MARINE AVIATION PLAN

2015


T-2.0
FLYING HOURS
READY AIRCRAFT
FIRST TO FIGHT

The Marine Corps' responsibilities to the nation are outlined in United States Code Title 10, which states that:

(a) The Marine Corps is a naval, expeditionary force-in-readiness tasked in public law and national policy to perform the following specific functions:

- (a) Seize and defend advanced naval bases or lodgments to facilitate subsequent joint operations.
- (b) Provide close air support for ground forces.
- (c) Conduct land and air operations essential to the prosecution of a naval campaign.
- (d) Conduct expeditionary operations in the urban littorals and other challenging environments
- (e) Conduct amphibious operations, including engagement, crisis response, and power projection operations, to assure access. The Marine Corps has primary responsibility for the development of amphibious doctrine, tactics, techniques, and equipment.
- (f) Conduct security and stability operations and assist the initial establishment of a military government, pending transfer of this responsibility to another authority.
- (g) Provide security detachments and units for service on armed vessels of the Navy, provide protection of naval property at naval stations and bases, and provide security at designated US embassies and consulates.
- (h) Perform other duties as the President or the Secretary of Defense may direct. These additional duties may not detract from or interfere with the operations for which the Marine Corps is primarily organized.

In other words, HQMC is responsible for manning, training and equipping the force, for the readiness to fight and win our nation's battles.

MARINE CORPS AVIATION

The United States Marine Corps is our nation's force in readiness—the combined arms force that is most ready when the nation is least ready. As such, our Corps must be ready to deploy and employ combined arms from the sea and from expeditionary/austere Forward Operating Bases—under any and every threat condition in every clime and place. Upon arrival we will defeat every foe—large or small—or we will provide assistance to our friends who need it.

One of the primary tools the Marine Corps relies upon to bring this capability to life is our organic aviation. Marine aviation is an integral and essential part of every MAGTF. Our aviation is seamlessly integrated and forward deployed with every MAGTF. These MAGTFs give the Marine Corps capability and reach that create a strategic advantage for our nation. As the Marine Corps' Deputy Commandant for Aviation, I am responsible for ensuring that Marine aviation has sufficient resources to prevail in today's and tomorrow's battlespace. To that end, Marine aviation must be trained, manned and equipped to:

- Be our Corps' aviation force in readiness, prepared to task organize, deploy and sustain combat ready forces--at a moment's notice, to any clime or place, from sea or forward operating bases— in support of MAGTF, naval, joint and combatant command (COCOM) requirements.
- Train the future of Marine aviation as well as the joint and coalition members in our fleet replacement squadrons (FRS), advanced tactics units and Marine Aviation Weapons and Tactics Squadron One (MAWTS-1).
- Develop and test our future aviation weapons and command and control systems at VMX-22.
- Safely transport the President of the United States in vertical lift and tiltrotor aircraft in HMX-1.

My responsibility can be distilled into one word: **READINESS**. I personally, along with my team in HQMC Aviation, have no other purpose than to ensure, and be held accountable for, the Corps' aviation readiness now and in our future. To deliver current and future readiness I will focus on flying, training, innovation, standardization, and culture, along with right-sizing and resourcing Marine Aviation forces to meet our operational requirements.

Flying: We will employ 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 combat readiness, currency and proficiency. We aren't doing well in this regard and we need to improve our performance. All Marine aviators assigned to tactical and training units need to fly a minimum of 15 hours per month. Why? We have analyzed each of the Training and Readiness Manuals for Marine Corps aircraft and calculated what we need each aircrew to fly to achieve a T2.0 readiness level for that unit. The target flight hours range from 15.4 to roughly 18 hours per aircrew. We have also calculated the Flight Line Entitlement and number of Ready Basic Aircraft to achieve that flight hour goal and a T2.0 readiness level. Those will serve as our targets and our benchmark for flight operations. I will ensure that we resource the fleet to this requirement both in CONUS and while deployed ashore or at sea.

MARINE CORPS AVIATION

Training:

Fleet: To be the organic air component of our nation's force in readiness we must maintain each unit at a T-2.0 readiness state. Some of our units are not there today, and so we will find the resources, adjust the policy--or do both--to turn that around.

FRS: Our Fleet Replacement Squadrons (FRSs), Training and Readiness (T&R) Manuals, and Weapons and Tactics Training Program (WTTP) provide the foundation for the world-class aviation training that our Marines receive. I will identify the gaps and barriers to successful training – and attack them aggressively. Our FRSs build the seed corn for future readiness and operational excellence. I intend to "fence" the aircraft and manning in our FRSs and make them immune to "resource runs." Our time to train in some of our FRSs is excessive, which negatively impacts readiness and career progression. We need to get our replacement aircrew to the fleet in an efficient and timely manner.

MAWTS-1: MAWTS-1 is our schoolhouse for the development and sharing of advanced tactics, techniques and procedures. The WTI course is our first choice for advanced instructor training over all other options. Co-locating VMX-22 with MAWTS-1 will allow greater synergy between our advanced weapons and tactics instructor schoolhouse and our operational test squadron—ensuring our ability to maximize the combat advantage of our new weapon systems as we field them.

Exercises: We must train like we fight and do so in venues and exercises that extract maximum value for our training dollar. We will operate and cross-train with our MAGTF teammates as the going-in proposition vice the exception. With alleged Russian separatists shooting down airliners with advanced SAM systems and Hezbollah striking Israeli ships with shore-based cruise missiles, we need to be ready for not only another OEF or OIF but for a high-end threat scenario. Our future operations will be integrated with GCE operations in a contested urban environment fighting against either a nation state or non-nation state actor in an anti-access scenario. The bottom line is that we need to train and be ready for operations across the range of military operations—now.

Innovation: One of the most significant changes made in USMC aviation in the last three decades is underway at MCAS Yuma right now with the move of VMX-22 from New River to Yuma. Specifically, we have moved (or are moving) virtually all of our aviation and aviation command and control operational test (OT) efforts (and assets) under the command and direction of the VMX-22 Commanding Officer. In the summer of 2015, VMX-22 will control an exponentially bigger force…probably the most strategically important effort in USMC aviation. That force will include 4 F-35Bs at Edwards Air Force Base (with a move to Yuma in 2017 along with an additional 2 jets,) all H-1 OT (2 UH-1Ys, 2 AH-1Zs, 1 AH-1W,) G/ATOR OT, CAC2S OT, MQ-21 OT and UAS experimentation. In essence, by next summer VMX-22 will be six times larger than its current form, and we have built the facilities to house it in Yuma. With this move, we consolidated the entire range of our aviation OT in one location, which facilitates our efforts to inform the generation of new capabilities, concepts and tactics, techniques and procedures. VMX-22's co-location with MAWTS-1 will accelerate integration and the ability of Marine aviation--and the MAGTF--to innovate…and stay ready.

Standardization: By improving our standardized approach to training, planning and executing, we position ourselves to more effectively adjust from our plans by creating a more solid baseline from which to shift. The more we work on standardization, the more we will force ourselves to look at best practices across Marine aviation and other partners that operate similar gear (think US Air Force, US Navy and allies). A standardized approach also consistently creates well-trained aircrew. Our NATOPS, T&R and WTTP manuals provide the baseline that allows our squadrons to seamlessly integrate with each other and the rest of the MAGTF.

Culture:

Discipline: We will do things the right way—always—even when no one is watching. We will insist that our peers, subordinates and seniors do the same. We will focus on being "brilliant in the basics." Great sports teams that win week in and week out are those that execute the basics very well and consistently; it is rarely the flashy play or single player that makes the difference.

MARINE CORPS AVIATION

Blue Threat: Statistically, the Blue Threat has proven to be much more lethal than anything the enemy (Red Threat) can throw at us in combat. The Blue Threat includes improper planning, bad decision making, poorly conceived tactics, careless maintenance, austere environments, substandard execution and failed leadership. We must understand the Blue Threat and plan, train and lead our Marines to avoid this threat like we would a SAM, AAM, AAA or IED belt.

Why: Because we need every Marine and warfighting asset in the fight. Ensuring we have a highly trained, disciplined approach to every planning, maintenance, flight or training event will not only allow us to protect our most precious asset—our Marines – but more importantly will ensure that they are most ready for the next fight. Aviation's culture needs to be based upon operational excellence. If we are thoughtful, focused and disciplined in how we conduct our operations, we will effectively mitigate the blue threat and maximize our ability to crush the red threats.

Resourcing: I will ensure we resource our legacy platforms—our legacy gear—to meet our Commandant's readiness requirement until the sundown of those platforms. I will also extract every ounce of capability from our legacy gear until we replace it with modern equipment—new gear—just like the proud legion of Marines that went before us. If we do not take care of the legacy gear then we will not be able to make the transition to the new gear.

Right-sizing and Equipping our Deploying Forces: I will work closely with my fellow Deputy Commandants to ensure that we tailor our forces to meet MARFOR, Combatant Commander, and Joint Force Commander requirements. If we deploy more than what is required, we degrade our ability to train the follow-on forces for rapid reinforcement, OPLAN requirements, and maintenance of T2.0 level readiness.

Legacy Gear:
Our legacy gear will be ready until we are done with it. We need to be able to transition out of our legacy gear at a time and place of our choosing. This equipment has proven itself in the last two to three decades of deploying and fighting. Our legacy gear is a key component of our current readiness, so if we take care of it properly, it will effectively support our Marines in every clime and place.

I am concerned about our current readiness. We have seen a decrease in flight hours per month per pilot and an uptick in our mishap rate. The flight hour metric, while not the only measure of capability, is an indicator of the depth of our material bench and of our ability to "surge" if needed. Current research on operational advantage advocates the benefits of getting one's players more "looks" at the ball. The book *Outliers* by Malcolm Gladwell highlights that the best hockey players are the same ones that received more "ice time" as young players. Our Marine aviators need more "looks at the ball" than they are getting right now. Improving the material readiness of our legacy gear—the key component to current readiness—is no easy task, but we must do it. I will conduct comprehensive readiness reviews of three of our legacy programs (AV-8, F/A-18 and CH-53E) to ensure our plans for readiness and sustainment are adequate to the end of their service life. I may extend the review effort to other USMC platforms to get an outside sanity check of our plans, programs and strategy for readiness.

We are currently laying out the final configuration of our legacy AH-1Ws, F/A-18s, AV-8Bs, KC-130Ts and CH-53Es. The final configuration will contain only those capabilities we truly need to support our Marines out to the end of the service life of those platforms. We will aggressively scrutinize any "wish lists" and ensure that the gear we ask for serves to make the MAGTF fight better – as a team. Those items that do not or cannot inter-operate or be used by several platforms will not make the cut.

Digital Interoperability. 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. We want all of our MAGTF, joint and combined teammates to "see" as much of what we see and "know" as much as we know as possible – at light speed. We will procure systems that provide distributed electronic warfare (EW) and intelligence, surveillance and reconnaissance (ISR) capability. "Every platform a sensor," "every platform an EW node," "every platform a shooter" and "every platform a connector" are our goals. We intend to make this true for our legacy gear as well as our new gear.

We are not looking for gold-plated solutions; speed of capability introduction trumps perfect integration in this effort. With the advances in private sector information technology, this is very achievable and not prohibitively expensive. If we think more tablet-like and "App"-based than proprietary and "in the glass" we can achieve our objectives quicker and cheaper. By doing this, we will enable our legacy gear to be a force-multiplier for a larger percentage of their remaining useful service life. All other warfighting upgrades for our legacy gear are subordinate to (1) linking every platform via Link 16 (or equivalent), and (2) equipping our air and surface nodes with software reprogrammable payload (SRP) radios.

New Gear:

We need to finish our transition to our new platforms as quickly and efficiently as possible. We are nearly complete with the KC-130J (65%) and MV-22 (65%) transitions and in the middle of the H-1 Upgrades transition. We have begun the F-35, G/ATOR and MQ-21 transitions and are getting ready to initiate our CH-53K transition. The KC-130J, MV-22 and UH-1Y have improved our ability to project power and fight the ACE—bringing us unmatched increases in capability. The AH-1Z, F-35, G/ATOR and CH-53K will likewise change the way we fight, for the better, just as the KC-130J, MV-22 and UH-1Y have.

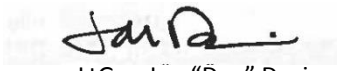
We need to focus on using every opportunity to buy new gear and transition out of our legacy gear. In my mind, that will constitute my primary strategy: to recapitalize the FMF aviation units with transformational gear like the MV-22, F-35B, CH-53K and G/ATOR. Those systems in particular give our Marines unique and qualitative basing, maneuver, situational awareness, information sharing and fires advantages – that no one else can even come close to. There are some who have said legacy or fourth-generation is good enough—it's not. Imagine if the US Army Air Corps decided in the early 1940s that the P-40 Warhawk was good enough and didn't develop a P-51. Imagine if we had taken counsel of our fears (and listened to the naysayers) and built an upgraded medium lift helicopter vice the MV-22. Fortunately, enlightened leaders pressed for the qualitative and leap-ahead technology in the 1940s…and again in the 1980s and 1990s for the MV-22.

As leaders did before me, I will lean forward in the straps to get us the future systems we need to ensure that we're ready. For example, I will look for ways to procure more F-35s faster. The jets we buy today will arrive in a combat-ready configuration, with a robust suite of precision air-to-ground and air-to-air weapons, 3F software and no need for post-production modifications. Currently the factory can produce more of our jets than we are scheduled to procure. They can produce 24 F-35Bs and 20 F-35Cs per year. Given our inventory shortfalls and our increasing OPTEMPO, I consider it a strategic imperative that we produce and procure as many fifth-generation F-35s as we possibly can.

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 investing and recapitalizing on platforms that can project USMC power from amphibious carriers or FARPs ashore, with leap-ahead technologies such as tiltrotor aircraft and fifth-generation STOVL strike fighters, we ensure that qualitative advantage for our MAGTFs.

We are on exactly the right track. My mission is to press the attack and 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. These efforts will collectively ensure that Marine Aviation and the United States Marine Corps is most ready when the nation is least ready.

Semper Fidelis,



LtGen Jon "Dog" Davis
Deputy Commandant for Aviation

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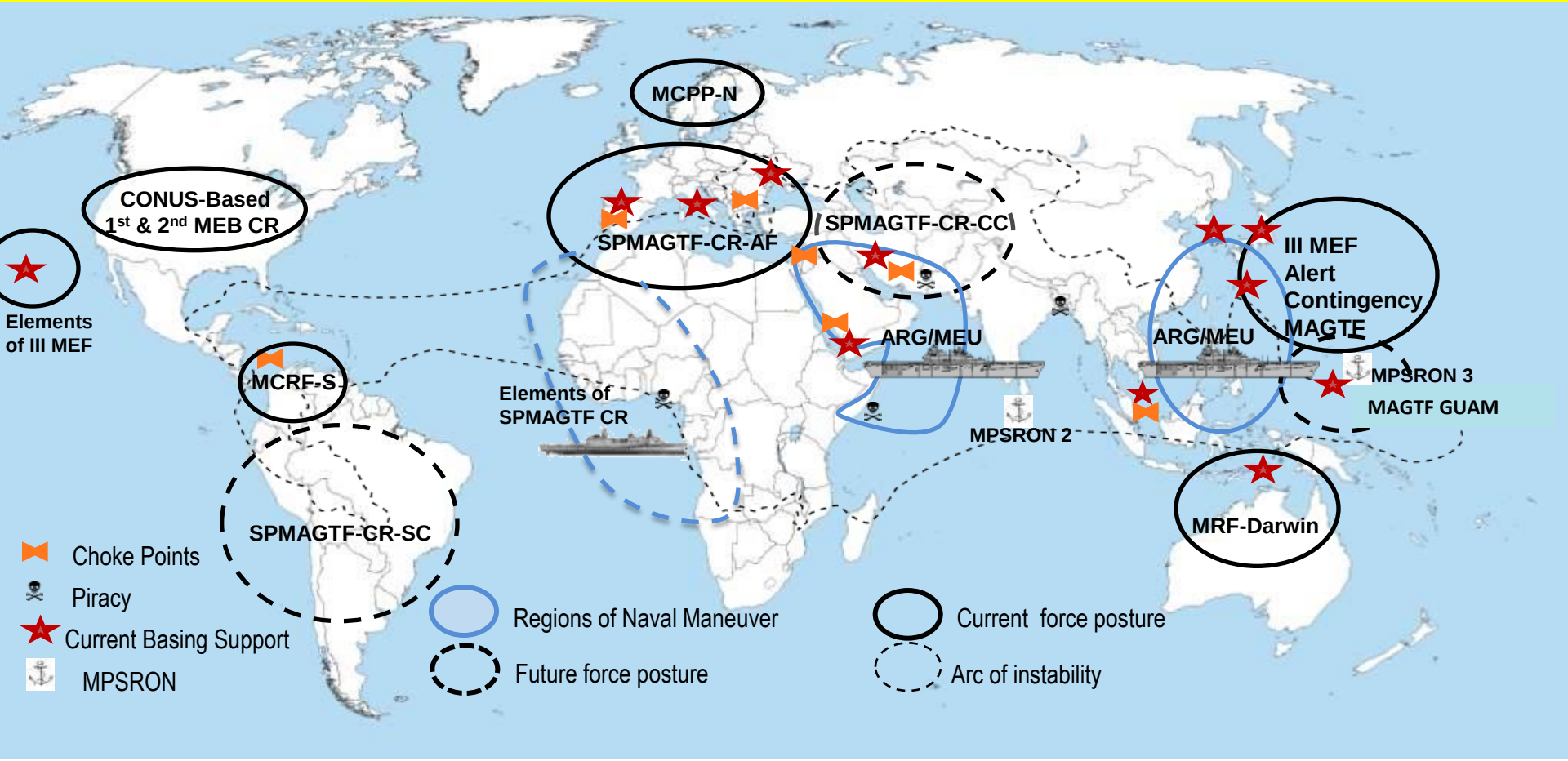
SECTION ONE MARINE CORPS OPERATIONAL LANDSCAPE

1.1 MARINE CORPS FORCE POSTURE 2014-2020

In the "new normal" environment, the Marine Corps will thicken the forward deployed Marine force posture. This posture provides more flexibility in employing the ARG/MEU within each geographic combatant command, with reach-back capability to the United States. With MEB command elements ready to deploy, and with Special MAGTF forces postured forward, the Marine Corps buys time for the nation's leaders.



1.2 HOW WE FIGHT

> The Marine Corps has long provided the nation with a force adept at rapidly and effectively solving complex security challenges…so much so that "Send in the Marines" connotes both a demand for action and a presumption of success. The Marine Corps is optimized to be expeditionary – a strategically mobile middleweight force.
>
> Marines operate in the spirit of, and are guided by, the philosophy of maneuver warfare. Success in fluid environments demands leaders and organizations that can understand the nature of a given situation and react to it faster than their opponents.
>
> -Marine Corps Doctrinal Publication 1-0, 2011

Maneuver warfare is a philosophy- not for fighting hard, but for fighting smart. We are not an effects-based force; we know that targeting and discretion are as important as lethality, and that understanding the battlespace means understanding the constraints and restraints of modern war.

The MAGTF can move from over the horizon into green water, and then project forces ashore at the time and place of the commander's choosing. Moving forces in this way requires sealift, at-sea connectors and a fleet of vehicles for ship-to-shore movement.

By 2017, we will have 22,500 Marines west of the international date line. For the world's largest ocean, we need to coordinate closely with the world's best Navy, and we are doing that in the following ways:

- Integrating MEB, ESG and CSG operations
- Building command and control capabilities, to include integrating the Marine Corps into the Maritime Operations Center
- Exploring options for Marines operating from alternative ships
- Working with the Navy as they modernize the connector fleet

The Marine Corps bias for action is reflected in our doctrine, Expeditionary Force -21, and in the ships we will use to execute maneuver warfare with sea as a maneuver space: the Navy's nine (soon to be ten) Amphibious Ready Groups of three ships apiece; Mobile Landing Platforms and Maritime Prepositioned Ships; the Amphibious Combat Vehicle and its successors. With these capabilities we will maximize our speed and lethality, and operationalize our philosophy of speed, shock and surprise.

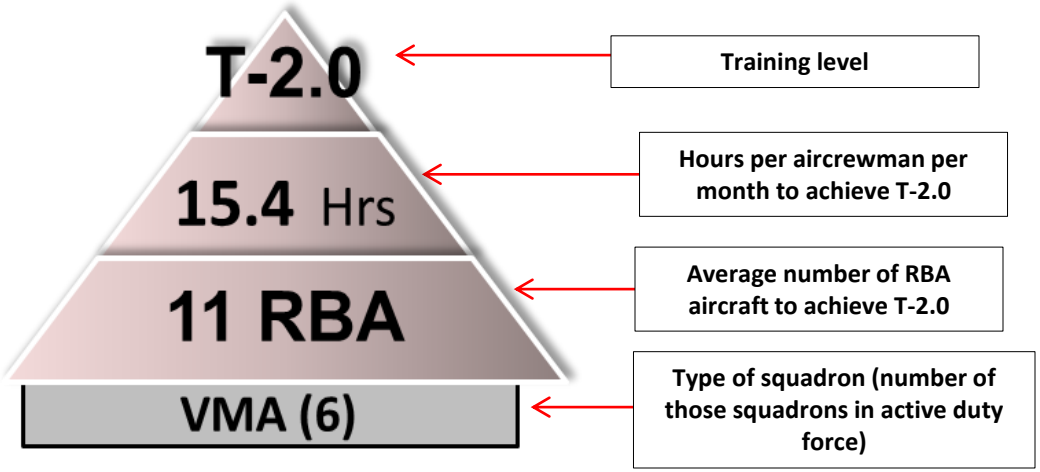
As we move closer to shore, we disaggregate into smaller units, to reaggregate on a fluid battlefield. We view the Marine Expeditionary Brigade as the baseline MAGTF, the middleweight MAGTF which we can aggregate for large-scale combat or break down into smaller, more agile teams below the MEU level. We maintain MEB-centric steady state for forcible entry, while the MEU is evolving: executing split operations, integrating special operations forces, working from prepositioned equipment and advanced expeditionary bases.

The Special Purpose MAGTF- Crisis Response is becoming a high-profile task force for the Marine Corps, demonstrating our strategic and operational agility. These forces are being used every day and around the world, and the speed with which we employ them are tribute to the aggressive maneuverist philosophy with which we train and educate our Marines and their leaders. We expect that the forward deployed MEUs and SPMAGTF-CR will be foundational for addressing threats around the world.

These SPMAGTFs are built around speed and flexibility. We will deploy our ground combat units as battalions, but we will build future capacity to employ them as company landing teams, with young 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 technology: radios, optics, assault and maneuver support, vehicles and vertical lift.

As we train, educate, and prepare for war, we keep a sharp eye on the changing world environment. As the world becomes more dense, urban, littoral and violent, the Marine Corps remains ready to fight and **win**.

1.3 AVIATION COMBAT READINESS



SQDN	T/M/S	Hrs per Pilot/WSO/ECMO	Primary Mission Aircraft Authorized (PMAA)	Flight Line Entitlement (FLE) per Sqdn	RBA Required for T-2.0
HMH	CH-53E	16.5	16	13	8
HMLA	AH-1W	15.8	18	13	10
	UH-1Y*	20.4/17.8	9/12	9/12	6/7
	AH-1Z*	18.2	15	13**	9
HMM	CH-46E	22.2	12	12	
VMM	MV-22B	16.8	12	12	7
VMGR	KC-130J	29.1	15	15	9
VMAQ	EA-6B	15.1	5	4	3
VMA	AV-8B	15.4	14	14	11
VMFA	F-35	10.2	16	16	10
VMFA	F/A-18C	15.8	12	10	8
VMFA(AW)	F/A-18D	16.6	12	10	8

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

- Our Marine aviators need more "looks at the ball" than they are getting right now, 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.

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 RED column here 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

.

**Represents degraded Primary Aircraft Inventory due to shallow aircraft fielding ramp and fielding decisions.

SECTION TWO EXPEDITIONARY AVIATION PROGRAMS AND CONCEPTS

2.1 MAGTF DIGITAL INTEROPERABILITY AND CYBER/EW CONVERGENCE

Digital Interoperability – Digital Interoperability is the seamless digital exchange of tactically relevant information between the different elements of the MAGTF, increasing the effectiveness and efficiency of the force as a whole. The current MAGTF networking architecture is comprised of a series of disparate networks and waveforms which rarely facilitate the needs of the entire MAGTF.

The goal of Digital Interoperability is not just the connection of nodes on the battlefield but the effective communication of tactically relevant information enabling decision makers to make more timely and informed decisions. Information on the battlefield can be stove piped: information that works in some areas but not others, which cannot be shared across the MAGTF or the joint force.

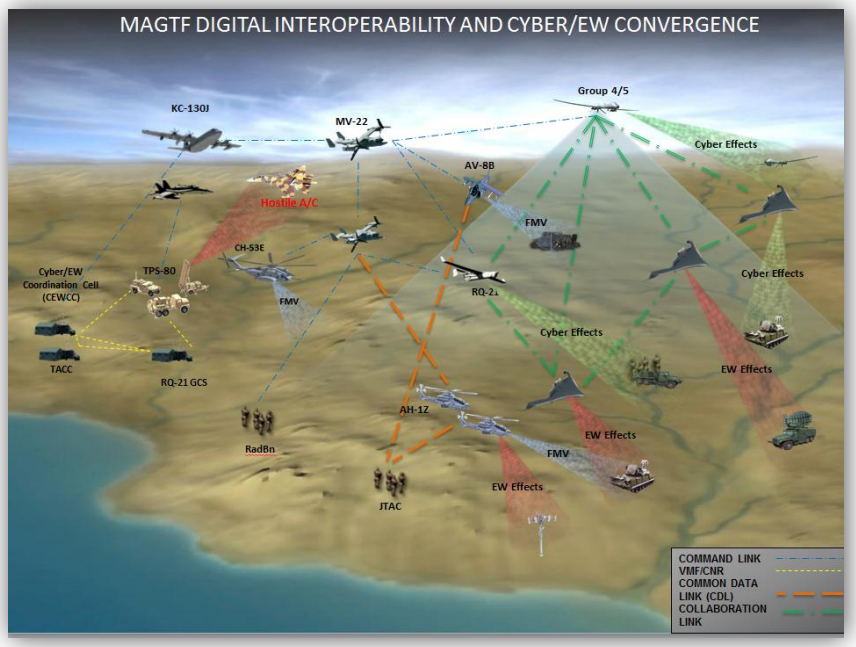
Digital Interoperability is generally divided into five arenas:

1. Situational awareness
2. Aircraft survivability
3. Intelligence, surveillance, and reconnaissance (ISR)
4. Fire support
5. Logistics

In order to validate our digital interoperability 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 (WTI) Courses hosted by MAWTS-1. The inclusion of emerging technologies within mission threads like the ones executed at WTI offers several benefits which include the refinement of existing requirements and validation of the concepts prior to formal requirements generation. 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.

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 (SDR), advanced waveforms and mesh networks, 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 antennas 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 utilized 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.

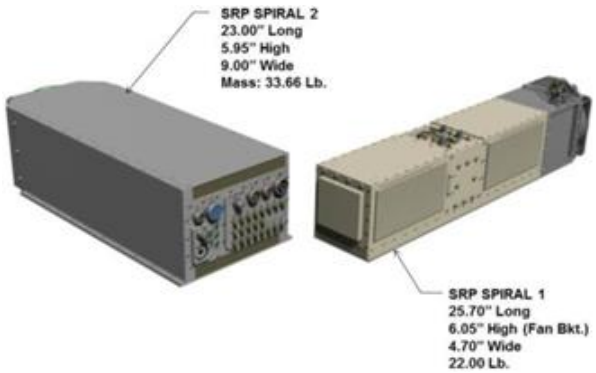


MAGTF DIGITAL INTEROPERABILITY AND CYBER/EW CONVERGENCE

Software Reprogrammable Payload (SRP)

The SRP program 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 lead platform for SRP with integration beginning at the end of FY 15. 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, 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 begin to develop the ability to digitally communicate, there is a growing need to develop new methods of exchanging their digital contributions. Given this need and the increase in operationally challenging environments there will be a need for 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 but are not limited to the Tactical Targeting Network Technology (TTNT), the Adaptive Networking Wideband Waveform (ANW2), the Soldier Radio Waveform 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 systems or adding new systems to some Marine aviation platforms, adding airborne gateways to operations allows for greater digital communications with those platforms without impacting the platform. This increased prevalence of airborne gateways will provide disadvantaged users a means of being able to communicate with all entities within the MAGTF without having to be equipped with every waveform currently being utilized on the battlefield. Airborne gateways generally require a series of radios for the networks you desire to conduct translation between and a processor to do the translations.

MV-22 Airborne Gateway– The MV-22 will soon deploy with a software defined radio and associated gateway solution. The SRP, when used in conjunction with the Mesh Network Manager (MNM), 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.

MAGTF DIGITAL INTEROPERABILITY AND CYBER/EW CONVERGENCE

Tablets – Tablets are emerging as the fastest way to integrate new information sources into aircraft platforms. All new aviation platforms come with highly integrated and complex operating systems that require years of development and testing prior to fielding. This process is necessary but is not only time consuming but also very 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.

Ground forces, upon exiting an aircraft, will have greater situational awareness than ever before, having followed the course of the flight, the landing zone evaluation, and enemy and friendly force disposition. Once on the ground, infantry forces will remain linked to the rest of the MAGTF, and to the aviation force, by digital interoperability and a robust and flexible network architecture.

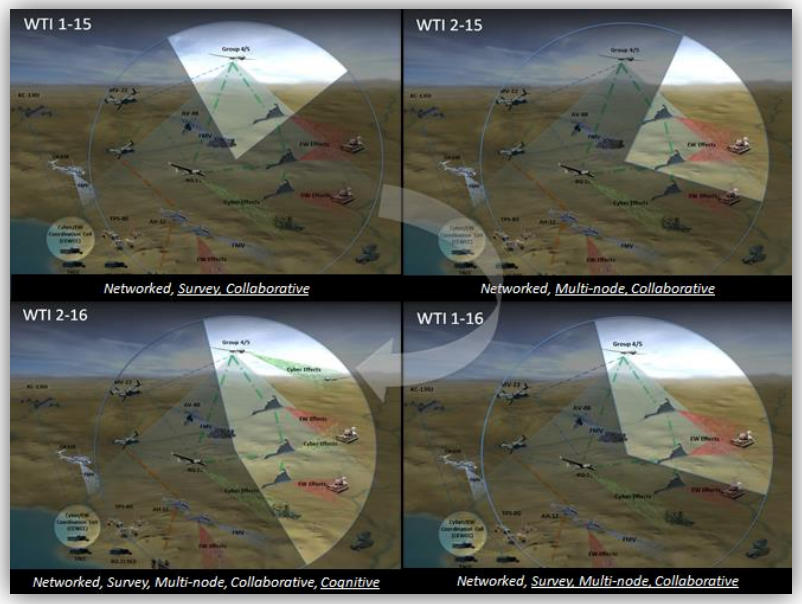
Electronic Kneeboard (EKB) / Electronic Flight Bag- These programs are being developed to bring tactically relevant applications to the tablet environment while also addressing administrative issues such as paperless publications. Digitally Aided Close Air Support (DACAS) applications like KILSWITCH (pictured below) are being further developed with operator inputs to ensure the maximum applicability before implementation. Refer to DACAS section for further information.

Cyber/Electronic Warfare Convergence– One of the fastest evolving portions of Digital Interoperability involves efforts in the Cyber/Electronic Warfare Convergence concept. Airborne networking and the Marine Corps' increased ability to "Maneuver within Spectrum" has enabled the Marine Corps to explore other concepts like advanced Cyber/EW payloads aboard manned and unmanned platforms.

MAGTF DIGITAL INTEROPERABILITY AND CYBER/EW CONVERGENCE

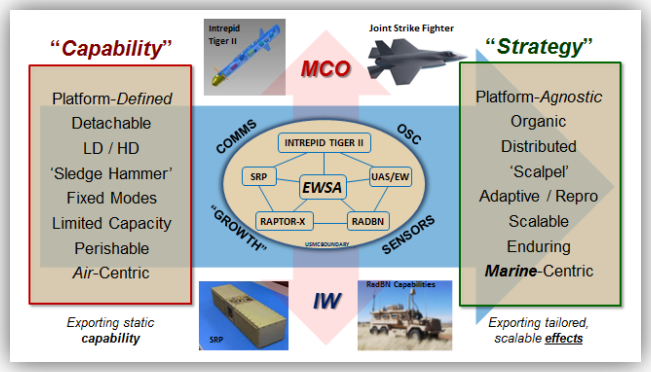
With the efforts of the Marine Corps in the digital operability realm, it will be well positioned to move operational control of advanced Cyber and EW payloads down to the tactical edge over the next several years.

