming areas - NPSI (EC-CONUS, WC-CONUS)

USMC F/A-18 C-D AIRCREW TRAINING SYSTEMS ROADMAP

Assistant Program Manager, Training Systems: Tim McDonald

PH: 301-757-7333

e-mail: timothy.mcdonald@navy.mil

T/M/S	Type Sim	COG Name	Db	TEn	Last Tech Ref Date	IA Cert	FY15				FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24				FY25			
							1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
IWAKUNI																																																		
F/A-18C	TOFT #16	2F193A		NASMP v1.4																																														
F/A-18D	TOFT #37	2F193B		NASMP v1.4																																														
F/A-18C	TOFT #25	2F193A		NASMP v1.4																																														
MIRAMAR																																																		
F/A-18D	TOFT #30	2F193B		NASMP v1.4																																														
F/A-18D	TOFT #31	2F193B		NASMP v1.4																																														
F/A-18C	TOFT #32	2F193A		NASMP v1.4																																														
F/A-18C	TOFT #33	2F193A		NASMP v1.4																																														
F/A-18C	TOFT #35	2F193A		NASMP v1.4																																														
F/A-18C	TOFT #38	2F193A		NASMP v1.4																																														
BEAUFORT																																																		
F/A-18C	TOFT #28	2F193A		NASMP v1.4																																														
F/A-18D	TOFT #34	2F193B		NASMP v1.4																																														
F/A-18D	TOFT #36	2F193B		NASMP v1.4																																														
F/A-18C	TOFT #40	2F193A		NASMP v1.4																																														
FT WORTH																																																		
F/A-18C	TOFT #43	2F193A		NASMP v1.4																																														
F/A-18C	TOFT #XX	XXXXX		NASMP v1.4																																														

Roadmap Legend

	Trainer Operational
	New Build
	Upgrades
	Planned Device Disposal
	MCAT (CFTD) Note 1

Note 1: New Facility Schedule in flux, driving timing of move. Effort is funded and will occur ICW Technology Refresh

Note 2: SAN DISK Hardware upgrades will be installed at Beaufort, Miramar and Iwakuni in late FY16-early FY17

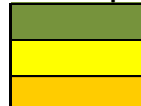
Note 3: Trainer move and MILCON funds need to be identified

F-35 AIRCREW TRAINING SYSTEMS ROADMAP

Transformation Task Force Lead: Maj Ryan Colvert PH: 703-693-7109 email: ryan.colvert@usmc.mil

T/M/S	Type Sim	Device S/N	FY15				FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24				FY25			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
YUMA																																														
F-35	FMS # 1																																													
F-35	FMS # 2																																													
F-35	FMS # 3																																													
F-35	FMS # 4																																													
F-35	FMS # 5																																													
F-35	FMS # 6																																													
BEAUFORT																																														
F-35	FMS # 1																																													
F-35	FMS # 2																																													
F-35	FMS # 3																																													
F-35	FMS # 4																																													
F-35	FMS # 5																																													
F-35	FMS # 6																																													
F-35	FMS # 7																																													
F-35	FMS # 8																																													
IWAKUNI																																														
F-35	FMS # 1																																													
F-35	FMS # 2																																													
F-35	FMS # 3																																													
F-35	FMS # 4																																													
MIRAMAR																																														
F-35	FMS # 1																																													
F-35	FMS # 2																																													
F-35	FMS #3																																													
F-35	FMS # 4																																													
F-35	FMS #5																																													
F-35	FMS # 6																																													
CHERRY POINT																																														
F-35	FMS # 1																																													
F-35	FMS # 2																																													
F-35	FMS # 3																																													
F-35	FMS # 4																																													
F-35	FMS # 5																																													
F-35	FMS # 6																																													
EDWARDS																																														
F-35	DMRT																																													

Roadmap Legend



Trainer Operational

New Build

Trainer Down for Mod/Upgrade



Planned Device Disposal

Trainer Relocation





Marine Aviation Plan 2016 link