While developmental work is still required in the areas of networked payloads, collaboration, cooperation, and autonomy, much has been accomplished already with networked payloads being demonstrated during WTI classes. Collaborating payloads are payloads that communicate with each other to determine the appropriate action against multiple targets. Cooperating payloads are payloads that work together against a single target. Both of these capabilities will be demonstrated at WTI in the upcoming years. The notion of autonomy requires several of these concepts to be done in parallel and technology is rapidly making the concept a feasible reality.



To evolve the Corps beyond its traditional reliance on high-power Electronic Attack for mitigating air defense threats and achieving freedom of maneuver, appropriately scoped cyberspace operations will be conducted from the CEWCC in concert with advanced EW devices to disrupt, deny, and destroy adversary capabilities .

MAGTF EW–The Marine Corps' comprehensive plan to address post-EA-6B Prowler Electronic Warfare (EW) requirements is Marine Air Ground Task Force (MAGTF) EW. MAGTF EW leverages emerging technologies and integrates multiple aviation platforms (unmanned, fixed wing, and rotary wing assets); payloads; ground-based EW nodes; and cyber effects to provide commanders with an organic and persistent EW capability. MAGTF EW transitions the Marine Corps from a focus on low-density/high-demand (LD/HD) EW capability, to a distributed, platform-agnostic approach.

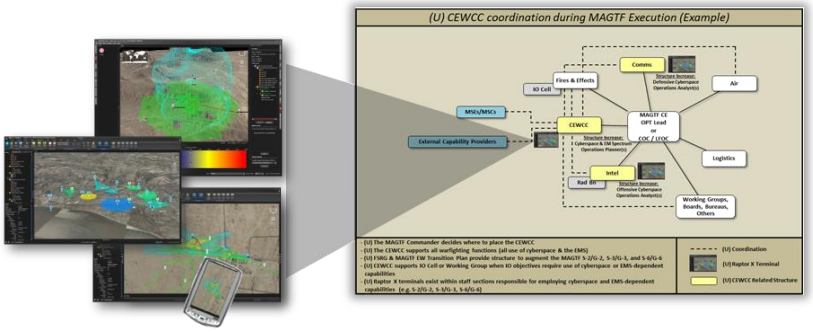


Any available digitally interoperable sensor can be connected with another to build a scalable, responsive, and cost-effective integrated system, delivering capabilities such as EW, cyber, and signals intelligence (SIGINT) on demand. This approach will also allow the Marine Corps, as a middleweight expeditionary force, to retain direct access to its capability investment throughout the operations as organic and inseparable features of the MAGTF. MAGTF EW will complement joint EW assets in support of ground forces and fifth-generation aircraft flying against sophisticated integrated air defense systems (IADS).

MAGTF DIGITAL INTEROPERABILITY AND CYBER/EW CONVERGENCE

Cyberspace and Electronic Warfare Coordination Cell (CEWCC)–
The CEWCC coordinates the integrated planning, execution, and assessment of cyberspace and EMS actions across the MAGTF's operational environment in order to increase operational tempo and achieve military advantage. To perform this primary function, the CEWCC is placed within the MAGTF at the commander's discretion, but should be established within the command element S-3/G-3 in order to ensure it can support all phases of the commander's scheme of maneuver with Electromagnetic Spectrum Operations (EMSO) and Cyberspace Operations (CO), which can be complex, technical, highly classified, and potentially global in consequence. Wherever the CEWCC exists, it is responsible for coordinating across principal staff sections , major subordinate commands (MSCs)/major subordinate elements (MSEs); working groups, boards, and bureaus; and with higher headquarters to enhance the integration of cyberspace and EMS-dependent capabilities applicable to all warfighting functions and MAGTF objectives.

EW Services Architecture (EWSA)- An extensible data exchange and hardware protocol intended to connect EW/SIGINT airborne nodes to ground Operators, Cyberspace and EW Coordination Cells (CEWCCs), and other air EW nodes. EWSA will provide "on-demand EW fires" in operational conditions under C/EWCC control, and will unite Air EW, Ground EW and SIGINT via an adaptive network with multiple waveforms. Additionally, EWSA will also provide basic digital interoperability between air platforms.



ALQ-231 Intrepid Tiger II (ITII)– IT-II is a platform agnostic, modular open system architecture payload that provides advanced AEA and ES capability to existing and dependable multirole platforms. Just as IT-II can be rapidly reprogrammed to counter evolving and emerging threats, the Modular Open System Architecture (MOSA) design allows for rapid integration on multiple platforms. IT-II (V) 1 currently deploys with AV-8Bs and F/A-18s. This year the IT-II (V) 3 will EOC with USMC light attack helicopters with follow –on IT-II (V) 2 for unmanned aircraft systems in development.

ITII details include:

- EOC of Block '0' pod to OEF conducted in 2012
- 116 pods for counter-communications and irregular warfare RF target sets
- Technology and capacity to field radar variant of Intrepid Tiger II
- MEU focus (AV-8B, F/A18, AH/UH series aircraft)
- Currently deployed *V(1)* on Fixed-Wing
- V(3) AH/UH series QRA of Block '1' set for FY15
- UAS (future)

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 Marine Air Ground Task Force (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 seven functions of Marine aviation.

The operations in Afghanistan and Iraq have provided MACCS Marines more operational experience than at any other time in our existence. We must harness this knowledge to fulfill the Commandant's Planning Guidance of providing a highly expeditionary MACCS to support a middle-weight force while balancing modernization and sustainment in times of fiscal austerity.

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 is Operation IRAQI FREEDOM in 2003, 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.

MACCS agencies train and fight as a team and are focused on a single mission. The MACCS will continue to organize and deploy around its traditional agencies and squadrons. This has proven successful in combat since the MACCS came of age in World War II and will serve as the baseline point of departure for future MACCS organization. The Marine Corps is rebalancing to provide forces to support increasingly dispersed operations by smaller, task-organized forces over ever-greater distances. The MACCS must adapt by providing tailored AC2 forces that can rapidly deploy to support the MAGTF.

Going forward, the MACG commander will be able to employ task-organized Multi-functional Air Operations Centers (MAOCs), capable of providing mission-dependent 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.

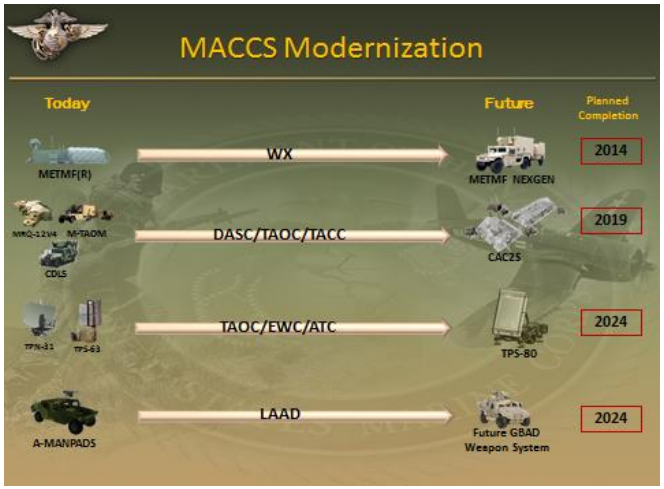
MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

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 Ground Combat Element (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, and tactical gateways. This vision will be realized with the fielding of new AC2, sensors, and weapons systems:

1) 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 for the MAGTF.
2) AN/TPS-80 Ground/Air Task Oriented Radar (G/ATOR) – is a 3-D, medium ranged radar that gives the MAGTF commander unparalleled detection within their AO while also providing fire control quality data supporting the Integrated Fire Control (IFC) concept.
3) Composite Tracking Network (CTN) – is an adaptation of the US Navy's (USN) cooperative engagement capability (CEC) which is a radar network providing sensor quality data to weapon systems, modified to meet Marine Corps requirements.
4) Directed Energy (DE) – provides game changing capabilities versus the low observable/low radar cross section (LO/LRCS) threat when integrated with CAC2S, TPS-80, and CTN. DE provides speed of light engagement (point of aim is point of impact), deep magazines, near-instantaneous effect on target, low shot cost, and precise lethal accuracy to negate the enemy's strategy to destroy our high value assets (HVAs) using rockets, artillery, and mortars (RAM) and Unmanned Aircraft Systems (UASs).

The most critical resource in the MACCS is the individual Marine. As we transition to a common set of equipment, new operational concepts such as Expeditionary Force 21, 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.

Today's MACCS has successfully provided continuous AC2 to the MAGTF and joint operating forces since the beginning of Operations ENDURING FREEDOM and IRAQI FREEDOM (OEF / OIF) while implementing incremental upgrades to technology and increasing interoperability. Although the current MACCS effectively supports the



MAGTF in today's fight, the prolonged engagement in complex non-linear battle spaces, limited capability for Marines to provide AC2 from afloat and emerging operational concepts have highlighted areas where the MACCS will need to be enhanced to provide more effective, ready, and relevant AC2 system for the ACE and MAGTF.

For our tactical control agencies, OEF/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. While 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 Battalion (LAAD Bn).

As the Marine Corps reorients its emphasis to forward presence and crisis response, the MACCS has demonstrated its ability to rapidly deploy as part of an Alert Contingency MAGTF ensuring effective AC2 during humanitarian assistance and disaster relief operations. During Operation DAMAYAN in November 2013, MACG-18 deployed elements from each of its squadrons to form a cohesive AC2 network.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

MATC Marines using Air Traffic Navigation, Integration, and Coordination System (ATNAVICS) provided terminal control, DASC Marines provided procedural control to assault support aircraft, Marine Wing Communication Squadron (MWCS) Marines established data communications, and the Tactical Air Command Center (TACC) provided Marines to perform airspace planning and liaison functions. This effort assisted in the safe control of over 5,200 sorties, the delivery of hundreds of thousands of pounds of relief supplies, and the evacuation of thousands of internally displaced persons.

Tactical Air Command Center – The TACC provides the MAGTF with the ability to plan and execute an Air Tasking Order 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, Anti-Air-Warfare (AAW) operations and routing itinerant aircraft. The TAOC recently completed its mission in Afghanistan where it was a key participant in one of the most robust TDL and airspace environments in history. 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 the CEC where it will 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 fielding of the highly expeditionary ATNAVICS, as a replacement to Marine Air Traffic Control and Landing System (MATCALS), has drastically reduced the time and logistical support required to set-up and ensures MATC's capability to provide maximum support across the range of military operations (ROMO).

Meteorological and Oceanographic – The Meteorological and Oceanographic (METOC) section, resident in the Marine Air Control Squadron (MACS), 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 (MEUs) and Special Purpose MAGTFs.

Low Altitude Air Defense Battalion – The LAAD Bn's capability to provide air and ground defense of airbases and MAGTF HVAs through the three dimensional continuum will become a critical tool for the ACE commander to meet their force protection and AAW responsibilities. LAAD Bns have successfully conducted ground defense of FOBs and security force (SECFOR) tasks during OEF/OIF for over a ten year period. 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 Bns 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 2015-2025 MACCS is synchronized with the arrival of key platforms, such as MV-22, F-35B, CH-53K and G/ATOR. 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 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 the TPS-59 long-range radar.

Command and Control Systems

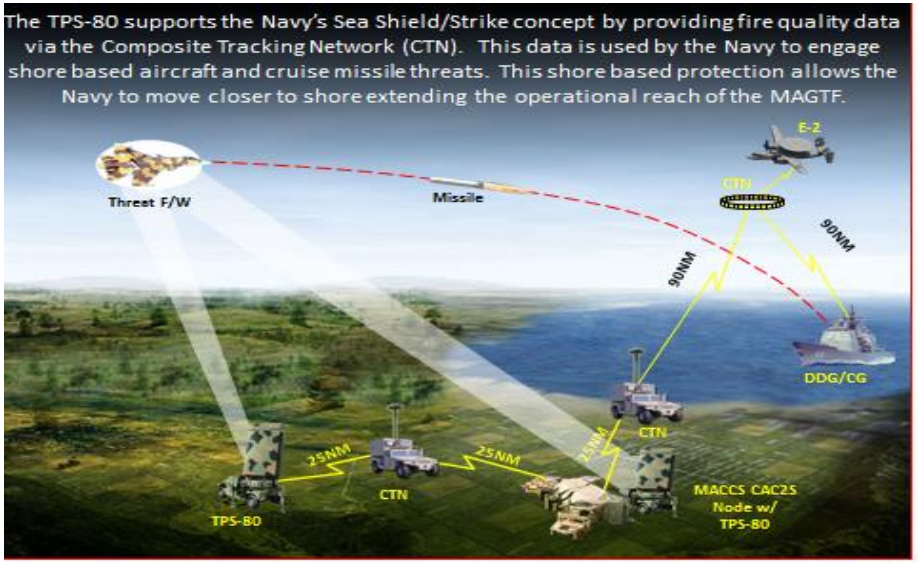
Common Aviation Command and Control System – CAC2S is the foundational command and control system of the future AC2 FoS. Increment 1 of CAC2S replaces equipment used by the TACC, TAOC, and DASC. Increment 1 is being developed and fielded in two phases:

The Phase 1 system focuses on the integration of air and ground situational awareness and the migration from multiple separate systems and workstations to a single workstation used to access multiple applications, systems, and information sources. 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 completed fielding (20) systems in FY13.

Phase 2 completes the development and fielding of Increment 1 by including sensor integration and realizing the goal of data fusion. Data fusion is accomplished through combining real-time sensor data (TPS-59, TPS-80, external sensors via a sensor network) correlate near-real time track data (TDLs) and associate 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 field 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 antennae trailer to link into the network.

Composite Tracking Network – CTN is a land-based adaptation of the USN's Cooperative Engagement Capability (CEC), which is a radar network providing fire quality data to weapon systems, modified to meet Marine Corps requirements. CTN will provide command and control systems and firing units real-time exchange of precise sensor measurement data and weapons engagement signals to conduct engagements. CTN along with CEC are the primary networks 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 increased range for Cruise Missile (CM) detection by TPS-80. This increased range for CM defense allows the USN to operate closer to shore enabling Ship to Objective Maneuver (STOM) & forcible entry by the MAGTF (see operational graphic.) 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 (10) 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 CM, 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 in four blocks that will cover both aviation and ground missions and will replace three in-service legacy systems and the functionality of two systems already retired. Each TPS-80 block consists of common hardware with different software applications for each respective mission.

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 targeting and 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 in FY17 with all (17) 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 III is not a formal acquisition program, but consists of software developments that will enhance the radar's performance and capabilities. Threats will continue to evolve over the course of the radar's lifecycle and maintaining currency to detect emerging threats will remain a priority.

These software upgrades may include but are not limited to, Non-Cooperative Targeting Recognition (NCTR), Electronic Protection (EP) and Theatre Ballistic Missile (TBM) Tracking.

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. Linked into the Joint Integrated Air and Missile Defense (IAMD) environment, the 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 Command, Control, and Communications - Modernization efforts are focused on a single scalable C3 system that supports the MATC SoS and is fully interoperable with current and planned MACCS AC2 operational systems and TDLs. A Capabilities Development Document (CDD) is currently under development.

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, more mobile, and scalable to meet the range of military operations, and maximize use of existing infrastructure. A common, scalable, remote-able mobile communications and control package will support the ETS.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

MATC Navigational Aids – The Legacy AN/TRN-44 TACAN is being replaced by the Airfield Mobile TACAN (AMTAC). A lighter trailer-mounted system that will maintain current capability but reduce size, weight, and setup time. The AN/TRN-47 initial entry TACAN will be replaced by a lighter system capable of two-man transport providing better MEU support.

AN/TPN-31A Air Traffic Navigation, Integration, and Coordination System –ATNAVICS is the currently fielded Airport Surveillance Radar (ASR) and Precision Approach Radar (PAR). 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 nm and fielding of the AN/TYQ-164 Communication Data Link System (known as Range Guardian) to support two-way TDL information exchange.

TPS-80 Block IV Expeditionary Airport Surveillance Radar – See previous.

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 carriers to support the F-35B, and on all CVNs to support the F-35C. Marine aviation will leverage maturing GPS technology to bring a self-contained precision approach landing capability (PALC) that is world-wide deployable.

Ground Based Sense and Avoid – UAS operations within the NAS are currently limited to active restricted and warning areas due to an inability to meet Federal Aviation Regulations (FAR) Part 91 'see and avoid' requirements.

USMC Ground Based Sense and Avoid (GBSAA) is a technology initiative developed for use at MCAS Cherry Point to mitigate FAR limitations and support direct transit of VMU-2 RQ-7B aircraft from their home airfield, through 6 miles of NAS Class E airspace, and into nearby Restricted Areas.

The GBSAA system, was developed to increase VMU-2 training opportunities, and uses existing MCAS surveillance radar and GOTS/COTS equipment to analyze the local air traffic picture and determine safe windows for UAS crossing.

Since obtaining Federal Aviation Administration authorization in June 2013, GBSAA support has doubled VMU-2 daily sortie generation, increased UAS operator proficiency, and increased ISR support to Operating forces training.

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 received upper-air data and 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

LAAD Bns will provide integrated, low-altitude, Ground Based Air Defense (GBAD) and ground security of MAGTF HVAs and provide the command, control, and training of augmentation forces to defeat enemy attacks.

The UAS and CM threat has outpaced the current program of record, the Stinger missile. To fill this capability gap the Marine Corps intends to vehicle mount integrated kinetic (missiles and machine gun) and non-kinetic (Directed Energy) weapons to provide continuous low altitude force protection, on-the-move (OTM), and at-the-halt, in support of the MAGTF.

As the Marine Corps operates from expeditionary FOBs with vulnerable, critical, non-recoupable, high-dollar aviation platforms and highly trained Marines, the LAAD Bns will leverage the investment in sensors (TPS-80, F-35B, UAS and GBOSS) to transition from the LAAD Gunner using the human eye to detect, identify, and engage targets to engagements that occur beyond visual range (BVR) to defeat the asymmetric air and ground threats using organic/non-organic fire control quality data to protect HVAs. To accomplish an engagement 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.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

The sensor/surveillance network contributes to building a coherent air/ground tactical picture to provide the LAAD Gunner with situational awareness to monitor and understand the air/ground battle space and evaluate friendly, enemy and neutrals that are in range of the GBAD Weapon System.

To realize this vision, the Marine Corps initiated an Office of Naval Research (ONR), Science & Technology (S&T), GBAD OTM, High Energy Laser (HEL) program. Following completion of the ONR S&T GBAD HEL initiative (FY13-17) and with the successful demonstration of this HEL capability, the Marine Corps will evaluate, transition, and incorporate this technology into a Program of Record. Once fielded, near-term modernization and replacement of LAAD equipment involves:

1) Executing a joint Service Life Extension Program (SLEP) of Stinger Block I Missiles starting in 1QFY14 in cooperation with the Army. The SLEP will extend the shelf life of the missile to 2026, incorporate lethality against UASs and serve as a bridge to the future GBAD Weapons System.
2) Upgrading and modernizing LAAD Simulators.
3) Developing, sourcing, and fielding a Day/Night Sight to enhance the effectiveness of the Stinger Block I Missile against UAS targets.
4) Developing, sourcing, and fielding a Mode 5 IFF capability by 2020 to conform to DoD directed fielding requirements.

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 CM.

DC/A identified the following attributes for incorporation in the GBAD CDD:
1) Multi-Mission Turret; incorporating DE, Missiles, and Guns
2) Open System Architecture for future material solutions
3) Command and control of the Joint Engagement Sequence (JES) OTM.

Employing DE weapons and executing command and control of the JES OTM will be critical in overcoming the identified GBAD ICD gaps. The planned Initial Operational Capability (IOC) of the future GBAD Weapons System is 2024.

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 that are well-positioned to support he 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 Option

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.

To support agile and forward-deployed Marine forces the MACG commander will have at their disposal the Multifunctional Air Operations Centers (MAOCs). The MAOC is a task-organized agency that is first and foremost an “employment option” for the MAGTF and MAW commanders. Expeditionary Force 21 concepts will be supported by MAOCs providing mission-dependent MACCS capabilities to support missions across the ROMO, although optimized for Crisis Response operations. MAOCs will provide redundancy while reducing the logistical footprint. The baseline for the MAOC will be the merging of DASC and TAOC functionality into a single agency. Each Wing commander will have at their disposal an on-call MAOC that is staffed by professional AC2 Marines and equipped with CAC2S, CTN and organic sensors. MAOCs are designed to deploy on short notice to support Crisis Response around the globe. MAOCs provide commanders the ability to operate in a distributed manner and control the entirety of the airspace within the MAGTF’s AO. Equipped with CAC2S and fueled by netted sensors, weapons, platforms, digital data networks, and fused data; MAOCs will exploit the information infrastructure coordinating requests for aviation fires and assault support to create greater decision space for the MAGTF commander. MAOC Marines will also coordinate with the ISR and Cyber/Electronic Warfare (EW) communities to ensure continuity of command and control across the ACE/MAGTF.

MWCS detachments will provide the MAOC’s data communications requirements, providing planners more flexibility as data and long range communications will be internally sourced as part of the MAOC. Common data supporting shared awareness, automated decision aides, and distributed collaborative planning enables the MAOCs and the TACC 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 MAOCs 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. Current doctrine does not support the ability to do this. Aviation must engage with Navy stakeholders to bridge the AC2 divide afloat that is promoted by legacy doctrine and the lack of integration between the Marine staff and ship's company. In future operations, the Navy Tactical Air Control Center (NTACC) must be better integrated with operations in the Landing Force Operations Center (LFOC) and Supporting Arms Coordination Center (SACC). 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 MAOCs 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. This capability will only be fully realized through enhanced 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 best positioned to process, integrate, and operationalize this myriad information in support of MAGTF operations.

MACG support to the MEUs has remained consistent for over twenty years. The MACG must revise its support to the MEU so that it best supports emerging amphibious concepts and is optimized to operate both afloat and ashore. The first element of this re-envisioned support will be the Tactical Air Control Element (TACE). The TACE replaces the ASE and will be the smallest defined multi-functional agency. It will be staffed by common controllers and the operators will be pulled from both the MACS and MASS. When afloat, TACE Marines will augment the NTACC and LFOC to ensure the proper AC2 of Marine assets in support of STOM. When the TACE is ashore, it will be capable of providing multi-functional AC2 for a limited duration. The future MMT will be augmented with additional controllers to be capable of supporting 24-hour operations from dual sites. LAAD structure will remain constant except it will be supported by a future GBAD Weapon System capable of engaging airborne threats via DE, missiles or guns. The LAAD detachment will also be responsible for planning for the point defense of MEU HVAs against ground and air threats. The size of the MWCS detachment will remain steady, but it must be able to support all relevant waveforms and networks to provide timely and accurate information to the ACE commander. Further, it must contain expertise that can assist the MEU S-6 staff with all network design and implementation regarding the digitally interoperable force. All elements of the MACG detachment, both afloat and ashore, must have access to a near-real time integrated air picture and collaborative planning. They must also be capable of providing a man-portable capability to support time-sensitive missions where space is at a premium.

Integrated Fire Control

IFC is an advanced capability 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 the platform. The IFC concept takes different forms (see operational graphic on 2.2.10):

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) Increased Electronic Attack (EA) resistance because weapons systems can rely on multiple sensors for firing solutions and be used at maximum effective kinematic range.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

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 of the future is pursuing a "gateway" capability to bridge divergent proprietary waveforms in use by DoD, providing a persistent means of enabling digital interoperability. 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 a fully realized digital kill chain. 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, TAOC, and MAOC 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. Traditional MACCS agencies as well as future agencies, like the MAOC, 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.

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

In July of 2013, the DC/A 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, 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. It is recognized that one cannot execute adequate test or TTP development without knowledge of the particular weapon system and how it functions in the collective when integrated with other elements of the MAGTF. Therefore, the coordinated efforts of VMX-22 and MAWTS-1, will define and refine employment concepts and TTP development that drives system/platform evaluation and digital interoperability throughout the aviation community. The AC2 Department of VMX-22 will work in direct support of MCOTEA to develop test plans, evaluation frameworks, resource development, and data collection to ensure mission effectiveness of future MACCS capabilities. They will also evaluate the utility of new initiatives and conduct risk reduction events to facilitate streamlined and efficient formal evaluation of both concepts and equipment on behalf of the DC/A.

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.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

Once in the operating forces, Marines will use the Training and Readiness (T&R) program to become experts in planning and controlling MAGTF airspace, integrating organic Marine and joint fires, employing TDL and radio communications, MACCS agency employment, 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. The goal is to be able to employ MAOCs staffed with enlisted common controllers possessing a broader skill set and MACCS officers trained to become agency directors much earlier in their careers. To complement this, enlisted MACCS Marines will retain agency specific skill sets early in their careers and then transition to becoming common aircraft controllers and finally to 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 29 Palms, California. ACTS has successfully combined three of the four MACCS entry level school houses. The next steps will be to redesign enlisted and officer training to address these new training paradigms.

Officers

To further achieve this endstate we envision our entry-level training paradigm creating MACCS officers that understand all facets of MACCS employment and not just their primary MOS. In addition to learning their primary MOS 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 career 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 and support future agency concepts such as the MAOC.

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 (Pvt – Cpl), to controller (Sgt – GySgt), to enlisted subject matter expert (MSgt – MGySgt). 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. 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.

MACG-18 ASE for Operation DAMAYAN 2013

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS) PLAN

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. Maintenance training must adapt to support these changes while operating in a resource challenged environment. The equipment has forced the operating forces and supporting establishments to take a fresh look at the training offered within entry-level courses and throughout the training continuum. 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 instead of fighting it. 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 and standardized simulation capability to each MACG. Simulation provides the most cost-effective means of gaining and maintaining crew proficiency and readiness. Simulation will give commanders the ability to link into their local Marine Aviation Training System Site (MATSS) facility and participate more readily in relevant, integrated training as part of the larger Aviation Training System (ATS).

Current exercises do not provide the number of 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 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 battlestaff, 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 the 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 (MAGTF) command and control agencies to enable intelligence collection and targeting across the force.

Transition Plan:
The F-35B and F-35C will replace F-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 16 F-35B FRS

Marine Corps F-35B IOC is July of 2015 (objective) and December 2015 (threshold). IOC requires the first squadron to have 10 aircraft in the Block 2B configuration capable of executing CAS; limited offensive and defensive counter-air; air interdiction; air support escort; armed reconnaissance; and limited suppression of enemy air defenses. Additionally, 6 aircraft need to be capable of executing amphibious carrier operations.

The aircraft is currently tracking to reach its full operational capability in Q4 of CY 2017. The full transition from legacy to F-35 will complete with the transition of the second reserve squadron in 2032.

The transition got underway on 2 April 2010 with the stand up of VMFAT-501, the first Marine Corps JSF STOVL training squadron. On 16 November 2012, VMFA-121 stood up as the first Marine Corps operational JSF STOVL squadron.

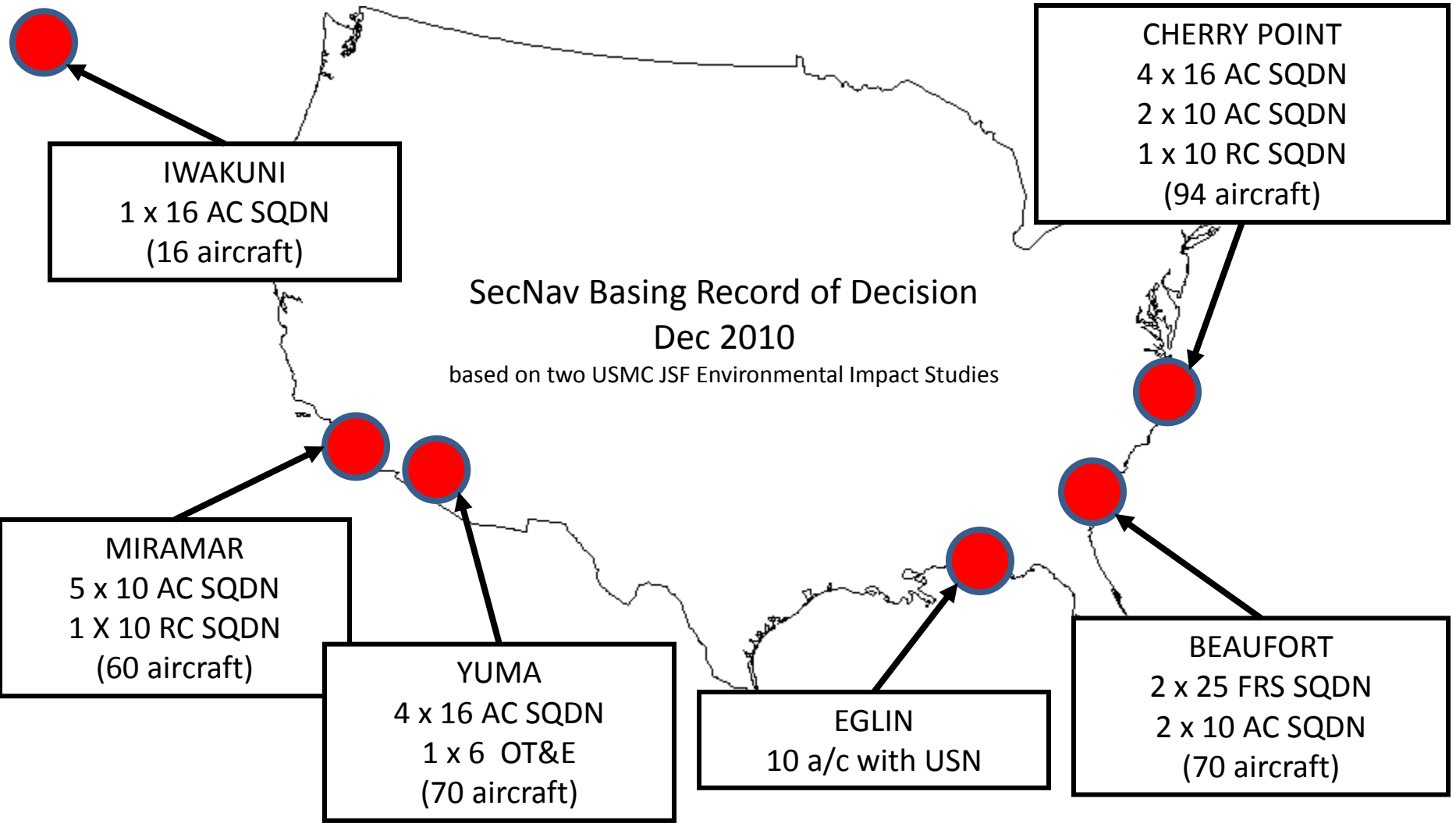
F-35 JOINT STRIKE FIGHTER

F-35B INITIAL OPERATIONAL CAPABILITY:

The F-35B IOC is defined as:

- One squadron of 10 F-35B aircraft with required spares, support equipment, tools, technical publications, and a functional Autonomic Logistic information system (ALIS V2) including enabling peripherals.
- Squadron will be manned with trained and certified personnel capable of conducting autonomous operations.
- Aircraft in a Block 2B software configuration with the requisite performance envelope, mission systems, sensors, and weapon clearances.
- Home base supporting infrastructure and facilities ready and capable of supporting and sustaining operations.
- Qualifications, certifications, and L-class amphibious carrier alterations completed to enable F-35B operations.
- Qualifications and certifications for deploying the F-35B to austere expeditionary sites.
- Ability to execute CAS; limited offensive and defensive counter-air; air interdiction; air support escort; armed reconnaissance; and limited suppression of enemy air defenses missions in concert with Marine Air Ground Task Force resources and capabilities within the performance envelope, mission systems, sensors, and weapons clearances provided by the 2B fleet release.
- Naval Aviation Enterprise (NAE), Joint Program Office (JPO) and contractor procedures, processes, and infrastructure capable of sustaining operations of the IOC squadron.

MARINE JOINT STRIKE FIGHTER SQUADRON GEO-LOCATION



Basing plans are subject to change and further environmental analysis

TACAIR LEGACY TO JSF TRANSITION PLAN

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-18 A/B/C/D, 1 FRS SQDN x 16 F-35B

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

F/A-18 | AV-8B | F-35B | F-35C | Transition to 16 x F-35B | Transition to 10 x F-35C | Transition to 10 x F-35B

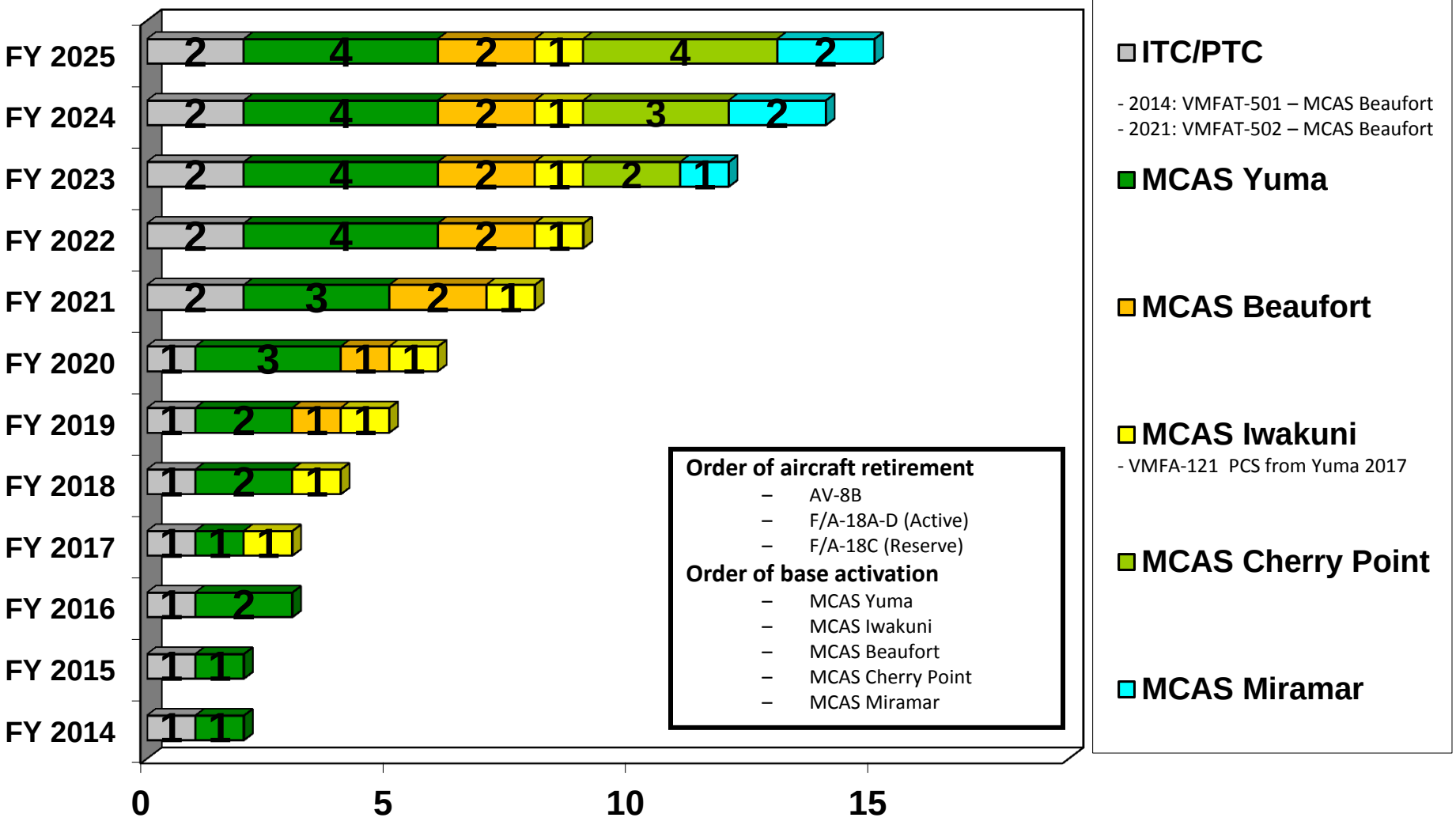
UNIT	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
VMFA-121	16B → 16B		Yuma	Iwakuni															
VMFA-211		Yuma	10B → 16B		Yuma														
VMA-311				Yuma	7B → 16B		Yuma												
VMFA-115				Beaufort		8C → 10C		Beaufort											
VMA-214						Yuma ☆	15B → 16B		Yuma										
VMFA-122							Beaufort	6C → 10C		Beaufort									
VMFA-533								Beaufort	16B → 16B		Yuma								
VMFA-224									Beaufort	9C → 10C		Miramar							
VMA-223									Cherry Point	16B → 16B		Cherry Point							
VMA-542									Cherry Point	4B → 16B		Cherry Point							
VMFA-323										Miramar	9C → 10C		Miramar						
VMFA-312										Beaufort	6B → 16B		Cherry Point						
VMFA-251											Beaufort	8B → 10B		Miramar					
VMA-231											Cherry Point		6B → 16B		Cherry Point				
VMFA-232													Miramar		10B → 10B		Miramar		
VMFA-242													Miramar		4B → 10B		Cherry Point		
VMFA-314						C+ CONVERSION								Miramar		8B → 10B		Cherry Point	
VMFA-225															Miramar		10B → 10B		Miramar
VMFA-112 (RES)																		10B → 10B	
VMFA-134 (RES)	CADRE																	10B → 10B	
	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32

Increasing F-35B production from 20 to 24 aircraft per year would reduce the Marine TACAIR transition timeline by four years.

☆F/A-18 A-D flight-line readiness and depot capacity will be assessed prior to transitioning to less than 3 x VMA squadrons, shutting down VMAT-203. and sun-downing AV-8B in 2025.

* We have insufficient inventory to equip each F/A-18 squadron with 12 aircraft and may choose to deploy a lesser number based upon inventory.

MARINE F-35 SQUADRON GEO-LOCATION



Basing plans are subject to change and further environmental analysis

DISTRIBUTED STOVL OPERATIONS

Strategic Context

Potential adversaries are increasingly becoming 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.

DSO Defined

Distributed short take-off, vertical land (STOVL) operations (DSO) is a threat-based limited objective operation which occurs primarily when the entire MAGTF cannot be brought to bear against the enemy. DSO asymmetrically moves inside of the enemy targeting cycle by using multiple mobile forward arming and refueling points (M-FARPs). Using existing infrastructure (multi-lane roads, small airfields, damaged main bases), DSO provides strategic depth and operational resiliency to the joint force.

DSO, coupled with the 5th generation low observable forcible entry capability of the F-35B, provides the Marine Air-Ground Task Force (MAGTF) with game-changing strategic access inside of the enemy weapons engagement zone (WEZ). The ability to operate inside of an A2/AD environment from multiple austere locations enables the joint force to have operational depth while simultaneously providing a strong deterrence to adversary aggression.

DSO 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 concept to be implemented at the time of crisis rather than requiring years of infrastructure preparation.

-DSO 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 enemies targeting cycle (24-72 hrs). Deception and decoys further increased the efficacy of DSO.

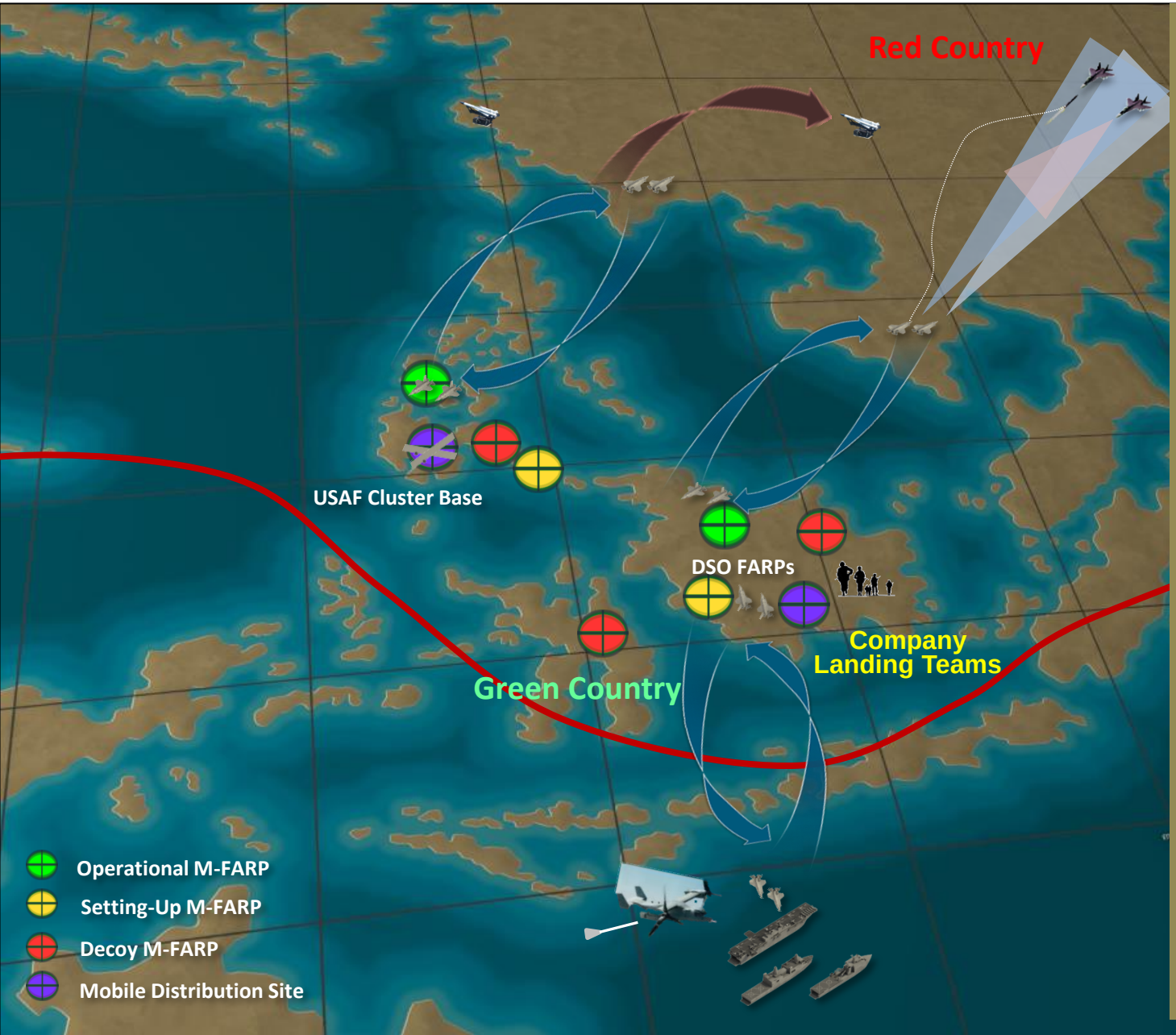
-Scalable in size, DSO can range from MEU sized F-35B divisions supported by MV-22s/CH-53s to MEB sized multiple squadron packages. The specific footprint ashore is scenario based for designated M-FARPs.

-During the early phase of operations, the air combat element (ACE) is the supported effort and the ground combat element (GCE) and logistics combat element (LCE) are the supporting efforts in order to deploy and employ STOVL aircraft in an A2/AD environment.

-DSO study (Feb ‘14)) has proven the concept is logistically feasible using organic MEU/MEB air and surface connectors along with maritime prepositioning ship squadron (MPSRON) and Combat Logistics Force (CLF) ships.

-Scheduled aircraft maintenance 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. DSO provides high sortie generation through fuel and ordnance reload inside of the threat WEZ.

FIFTH GENERATION AIRCRAFT AND LITTORAL ACCESS



- Organic MV-22 tanking provides extended combat radius
- DSO Mobile Forward Arming and Refueling Point (M-FARP) sites operate in green country within red missile threat
- Mobile FARPs move inside of red's targeting cycle (24-48hrs), maximizing sortie generation to roll back threat
- Aircraft dispersed around existing main operating bases (MOBs) or fly in from seabase
- USMC leverages USAF F-35 commonality (fuel, ordnance, parts), active defenses, joint logistics network IVO cluster bases

2.4 MARINE FIXED-WING AVIATION PLAN

TACAIR 2030 ROADMAP

The TACAIR 2030 Roadmap is a departure from the previous AVPLAN's TACAIR transition order. The F-35 transition continues per the program of record, while the AV-8B and F/A-18 order of transition has changed.

* AV-8B will transition to the F-35B first, with a planned sunset of 2025.

* F/A-18A-D will transition in the out years with a planned sunset of 2029 for the active component and 2030 for the reserve component.

The TACAIR transition will retain flexibility with regards to VMA/VMFA transition order based on F-35 program progress and legacy readiness.

Life remaining on F/A-18A-D allows prioritization of legacy STOVL conversion to 5th Generation STOVL capability while utilizing F/A-18A-D as the final bridging platform to complete the TACAIR transition. Two independent cost-benefit analyses were conducted. Visibility and Management of Operating and Supporting Cost (VAMOSC) analysis estimated changing transition order would result in cost avoidance of over one billion dollars through 2030.

The AVPLAN now prioritizes F-35B sourcing to MAGTF (MEUs) in the PACOM AOR with the first VMA transition (VMA-211) planned to begin FY16. The pace of the AV-8B conversion has been accelerated and F-35B will source 31st MEU requirement beginning 3QFY17.

All West Coast MEUs will be sourced with F-35B by end of FY19. The sequence of AV-8B transition to F-35 prioritizes MAG-13 in 3d MAW enabled by timely F-35 MilCon and Navy L-Class amphibious carrier modifications.

*Decision point in 2019 to accelerate or delay transitions

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.

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

MARINE FIXED-WING AVIATION PLAN

TOTAL SQUADRONS	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
FA-18A+/C	8	8	8	8	7	7	6	6	5	4	3
FA-18D	4	4	4	4	4	4	4	3	2	2	2
AV-8B	6	5	5	4	4	3	3	3	1	1	1
EA-6B	3	3	3	2	1	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	2	2	3	4	4
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	1	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	**FY15**	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**FY21**	**FY22**	**FY23**	**FY24**	**FY25**
AC/RC PMAI											
FA-18A+/C	96	96	96	96	84	84	72	72	60	48	36
FA-18D	48	48	48	48	48	48	48	36	24	24	24
AV-8B	84	80	80	64	64	48	48	48	16	16	16
F-35B	16	26	32	39	48	63	64	80	100	118	136
F-35C	0	0	0	0	8	10	16	20	29	39	40
EA-6B	18	18	18	12	6	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**	**280**	**286**	**271**	**270**	**265**	**260**	**268**	**241**	**257**	**264**
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	6	0	0	0	0	0	0	0	0	0
F-35B	21	13	16	17	20	20	37	38	40	41	41
F-35C	3	5	6	15	10	10	10	10	10	10	10
TOTAL FRS PTAI	**97**	**87**	**85**	**89**	**80**	**80**	**95**	**95**	**80**	**79**	**73**

* 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:

Over thirteen years of combat operations, deployed ashore and aboard our aircraft carriers, USMC F/A-18s provided vital overwatch and direct support to our troops. In February 2014 the Marine Air Board approved changes in legacy squadron transition order that will keep the F/A-18A-D in service until 2029 in the active component, and 2030 in the reserves, to complete the TACAIR transition.

The USMC F/A-18A-D community is enduring a sustained shortage in excess of 40 aircraft fleet wide due to "Out Of Reporting" (OOR) maintenance. The USMC currently has eleven active squadrons and one reserve squadron that deploy with a full complement of aircraft, but the community is forced to absorb the shortfall during pre-deployment training due to a degraded Primary Mission Aircraft Inventory (PMAI). HQMC AVN is resetting 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. Scalable squadron detachment models are being developed to meet the operational requirement without deploying excess assets, and Marine Corps Aviation is adding a detachment capability to each non-TAI VMFA. Forecasted improvements in aircraft availability will enable USMC F/A-18s to achieve 12 PMAI squadrons beginning in FY 17. Sustained training across all mission sets is required to provide the aircrew and the aircraft for today's mission and tomorrow's combat operations.

SUSTAINMENT:

F/A-18 SERVICE LIFE MANAGEMENT PROGRAM (SLMP)

The current Center Barrel Replacement Plus (CBR+) program has extended the service life of 200 Lot 17 and below aircraft to 1.0 Wing Root Fatigue Life Extension (WRFLE). The current High Flight Hour (HFH) inspection has extended the life of 110 DoN F/A-18A-D aircraft beyond 8000 hours with 129 aircraft currently in work.

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 ~150 hand selected F/A-18 C/D to 10,000 Flight Hours.

FUTURE:

TACAIR INTEGRATION (TAI)

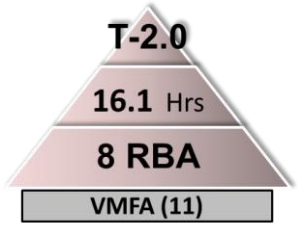
Currently the Marine Corps has three squadrons integrated into CVWs, and with F-35C IOC approaching, the Marine Corps is committed to TAI. In light of the changes in force structure, the TACAIR Integration Team is assessing the current TAI MOA and expects to remain at current levels for FY15.

Final Fit:

Survivability Upgrade Roadmap:

ALR-67 v3 - 2016

ALQ-214 v5 - 2016



Interoperability Upgrade Roadmap: :

High Order Language mission computers (#1 2014 VMFA OAG item)

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: :

Litening Air to Air functionality – 2015

Upgraded Displays – 2017/18

APKWS – 2017/18

AIM-120D – 2015

AIM-9X Block II – 2017

Zap Lars (limited functions) – 2017

Pursue minimum of two stand-off Net Enabled Weapons (2014 VMFA OAG item)

Reliability Upgrade Roadmap: :

Solid-state recorders – 2015

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).

VMA-211 will be the first AV-8B squadron to transition to the F-35B in FY16. The February 2014 Marine Air Board approved a TACAIR plan which accelerates the transition of all West Coast VMAs to the F-35B by 2020 and the out of service date of the remaining East Coast VMAs by 2025. There are currently 6 active VMAs comprised of 14 AV-8B aircraft each.

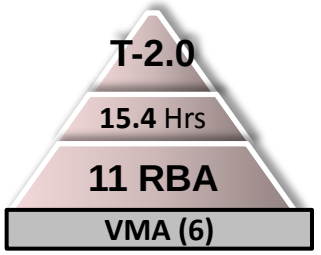
SUSTAINMENT:

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 will transition support from Boeing to NAVSUP.

In the first half of 2015, the AV-8B will receive 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. It will also bring 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 (CAS) technology. Other near-term capability upgrades in FY15 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 advance systems. In 2017, the program plans to field the H6.2 OFP which will integrate FAA-compliant Required Navigation Performance / Area Navigation (RNP/RNAV) capability and correct additional software deficiencies identified through combat operations.

FUTURE:

The next major step for the aircraft is full Link-16 network integration into all AV-8B II+ Radar aircraft; next goal is to integrate SRP into this airframe. This 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:

Survivability Upgrade Roadmap:

ALE-47 V2

ALR-67

ALQ-164

Interoperability Upgrade Roadmap:

DACAS VMF terminals complete by FY2016

H6.1 OFP integration of 4th Generation LITENING - FY 2015

TPOD TTNT TacDemo

Link-16

Software Reprogrammable Payload (SRP) radio replacement

Lethality Upgrade Roadmap:

AGM-65E self-lase capability – FY2015

GBU-54 Laser JDAM in weapon LAR full integration – FY2015

MSC/WMC Processor Upgrade – FY2015

JDAM capable Digital Improved Triple Ejector Rack (DITER)- FY2015

Net Enabled Weapons standoff weapons

1760 Wiring on Station 1 and 7

AIM-120 C/D – Flight tests begin in FY 2016

AIM-9X block II

Reliability Upgrade Roadmap:

Digital Video Recorder

RNP / RNAV (GPS Approach capable) - Q4 2017 (funded with H6.2)

IFF Mode 5/S

EA-6B PLAN : PROGRAMMATICS, SUSTAINMENT AND FUTURE

EA-6B:

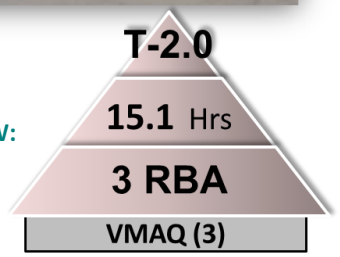
The USMC currently has three operational and one FRS EA-6B squadrons that operate the Improved Capabilities (ICAP) III version of the EA-6B Prowler. This variant will support Marine and joint operational requirements through 2019. Planned ICAP III Block 7 upgrades to software and hardware will improve 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 low-density/high-demand EW capability such as the EA-6B, to a distributed, platform-agnostic approach. Under MAGTF EW the Marine Corps is leveraging emerging technologies and operational efficiencies and integrating multiple aviation platforms (unmanned, fixed wing, and rotary wing assets); payloads; ground-based EW nodes; and cyber effects to provide commanders with an organic and persistent EW capability. This integration of manned and unmanned airborne and ground EW capabilities will provide the MAGTF commander with greater flexibility and control of EW than he has ever had before. 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 strategies.

UAS are a critical component of the MAGTF EW concept. As such, EW expertise normally resident within the VMAQ community will begin to transition to the VMU community beginning in 2015. Manned airborne capabilities post-2019 will be provided by EW payloads such as the Intrepid Tiger II EW Pod, Unmanned Aircraft Systems EW payloads, and the EW capabilities inherent to F-35.

Digital interoperability with the MAGTF aboard all platforms and nodes will be facilitated by the inclusion of Software Reprogrammable Payloads (SRP). SRP is a multi-function, reprogrammable RF device providing EMS maneuver superiority for complex environments, interoperable across all MAGTF assets.



EA-6B CAPABILITIES TRANSITIONING TO MAGTF EW:

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
- Technology and capacity to field radar variant of Intrepid Tiger II
- Deployed on AV-8B and F/A-18 aircraft
- AH/UH series QRA set for FY15
- UAS (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

		FY14				FY15				FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24			
		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. 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-air training

FY15 VMFAT-501 (F-35 Fleet Replacement Squadron) requires adversary support

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. With additional aircraft, the F-5 can remain in service through 2030.

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, all requirements for adversary training and potentially close air support for Tactical Air Control Party training. The first phase of expanded adversary capacity will be to establish a detachment on the East Coast in support of VMFAT-501.

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 eventually include adversary elements at MCAS Miramar, Yuma, Beaufort and Cherry Point are being explored. Sites will likely grow to a maximum of 8xF-5's per site or 32 F-5's in service through 2030. Efficiently co-locating adversary support with the operational forces generates the most readiness for our operational forces at the least cost.

KC-130J HERCULES

KC-130J DESCRIPTION:

The KC 130J is a new production aircraft that supports the Marine Air-Ground Task Force (MAGTF) 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.

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.

Transition Plan:

The aerial refueler / transport transition is complete for the active component and is just beginning for the reserve component. This AVPLAN provides the roadmap for completion of the transition, presents known operational commitments, and highlights future improvements for the aerial refueler / transport assault support community:

- At the direction of the Department of State, VMGR-152 relocated from MAG-36, MCAS Futenma to MAG-12, MCAS Iwakuni during Q4 FY14.
- VMGR-234 projected to reach full operational capability (FOC) in FY21 with 12 Primary Mission Aircraft.
- VMGR-452 will transition to the KC-130J after VMGR-234 reaches FOC (FY21-FY23).
- Backup aircraft procurement deferred until VMGR-452 reaches FOC.
- Harvest HAWK support transitions from OEF (A) to MEU and SPMAGTF.
- Enhanced aircraft survivability equipment beginning in FY16.
- Enhanced Harvest HAWK systems beginning in FY17.
- Enhanced enlisted aircrew training devices deliver in FY16-FY19
- Expanding air-to-air refueling drogue airspeed envelope and exploring EW / digital interoperability capabilities.

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. Additional KC-130T aircraft will be transferred to COMOPTEVFOR and CNAFR to replace aging KC-130F/R assets.

KC-130J HARVEST HAWK

KC-130J

HARVEST HAWK: 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 re-configure the KC-130J aircraft into a platform capable of performing persistent targeting ISR and delivering precision fires using Hellfire, Griffin or Viper Strike munitions. This mission kit is designed as a complementary capability that takes advantage of the aircraft's extended endurance.

The capability has been deployed since October 2010 and has experienced overwhelming success in theater. MROC Decision 19-2012 reduced the total kit inventory objective from 9 kits to 6 kits with 3 kits each going to 2d MAW and 3d MAW. 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.

Beginning in 2015, the mission kit will receive 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.

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.

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 provided air-to-air refueling, aviation delivered ground refueling, battlefield illumination, as well as 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

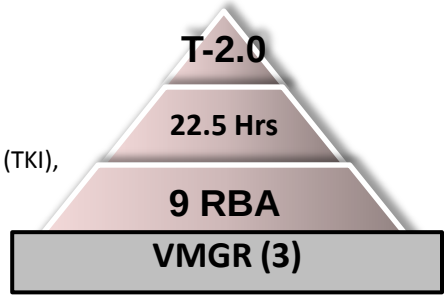
In March 2014 the reserve component began the transition to the KC-130J with IOC for VMGR-234 planned for August 2015. FOC for VMGR-234 is projected to occur in 2021. VMGR-452 will transition to KC-130J after VMGR-234 reaches FOC.

KC-130J BLOCK UPGRADE PROGRAM

The USMC participates in a joint users group with the USAF and seven international partner nations in order 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 are required in 4th MAW until VMGR-452 reaches KC-130J IOC which is anticipated in FY2023. 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 the fleet through 2023. KC-130T Tactical Systems Operators are in sundown with the existing inventory expected to sustain VMGR-452 through FY2023. KC-130T Flight Engineers will continue to be required through KC-130J IOC and at VMGR-452.



Final Fit:

Survivability Upgrade Roadmap:

AAQ-24B(V)25 DoN LAIRCM/ATW – 2014 (TKI),
Fleet retrofit beginning in FY15.

Interoperability Upgrade Roadmap:

Blue Force Tracker (BFT I) - Integrated onto Harvest HAWK aircraft.
Dual Vortex – 2014 (TKI/Test) – Harvest HAWK retrofit beginning in 2015.
Block 7.0/8.1 with LINK-16 - 2016 (TKI) - Fleet retrofit beginning in FY18.
Software Reprogrammable Payload (SRP) radio replacement – POM-17 Issue

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 – 2019

MARINE AERIAL REFUELER / TRANSPORT (VMGR) PLAN

	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
KC-130J/T TOAI PLAN											
AC/RC KC-130J TOAI	**48**	**51**	**53**	**54**	**57**	**58**	**59**	**61**	**63**	**65**	**67**
AC KC-130J PMAI	42	44	45	45	45	45	45	45	45	45	45
RC KC-130J PMAI	5	5	7	8	11	12	13	15	17	19	21
AC KC-130J BAI	0	0	0	0	0	0	0	0	0	0	0
RC KC-130J BAI	1	2	1	1	1	1	1	1	1	1	1
KC-130J SHORTFALL	31	28	26	25	22	21	20	18	16	14	12
RC KC-130T TAI	14	14	14	14	14	14	11	10	8	0	0
KC-130J/T TOAI	**62**	**65**	**67**	**68**	**71**	**72**	**70**	**71**	**71**	**65**	**67**

NOTES:

1) TOTAL OVERALL AIRCRAFT AUTHORIZED (TOAA) PROGRAM OF RECORD IS 79 KC-130J AIRCRAFT.
2) PMAI FOR ACTIVE COMPONENT VMGR SQUADRONS IS 15 AIRCRAFT EACH AND PMAI FOR RESERVE COMPONENT VMGR SQUADRONS IS 12 AIRCRAFT EACH.
3) USMC UTILIZING RESERVE COMPONENT BAI TO SOURCE TEST AND EVALUATION AT VX-20.
4) REMAINING KC-130J BAI AIRCRAFT DELIVERIES BEGIN FOLLOWING RC KC-130J FOC (PROJECTED IN FY27 BASED ON PB-15 PROCUREMENT PROJECTION).
5) KC-130T RETIREMENT SCHEDULE IS A PROJECTION ONLY AND WILL REQUIRE CONTINUED ADJUSTMENT UNTIL THE RESERVE KC-130J TRANSITION IS COMPLETED.
6) MARINE CORPS IS INVESTIGATING OPTION OF CONFIGURING PORTION OF MARINE CORPS KC-130J WITH AN AERIAL REFUELING RECEIVE CAPABILITY.

MARINE AERIAL REFUELER / TRANSPORT (VMGR) PLAN

KEY
J = KC-130J TRANSITION BEGINS
V = KC-130J TRANSITION COMPLETE

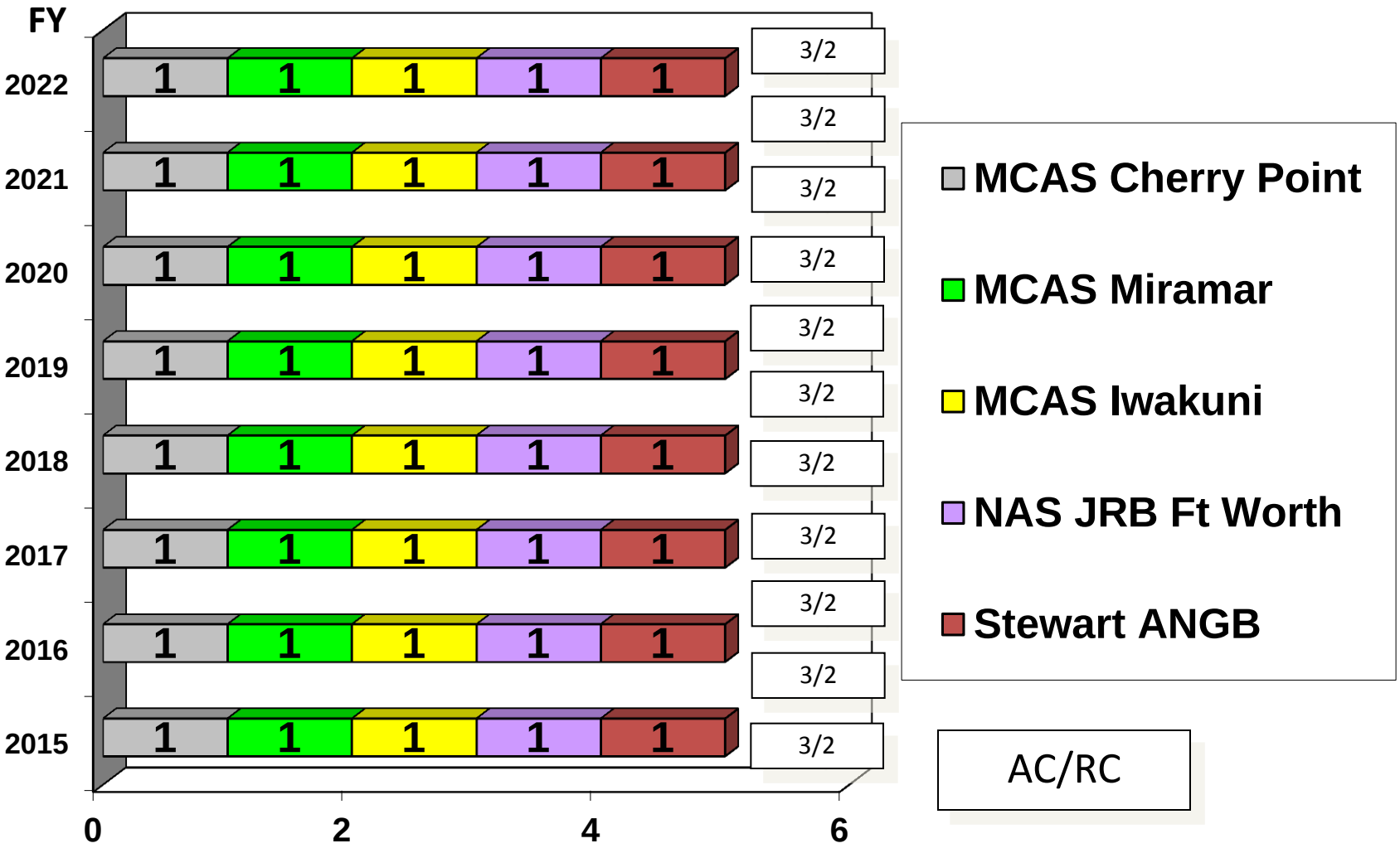
CURRENT FORCE:
3 AC SQDN X 15KC-130J
1 RC SQDN X 10 KC-130T/2 KC-130J
1 RC SQDN X 12 KC-130T

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

		FY14				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	1	2	3	4
UNIT/LOCATION	PMAI																																															
MAG-11/MIRAMAR, CA																																																
VMGR-352	15 KC-130J																																															
WEST COAST MEU (11/13/15)																																															
SPMAGTF/TSC/RFF																																															
I MEF GENERAL SUPPORT																																															
MAG-12/IWAKUNI, JA																																																
VMGR-152	15 KC-130J																																															
WESTPAC MEU (31)																																															
MRF-D/MRF-G/TSC																																															
III MEF GENERAL SUPPORT																																															
MAG-14/CHERRY POINT, NC																																																
VMGR-252	15 KC-130J																																															
EAST COAST MEU (22/24/26)																																															
SPMAGTF/TSC/RFF																																															
II MEF GENERAL SUPPORT																																															
MAG-41/FORT WORTH, TX																																																
VMGR-234	12 KC-130J		J					V																																								
SPMAGTF/TSC/RFF																																															
I/II/III MEF GENERAL SUPPORT																																															
MAG-49/NEWBURGH, NY																																																
VMGR-452	12 KC-130J																																	J							V								
SPMAGTF/TSC/RFF																																															
I/II/III MEF GENERAL SUPPORT																																															

NOTES:
1) VMGR SOURCING WILL BE CONTINUALLY UPDATED DURING QUARTERLY FORCE SYNCH CONFERENCES.
2) THE ABOVE DEPICTED REQUIREMENT IS ACCOMPLISHED VIA SURGE OPERATIONS AND DOES NOT MEET THE GOAL OF A 1:2 DEPLOYMENT TO DWELL.
3) VMGR SQUADRONS ARE STRUCTURED TO SUPPORT A CORE ELEMENT AND ONE (1) ENDURING MEU DETACHMENT EACH.
4) DETACHMENT SIZE IS TAILORABLE TO MAINTAIN FLEXIBILITY IN SUPPORT OF THE MAGTF.

MARINE AERIAL REFUELER / TRANSPORT SQUADRON GEO-LOCATION



2.5 MARINE CORPS ROTORCRAFT: TILTROTOR AVIATION PLAN

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 of the Osprey, a detachment capability is being built into the VMMs. Staffing began in 2014 for detachment capability in two East Coast squadrons. Fourteen 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: a capability leap to ensure relevance and improved readiness at a lower cost for decades.

Transition Plan:

The MV-22B is 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 65% complete with the medium lift transition. There are thirteen full operational capable squadrons (FOC) 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 third quarter of FY16. HMM-774 will re-designate to VMM-774 at NS Norfolk in the first quarter of FY15. This will mark the last Marine CH-46E squadron.

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 TACAIR, 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 65% 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 COCOM demand, the industrial and logistics support base is working to keep pace. As 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:

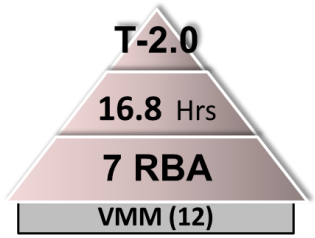
TIME ON WING IMPROVEMENTS

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 fourteen 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

RF Threat Protection System

Interoperability Upgrade Roadmap:

Software Reprogrammable Payload (SRP) radio replacement, Spiral II FY17

Enhanced situational awareness through beyond line of sight (BLOS) voice, data, still photos, and network-enabled full motion video (FMV)

Airborne gateway functionality for multiple waveforms, including Link-16

Radio frequency identification (RFID) of cargo and personnel

Lethality Upgrade Roadmap:

V-22 Aerial Refueling System (VARS)

Traffic Collision and Avoidance System (TCAS)

Enhanced Weapon System; PGM

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:

Mission Computer Obsolescence Initiative (MCOI) - 2014

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 (DWS) 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 Omega 707.

V-22 Aerial Refueling System (VARS)

Being developed to align the fielding of the system with the F-35B WESTPAC deployment in summer 2017. Planned for initial utilization by TACAIR with follow-on capabilities of MV-22 and helicopters.

Enhanced Weapon System

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

Integrated Aircraft Survivability Equipment (IASE)

An Integrated Aircraft Survivability Equipment (IASE) 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

V-22 Next

The V-22 has without question 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 platforms relevance and capability for the future force.

Initial planning has begun to map the next block upgrade of the MV-22B, as well as the follow on series upgrade to MV-22C. Following the successful lifecycle block upgrade program that saw the airframe progress from block A to B to C, block D will take advantage of maturing technologies as well as incorporate improvements driven by lessons learned over the years since fleet introduction. Block D will serve as a mid-life upgrade and include improvements that increase operational effectiveness, reliability and maintainability. It will also facilitate and maintain downward pressure on operating cost while increasing readiness, both of which have been hallmarks of the platform's overall performance to date.

To take full advantage of the success of tiltrotor technology, we plan to field the MV-22C in the mid-2030s. The MV-22C will take advantage of technologies spurred by the ongoing joint multi-role (JMR) and future vertical lift (FVL) 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

MARINE MEDIUM TILTROTOR (VMM) PLAN

	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
TOTAL SQUADRONS / PRIMARY MISSION AIRCRAFT AUTHORIZED (PMAA) - REQUIREMENT											
Active Component											
12 CH-46E	1	0	0	0	0	0	0	0	0	0	0
12 MV-22B	14	16	16	17	18	18	18	18	18	18	18
Reserve Component											
12 CH-46E	1	0	0	0	0	0	0	0	0	0	0
12 MV-22B	1	2	2	2	2	2	2	2	2	2	2

	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
PRIMARY AIRCRAFT INVENTORY (PAI) PLAN - INVENTORY											
AC/RC PMAI											
MV-22B	180	216	216	216	216	216	216	216	216	216	216
FRS PTAI											
MV-22B BLOCK A	10	6	2	0	0	0	0	0	0	0	0
MV-22B BLOCK B	10	14	18	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	0	19	38	38	38	38	38	38	38	38	38
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 388 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

KEY

M = TRANSITION BEGINS

V = TRANSITION COMPLETE

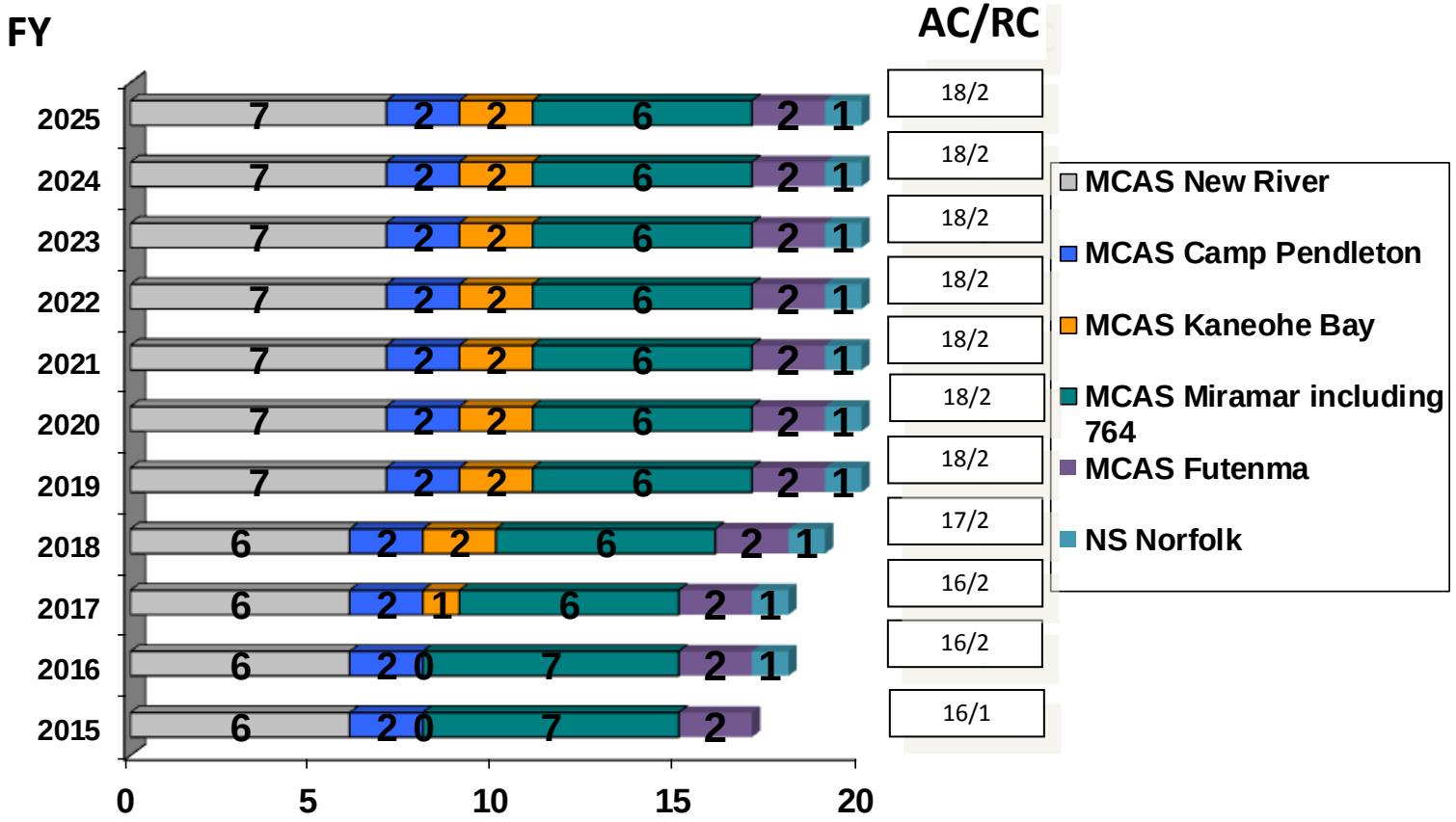
18 AC SQDN X 12 MV-22B
2 RC SQDN X 12 MV-22B
FRS x 20 MV-22B
HMX-1 x 12 MV-22B

UNIT/LOCATION	PMAI	FY14				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	1	2	3	4
MAG-16																																																
VMM-161	12 MV-22B																																															
VMM-163	12 MV-22B																																														
VMM-165	12 MV-22B																																														
VMM-166	12 MV-22B																																														
VMM-268 (1)	12 MV-22B		M						V																																						
VMM-363 (2)	12 MV-22B		V																																												
VMM-362 (3)	12 MV-22B																		M				V																										
SOCAL MEU		3	1			5	3			1	5			3	1			5	3			1	5			3	1			5	3			1	5			3	1			5	3			1	5	
SPMAGTF-CENT						A	B			A	B			A	B			A	B			A	B			A	B			A	B			A	B			A	B			A	B			A	B	
MILCON		HANGAR 5 MODIFICATION																CORROSION CONTROL FACILITY																																	
MILCON										AIRFIELD TAXIWAY																																											
MILCON														LHD PAD																																			
MAG-24																																																
VMM-268	12 MV-22B																																															
VMM-363	12 MV-22B																																															
MRF-D / GUAM UDP																						M		M		M		M		M		G		M		G		M		G		M		G					
MILCON		HANGAR								LHD PAD AND LZ IMPROVEMENTS																																								
MILCON		STAGING AREA								V-22 / H-1 WAREHOUSE																																								
MILCON		PARKING APRON								MAG-24 ARMORY EXPANSION																																								
MILCON		HANGAR																																														
MAG-26																																															
VMMT-204	20 MV-22B																																															
VMM-162	12 MV-22B																																															
VMM-261	12 MV-22B																																															
VMM-263	12 MV-22B																																															
VMM-264	12 MV-22B																																															
VMM-266	12 MV-22B																																															
VMM-365	12 MV-22B																																															
VMM-212 (4)	12 MV-22B																					M				V																							
EAST MEU		6	2			4	6			2	4			6	2			4	6			2	4			6	2			4	6			2	4			6	2			4	6			2	4	
SPMAGTF-CR		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		MAINT HANGAR								SQUADRON WAREHOUSE																																								
MILCON		MAINT HANGAR																																														
MAG-36																																																
VMM-262	12 MV-22B																																															
VMM-265	12 MV-22B																																															
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	
MILCON						RINSE FACILITY AND HANGAR UPGRADE																																													
MAG-39																																																
VMM-164 (5)	12 MV-22B							M				V																																				
VMM-364 (6)	12 MV-22B						M				V																																					
SOCAL MEU														3	1			5	3			1	5			3	1			5	3			1	5			3	1			5	3			1	5	
MILCON		HANGAR REPLACEMENT																								CONVERT LHA DECK TO CONCRETE																							
MILCON		AVIATION PAVEMENT																								LHD PAD MODERNIZATION																							
MILCON		AVIATION FUEL STORAGE																								VTOL PAD MODERNIZATION																							
MILCON		SIMULATOR BUILDING																																														
MAG-41																																																
VMM-764 (7)	12 MV-22B											V																																				
MAG-49																																																
VMM-774 (8)	12 MV-22B									M								V																														
WHMO																																															
HMX-1	12 MV-22B		V																																												

NOTES:

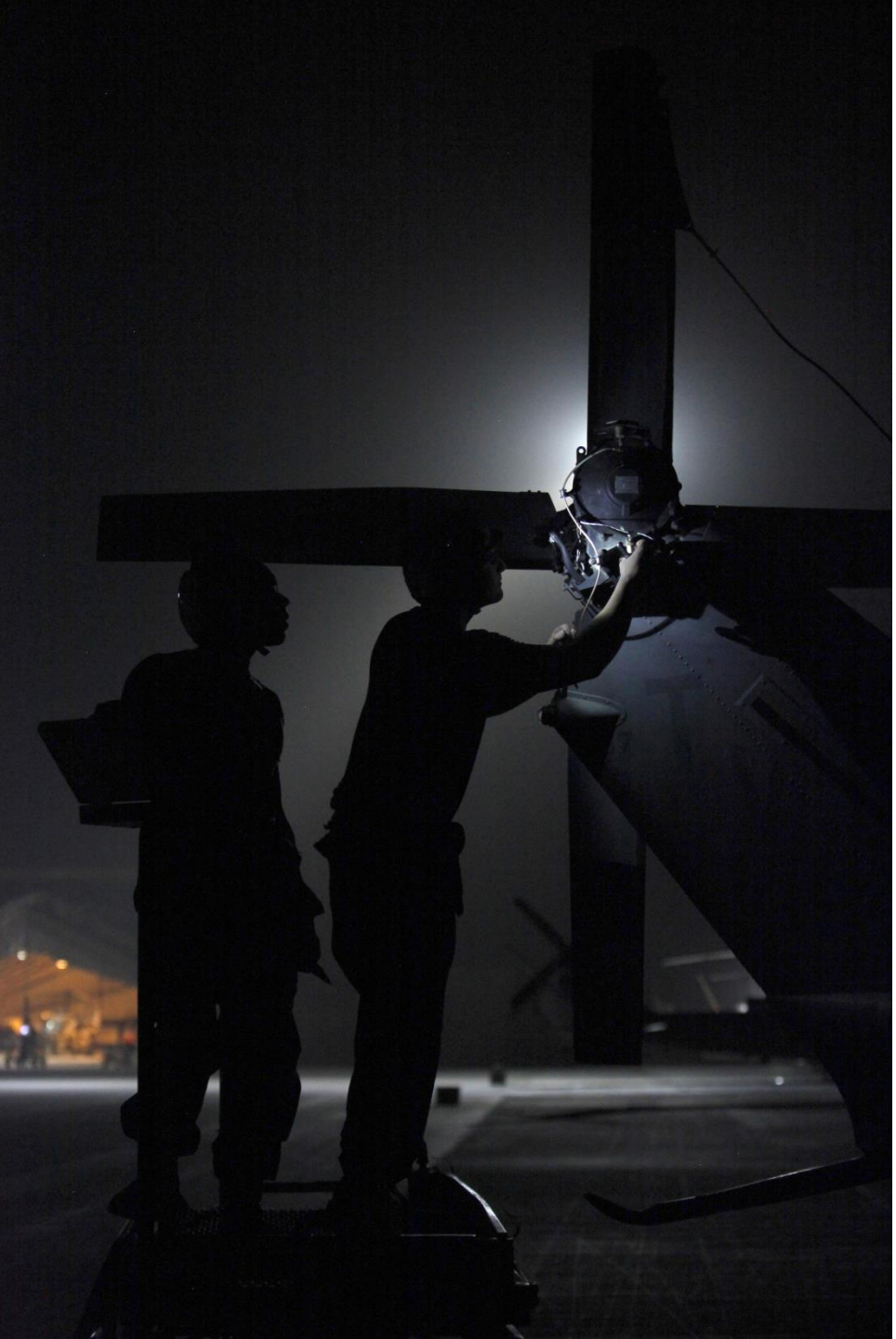
1) VMM-268 IOC Q1 FY15. FOC Q1 FY16. RELOCATE TO MAG-24 DURING Q1 FY17.
2) VMM-363 FOC Q4 FY14. RELOCATE TO MAG-24 DURING Q1 FY18.
3) VMM-362 WILL BEGIN STAND UP IN FY18 IN MIRAMAR.
4) VMM-212 WILL BEGIN STAND UP IN FY19 IN NEW RIVER.
5) VMM-164 IOC Q1 FY16. FOC Q4 FY16.
6) VMM-364 IOC Q3 FY15. FOC Q2 FY16.
7) VMM-764 IOC Q3 FY14. 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

2.6 MARINE CORPS ROTORCRAFT: HELICOPTER 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 MEDIUM HELICOPTER SQUADRON (HMM): 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 HELICOPTER TRAINING SQUADRON (HMMT): Conduct combat capable assault support medium lift helicopter training for selected aircrews in the CH-46E aircraft and provide technical training for aviation maintenance personnel.

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

MARINE HEAVY HELICOPTER (HMH) PLAN

New Aircraft Test and Evaluation Updates

CH-53K King Stallion:
DEVELOPMENTAL TEST: 1st Qtr FY13 to 2nd Qtr FY18

OPERATIONAL TEST/OPEVAL: OT-B1 testing in support of Milestone C Decision begins 2nd Qtr FY16. OT-C testing in support of Initial Operational Capability (IOC) / Full Rate Production (FRP) begins 3rd Qtr FY18.

INITIAL OPERATIONAL CAPABILITY: Scheduled for 3rd QTR 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 13 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. This shortfall has created a degraded Primary Mission Aircraft Inventory (DPMAI) of 13 aircraft per squadron vice the 16 per squadron which is authorized. The DoN is exploring options to bolster the CH/MH-53E inventory by purchasing surplus foreign MH-53E as well as reactivating MH-53Es from the Aerospace Maintenance and Regeneration Group (AMARG).

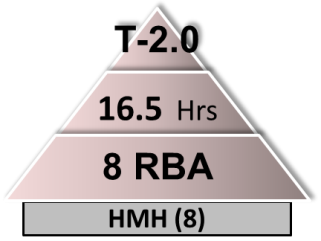
CH-53E SUSTAINMENT:

The CH-53E service life has been extended to 10,000 hours by the replacement of the station 820 bulkhead, a 6120 hour lifetime limited component. This modification has been completed on two-thirds of the aircraft inventory with the balance funded and scheduled to be completed by FY20. Other sustainment challenges to the CH-53E community include avionics obsolescence and Kapton wiring replacement. The CH-53E Automatic Flight Control System (AFCS) computer circuit cards required reverse engineering to reproduce. Kapton wiring replacement has entered its third and final phase. Management of multiple modifications and upgrades to the Super Stallion fleet is essential to the warfighter, aircraft survivability and critical to sustainment while transitioning to the CH-53K King Stallion.

FUTURE:

The CH-53E will continue to support the full spectrum of assigned combat operations and scheduled deployments to include the full resumption of UDP to Okinawa, Japan. It is imperative to sustain the current CH-53E fleet throughout the transition to the CH-53K (Initial Operational Capability FY19/Full Operational Capability FY28).

Final Fit:



Survivability Upgrade Roadmap:

AAQ-24 DIRCM(V25)
Critical Systems Armor (CSA)
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:

Blue Force Tracking 1.0 to 1.5
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 Symbology 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:
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 lbs. 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, more capable and fuel efficient engines, composite airframe capable of increased gross weights, split torque main gearbox, advanced 4th generation composite main rotor blades, modern interoperable glass cockpit, internal cargo handling systems compatible with USAF 463L pallets, triple hook external cargo system, and 4th 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 Joint Task Force 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.

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 was delivered 1st QTR FY 14 with remaining deliveries to be completeby 3rd QTR of FY 15. First flight is planned for 2015 with OT-B1 testing to support a Milestone C decision in 2nd QTR FY 16. OT-C testing in support of Initial Operational Capability (IOC)/Full Rate Production begins 3rd QTR FY 18.

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.

Marine Corps CH-53K IOC is scheduled for 3rd QTR FY19. IOC will 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.

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, 3rd MAW FY 24-27, 1st MAW FY 27-29 and 4th MAW FY 28-29. 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 Full Operational Capability (FOC) will be achieved in FY 28 with the transition of the last active component squadron. Backup aircraft inventory / attrition reserve deliveries will complete in FY30 when the program of record reaches 200 aircraft.

MARINE HEAVY HELICOPTER (HMH) PLAN

	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
TOTAL SQUADRONS / PRIMARY MISSION AIRCRAFT AUTHORIZED (PMAA) - REQUIREMENT											
Active Component											
16 CH-53E	8	8	8	8	7	7	7	7	6	5	4
16 CH-53K	0	0	0	0	1	1	1	1	2	3	4
Reserve Component											
8 CH-53E	1	1	1	1	1	1	1	1	2	2	2
8 CH-53K	0	0	0	0	0	0	0	0	0	0	0

	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
PRIMARY AIRCRAFT INVENTORY (PAI) PLAN - INVENTORY											
AC/RC PRIMARY MISSION AIRCRAFT INVENTORY (PMAI)											
CH-53E	109	109	109	109	109	109	110	110	112	96	80
CH-53K	0	0	0	0	5	5	8	14	21	33	52
TOTAL PMAI	**109**	**109**	**109**	**109**	**114**	**114**	**118**	**124**	**133**	**129**	**132**
FRS PRIMARY TRAINING AIRCRAFT INVENTORY (PTAI)											
CH-53E	15	15	15	15	15	15	14	14	12	12	10
CH-53K	0	0	0	0	0	2	3	6	6	6	8
TOTAL PTAI	**15**	**15**	**15**	**15**	**15**	**17**	**17**	**20**	**18**	**18**	**18**
PRIMARY DEVELOPMENTAL/TEST AIRCRAFT INVENTORY (PDAI)											
CH-53E	1	1	1	1	1	1	1	1	1	1	1
CH-53K	4	5	8	8	6	6	6	6	6	6	6
TOTAL PDAI	**5**	**6**	**9**	**9**	**7**	**7**	**7**	**7**	**7**	**7**	**7**
BACKUP AIRCRAFT INVENTORY (BAI)/PIPELINE											
CH-53E	24	24	24	24	24	24	24	24	24	23	20
CH-53K	0	0	0	0	0	0	0	0	0	0	0
TOTAL BAI	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**23**	**20**
TOTAL PAI	**153**	**154**	**157**	**157**	**160**	**162**	**166**	**175**	**182**	**177**	**177**

GENERAL NOTES:

1) FOUR CH-53K ENGINEERING DEMONSTRATION MODELS (EDM) , NONPRODUCTION AIRCRAFT, WILL BE UTILIZED FOR DEVELOPMENTAL TEST AND RETAINED AT HX-21 UNTIL NO LONGER NEEDED. EDM AIRCRAFT DO NOT COUNT AGAINST THE PROGRAM OF RECORD.
2) PROGRAM OF RECORD IS 200 CH-53K.

MARINE HEAVY HELICOPTER (HMH) PLAN

CURRENT FORCE:
8 AC SQDN X 16 CH-53E
1 RC SQDN X 8 CH-53E
1 FRS SQDN X 17 CH-53E

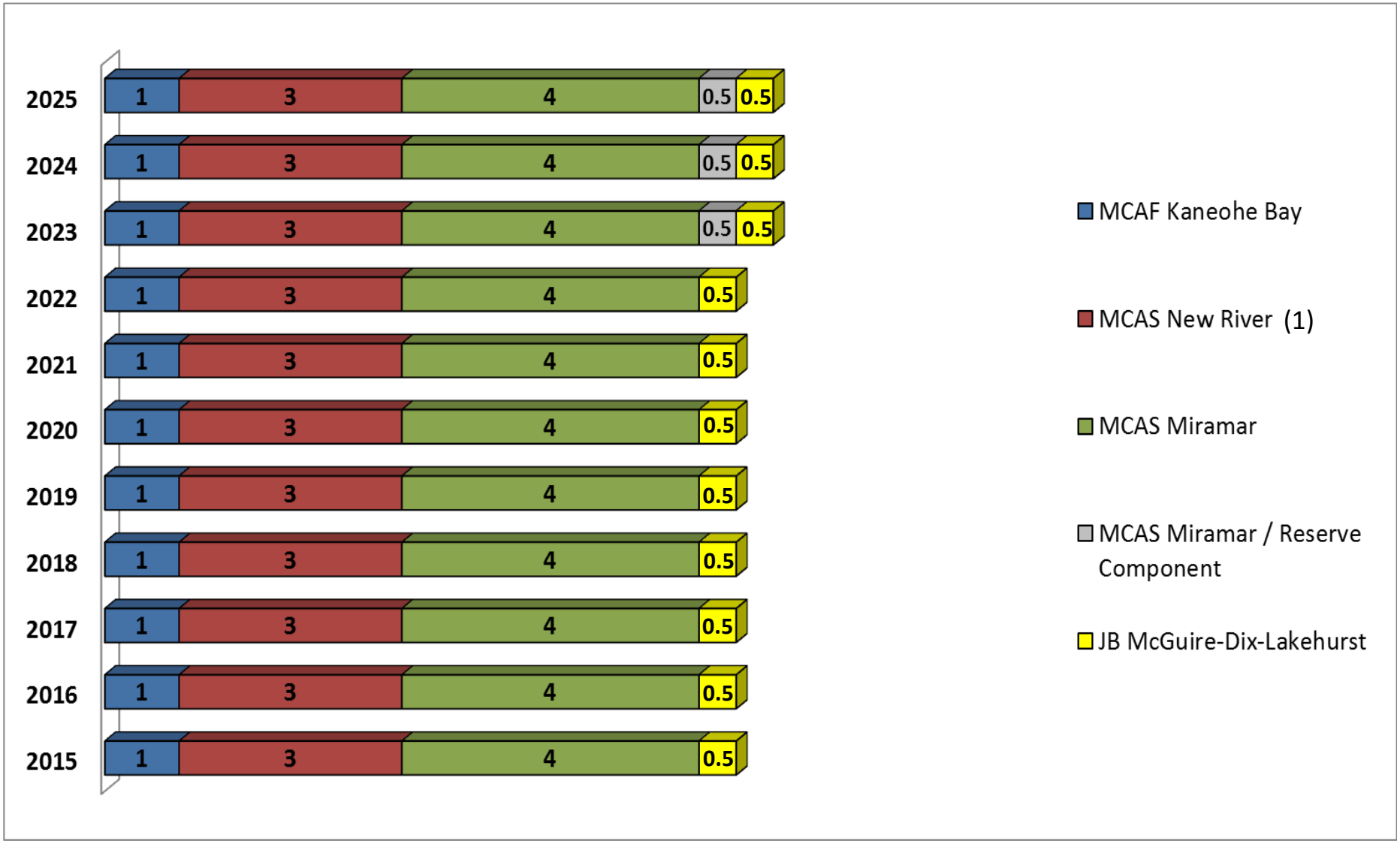
FORCE GOAL:
8 AC SQDN X 16 CH-53K
2 RC SQDN(-) X 8 CH-53K
1 FRS SQDN X 21 CH-53K

UNIT/LOCATION	PMAA	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
MAG-16																																									K			
HMH-361	16 CH-53E																																											
HMH-462	16 CH-53E																																											
HMH-465	16 CH-53E																																											
HMH-466	16 CH-53E																																											
West Coast MEU		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	3	1	5	3	1	5	3	1	5	3
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	A	B	A	B	A	B	A	B	A	B
UDP																																												
MAG-24																																												
HMH-463	16 CH-53E																																											
MRF-D																																												
GUAM (1)																																												
MILCON		MALS AIRCRAFT MAINT EXPANSION																																											
MILCON		MAG-24 ARMORY EXPANSION																																											
MILCON										HANGAR 102 MODERIZATION																																								
MAG-29																																												
HMHT-302 (2)	17 CH-53E																					K																						
HMH-366 (3)	16 CH-53E																					K											V										
HMH-461	16 CH-53E																																	K			V							
HMH-464	16 CH-53E																																					K					V	
East Coast MEU		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	4	6	2	4	6	2	4	6	2	4	6
SOUTHCOM																																												
MILCON		53K HANGAR																																											
MILCON		53K MAINTENANCE TRAINING																																											
MAG-41																																												
HMH-769 (-) (4)	8 CH-53E																																	A										
MAG-49																																												
HMH-772 (-)	8 CH-53E																																											
MILCON										53K TRAINER FACILITY																																							

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

NOTES:
1) CURRENT REQUIREMENTS CALL FOR HMH DET ON GUAM
2) HMHT-302 WILL BECOME A DUAL T/M/S (CH-53E/CH-53K) THROUGHOUT THE DURATION OF THE CH-53K TRANSITION.
3) HMH-366 TO RELOCATE FROM MCAS CHERRY POINT TO MCAS NEW RIVER 1st QTR FY 2016
4) SQUADRON (-) ACTIVATES, LOCATION MCAS MIRAMAR BEGINNING FY23

MARINE HEAVY LIFT SQUADRON GEO-LOCATION



Notes:

1) HMH-366 TO RELOCATE FROM MCAS CHERRY POINT TO MCAS NEW RIVER 1st QTR FY2016

MARINE LIGHT ATTACK HELICOPTER (HMLA) PLAN

New Aircraft Test and Evaluation Updates

AH-1Z:
DEVELOPMENTAL TEST: Complete.
OPERATIONAL TEST/OPEVAL: Complete.
INITIAL OPERATIONAL CAPABILITY: Achieved 24 February 2011.
FINAL OPERATIONAL CAPABILITY: Q3 FY20.
FOLLOW ON TEST AND EVALUATION: Ongoing.

UH-1Y:
DEVELOPMENTAL TEST: Complete.
OPERATIONAL TEST/OPEVAL: Complete.
INITIAL OPERATIONAL CAPABILITY: Achieved on 8 August 2008.
FINAL OPERATIONAL CAPABILITY: Q4 FY15.
FOLLOW ON TEST AND EVALUATION: Ongoing.

MARINE LIGHT ATTACK HELICOPTER (HMLA) PLAN

The variables that contributed to the development of the H-1 portion of the previously published AVPLAN have changed. This AVPLAN represents a shift for the HMLA community in several key areas:

Service level changes created by the Commandant of the Marine Corps' force shaping guidance have resulted in the 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. In addition to force shaping actions, the USMC is also undergoing an operational transition out of Afghanistan.

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 2015 AVPLAN retires the HH-1N from USMC service, and maximizes mutual support within the HMLA community by changing the sequence and pace of the H-1 Transition.

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 Type-Model-Series (T/M/S) 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. The increased mutual support 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. In order to increase mutual support quickly, and mitigate delays to the 2d MAW AH-1Z transition, initial AH-1Z fielding is now 13 aircraft per squadron vice 15. Once each active component MAG fields to (13) AH-1Z per squadron, the AH-1Z conversion begins in the next MAG. When the active component is complete with the initial fielding to (13) AH-1Zs, the MAGs will be backfilled to (15) aircraft per squadron. The reserve component will begin AH-1Z conversion when the active component is complete. The result of the 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 still on the aircraft giving the operator a fire-and-forget missile. The second increment will increase the maximum range to twelve (12) 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 (16) kilometers. Marine Corps integration on the AH-1Z begins in FY15 with an expected IOC in FY20-21.

The H-1 program plans to execute a block upgrade to integrate these airframes into the larger digitally interoperable MAGTF electronic warfare concept. This will include integration of Software Reprogrammable Payload and capability similar to that of LINK-16 in concert with an enhanced EW capability.

AH-1W : PROGRAMMATICS, SUSTAINMENT AND FUTURE

AH-1W:

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.

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 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 which achieved initial operational capability (IOC) in Mar 2012.

The 20mm linkless feed system compatible with both the legacy and upgrade platform recently deployed to contingency operations showcasing a marked increase 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:

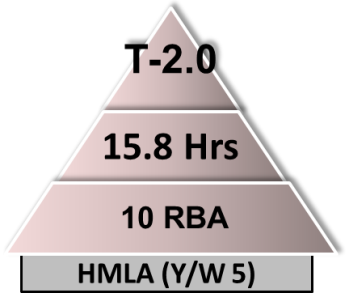
Tactical Video Data Link
Blue Force Tracker

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 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, 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).
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 deployed 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.

76 AH-1Zs (Lots 1-11) are currently on contract.

39 AH-1Zs have been delivered to date (as of Sep 14)

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:

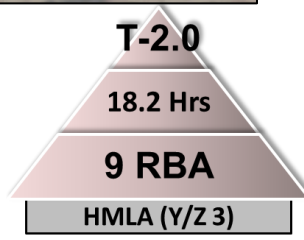
The details of unit conversion timelines will adjust with real time production delivery schedule updates. These forecast dates reflect the current delivery schedule.

3d MAW: AH-1Z conversion complete in July 2016

2d MAW: AH-1Z conversion begins 2017, complete by 2019

1st MAW: HMLA 367 AH-1Z conversion begins in 2016, complete by 2017

-UDP / 31st MEU conversion in Q3 FY15



Final Fit:

Survivability Upgrade Roadmap:

Integrated Aircraft Survivability Equipment (ASE)
Degraded Visual Environment solutions
Advanced Threat, Missile, and Laser Warning System

Interoperability Upgrade Roadmap:

Blue Force Tracking, Software Reprogrammable Payload (SRP) with LINK 16, FMV SPIRAL 1 – 2016 and FMV SPIRAL 2 (integrated) - 2018

Lethality Upgrade Roadmap:

APKWS – 2015
JAGM – 2019
AIM-9X
Enhanced EW capabilities
Advanced Missile Warning System
DRL 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 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, whereby 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, 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.

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

The UH-1Y achieved its initial operational capability (IOC) on 08 Aug 2008 and was granted full rate production (FRP) approval on 17 Sep 2008.
The UH-1Y has supported sustained combat operations in Afghanistan since November 2009
The UH-1Y employs the Advanced Precision Kill Weapon System (APKWS), which achieved IOC in Mar 2012.

132 UH-1Ys (Lots 1-11) are currently on contract.

101 UH-1Ys have been delivered to date (as of Sep 14)

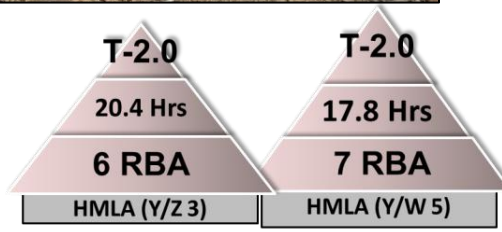
SUSTAINMENT:

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



Final Fit:

Survivability Upgrade Roadmap:

Integrated Aircraft Survivability Equipment (ASE)
Degraded Visual Environment solutions
Advanced Threat, Missile, and Laser Warning System

Interoperability Upgrade Roadmap:

Blue Force Tracking, Software Reprogrammable Payload (SRP) with LINK 16, FMV SPIRAL 1 – 2016 and FMV SPIRAL 2 (integrated) - 2018

Lethality Upgrade Roadmap:

APKWS
DRL Digital Rocket Launcher
BRITE Star w/Laser Spot Tracker

Reliability Upgrade Roadmap:

Structural and Power upgrades – 2020
Block IV Upgrade – 2021

MARINE LIGHT ATTACK HELICOPTER (HMLA) PLAN

	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
TOTAL SQUADRONS / PRIMARY MISSION AIRCRAFT AUTHORIZED (PMAI) - REQUIREMENT											
Active Component											
18 AH-1W / 9 UH-1Y	5	4	2	1	0	0	0	0	0	0	0
15 AH-1Z / 12 UH-1Y	3	4	5	6	7	7	7	7	7	7	7
Reserve Component											
18 AH-1W / 9 UH-1Y	1	1	2	2	2	0	0	0	0	0	0
15 AH-1Z / 12 UH-1Y	0	0	0	0	0	2	2	2	2	2	2

	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
PRIMARY AIRCRAFT INVENTORY (PAI) PLAN - INVENTORY											
AC/RC PMAI											
AH-1W	97	66	66	48	36	6	0	0	0	0	0
AH-1Z	40	53	64	78	103	130	135	135	135	135	135
UH-1Y	95	108	108	108	108	108	108	108	108	108	108
TOTAL AH PMAI	**137**	**119**	**130**	**126**	**139**	**136**	**135**	**135**	**135**	**135**	**135**
TOTAL UH PMAI	**95**	**108**	**108**	**108**	**108**	**108**	**108**	**108**	**108**	**108**	**108**
FRS PTAI											
AH-1W	10	10	10	0	0	0	0	0	0	0	0
AH-1Z	10	13	14	15	15	15	15	15	15	15	15
UH-1Y	12	12	13	13	13	13	13	13	13	13	13
TOTAL AH PTAI	**20**	**23**	**24**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**
TOTAL UH PTAI	**12**	**12**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**
PDAI											
AH-1W	3	3	3	3	3	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**	**8**	**5**	**5**	**5**	**5**	**5**	**5**
TOTAL UH PDAI	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
POAI (UH ONLY)											
UH-1N*	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
UH-1Y	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
TOTAL POAI	**7**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
*HH-1N WILL SUNDOWN DURING FY15											
BAI/PIPE											
AH-1W	15	11	10	7	5	1	0	0	0	0	0
AH-1Z	0	0	0	0	0	0	25	34	34	34	34
UH-1Y	0	0	0	27	27	27	27	27	27	27	27
TOTAL AH BAI	**15**	**11**	**10**	**7**	**5**	**1**	**25**	**34**	**34**	**34**	**34**
TOTAL UH BAI	**0**	**0**	**0**	**27**	**27**	**27**	**27**	**27**	**27**	**27**	**27**
PMAI PER HMLA (W)	**16**	**13**	**17**	**16**	**18**	**0**	**0**	**0**	**0**	**0**	**0**
PMAI PER HMLA (Z)	**13**	**13**	**13**	**13**	**15**	**14**	**15**	**15**	**15**	**15**	**15**
PMAI PER HMLA (Y)	**11**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**
AH PAI	**165**	**150**	**162**	**149**	**162**	**156**	**155**	**155**	**155**	**155**	**155**
UH PAI	**118**	**127**	**128**	**128**	**128**	**128**	**128**	**128**	**128**	**128**	**128**
AH TAI	**180**	**161**	**172**	**156**	**167**	**157**	**180**	**189**	**189**	**189**	**189**

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

CURRENT FORCE:
5 AC SQDN X 18 AH-1W/9 UH-1Y
3 AC SQDN X 15AH-1Z/12 UH-1Y
1 RC SQDN X 18 AH-1W/9 UH-1Y
1 FRS X 15 AH-1W/0 UH-1N
10 AH-1Z/13 UH-1Y
SAR 3 X HH-1N (Yuma)
4 X HH-46E (Cherry Point)

FORCE GOAL:
7 AC SQDN X 15 AH-1Z/12 UH-1Y
2 RC SQDN X 15 AH-1Z/12 UH-1Y
1 FRS X 15 AH-1Z/12 UH-1Y

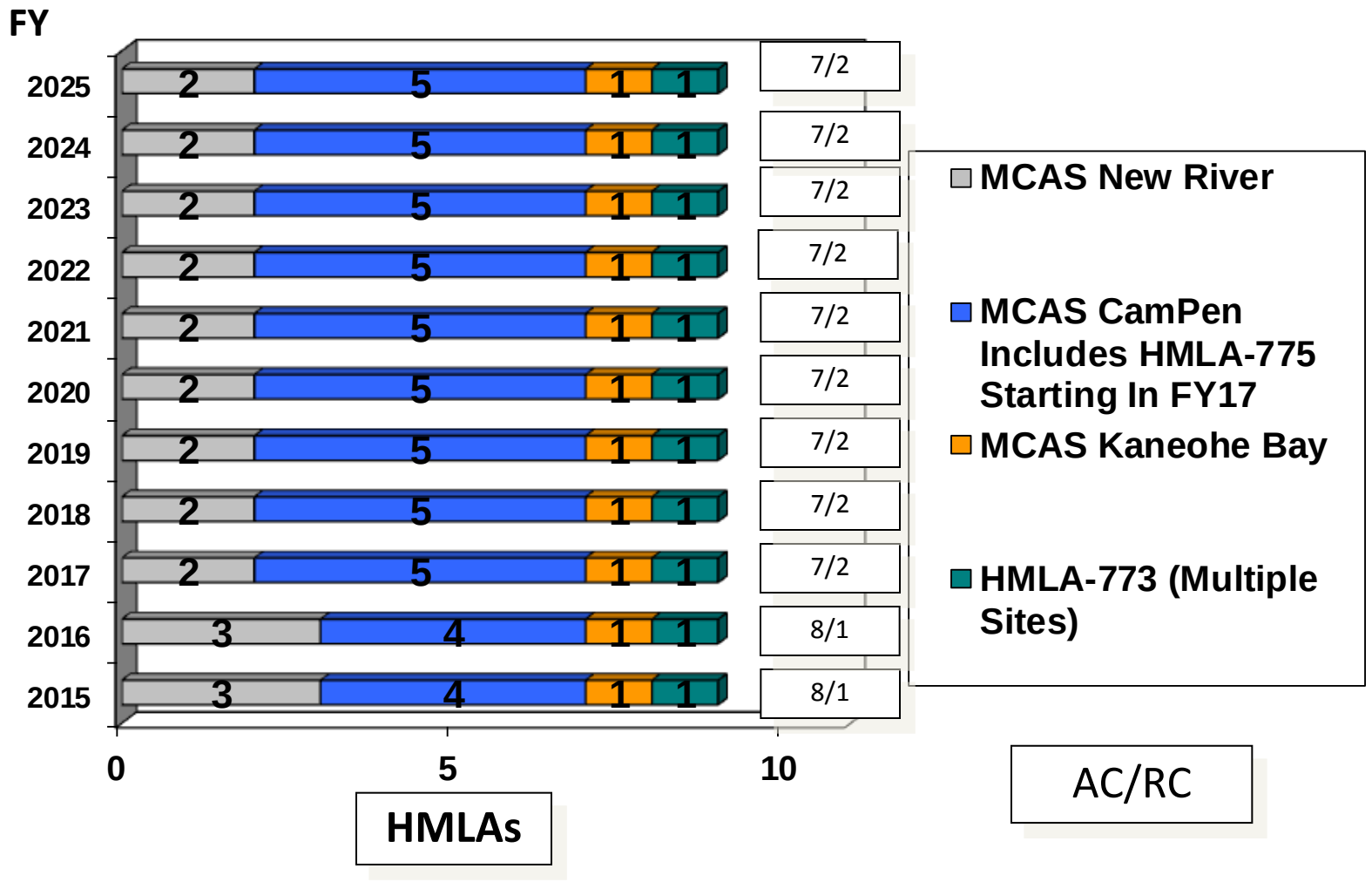
KEY
Y = YANKEE TRANSITION BEGINS
Z = ZULU TRANSITION BEGINS
X = TRANSITION TO USCG BEGINS
V = TRANSITION COMPLETE

UNIT/LOCATION	PMAI GOAL	FY14 1 2 3 4	FY15 1 2 3 4	FY16 1 2 3 4	FY17 1 2 3 4	FY18 1 2 3 4	FY19 1 2 3 4	FY20 1 2 3 4	FY21 1 2 3 4	FY22 1 2 3 4	FY23 1 2 3 4	FY24 1 2 3 4	FY25 1 2 3 4
MAG-24													
HMLA-367	15 AH-1/12 UH-1	RELOCATION			Z V								
31st MEU													
Guam / Emerging MARFORPAC Rqmts													
MILCON		HANGAR 101 RENOVATION											
MILCON							HANGAR 102 RENOVATION						
MILCON				HMLA WAREHOUSE CONSTRUCTION									
MAG-29													
HMLA-167	15 AH-1/12 UH-1				Z V								
HMLA-269	15 AH-1/12 UH-1					Z V							
HMLA-467	15 AH-1/12 UH-1				HMLA-467 Deactivation								
MEU		6 2	4 6	2 4	6 2	4 6	2 4	6 2	4 6	2 4	6 2	4 6	2 4
MILCON		CALA ADDITION											
MILCON		CORROSION CONTROL HANGAR											
MILCON				ORDNANCE MAGAZINE									
MAG-39													
HMLAT-303	15 AH-1/12 UH-1												
HMLA-169	15 AH-1/12 UH-1	V											
HMLA-267	15 AH-1/12 UH-1												
HMLA-369	15 AH-1/12 UH-1		Z V										
HMLA-469	15 AH-1/12 UH-1			Z V									
SoCal MEU		3 1	5 3	1 5	3 1	5 3	1 5	3 1	5 3	1 5	3 1	5 3	1 5
31st MEU													
UDP													
MILCON		CNATT FACILITIES											
MILCON				EXPAND HANGARS 23144 & 23170									
MILCON					AVIATION WAREHOUSE								
MILCON								LZ & HOLF LIGHTING MODERNIZATION					
MAG-49													
HMLA-773	15 AH-1/12 UH-1		Y V					Z V					
MAG-41													
HMLA-775	15 AH-1/12 UH-1				W/Y V			Z V					
SAR													
Yuma SAR			Transition to Contract SAR										

NOTES: 1) HMLA-775 BASED AT CAMP PENDLETON.
2) CURRENT REQUIREMENTS CALL FOR AN HMLA DET IN GUAM STARTING IN FY22.
3) The details of unit conversion timelines will adjust with real time production delivery schedule updates. Timelines depicted above reflect the current delivery schedule.

2.6.15

MARINE LIGHT ATTACK SQUADRON GEO-LOCATION



Basing plans are subject to change and further environmental analysis

MARINE SEARCH AND RESCUE (SAR) PLAN

Marine aviation will divest from the dedicated SAR mission at MCAS Cherry Point and MCAS Yuma.

Discussion:

- The Marine Corps sundowns dedicated SAR assets at MCAS Yuma and MCAS Cherry Point per the timeline provided.
- The National SAR Plan assigns the responsibility for maritime SAR to the Coast Guard (USCG). Upon sundown of the HH-46E at MCAS Cherry Point, the SAR mission will be returned to the USCG.
- 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: 3 X HH-46E, 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 CHERRY POINT																																												
VMR-1	3 HH-46E																																											
MCAS YUMA																																												
	4 HH-1N																																											
	TBD			C																																								

C = CONTRACT BEGINS

	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
SAR PAI PLAN											
SAR POAI											
HH-46E	3	3	0	0	0	0	0	0	0	0	0
HH-1N	4	0	0	0	0	0	0	0	0	0	0
TOTAL USMC SAR PAI	**7**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

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 destroying 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 2015-2025 timeframe, the FoUAS provides support to any sized MAGTF for offensive air support, cyber/electronic warfare, aerial reconnaissance, signals intelligence, target acquisition, force protection, and communications relay. Marine Corps UAS employment will continue to enhance and extend the lethal and non-lethal capabilities of MAGTF and joint force commanders, fostering transformational 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.

VMU Command Alignment and Laydown

The realignment of VMUs from the Marine Aircraft Control Group (MACG) to the Marine Aircraft Group (MAG) was codified in the 2014 mission statement change. 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 Naval Aviation Enterprise (NAE) advocacy and the inculcation of aviation safety practices from an operational flying command.

Marine aviation has begun deliberate planning to locate each VMU aboard a Marine Corps Air Station (MCAS). Alignment aboard an air station will facilitate a Medium Altitude Long Endurance (MALE) / High Altitude Long Endurance (HALE) 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 are in work:

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

MARINE UNMANNED AIRCRAFT SYSTEMS

RESERVE COMPONENT VMUs

The reserve VMU exists to augment, reinforce, and sustain the active component VMU mission. To this end, VMU-4 (-) will replace RQ-7B with MQ-21A in FY-15 and provide operational depth to the active component. In the long-term, VMU-5(-) will activate in FY-23 and provide additional flexibility for the VMU community. A VMUT will stand up in FY16 at MCAS Cherry Point.

MQ-'X' – MEF / MEB Level of 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. By 2024, MQ-'X' will provide the MEF/MEB-sized MAGTF with a Medium-High Altitude/Long Endurance (MALE/HALE) multi-mission platform. MQ-'X' will also provide support to MEUs and SPMAGTF-CRs, directly supporting the Marine Corps' post-OEF global posture. The MQ-'X' program of record will ensure a capability to operate within an anti-access/area denial (A2/AD) environment.

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 by leveraging joint requirements for its MQ-'X' solution. The MQ-'X' concept of employment will be shipboard compatible and expeditionary. In the cyber / ew role, MQ-'X' will contribute to the aviation combat element's (ACE's) ability to deliver unmanned non-kinetic effects, supporting commanders at the tactical, operational, and strategic level. MQ-'X' will also carry network relay payloads that will help create and extend the MAGTF's tactical networks.

Until the MQ-'X' is fielded, Marine aviation will pursue opportunities to inform MQ-'X' programmatic decisions, such as field user's evaluations, science & technology (S&T) projects, and tactical demonstrations (TACDEMOS) in conjunction with large force exercises (LFE). VMX-22 and MAWTS-1 ADT&E teams will conduct testing and evaluation of UAS. The intent of these opportunities is to put emerging UAS technologies into the Marines' hands and allow them to employ the systems in various training or real-world scenarios.

During this iterative development process, optimized software defined radios will be evaluated to support multiple waveforms as UAS serve key nodes in distributed network concepts.

Small Tactical UAS (STUAS) – MEB / MEU Level of Support

Small Tactical UAS (STUAS) provides UAS support to the Marine Expeditionary Unit (MEU) or regimental-sized elements. STUAS amplifies the expeditionary capabilities of the MEU by providing a multi-mission platform that is shipboard capable. STUAS shall also be able to operate from land based forward operating bases. It will be characterized by its runway independence, beyond line of sight (BLOS) for extended range, and all-environment multi-sensor/multi-int/cyber/ew/kinetic capability. The STUAS mission for the Marine Corps is currently fulfilled by the RQ-21A Blackjack. We are in the process of changing the naming convention to MQ-21 since it will have more payload than simple reconnaissance. As such we will refer to the Blackjack as the MQ-21 in this AvPlan and from this point forward. As MQ-21A is fielded to the VMUs, the Marine Corps will transition from its current fleet of RQ-7B in order to efficiently posture the squadrons to provide an effective, expeditionary and shipboard-capable Group 3 UAS capability to the MAGTF.

With its 135 pound, multiple payload capacity, the MQ-21A is a Group 3 system, and will continue to evolve to meet the shifting priorities of the MAGTF commander. Hundreds of payloads with the appropriate size, weight, and power (SWaP) are available for the Blackjack. Hyperspectral payloads capable of detecting explosives, Signals Intelligence Payloads capable of monitoring spectrum, synthetic aperture radar (SAR) / ground moving target indicator (GMTI) capable of detecting targets through clouds and tree cover, and cyber payloads capable of affecting enemy electronics are examples of payloads available today for MQ-21A.

A key enabler for realizing the full capability of the STUAS is L-class amphibious carrier shipboard compatibility. Currently, ship installs are on-going for LPD-17 class. Marine aviation is pursuing STUAS compatibility for all ARG shipping in order to provide maximum employment flexibility for the MAGTF commander both afloat and ashore. Initiatives are underway to improve MQ-21A performance and reliability. The four highest priorities for Blackjack improvements are a laser designator, a high-reliability, purpose built 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 full potential of the system.

MARINE UNMANNED AIRCRAFT SYSTEMS

Family of Small UAS (FoSUAS) – Battalion / Company Level of Support

The purpose of the FoSUAS is to provide a capable, responsive, and cost-effective organic airborne intelligence, reconnaissance, surveillance (AISR)/kinetic capability to the operating force maneuver units at the team/company/battalion level. SUAS systems are defined by the following characteristics: man portable, all-environment, ruggedized, low-cost, and simple to operate. SUAS solutions that are single-operator, multi-mission, and multi-intelligence capable shall be pursued whenever practicable. Ideally, SUAS shall be able to operate in every environment and in the same conditions as the front line operating forces that they support across the full spectrum of conflict. Additionally, Marine aviation will pursue a VTOL, nano-VTOL and Lethal Miniature Aerial Munition System (LMAMS) capability. A common SUAS control station for the entire SUAS portfolio will decrease procurement and sustainment costs and streamline training requirements. The SUAS FoS is made up of three Group I assets: RQ-11B Raven, MQ-12A Wasp, and RQ-20A Puma.

RQ-11B Raven

The Raven is hand-launched and rucksack-packable, and with an endurance of up to two hours and a range of ten kilometers provides maneuver units with a unique ISR capability. It is equipped with color electro-optical; black and white low light; and infrared payloads, and provides small units with day/night full motion video and laser pointer capability via a laptop-based ground control station. Current upgrades to the Raven include transitioning to Digital Data Link (DDL) and a gimbaled turret.

RQ-12A Wasp

The Wasp UAS is organic to the infantry battalion, but employed by the company's platoons and squads. The Wasp is a small, portable, lightweight, ruggedized UAS designed for employment at small tactical units for front-line day/night reconnaissance and surveillance. Wasp uses the same advanced technology found in the RQ-11B, and is controllable through a common GCS. The small size, and quiet battery-driven propulsion system makes Wasp nearly undetectable. The system is fully waterproofed and is capable of recovery on land or water. It has an integrated Digital Data Link (DDL) system and combined with its gimbaled dual-mode EO/IR payload, can transmit live airborne video images and location information to a Ground Control Station (GCS) and a Remote Video Terminal (RVT).

RQ-20A Puma

The Puma is a hand-launched reconnaissance and surveillance SUAS. The system transmits live airborne video images and location information to the GCS, and RVTs. The Puma uses a DDL and a gimbaled EO/IR/Laser Illumination payload. Because of its relatively large size compared to Raven and Wasp, it has the power available to carry multiple payloads. Its capabilities include laser marking, SIGINT, and communications relay. The Puma GCS is compatible with the Raven and Wasp GCS. The system is fully waterproofed, capable of recovery on land or water. It weighs 13 pounds with an 8.5 foot wingspan. Like the other systems in the FoSUAS, Puma carries both a combined electro-optical (EO) and infrared (IR) camera on a lightweight mechanical gimbaled payload.

MARINE UNMANNED AIRCRAFT SYSTEMS

Cargo Resupply UAS (CRUAS)

The 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 has 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 has flown over 1800 sorties and delivered over 4.4 million pounds of cargo from December 2011 to May 2014. In February 2013, the MROC approved the extension of CRUAS to operate in support of MARCENT through the end of OEF. Lessons learned in combat indicate that cargo UAS is best suited to support widely dispersed, small team combat operations in environments with high risks to ground personnel.

Cargo UAS should also be able to conduct resupply missions from a sea base as well as land based sites. The Marine Corps will continue to conduct science and technology research in support of the cargo UAS concept to refine this capability in order to meet the needs of the Logistics Combat Element, and the MAGTF as a whole. The existing MUA assets will return to CONUS at the conclusion of OEF. Aviation will transition the capability to VMX-22 in FY15 to continue to refine and develop the capability in close coordination with MAWTS-1. The Cargo UAS concept will leverage the lessons learned from the OEF MUA to inform programmatic decisions for a future Program of Record.

UAS Manpower

The Marine Unmanned Aerial Vehicle Squadron (VMU) tables of organization are structured and manned to support both the RQ-7B Shadow and MQ-21A Blackjack. The 7315 Unmanned Aircraft System Officer MOS created in FY12 continues to populate through initial accessions from TBS and annual MOS conversion boards. In FY16, structure and personnel from the 7588 Naval Flight Officer EA-6B Electronic Warfare Officer MOS will begin to migrate to the UAS community. The merger will ultimately double the size of the 7315 population and infuse UAS/EW experience across the MAGTF. This manpower transition is in-line with the MAGTF EW Concept of Operation (signed 14 Jun 2011) and supports the MAGTF EW ICD (MROC approved Sept 2012). UAS capability will expand with the acquisition of a MALE/HALE UAS by the mid 2020s. This system will drive training requirements for intelligence, weaponization, and EW for support of MAGTF requirements.

As the VMUs migrate from contract maintenance and establish habitual relations with the MALS, an augmentation of I-level maintenance Marines will be required.

The FAA continues to integrate UAS operations in the National Airspace System. With this new opportunity to expand CONUS-based UAS training opportunities comes an increase in responsibility for the UAS Officers and Operators. 7315 officers will be required to maintain instrument qualifications and currency.

UAS Payloads & Capabilities

The UAS community has developed a payload and sensor strategy that focuses science and technology development, guides capability integration efforts, and facilitates the planning, programming, budgeting, and execution (PPBE) process. Indicators point to an increasing and enduring reliance upon UAS to perform or facilitate the seven functions of Marine aviation.

The Marine Corps recognizes the need for modular, "plug-and-play" payloads that enable UAS to support a wide variety of missions. Key steps to meet these challenges include establishing priorities, publishing a cohesive strategy, and developing, integrating, and fielding payloads.

An evident trend in payload development is the ability to rapidly miniaturize capability and form factor. Marine Corps UAS will capitalize on this trend by including emerging payload development for larger UAS within the payloads roadmaps for our STUAS and SUAS family of systems.

As the VMU community assumes a portion of the aviation combat element's airborne EW mission, fielding a capable uas cyber/electronic warfare (C/EW) payload becomes imperative. Intrepid Tiger II Block 1 is currently fielded on fixed wing aircraft and is informing programmatic decisions for UAS program of record (PoR) EW capabilities. The MAGTF EW vision calls for multiple aviation platforms and payloads to provide a persistent, distributed, survivable C/EW capability. To realize this vision, Marine aviation is pursuing viable C/EW payloads for the FoUAS.

MARINE UNMANNED AIRCRAFT SYSTEMS

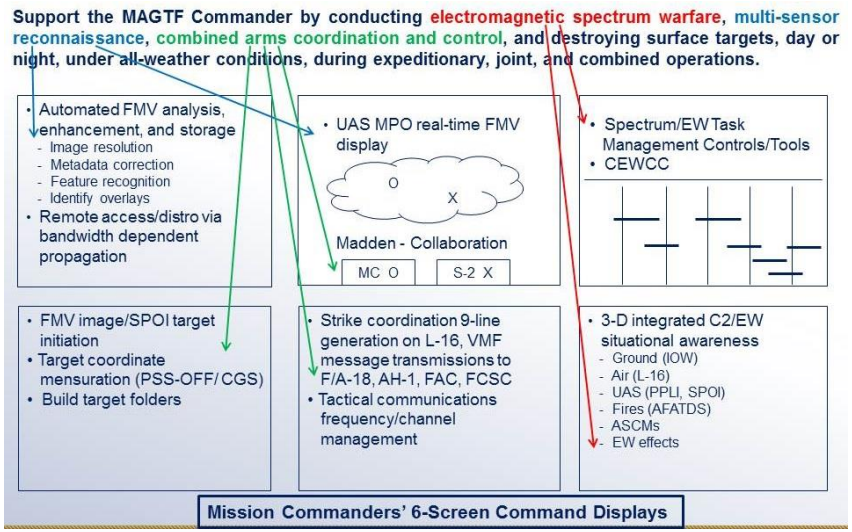
Additionally, the Marine Corps is teaming with Other Government Agencies (OGAs) to field UAS payloads with Size, Weight and Power (SWaP) and capabilities commensurate with MAGTF requirements. This mutually symbiotic effort allows the Marine Corps to deliver cutting edge technological solutions to the warfighter at a reduced cost.

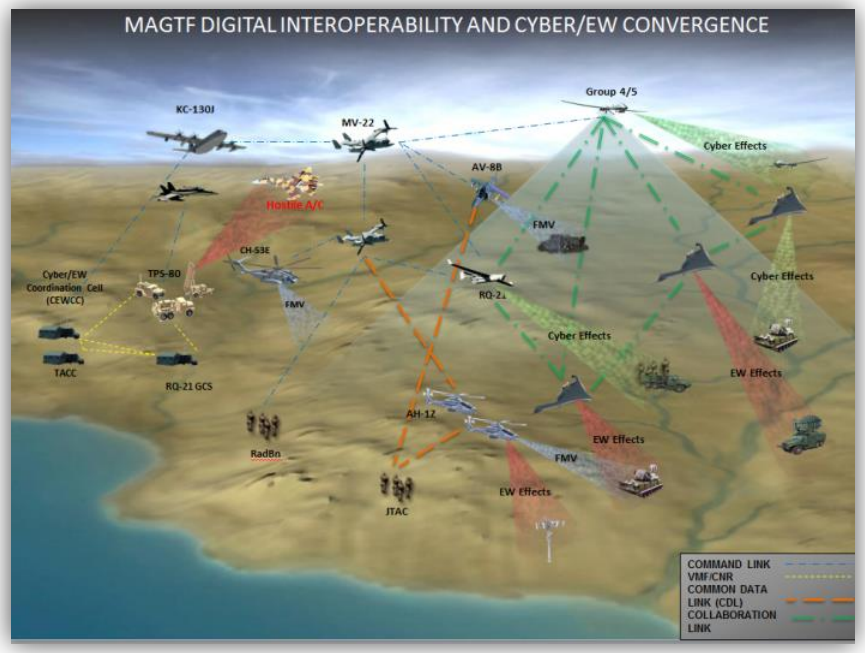
Universal Mission Operations System (UMOS) "Cockpit for the Unmanned Aircraft Commander"

The Universal Mission Operations System (UMOS) is the cockpit for the Unmanned Aircraft Commander and will be digitally interoperable with all UAS. Currently in development, UMOS will fuse information collected from the Air Vehicle (AV) with information from other Tactical Data Systems. Beginning with Link 16, and quickly growing to encompass Variable Message Format (VMF), Advanced Field Artillery Tactical Data System (AFATDS), Theater Battle Management Core System (TBMCS) and Blue Force Tracker (BFT) 2, the UMOS will provide the Unmanned Aircraft Commander (UAC), and the supported unit, with an integrated picture of the battlefield. This will enhance the ability of the MAGTF to integrate intelligence and fires with maneuver, and streamline the kill chain.

Additionally, the UMOS 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. The UMOS will act as a digitally interoperable hub for the collection, cataloguing and storage of full motion video, multi-intelligence sensor data, topological data, and targeting information. Initially, the majority of the processing, exploitation, and dissemination will be done manually.

The UMOS will be able to measure the available bandwidth and determine the optimal means to disseminate intelligence products. Future iterations of UMOS will use algorithms to analyze the vast amount of data as it is collected, and automatically cue operators and analysts to events of interest. The UMOS enables the full capability of the digitally interoperable VMU. Incorporating the UMOS into a program of record is imperative for the UAS community.





MARINE UNMANNED AIRCRAFT SYSTEMS

UAS Training

The VMU community requires a Fleet Replacement Squadron (FRS) to address the following three training shortfalls:

1. MQ-21A operators require an MOS producing curriculum. Additionally, Unmanned Aircraft Commanders and VMU Maintenance Marines require MQ-21A specific training. Mobile Training Teams (MTT's) are the interim solution for MQ-21A training, but are prohibitively expensive in the long term. As MQ-21A fielding progresses, VMU-2, as the T/M/S Lead will manage the Blackjack 1000 level Training and Readiness (T&R) curriculum development. This 1000 level curriculum will migrate from contractor provided Mobile Training Teams (MTTs) to the VMU community no later than FY-17. VMX-22, PMA-263, TECOM and CNATT will support VMU-2 with MQ-21A curriculum development.

2. There is no training advocate for the UMOS (cockpit for the Unmanned Aircraft Commander). The UMOS is the critical enabler to realize the full capability of the VMU in accordance with this Aviation Plan. As UMOS capabilities mature, a robust syllabus is required to train the Unmanned Aircraft Commanders (UAC) to the multi-mission role enabled by this system. The VMU FRS is the optimal training agent for the UMOS.

3. EW fundamentals training must 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. 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 FoS to ensure material solutions exist to provide full spectrum EW to the ACE.

A 100% simulation based curriculum is the ultimate goal of the VMU FRS. The current Program of Record simulators for MQ-21A are not funded to a level commensurate with a 100% simulation based syllabus. A robust, networked, high fidelity simulation solution is required for MQ-21A, UMOS, and EW curricula in order to realize Marine aviation's vision for the VMU FRS.

The VMU FRS will evolve to an O-5 level command staffed 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 are efficiently and effectively accomplished. Doctrine, Organization, Training, Materiel, Leadership, Personnel, Facilities, Cost (DOTMLPFC) analysis is under way to optimize the VMU FRS construct for introduction to the Fleet by FY17.

Training and Logistics Support Activity (TALSA)

A Training and Logistics Support Activity (TALSA) to support Group I UAS has been established at Camp Pendleton, CA and Camp Lejeune, NC. TALSAs reduce training costs by 70% and are responsive to operating forces' dynamic SUAS 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. SUAS training and logistical support is an enduring USMC capability that will continue post-OEF and transition from OCO to base funding. This initiative maintains Mobile Training Teams (MTT) funding for all MEU and potential SPMAGTF deployments.

As the role of small UAS expands, TALSAs will increase training throughput to meet MAGTF demands. Forward Air Controllers (FACs) and Joint Terminal Attack Controllers (JTACs) will attend training as SUAS 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 small UAS.

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 the FoUAS.

MARINE UNMANNED AIRCRAFT SYSTEMS

Joint Research and Collaboration

In partnership with the Defense Advanced Research Projects Agency (DARPA), the Office of Naval Research (ONR), the Marine Corps Warfighting Lab (MCWL), and national laboratories, Marine aviation will monitor the progress of Science and Technology programs and provide feedback with an eye on future Marine aviation requirements. Programs such as the DARPA Tactically Exploited Reconnaissance Node (TERN), DARPA Aerial Reconfigurable Embedded System (ARES), and ONR Autonomous Aerial Cargo Utility System (AACUS) are examples of projects that have tremendous potential. 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 because of the asymmetric advantage provided:

Digital Interoperability. Because of their persistence, unmanned systems are ideally suited to serve as airborne data network relays and gateways. Emerging technologies, such as the Software Reprogrammable Payload (SRP), shall be integrated onto unmanned platforms at the earliest opportunity.

Cyber / Electronic Warfare (EW). UAS are a critical component of the MAGTF EW concept. Coupling new UAS employment concepts with emerging Cyber/EW payloads offers the Marine Corps a unique opportunity to counter a complex integrated air defense system (IADS). UAS can create opportunities with smaller, lighter, faster, more maneuverable platforms that are able to accept more risk than manned aircraft.

UAS Common Control Architecture. A common control architecture for UAS should be pursued to include software architecture and common ground control stations. This will allow future capabilities to iterate at a faster rate, keeping pace with technology developments. Additionally, having a common, non-proprietary system architecture and interface will streamline training and sustainment. The Universal Mission Operations System (UMOS) is critical to realizing the vision of the Common Control Architecture.

National Airspace (NAS) Integration. The Marine Corps has taken a key role in ground based sense and avoid (GBSAA) for UAS. It operates 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.

FoSUAS. Future SUAS 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 SUAS. By moving towards standardized interfaces, the rapid technology development cycle for payloads can be capitalized upon without requiring more costly replacement of entire system.

VTOL and nano-VTOL SUAS 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 will provide an unprecedented organic precision low-yield strike and defensive fires capability that can be widely distributed to front line, forward deployed, and isolated/independent units.

MARINE UNMANNED AIRCRAFT SYSTEMS

UAS SUSTAINMENT

Naval Aviation Enterprise (NAE) Inclusion

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

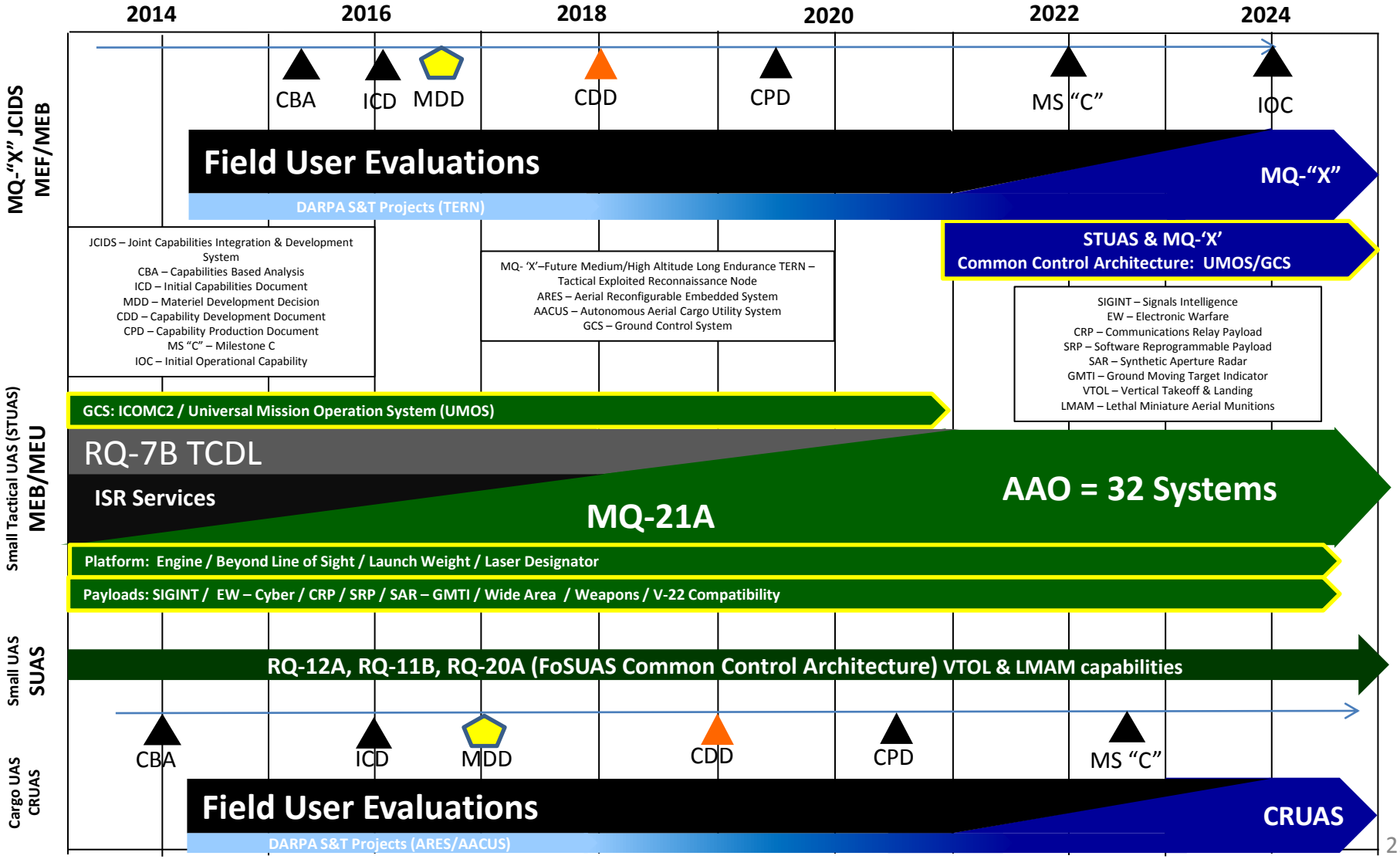
Naval Aviation Maintenance Policy (NAMP): In an effort to bring UAS into compliance with Naval Aviation Maintenance Policy (NAMP), a 2014 comprehensive NAMP review was completed by HQMC Aviation and NAVAIR. This was done in order to determine which aspects of the NAMP require modification, deviation, 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 will be processed by Commander, Naval Air Forces (CNAF) and reflected in the next NAMP update, with an expected release in CY2014. NAMP reviews will be accomplished on an annual basis to ensure UAS are in compliance.

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 MQ-21A, a way forward has been established to move UAS onto NALCOMIS OOMA for NAMP compliance readiness reporting and tracking. As MQ-21A is fielded to the VMUs, it will allow NAVAIR, working with HQMC Aviation and SPAWAR, to baseline MQ-21A into NALCOMIS OOMA. The goal is to baseline MQ-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 MQ-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) will provide a 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 aviation ground support to the UAS squadrons will be an enabling factor in the squadrons' ability to conduct expeditionary operations.

FAMILY OF UNMANNED AIRCRAFT SYSTEMS (FOUAS) ROADMAP



MARINE UNMANNED AERIAL VEHICLE (VMU) PLAN

Current Force (3) AC SQDN 3 RQ-7B
(1) RC SQDN 3 RQ-7B
(1) T&E 1 RQ-7B

Future Force (3) AC SQDN 3 RQ-7Bv2 transition to 9 MQ-21A
Field MQ-'X' in 2024
(2) RC SQDN 3 MQ-21 A

		FY14				FY15				FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24			
		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# Systems**																																											
MAG-13																																												
VMU-1																																												
Twentynine Palms	3 RQ-7Bv2 / 9 MQ-21A																																											
										VMU-1 to MCAS Yuma																																					
	RQ-7Bv2 Fielding	3 RQ-7B						3	RQ-7Bv2																																					
	MQ-21A Fielding	system #					1	2	3					4	5							6	7			8	9																		
	MQ-'X'																																										MQ-'X'		
MAG-14																																												
VMU-2																																												
Cherry Point	3 RQ-7Bv2 / 9 MQ-21A																																											
	RQ-7Bv2 Fielding	3 RQ-7B									3	RQ-7Bv2																																			
	MQ-21A Fielding	sys #	1	2	3	4	5											6		7		8				9																		
	MQ-'X'																																										MQ-'X'		
VMUT																		1	MQ-21A																										
MAG-24																																												
VMU-3																																												
Twentynine Palms	3 RQ-Bv2 / 9 MQ-21A																																											
			VMU-3 to MCAF Kaneohoe Bay																																										
	RQ-7Bv2 Fielding	3 RQ-7B						3	RQ-7Bv2																																					
	MQ-21A Fielding											1	2	3	4	5						6	7			8	9																		
	MQ-'X'																																										MQ-'X'		
MAG-41																																												
VMU-4																																												
Camp Pendleton	3 RQ-7B > 3 MQ-21A																																											
	RQ-7B removal	1 RQ-7B																																										
	MQ-21A Fielding	system #					1	2	3																																				
VMU-5	TBD																																												
T&E																																												
Patuxent River UASTD		1 RQ-7B												1 RQ-7Bv2																														
VMX 22 Yuma										1	MQ-21A																																		

SUAS FIELDING

CURRENT FORCE:

(0) RQ-12, (105) RQ-11, (0) RQ-20 IN I MEF

(0) RQ-12, (82) RQ-11, (11) RQ-20 IN II MEF

(0) RQ-12, (41) RQ-11, (0) RQ-20 IN III MEF

(0) RQ-12, (94) RQ-11, (0) RQ-20 IN MARFORRES
(40) RQ-12, (6) RQ-11, (10) RQ-20 IN MARSOC
(2) RQ-12, (15) RQ-11, (4) RQ-20 TO SUPPORT/TRAINING

FORCE GOAL:

(27) RQ-12, (58) RQ-11, (20) RQ-20 IN I MEF

(21) RQ-12, (44) RQ-11, (17) RQ-20 IN II MEF

(11) RQ-12, (16) RQ-11, (14) RQ-20 IN III MEF

(30) RQ-12, (46) RQ-11, (18) RQ-20 IN MARFORRES

(50) RQ-12, (14) RQ-20 IN MARSOC

(4) RQ-12, (12) RQ-11, (6) RQ-20 TO SUPPORT/TRAINING

FIELDING SCHEDULE		FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24
UNIT	TOTAL SYSTEMS											
I MEF	105	70	78	81	85	89	97	105	105	105	105	105
II MEF	82	45	52	55	59	63	71	79	82	82	82	82
III MEF	41	22	24	29	35	41	41	41	41	41	41	41
MARFORRES	94	29	29	29	29	39	54	62	70	78	86	94
MARSOC	64	56	56	56	64	64	64	64	64	64	64	64
WRMR-D	0	0	0	0	0	0	0	0	0	0	0	0
SUPPORT	22	15	22	22	22	22	22	22	22	22	22	22

UAS FIELDING		FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24
RQ-12 WASP	SYSTEMS	42	56	60	66	72	80	82	112	128	143	143
RQ-11 RAVEN	SYSTEMS	340	320	314	306	300	292	286	248	220	190	178
RQ-20 PUMA	SYSTEMS	26	32	34	36	36	36	40	48	60	75	87

General Notes:

1. AAO changed from 439 RQ-11 to FoSUAS ; AAO of 408 in FY13
2. "Current Force" and "Total Systems" columns reflect TFMS numbers 2014.
3. Fielding Schedule based POM16 WIPEB.

2.8 MARINE AVIATION LOGISTICS PLAN

AVIATION LOGISTICS: MALSP

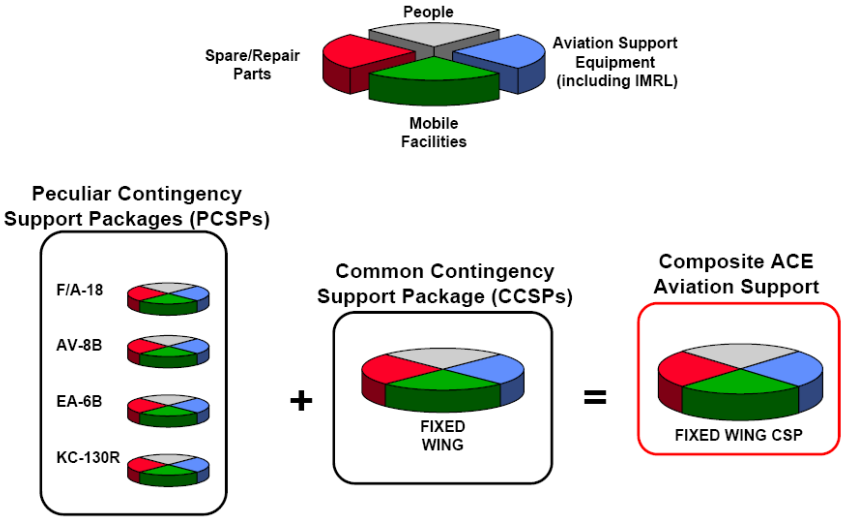
MALSP provides flexible and effective aviation logistics support and readiness to the deployed MAGTF ACE. It enables ACE logisticians to rapidly and efficiently identify, marshal, and deploy aviation logistics elements needed to keep a task-organized mix of ACE aircraft ready.

By structuring aviation logistics support into force modules, MALSP provides credible and replenishable sustainment packages, while reducing lift requirements and force closure times. Required aviation logistics elements (personnel, spares, support equipment, and mobile facilities) are formed into specific support packages that are retained within every MALS. Specific support packages consist of fly-in support packages (FISPs), contingency support packages (CSPs), and follow-on support packages (FOSPs). They are sized and tailored to meet the aviation logistics requirements of each type, model, and series aircraft. These packages are used in a "building block" fashion to maintain aircraft availability during every phase of an operation.

Contingency Support Packages (CSPs) identify aviation logistics support for Marine contingency requirements based upon the readiness/sortie rate requirement of the MAGTF ACE. CSPs provide the necessary people, support equipment (SE), mobile facilities (MFs), and spare/repair parts for each MAG/MALS. The spare/repair parts are computed at the combat utilization rate for a 90 day duration. CSPs ensure that adequate common and peculiar support is available for separate/sustained operational commitments when attached to a "host" MALS.

The Remote Expeditionary Support Package (RESP) is the most tailorable element of MALSP, consisting of the FISP, people, MF, and SE for a thirty-day duration. In order to capture the composition of a RESP, a workbook has been designed for each Type/Model/Series (T/M/S) aircraft. Each workbook will capture data that will enable planners to access quickly the solution for current and future deployments alike. Each current readiness T/M/S team lead will be responsible for the input and upkeep of the RESP workbooks.

Marine Aviation Logistics Support Program
Contingency Support Package



Marine aviation is transforming to posture itself for operations in new and uncertain austere expeditionary environments. Marine aviation logistics (AVLOG) is aligning its concept of operations and support to ensure it is ready to meet both current and future challenges across the range of military operations.

AVLOG transformation will be a critical enabler for Marine aviation operations, specifically in the Pacific Command (PACOM) area of responsibility (AOR). Marine aviation will transition to a distributed lay down plan that spans this strategically important geographic region. Specifically, Marine aviation will be based at and/or deployed to Hawaii, Japan, Guam, and Australia, with remote locations relying on buffering management systems and reach back capability to aviation logistics squadrons.

AVIATION LOGISTICS TRANSFORMATION: MALSP II

MALSP II 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 geographically distributed, nodal AVLOG system tailored to sustain any given mix of TMS aircraft assigned any given mix of missions. MALSP II will be achieved through four lines of effort: (1) integrating Information Technology capabilities to provide global visibility and management of materials and other resources, (2) redesign of legacy aviation logistics support packages, (3) identifying and establishing pre-determined logistics nodes, and (4) improve depot level performance to increase Aviation Depot Level Repairable (AVDLR) component availability to support OPFOR operations.

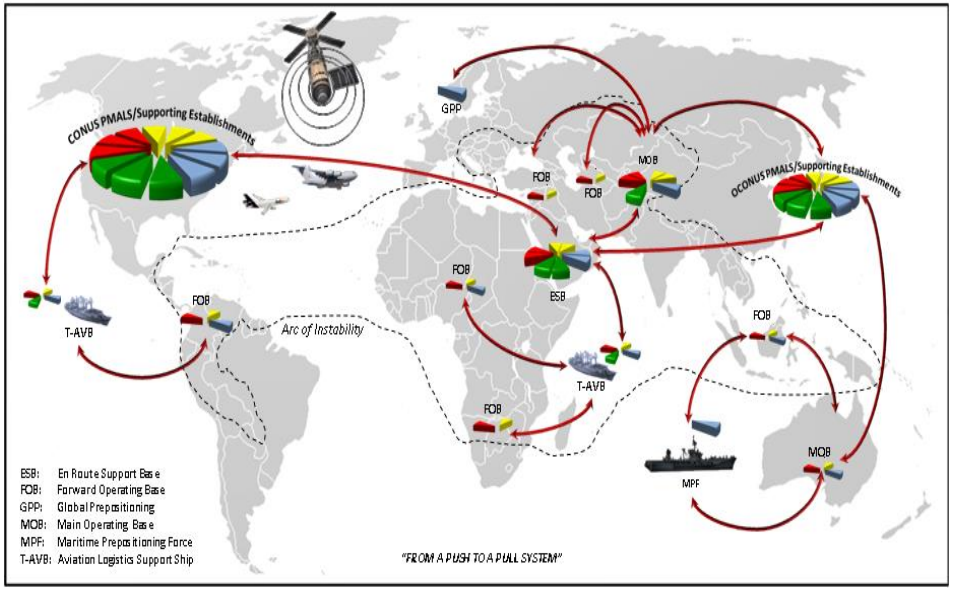
Key components of MALSP II include support package formulation based upon specific combinations of TMS aircraft performing specific missions, corresponding demand profiles, buffer calculation and management, requisitions in real time or near-real time, accurate asset tracking, and Continuous Process Improvement (CPI) principles. MALSP II supports *Marine Corps Vision and Strategy 2025* and the Maritime Strategy. MALSP II IOC and FOC are planned for early FY17 and early FY18, respectively.

The nodes in a MALSP II demand-pull nodal logistics chain may include the Primary MALS (PMALS); an En route Support Base (ESB); a Main Operating Base (MOB); and a Forward Operating Base (FOB). MALSP II'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 II 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 (MCPP-N), and future Geographic Prepositioning Program (GPP) capability for aviation support equipment.

In 2010, an ESB was established in Bahrain to support a MALSP II demand-pull nodal logistics chain proof of concept (POC). The ESB supported a detachment of USMC CH-53Es at the Horn of Africa (HOA). The demand-pull nodal logistics chain consisted of a PMALS (MALS-29), an ESB in Bahrain, and the FOB in HOA. This POC measured performance; refined inventory sizing and management methodologies; tested transportation networks for speed and reliability; tested new logistics information technologies such as the Expeditionary Pack-Up Kit (EPUK); and developed the doctrine and standard operating procedures required to identify, select, stand-up, and operate an ESB.

MALSP II



AVIATION LOGISTICS TRANSFORMATION: ENABLERS

Aviation Logistics Support Ship (T-AVB)

USMC aviation currently employs two dedicated Aviation Logistics Support Ships (T-AVBs). The ships provide dedicated sea-based capability for the rapid movement and employment of USMC aviation intermediate level (I-level) maintenance facilities, supply support, and personnel to sustain fixed and rotary-wing aircraft operations. This tailored expeditionary logistics support to a MAGTF ACE can be fully operational at sea, pier side or off-loaded ashore. AVLOG's future T-AVB activities are focused on maintaining this critical capability, validating future AVLOG requirements, and increased MAGTF support beyond ACE requirements.

Maritime Prepositioning Force (Seabasing Enabled) (MPF (SE))

MPF (SE) has transitioned from its previous three Maritime Prepositioning Ship Squadron (MPSRON) posture to an enhanced two MPSRON posture. Both MPSRONs are sited in the PACOM AOR. Each carries a majority of the equipment and supplies required to deploy and employ a Marine Expeditionary Brigade (MEB) for up to 30 days. Additionally, the MPF (SE) provides limited selective offload, limited at sea arrival and assembly, and accommodations for aircraft necessary to conduct replenishment and sustainment operations ashore.

Though tailored for major contingency operations (MCOs), the MPSRONs can also be used in support of smaller units conducting activities across the range of military operations (e.g. support of a SPMAGTF or reinforced Marine rifle company). For added capability, the MPF(SE) has incorporated the use of dry cargo/ammunition (T-AKE) ships, large, medium speed roll-on/roll-off ships (LMSR), and Mobile Landing Platform (MLP) ships into the remaining MPSRONs. These new ships provide the MPF with an enhanced seabasing-enabled capability.

Geographic Prepositioning Program (GPP)

Forward geographic prepositioning of equipment is an HQMC initiative which is fully complementary to MALSP II and its family of systems. GPP uses forward operating sites, and a diverse array of more austere cooperative security locations to preposition equipment and supplies in critical regions and along key transportation routes. GPP allows for more responsive aviation logistics support by placing equipment and supplies with the geographic combatant commands' operational area. Moreover, GPP is an important aspect of the MALSP II doctrine as it will ensure that equipment and supplies are available to support and sustain rapid deployment of the ACE. Additionally, in an effort to utilize all available modes of transportation, Marine Corps Aviation leverages commercial carriers to move supplies throughout the world when this mode of transportation is feasible and practical. AVLOG will fully embrace and support the GPP initiative and leverage its capability to enable the success of AIRSpeed and MALSP II.

Expeditionary Delivery System (EDS)

The MALSP II doctrine demands a highly flexible and responsive delivery system for aviation maintenance repair facilities, parts, supplies, and support equipment. The EDS will satisfy this requirement with a delivery solution which is comprised of a stronger, light weight, and modular family of containers and support packages. Key components of the system include standardization, scalability, right sized modules and International Organization for Standardization (ISO) compatibility. These features will facilitate organic lift and handling capabilities and ultimately satisfy the fundamental requirements for flexibility, agility, and rapid response. AVLOG will participate in the evolution of EDS and leverage its concept to ensure its capability is an integral part of the overall MALSP II solution.

AVIATION LOGISTICS TRANSFORMATION: INFORMATION TECHNOLOGY (IT) STRATEGY

Marine Aviation Logistics Enterprise Information Technology (MAL-EIT) is a suite of IT management tools designed to provide near real-time, global visibility, and management of materials while maintaining electronic connectivity with stakeholders from dispersed, austere geographic locations. MAL-EIT will improve command and control by providing the Parent Marine Aviation Logistics Squadron (PMALS) with total asset and in-transit visibility of inventory from home station to forward edge of battle area (FEBA), increase performance by sizing inventory based on demand-pull and time to reliably replenish (TRR), and reduce the footprint through an intelligently designed geographical distribution of logistics nodes. IOC and FOC are planned for no later than (NLT) 4Q FY16 and NLT 4Q FY17, respectively.

Expeditionary Pack-Up Kit (EPUK): the detached and deployed expeditionary requisitioning capability that provides receipt/stow/issue, automated data entry into NALCOMIS, and near-real-time data exchange with up-line tiered repositories via Gateway Servers for core capable units deployed in austere expeditionary environments.

Next Generation Buffer Management System (NGBMS): an integrated web based tool developed to manage and monitor both physical and time buffers across the MALSP II demand-pull nodal logistics chains. NGBMS will analyze planned versus actual buffers in near-real-time; analyze performance of multiple transportation patterns; convey buffer health status information between nodes and the P-MALS; and provide the P-MALS with alerts when there are vulnerabilities in designed time and physical buffers due to insufficiencies.

Logistics Planning Tool (LPT): identifies initial outfitting of material for deployments; automates container and pallet configuration entries for Time Phased Force Deployment Data (TPFDD); automates Remote Expeditionary Support Package (RESP) and Contingency Support Package (CSP) planning and development; determines the starting list of parts per contingency scenario.

Optimization Tool (OPT): models RESP/CSP performance; determines initial demand-pull nodes for optimal distribution and buffering; and provides consumption forecasts.

Navy Tactical Command Support Systems (NTCSS)

Introduced in Apr 1995, NTCSS is a multi-application program providing standardized tactical support information systems capability to afloat, deployed, and shore-based Navy and Marine Corps activities. NTCSS incorporates maintenance, supply, inventory, finance, and administration functions. NTCSS is the primary automated logistics system supporting Marine aviation. The USMC version of NTCSS is fully deployable and capable of supporting the ACE's Intermediate Logistics needs in any theater of operation. It also provides O-level squadrons with automated maintenance management capability ashore, afloat, or forward deployed. NTCSS supports the Marine Aviation Logistics Support Program (MALSP and MALSP II) and includes the following functionalities:

Relational Supply (R-Supply)

Is the system for supply control, requirements processing, parts ordering and tracking, inventory management, and financial management.

Optimized Intermediate Maintenance Activity (OIMA) Naval Aviation Logistics Command/Management Information System (NALCOMIS)

Is the day-to-day maintenance management tool for Intermediate level production control, quality assurance, supply, history retrieval, asset management operational readiness reports, and includes individual repairable components requisition and documentation.

Optimized Organizational Maintenance Activity (OOMA) Naval Aviation Logistics Command/Management Information System (NALCOMIS)

Is the day-to-day maintenance management tool for aviation squadrons and other O-level maintenance activities that provides flight data recording, asset management, maintenance control, quality assurance, logs and records – technical publications that encompasses end items such as aircraft, repairables and equipment component repair. The current release of version 5.11 interfaces with F-AME (F-18 Automated Maintenance Environment), the F-18 smart aircraft application; version 5.10 is multiplatform compliant; all provide enhanced tracking of critical data.

NTCSS Way Forward

The current release of NTCSS (Patriot) migrated the Intermediate Maintenance Activity (IMA) applications to a Common Operating Environment (LINUX) as well as provided a complete hardware refresh to nineteen MALS during FY 2012 -13. Respective Continuity of Operations Plan (COOP) refresh are scheduled in FY14. The Patriot Upgrade provides a new ISO Certified Mobile Facility to all deployable USMC aviation units.

AVIATION LOGISTICS TRANSFORMATION: MAGTF LOGISTICS INTEGRATION (MLI)

Future operating concepts and fiscal constrains are driving the need to modernize and increase the efficiency of MAGTF Logistics. Previously, the ground and aviation communities embarked on separate modernization efforts, such as Global Combat Support System-Marine Corps (GCSS-MC) and Marine Aviation Logistics Support Program II (MALSP II). Separately, each effort does not necessarily aim for integration of the logistics function into the MAGTF's future operating concepts. Reviewing current practices and aligning future improvement initiatives towards the integration of internal MAGTF logistics will further minimize disparate and overlapping processes that exist. MLI is a critical component for future success of our naval expeditionary forces. The MLI initiative focuses on logistics standardization and optimization across the MAGTF, with specific concentration focused 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. Primary MLI focus areas are:

1. Improved and sustained combat readiness.
2. Combining aviation and ground efforts to increase productivity, reduce workload demand, and maximize readiness by cross leveraging best practices across the MAGTF.
3. Improving logistics responsiveness and flexibility internal & external to the MAGTF.
4. Recapitalized funding of MAGTF logistics supply chain and distribution processes for more efficient use of resources.

The overall MLI objective is to integrate aviation and ground logistics capability by leveraging current and future technologies, processes, and structure to enhance the deployment, employment, sustainment, and readiness of the MAGTF.

On 30 August 2012, the Deputy Commandant for Aviation (DCA) and Deputy Commandant for Installations and Logistics (DC I&L) signed a charter that formalized the Marine Corps commitment to MLI and established the MAGTF Logistics Integration Group (MLIG). The MLIG addresses and prioritizes MAGTF logistics initiatives with a focus on leveraging and applying proven best practices to current logistics improvement initiatives. The MLIG is empowered to develop specific solutions and approaches to logistics challenges and make recommendations to the DCA and DC I&L. The project areas the MLIG is currently addressing include:

1. **Distribution in the Battlespace**: Determine the most effective method to distribute supplies in the battlespace using MAGTF aviation assault support and ground lift assets, while effectively managing tactical level transportation capacity.
2. **MAGTF Commander's User-Define Operational Picture (UDOP)**: Leverage a shared data environment to enable commanders to uniquely define specific information objectives that will enhance informed decision making and the speed of command.
3. **MEU Class IX Support**: Compare and contrast aviation and ground allowancing, requisitioning, and expediting procedures for MAGTFs afloat and ashore to determine the most effective method(s) of supporting a MEU with repair parts.
4. **Supply and Maintenance Battalion Process Mapping**: Compare and contrast aviation and ground maintenance planning and processes for MAGTFs afloat and ashore to determine the most effective method(s) of supporting ground maintenance.
5. **Maintenance Planning**: Review current Supply and Maintenance Battalion procedures and determine areas for improvement to provide optimum performance to support MAGTF capability equipment readiness.
6. **T-AVB Ground Maintenance Integration**: Determine the feasibility and scope of integrating ground I-level maintenance operations into T-AVB operations afloat.

AIRCRAFT MATERIAL CONDITION PROGRAM

Aircraft Material Condition

The responsibility to maintain, preserve, and enhance the capability of aircraft rests with organizational level squadrons and intermediate level activities that provide essential aviation logistics support. Professionally maintained and 'healthy' aircraft will promote safe operations and ensure maximum aircraft reliability, performance, and readiness to fight any foe. To that end, aircraft material condition goals and a standardized policy of limiting outstanding maintenance discrepancies for each T/M/S aircraft are directed.

Aircraft Material Condition Goals

- Maintains all squadrons at 100% PMAI.
- Achieve the Commandant's readiness goals for MC/FMC rates as specified in COMNAVAIRFORINST 4790.2B, Chapter 17.2.1.
- Increase priority of corrosion prevention and treatment.
- Require annual training for aircrew and maintenance personnel in corrosion identification and prevention.

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 seven 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
- Essential Engineer Services
- Internal Airfield Communications
- Routine/Emergency Sick Call
- Individual/Unit Training
- Chemical, Biological, Radiological, Nuclear Defense (CBRND)
- 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 the past twelve plus years of conflict in both Operation IRAQI FREEDOM (OIF) and Operation 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 2012, a Marine Corps organization did away with our four MWSG headquarters. We are looking again at that decision and developing options to bring back at least two of those headquarters.

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, and Air Force 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

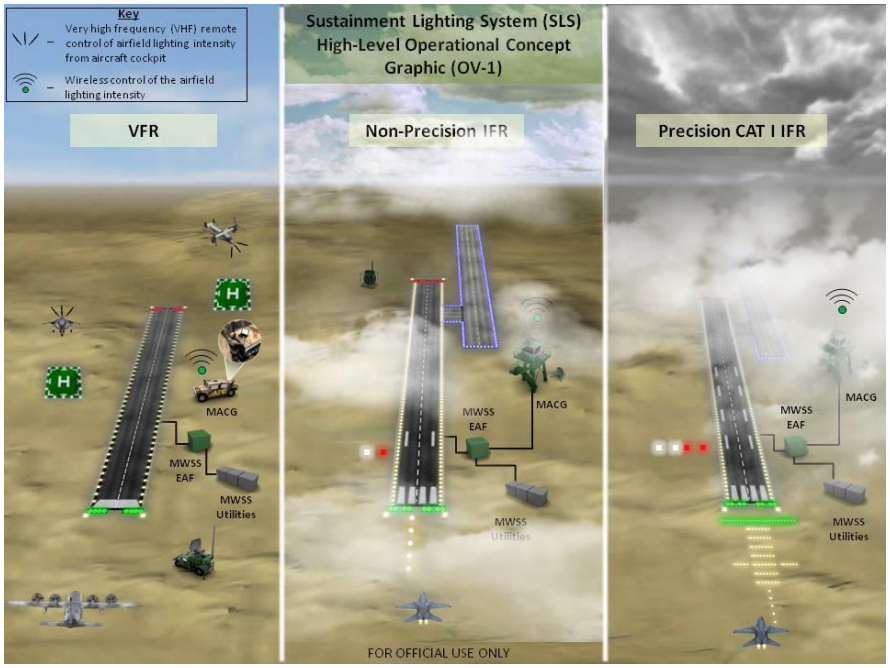
As the Marine Corps evolves to address future operating environments the MWSS will leverage Marine Corps equipment reset initiatives to achieve higher levels of materiel readiness. In addition, through an enhanced level of integration with the ground logistics community, aviation will be able to influence 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 FY16-FY18)

This initiative replaces the A/S32P-19A Aircraft Crash and Structure Fire Fighting Truck, TAMCN D1064, known as the P-19A. The P-19A was introduced in 1984 with a service life of 12 years and 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 Forward Operating Bases 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 (anti-lock brakes, roll-over protection, and other such protection).
- 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.



EAF SUSTAINMENT LIGHTING SYSTEM (SLS) (FIELDING TBD)

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) was extensively revised into a construct that combines advocacy from the Aviation Ground Support community and the Ground Logistics community.

By linking the expertise of the combat support of AGS and combat service support of the logistics community, a synergy was achieved that benefits 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 29 Palms, California are premiere training sites designed to simulate the adverse conditions faced in austere operational environments.

This includes exercising emerging TTPs under the unique stresses associated with conducting mixed type, model, and series operations in a confined space using expeditionary surface material and lighting. By operating these sites, the MWSS enables the accomplishment of critical mission essential training and readiness qualification requirements for aviation units.

A RESPONSIVE AND RELEVANT AVIATION COMBAT MULTIPLIER

By closely aligning 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:

- Establishing AGS as the seventh function of Marine aviation. This change will result in a deeper institutional understanding of the inherent connection between the planning of AGS and the execution of successful expeditionary and distributed operations.
- Participation in the new global posture of the Marine Corps by supporting aviation operations to SPMAGTFs and Unit Deployment Program rotations.
- Enabling the new concept of distributed STOVL operations. This concept ensures a ready force forward, and ground support in a sine qua non for such 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 Mission Essential Tasks (MET).
- 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 Mobile Forward Arming and Refueling Points (MFARP) to allow the MAGTF or joint commander to exploit the operational overmatch afforded by the expeditionary nature of rotary wing (RW), tiltrotor (TR), and short take off vertical landing (STOVL) aviation operating within an anti-access, area denial (A2AD) environment.

2.10 TACTICAL AIR CONTROL PARTY (TACP) PLAN

TACTICAL AIR CONTROL PARTY PLAN: PROGRAMMATICS, SUSTAINMENT AND FUTURE

TACP SUPPORT, TRAINING, AND READINESS

Joint Terminal Attack Controllers (JTAC), Forward Air Controllers (FAC), Forward Air Controllers (Airborne) (FAC(A)), and Joint Fires observers have been demanded and employed increasingly in support of USMC operations and 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, ANGLICOs, 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 need for 358 JTACs and 256 FACs for a total of 614 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. Studies about Post-OEF JTAC requirements in an Expeditionary Force 21 are on-going and Contract Close Air Support (CCAS) providers exist to help offset some of the fleet air training requirements. However, pressure must be applied continuously 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 to train JTACs in employing ordnance, and scrubbing 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% Gov't owned, Gov't civilian software team
- Creators of PSS-SOF applications and software

KILSWITCH = Android App for Precision Fires Image Map Engine

- Users: SOCOM (NSW), MARSOC, HMX-1, DOS, FBI, AZ Fire Fighters, USMC
- 1250+ tablets fielded through DARPA since 2012, still in widespread use
- Application in final phases of NGA validation (July 2014)
- Same algorithms and engines employed in NGA certified PSS-SOF and APASS applications.

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 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.

Additional authorized enlisted MOSs per MCO 1200.17D "MOS Manual": 0369, 1812, 1833, and 1834. Must be E-6 and above.

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), or directly to aircraft when authorized by the controlling JTAC/FAC (A), 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) that is not co-located with JFO but has situational awareness to facilitate the attack.

Weapons and Tactics Instructor (8077)

Formerly 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 (WTTP). 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 an Air Officer. **Group 1 Small UAS Training** RQ-11 Raven RQ-12 Wasp RQ-20 Puma TALSA East - Camp Lejeune TALSA West - Camp Pendleton	JTACE: A designated SNCO or Officer that 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.
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 that 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.

FAC/JTAC/FAC(A) Requirement

Total FAC/JTAC: 626*	
FAC	272
JTAC	354
Active	
FAC	199
JTAC	247
Reserve	
FAC	73
JTAC	107

*USMC must produce approximately 216 JTACs and FACs annually to meet requirements
-Reserve Component (RC) Table of Organization (T/O) numbers depicted represent 100% mobilization of MARFORRES mirrored to the Active Component Force

Total FAC(A): 142	
FW	52
RW	90

JTAC/FAC/FAC(A) Annual Training Control Requirement: **7889**
Fixed Wing: 5207 Rotary Wing: 2682

USMC CAS Rotary and Fixed-Wing Training Requirement: **9117**
Fixed Wing: 4029 Rotary Wing: 5088

EWTG FY' 14 CAS Asset Frag Sourcing:

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

The number of controls USMC JTACs, FACs and FAC(A)s require for certification and qualification exceed our ability to generate the sorties with current organic and Contract CAS platforms in order to maintain a T 2.0 readiness level. HQMC Aviation is investigating several options to source the delta and close the gap.

TACTICAL AIR CONTROL PARTY STRUCTURE (182K)

FAC 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
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**

JTAC Requirement

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	N/A
Force Recon	1st Force: 5 2d Force: 5 3rd Force: 5	15	N/A
ANGLICO	1st ANG: 16 2d ANG: 16 5th ANG: 16	48	72
MARSOC		31	N/A
Other		9	N/A
	TOTAL	**247**	**107**

JFO Requirement

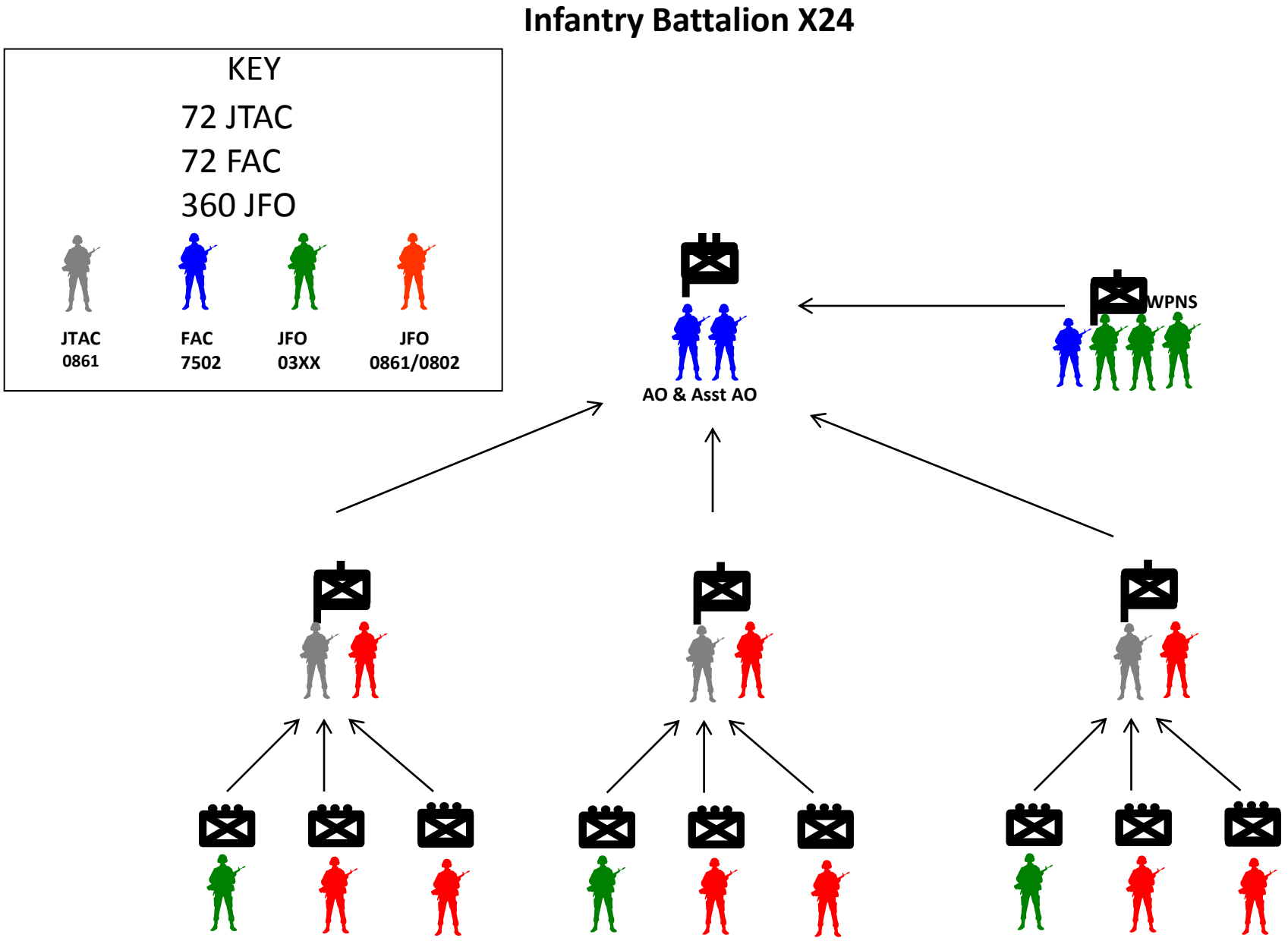
Unit Type	Distribution	A/C	R/C
Infantry Bn	6/ Inf Bn	144	54
LAR Bn	1/Plt	27	18
Tank Bn	1/Plt	10	23
Artillery	3/FO Team	216	42
	2/NGF Liaison Section	12	N/A
	HQ BTRY (LAR/Tanks)	26	N/A
Force Recon/ Recon	1/Team	111	60
ANGLICO	24/ Co	72	108
	TOTAL	**618**	**305**

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**

Note: 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.

TACTICAL AIR CONTROL PARTY STRUCTURE



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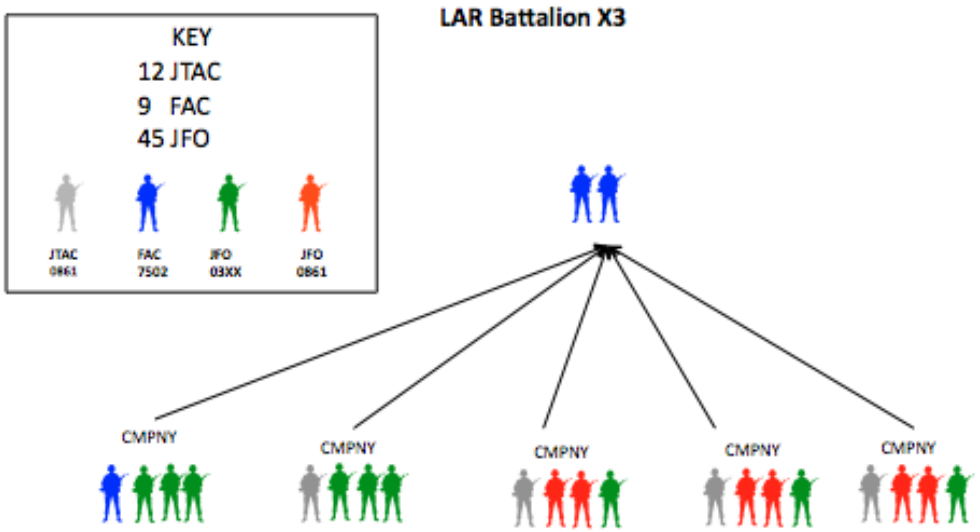

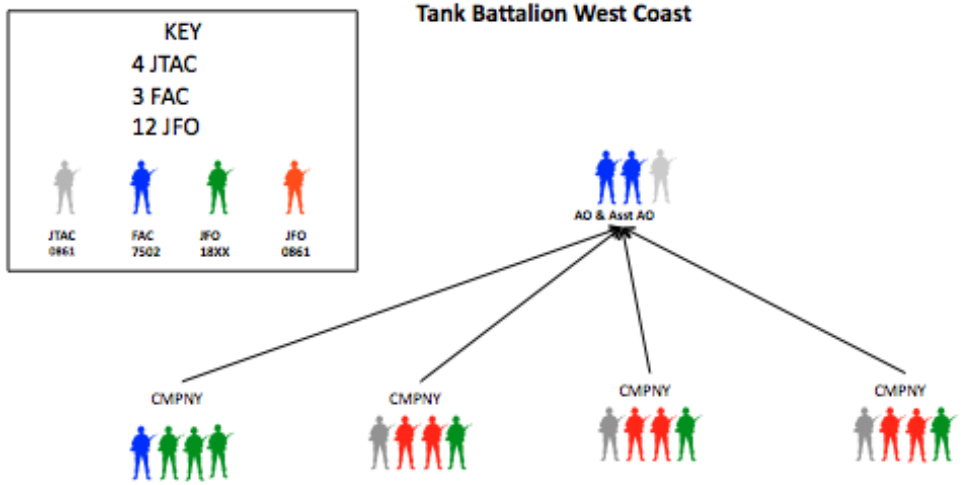

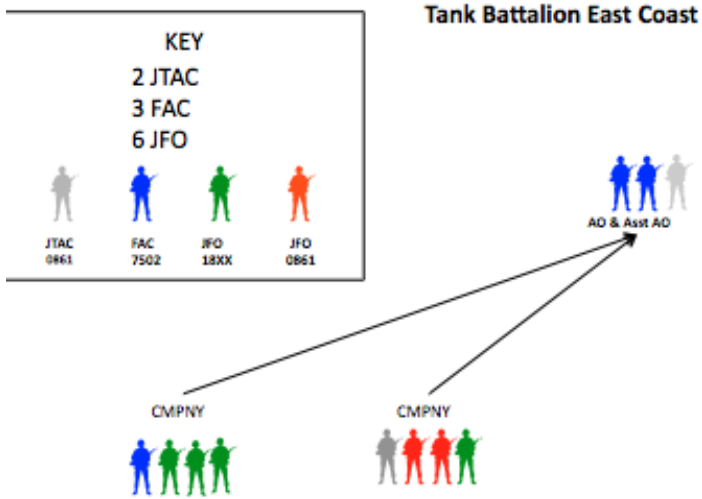

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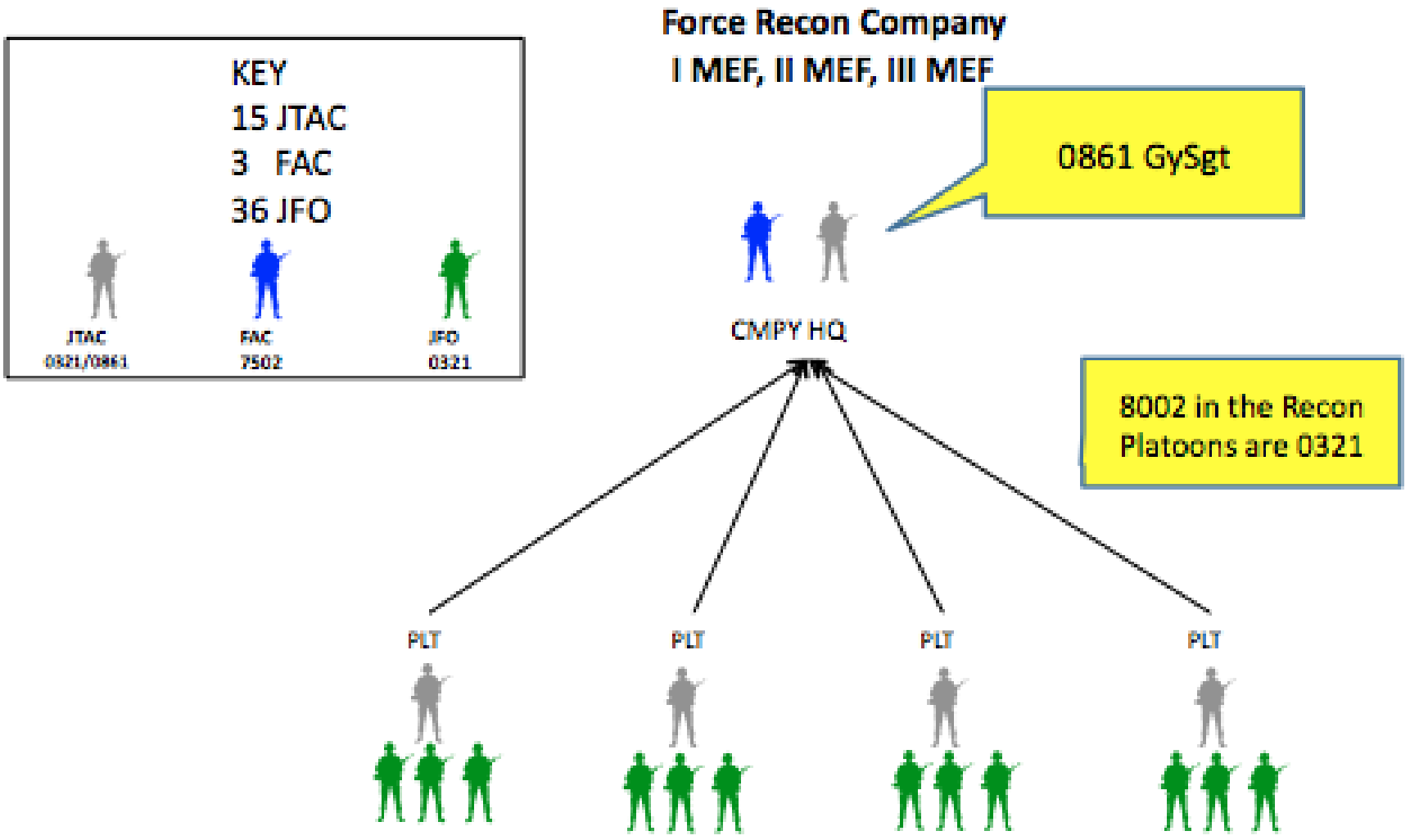

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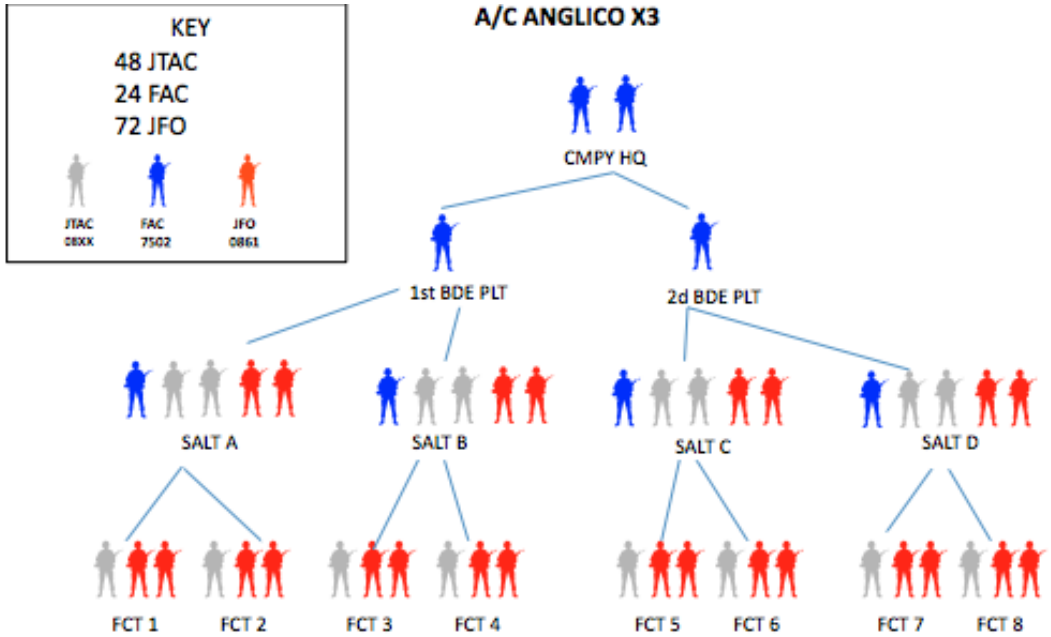

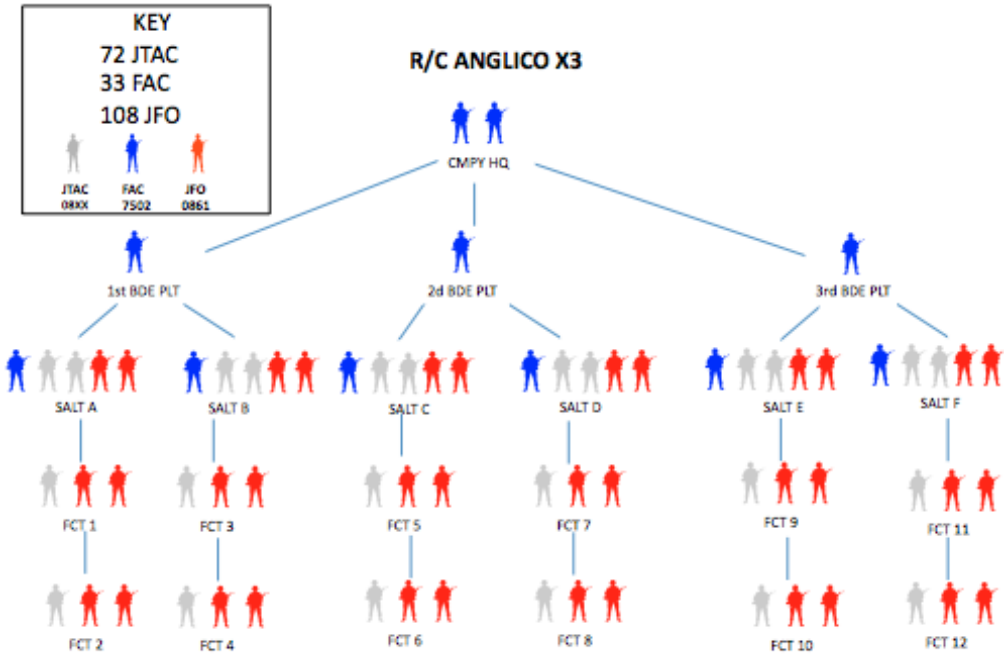

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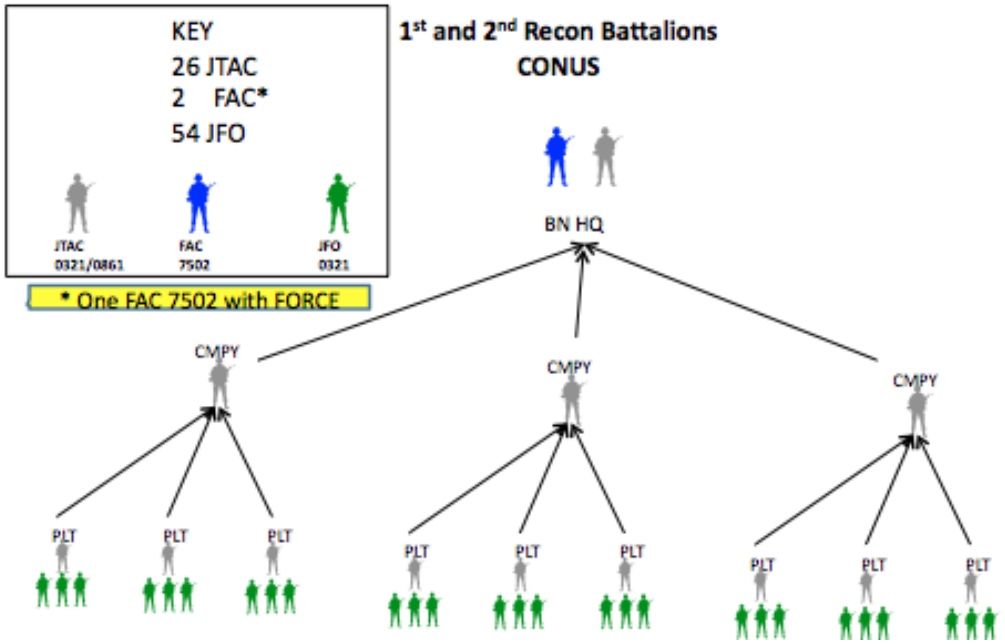

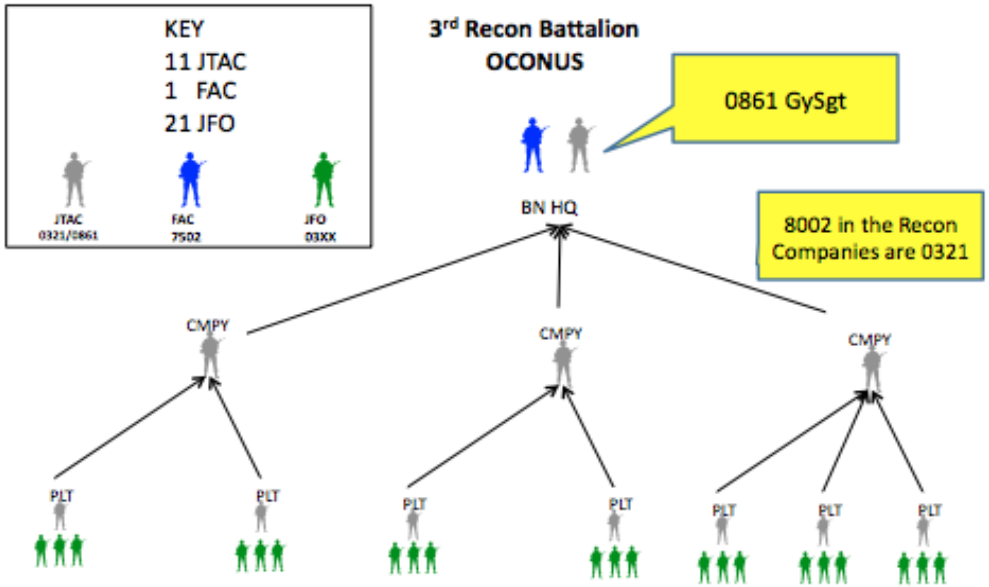

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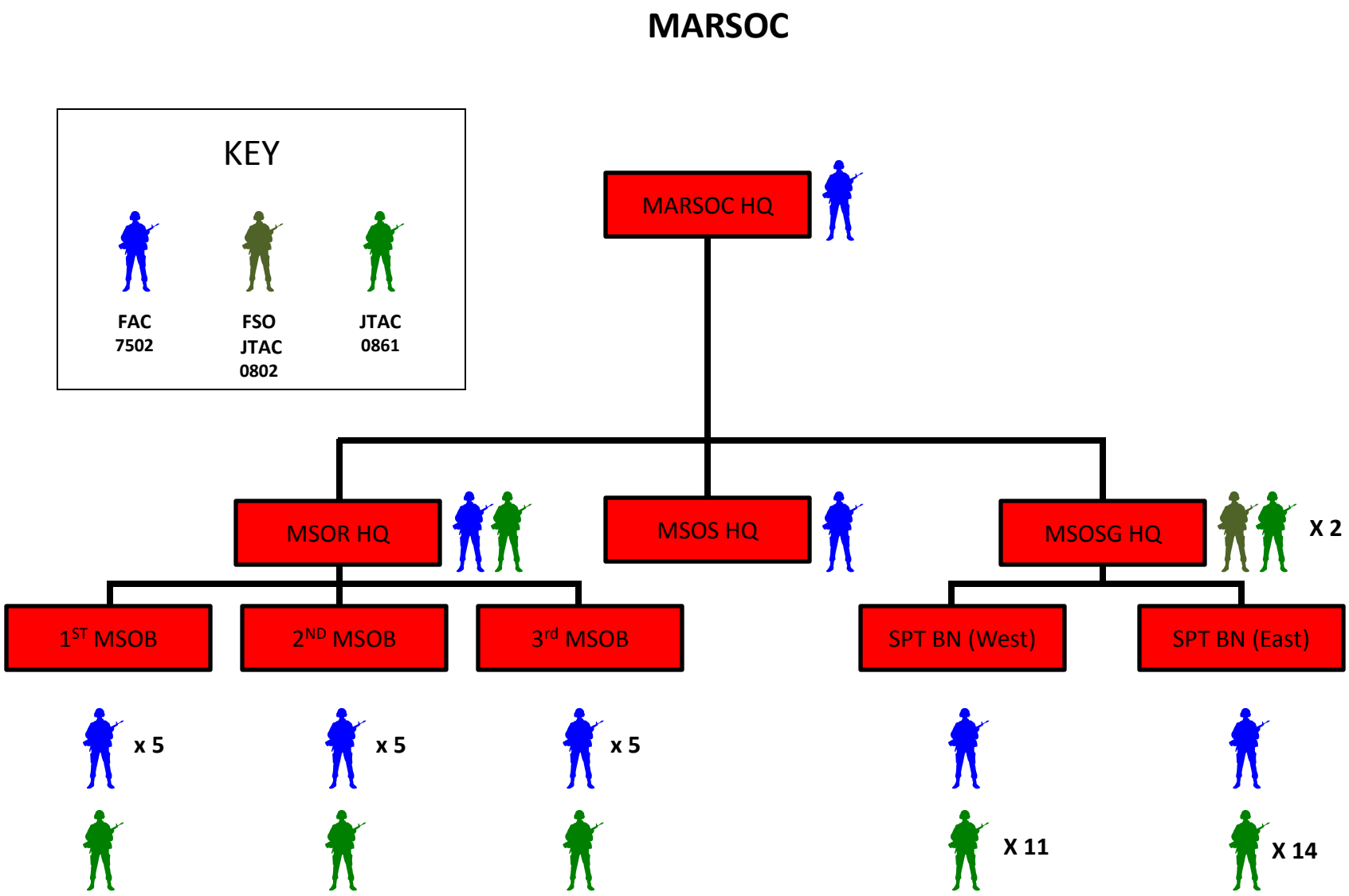
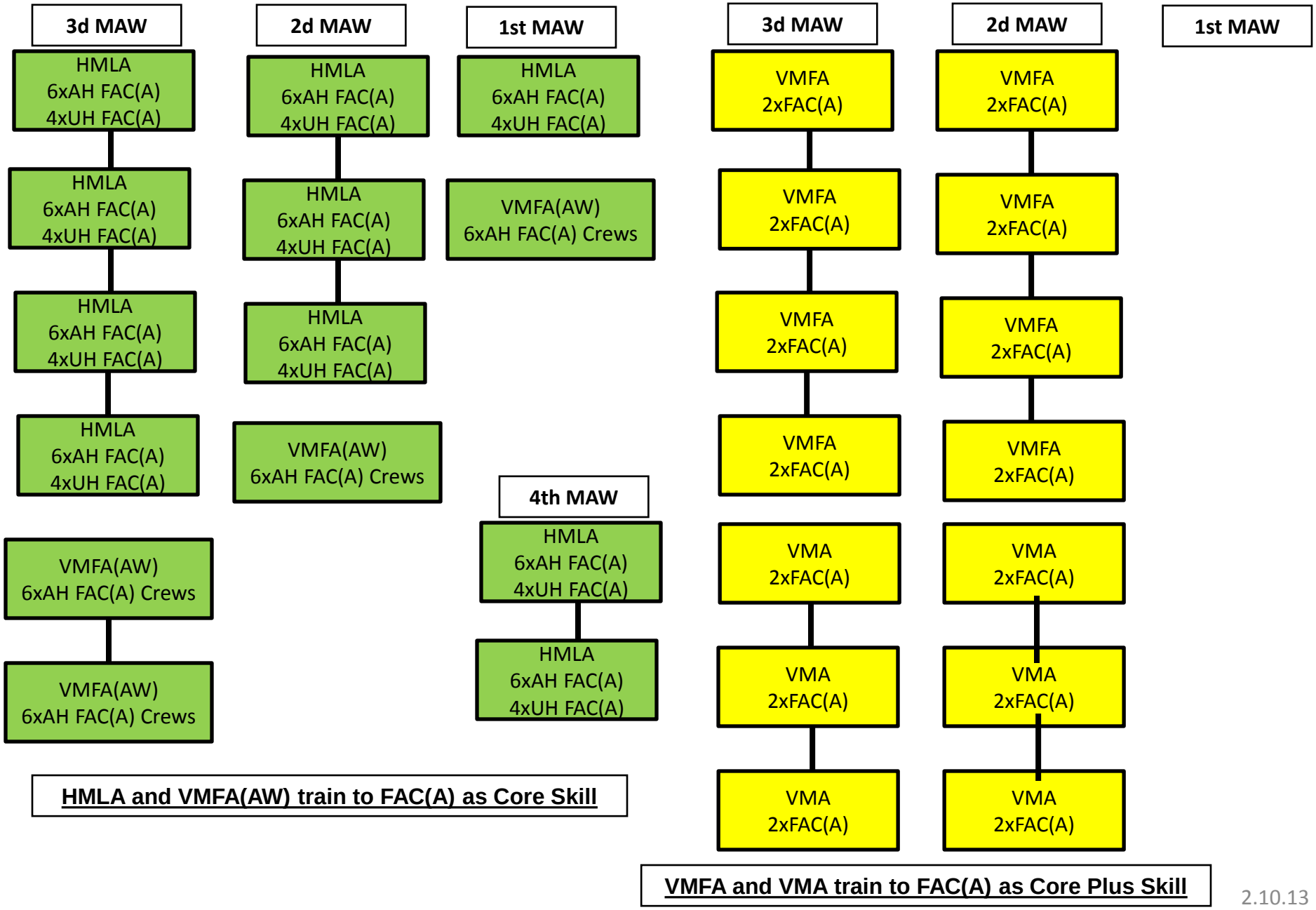


FORWARD AIR CONTROLLER (AIRBORNE) STRUCTURE



TACTICAL AIR CONTROL PARTY FAMILY OF SYSTEMS

Target Location, Designation and Handoff System (TLDHS)

TLDHS is 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.

TLDHS has also assumed responsibility for the hand-held video downlink requirement and began fielding this capability in FY 2013 with several Soldier ISR Reciever (SIR) versions 2.0 and 2.5.

Common Laser Range Finder (CLRF)/Vector 21

The Common Laser Rangefinder - 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, beginning in January 08. 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 with an anticipated fielding beginning in late FY 2013 or early FY 14. The intent is to maintain a technical Family of systems approach for the non-static operator (TLHDS operators) and static operators (COC operators).

TACTICAL AIR CONTROL PARTY FAMILY OF SYSTEMS

TACP FoS Present

MPVDL
SIR 2.0/2.5

PRC-117F

MRT-B and
SLATE w/
Strikelink 1.2

TLSI

JTAC-LTD

PLRF

Then…

TACP FoS Future *

JTAC-ELTD

CLRF IC

Android
Handheld

KILSWITCH

WPAN Hub

PPCDL
TNR

AN/PRC-152

or

PRC-117G

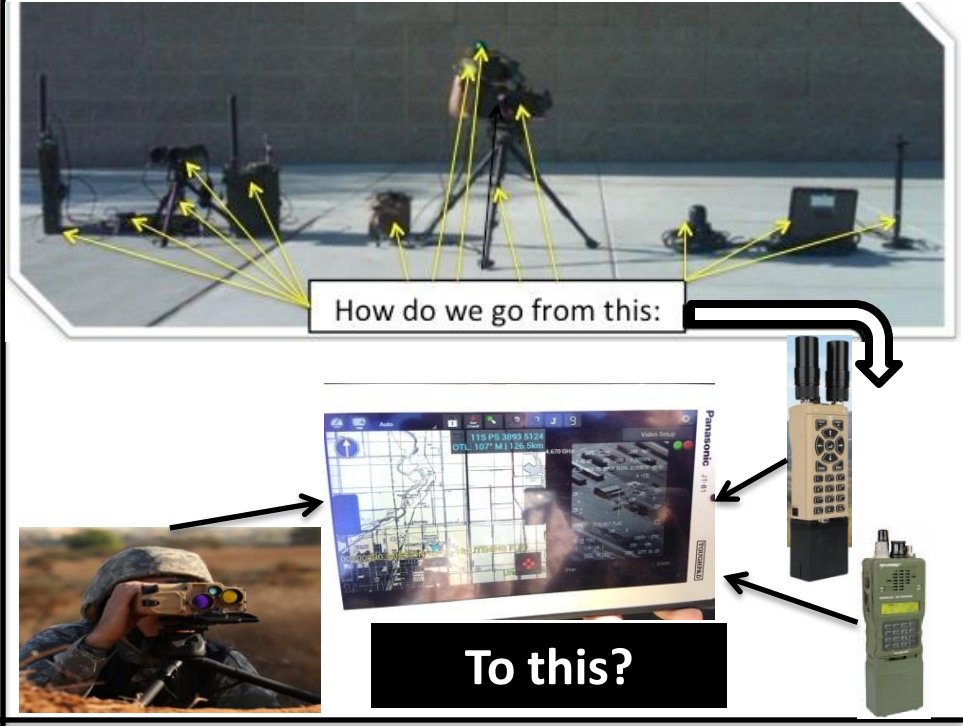
Cabled
Wireless

35 lbs operational weight for complete task capability

25 lbs operational weight for complete task capability

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

DIGITALLY AIDED CAS



Demonstrated Capability

WTI: Every Air O receives tablet and training

"Invaluable tool for gaining, maintaining and enhancing the SA of the air/ground team"

Used with TacNet Rover for DaCAS (several successful dry controls followed by live drops)

Exercise Talon Reach: Each stick had at least one tablet, plus RFC, Air O, JTAC and Airborne FSCC

Real time chat between aircraft enroute (PRC-117G)

Ability to share images, overlays and "John Maddened" pictures

Aircrew felt the Raid Force actually had higher SA to the target area than they did

Future Capability

COTS tablets + GOTS software

DPSS Project Office located at NAWCWD-CL in AIR 4.1

100% Gov't owned, Gov't civilian software team (creators of PSS-SOF)

KILSWITCH = Android App for Precision Fires Image Map Engine

Users: SOCOM (NSW), MARSOC, HMX-1, DOS, FBI, AZ Fire Fighters, *USMC*

1250+ tablets fielded through DARPA since 2012, still in widespread use

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
- During 2100 Level training once assigned to unit

Training conducted by the UAS Training and Logistics Support Activity (TALSA) located in Camp Pendleton and Camp Lejeune

Far Term: UAS Expertise to the TACP

7315 (UAS Officer) infusion into the TACP:

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

COA 1: As added member of TACP (requires structure change)

COA 2: Make 7315s eligible for 8002 (JTAC) MOS and associated B-Billet assignments

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

F-5

The Marine Corps has a ready adversary and training platform in the F-5. Marine Corps Aviation is exploring expanding its capability as a close air support platform for JTAC and FAC training.

Commercial Air Services in Support of JTAC Production

As the first service in the world to employ Contract Close Air Support with ordnance, the Marine Corps leads the way with cost effective solutions to the increased JTAC production and throughput demands on fleet aircraft.

USMC Contract Close Air Support (CCAS) Program

- Approximately 400 hrs /266 sorties annually to JTAC Production and Qualification
- The T-59 Hawk is the current USMC CCAS supporting aircraft

2.11 MARINE AVIATION SCIENCE AND TECHNOLOGY PLAN

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 tenants, 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 (ROMO) 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 and rotary and UAS systems will be employed as information systems conducting 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 Aviation Command Element (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 (CAC2S) 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 collation 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.

Communication and Networks

Airborne communication networks provide the backbone to reliably exchange relevant information to/from airborne, ground, ship, and ground platforms. The 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 SRPs, 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.

AVIATION SCIENCE AND TECHNOLOGY STRATEGIC GUIDANCE

Unmanned Systems

Marine aviation has successfully deployed and leveraged unmanned air vehicles (UAVs) for ISR operations utilizing video, infrared, and electro-optical payloads. The expanding role Group 1, Pumas, Wasp, and RQ-11 Raven equipped with electronic warfare, cyber, tactical communication payloads will enable UAVs to provide more effective support for logistics, kinetic and non-kinetic expeditionary operations. Employing UASs such as the MQ-21 and unmanned cargo systems to carry larger payloads increases the ACE operational capability and mission effectiveness over wide geographic areas. 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.

Directed Energy Weapons

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 fixed, 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 Electromagnetic Pulse (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: Developed 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 pursing 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.

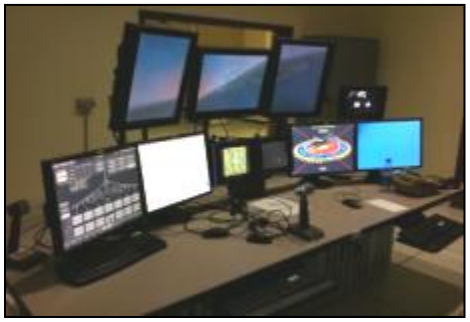
- Variable-speed air refueling drogue: Develop technologies that enable refueling drogues to refuel fast tactical aircraft as well as slower rotorcraft.

- 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



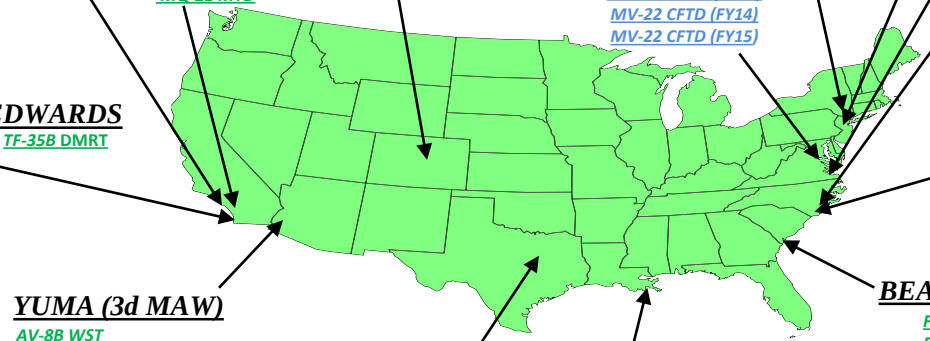
<u>1ST MAW ATS</u>
- MATSS Iwakuni
- MATSS Futenma
- MATSS Kaneohe Bay
- MATSS Guam - TBD

<u>2D MAW</u>
- MATSS Cherry Point
- MATSS New River
- MATSS Beaufort

<u>3D MAW ATS</u>
- MATSS Miramar
- MATSS Camp Pendleton
- MATSS Yuma

<u>4th MAW</u>
- MATSS Ft Worth
- MATSS JB McGuire-Dix-Lakehurst
- MATSS Norfolk

USMC SIMULATOR LAYDOWN



IWAKUNI (1ST MAW)
- F/A-18D TOFT
- F/A-18C TOFT
- EA-6B WST (FY19)
- KC-130J WST (FY17 - From Futenma)
- KC-130J CPT (FY17)
- KC-130J FuT (FY17)
- KC-130J OBST (FY17)
- F-35B FMS (FY16)
- F-35B FMS (FY17)
- F/A-18C TOFT (FY15)

FUTENMA (1ST MAW)
- CH-53E APT
- KC-130J WST (Reloc IWA FY15)
- MV-22 CFTD
- MV-22 CFTD
- CH-46E APT (FY14)
- CH-53/MV-22 MCAT/CFTD (FY18)

KANEOHE BAY (1ST MAW)
- AH-1W APT (FY20)
- UH-1Y FTD (FY15)
- AH-1Z FTD (FY17)
- MV-22 CFTD (FY15)
- MV-22 CFTD (FY15)
- CH-53E CFTD
- CH-53K CFTD (FY25)
- CH-53/MV-22/UH-1 MCAT/CFTD (FY18)
- CH-53E EAET
- CH-53K ICLT (FY25)
- RQ-7 IMS (FY16)
- RQ-7 UMS (FY16)
- MQ-21 MTD (FY15)

MCGUIRE-DIX-LAKEHURST (4th MAW)
- AH-1W APT (From Camp Pendleton FY15)
- UH-1Y CFTD (FY17)
- AH-1Z CFTD (FY19)
- CH-53E FTD (FY16)
- CH-53K CFTD (FY26)
- CH-53E ICLT (FY26)
- CH-53/MV-22/UH-1 MCAT/CFTD(FY20)
- C-130T OFT (USN)

NORFOLK (4th MAW)
- MV-22 CFTD (FY16)
- MV-22 CFTD (FY16)
- CH-53/MV-22/UH-1 MCAT/CFTD (FY20)

CHERRY POINT (2d MAW)
- AV-8B WST
- AV-8B WST
- AV-8B WST
- AV-8B MTTs (x9)
- KC-130J WST
- RQ-7 IMS (FY17)
- AV-8B DMRT (FY16)
- KC-130J CPT (FY16)
- KC-130J OBST (FY17)
- KC-130J HH FCO CREW TNR (FY20)
- F-35B FMS (FY23)
- F-35B FMS (FY23)
- F-35B FMS (FY24)
- EA-6B OF/NT (FY19)
- EA-6B TTT (FY19)
- EA-6B OT/NT (FY19)
- EA-6B WST (FY17)
- HH-46E APT (FY17)
- RQ-7 UMS (FY17)
- MQ-21 MTD
- KC-130J FuT (FY17)
- KC-130J HH PTT
- F-35B FMS (FY23)
- F-35B FMS (FY23)
- F-35B FMS (FY24)

PENDLETON (3d MAW)
- AH-1W WST (FY20)
- AH-1Z FTD
- AH-1Z FFS
- UH-1Y FFS
- UH-1Y FTD
- UH-1Y CPT
- UH-1Y CPT
- AH-1Z CPT
- AH-1Z CPT
- AH-1W APT (Reloc MDL FY15)
- CH-46E WST (FY15)
- RQ-7 IMS
- RQ-21 MTD (TBD)
- MV-22 CFTD (FY16)
- MV-22 CFTD (FY16)
- MV-22/UH-1 MCAT/CFTD (FY18)
- MV-22/UH-1 MCAT/CFTD (FY19)
- MV-22/UH-1 MCAT/CFTD (FY19)

GUAM(1ST MAW)
- TBD

STEWART ANGB (4th MAW)
- KC-130J CPT (FY18)
- KC-130J WST (FY19)
- KC-130J FuT (FY19)
- KC-130J OBST (FY19)

29 PALMS (3d MAW)
- RQ-7 IMS (FY15)
- RQ-7 UMS (FY15)
- MQ-21 MTD

Denver, CO
- C-9B FLT SIM

QUANTICO
- VH-60N APT (FY15)
- VH-3D APT
- VH-60N CFTD (FY14)
- MV-22 CFTD (FY14)
- MV-22 CFTD (FY15)

EDWARDS
- TF-35B DMRT

NEW RIVER (2d MAW)
- MV-22 FFS
- MV-22 FFS
- MV-22 FFS
- MV-22 FTD
- MV-22 CFTD
- MV-22 CFTD
- MV-22 ICLE
- MV-22 CMS PTT
- CH-53E WST
- CH-53E APT
- CH-53/CH-46 MCAT –P1/APT
- CH-53E EAET
- AH-1W WST (FY20)
- UH-1Y FTD
- UH-1Y FTD (FY17)
- AH-1Z FTD (FY17)
- AH-1Z FTD (FY18)
- CH-53K CFTD (FY17)
- CH-53K CFTD (FY18)
- CH-53K CFTD (FY20)
- CH-53K CFTD (FY21)
- CH-53K CFTD (FY22)
- CH-53/MV-22/UH-1 MCAT/CFTD (FY17)
- CH-53/MV-22/UH-1 MCAT/CFTD (FY20)
- CH-53/MV-22/UH-1 MCAT/CFTD (FY20)
- CH-53E EAET (FY15)
- CH-53E ICLT (FY18)
- CH-53K AMSPTT (FY18)

MIRAMAR (3d MAW)
- MV-22 CFTD
- MV-22 CFTD
- MV-22 CFTD
- MV-22 CFTD
- MV-22 CMS PTT
- CH-53E WST
- CH-53E APT
- CH-53K CFTD (FY23)
- CH-53K CFTD (FY24)
- KC-130J CPT (FY17)
- KC-130J OBST (FY17)
- KC-130 HH FCO CREW TNR (FY21)
- CH-53/MV-22 MCAT- P2/APT
- CH-53/MV-22/UH-1 MCAT/CFTD (FY19)
- CH-53/MV-22/UH-1 MCAT/CFTD (FY19)
- CH-53E EAET (FY15)
- CH-53E ICLT (FY23)
- F-35B FMS (FY21)
- F-35B FMS (FY23)
- F-35B FMS (FY24)
- KC-130J WST
- F/A-18D TOFT
- F/A-18D TOFT
- F/A-18C TOFT
- F/A-18C TOFT
- F/A-18C TOFT
- F/A - 8C TOFT
- CH-53K CFTD (FY24)
- CH-53K CFTD (FY26)
- KC-130J FuT (FY17)
- KC-130J HH PTT
- F-35B FMS (FY22)
- F-35B FMS (FY24)
- F-35B FMS (FY24)

YUMA (3d MAW)
- AV-8B WST
- AV-8B WST
- AV-8B MTTs(x11)
- AV-8B DMRT (FY16)
- RQ-7 UMS (TBD from 29 Palms)
- MQ-21 MTD (TBD)
- F-35B FMS
- F-35B FMS
- F-35B FMS (FY15)
- F-35B FMS (FY15)
- F-35B FMS (FY16)
- F-35B FMS (FY17)
- SAVT – JTAC SIM

FORT WORTH (4th MAW)
- F/A-18C TOFT
- C-130T OFT (USN)
- KC-130T APT
- C-130T CPT (USN FY18)
- KC-130J CPT (FY16)
- KC-130J WST (FY18)
- KC-130J FuT (FY19)
- KC-130 OBST (FY18)

BELLE CHASE (4th MAW)
- AH-1W APT (FY17)(FY20)
- UH-1Y FTD (FY18)
- AH-1Z FTD (FY19)

BEAUFORT (2d MAW)
- F/A-18C TOFT
- F/A-18C TOFT
- F/A-18D TOFT
- F/A-18D TOFT
- F-35B FMS
- F-35B FMS
- F-35B FMS (FY15)
- F-35B FMS (FY15)
- F-35B FMS (FY16)
- F-35B FMS (FY16)
- F-35B FMS (FY19)
- F-35B FMS (FY19)

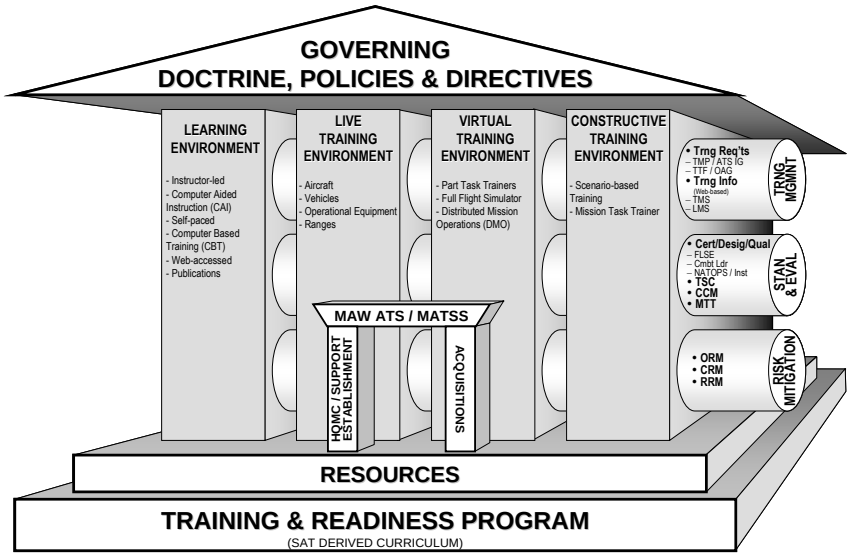
Note 1: Laydown does not depict future re-direction of systems (Reference platform specific simulator roadmaps).
Note 2: External variables and newly identified requirements may adjust projected "planned new build" strategy.
Note 3: FY/CY identified represents year of planned funding execution. See platform specific simulator roadmaps for planned delivery dates.

Legend
- Existing Systems
- Planned New Build (#)=Planned execution year
- Planned Device Disposal

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 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 contributes 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. The result is two-fold: significant cost savings and cost avoidance by using a robust SAT by freeing funds for other requirements, and foster 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. Headquarters Marine Corps Aviation is establishing the billet of Standardization Officer, to oversee this process. The USMC ATS MATSS shall remained 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 (MCSAMP)

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 (TEn) : 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 vision, strategy, and end state driving future simulator procurement is depicted in Figure 1.0. 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 2.0).

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.

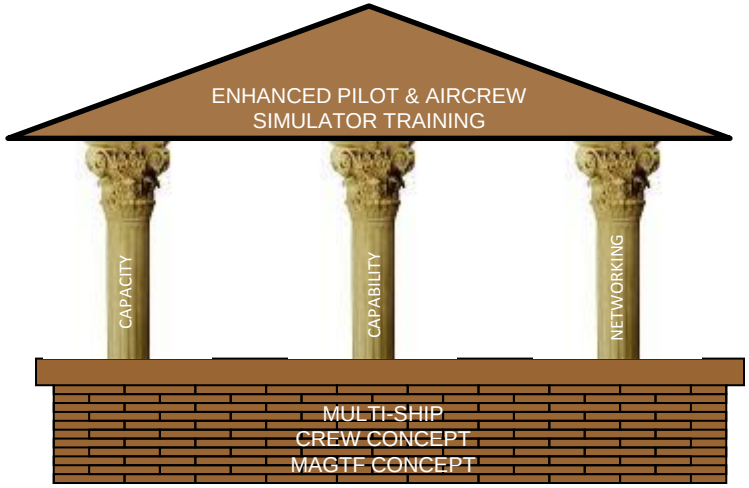


Figure 1.0

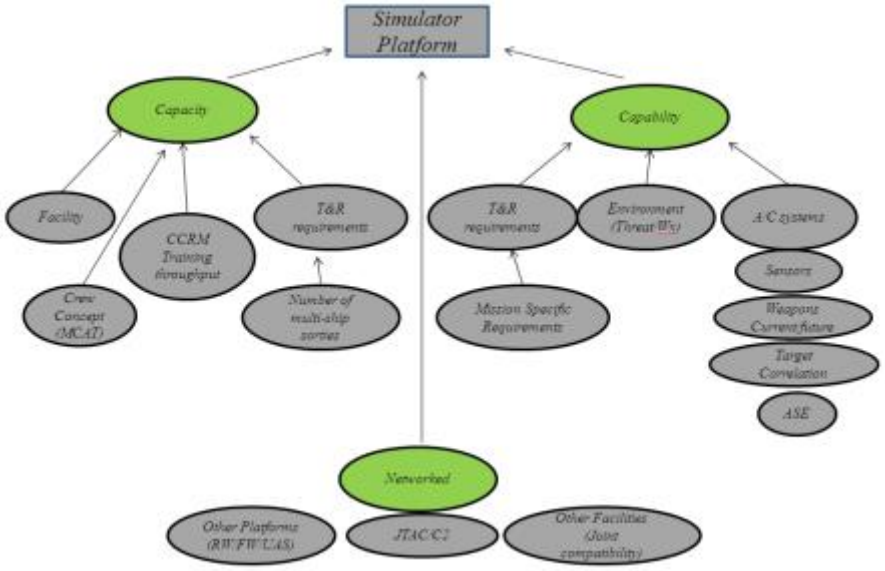


Figure 2.0

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

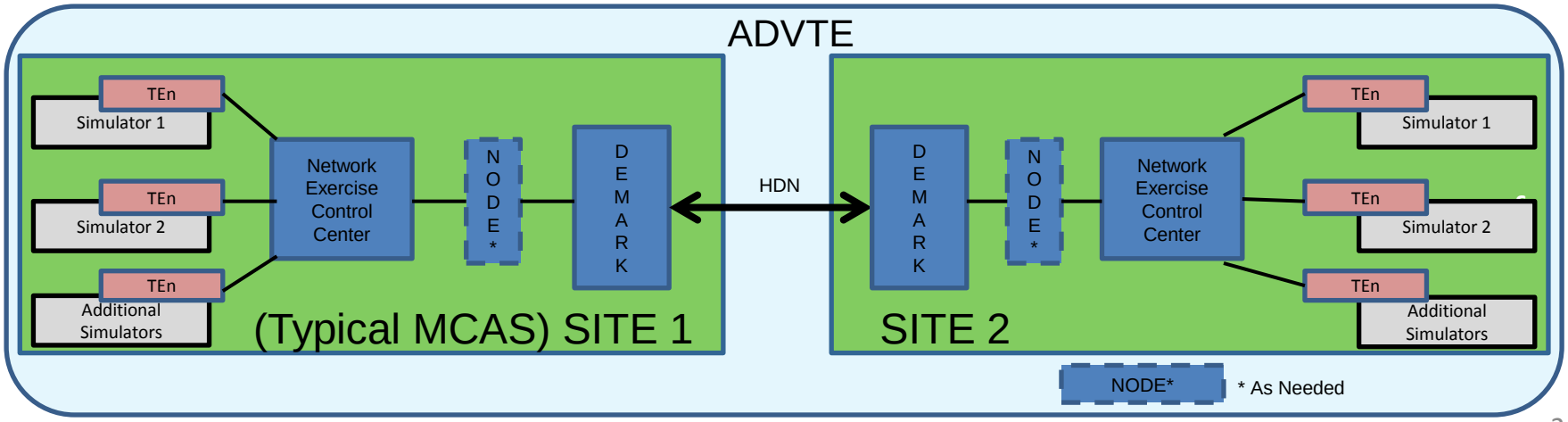
A future initiative for ADVTE is to connect and interface with the Joint Information Operations Range.

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 (MCCVDb)

Concept of the MCCVDb

The concept of the Marine Corps Common Visual Database (MCCVDb) 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 MCCVDb, and the term "MCCVDb", 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 MCCVDb 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 MCCVDB concept.

The MCCVDb 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 Sates
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 MCCVDb 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 Live/Virtual/Constructive training construct capable of supporting high value integrated virtual MAGTF training.

Moving forward:

- Improvements to the MCCVDb consisting of adding new geographic regions, and updated source files, will be necessary to support the virtual MAGTF training environment.
- The MCCVDb 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 develop a USMC Common Visual Gaming Area (CVGA) 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 CVGA solution with the GCE as well as with the joint and multi-national partners. Distributed mission training environments incorporating a common arenas will yield a limitless enhanced combat readiness training experience. Initial developmental focus will initially 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 variable level of fidelity.

2.13 MARINE AVIATION WEAPONS AND MUNITIONS PLAN

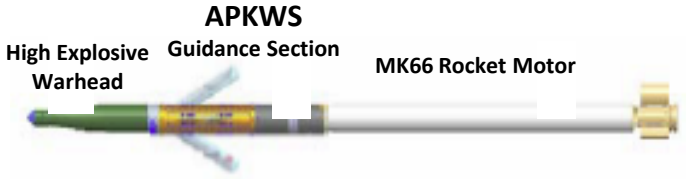
Marine aviation continues to develop and procure weapon systems that will increase lethality and survivability for the warfighter. Our focus of effort is to pace enhancements to the USMC weapons portfolio with platform advances through precision, discrimination, lower weight, and commonality wherever appropriate. A more detailed discussion on existing program upgrades, new initiatives, and future requirements follows.

Rockets:

APKWS II has been operationally successful, generating a direct hit rate of nearly 90% during contingency operations.

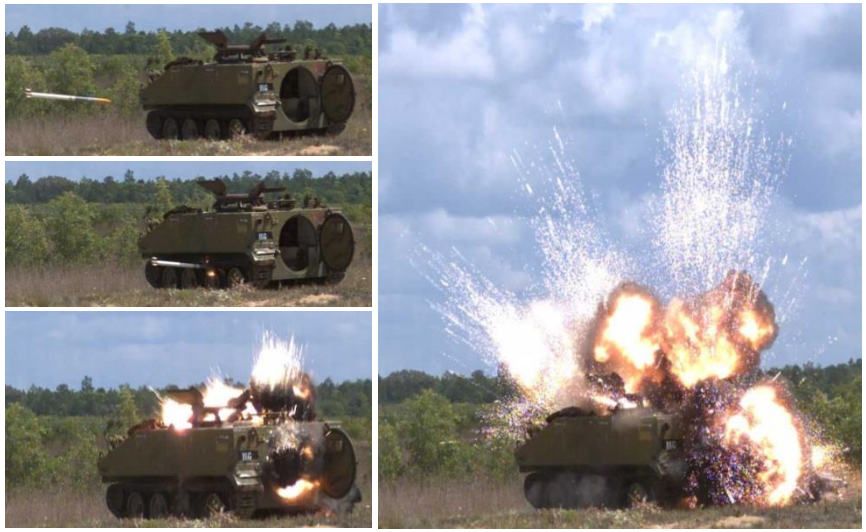
New Initiative

Marine aviation will leverage APKWS II success by developing APKWS II for TACAIR. AV-8B, F-16, and A-10 aircraft demonstrated the FW APKWS II variant in a joint Capabilities Technical Demonstration (JCTD). For this demonstration, the FW variant utilized a small cartridge activated device to force open the control canards. The RW variant has spring-opened canards. FW APKWS II yields increased stored kills per sortie with affordable forward firing, air-to-ground, low collateral damage weapons.



Future Requirement

A future rocket requirement is a low-cost PGM capable of defeating light-armored vehicles. The M282 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 zirconium burn). APKWS II's nearly 90% hit rate, coupled with the M282 penetrating HEI warhead provide a lower yield and lower cost choice for attacking targets otherwise serviced by Hellfire missiles or guided bombs. HQMC anticipates M282 integration on H-1s with initial operational capability in FY19.



Missiles:

Stand-Off Precision Guided Munitions (SOPGM) have provided the warfighter with increased offensive capabilities through their integration on the KC-130J Harvest HAWK. The AGM-176A Griffin and the GBU-44 Viper Strike use a common launch tube that interface with the Harvest HAWK Battle Management System (BMS) for missile programming, target hand-off and launch. The SOPGM system and Harvest HAWK mission kit are a unique combination in the Marine Corps weapons portfolio. Together, they allow delivery of weapons with capabilities usually limited to TACAIR delivery.

MARINE AVIATION WEAPONS AND MUNITIONS PLAN

New Initiatives

To address the operational need for a TACAIR forward-firing missile, 500 legacy AGM-65F Infrared (IR) Mavericks will be purchased from the USAF and 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. The AIM-9X Block II Sidewinder will add 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 III variant will further meet future requirements and will have a larger motor, giving it increased range.

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.

JOINT AIR-GROUND MISSILE

New JAGM Seeker
- **TD phase development**
- **Mates to HF ROMEO Bus**

Existing HELLFIRE ROMEO Bus
- **Already in production**

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 combined with a multi-mode fuze (height of burst, delay, and point detonate) and a shaped-charge warhead with blast-frag capabilities. The MMW guidance can be activated while still on the aircraft giving the operator a fire-and-forget capability. The second increment will increase the maximum range to 12 kilometers and add an Imaging Infrared (IIR) mode to the seeker for 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 16 kilometers and incorporate the AV-8B and F-35 as objective platforms. Marine Corps integration on the AH-1Z begins in FY15 with an IOC in FY19.

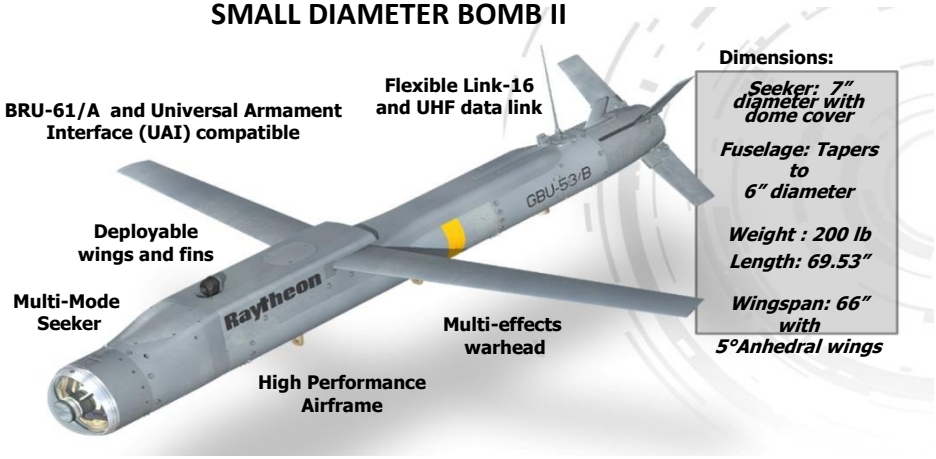
Bombs:

New Initiatives

The AGM-154 Joint Stand-Off Weapon (JSOW) C-1 adds a Moving Maritime Target (MMT) capability. The JSOW C-1 will IOC in FY23 on the F-35B and provide a net-enabled weapon (NEW) with stand-off.

The GBU-53 Small Diameter Bomb (SDB) II is a 250-pound class, precision-guided, all-weather munition that will provide standoff air-to-ground capabilities for the F-35B/C. SDB II is a gliding, standoff, direct-attack weapon suitable against fixed and moving targets in day, night, and adverse weather. SDB II will utilize a tri-mode SAL, MMW, and IIR seeker and will be network-enabled. Milestone C is scheduled for September 2014, and it will IOC in FY21 on the F-35B.

SMALL DIAMETER BOMB II



Guns:

A new UH-1Y mount kit increased the GAU-17, GAU-21, and M240D fields of fire.

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.

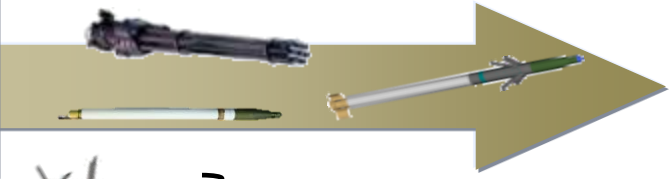
Future requirement

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.

MARINE AVIATION WEAPONS AND MUNITIONS PLAN

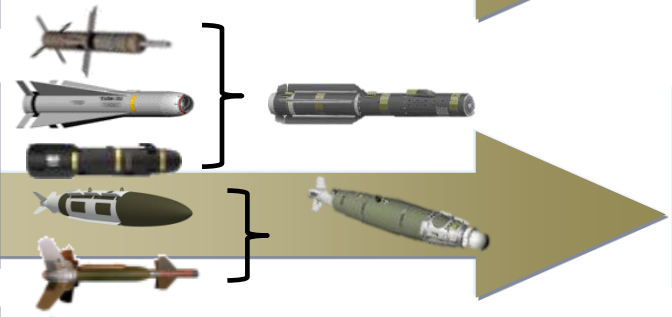
Aviation Weapons Roadmap

Rockets/Machine Gun Ammo
- 2.75” Rockets/APKWS II
- 5” Rockets
- 20mm/25mm/.50 Cal/CDWS



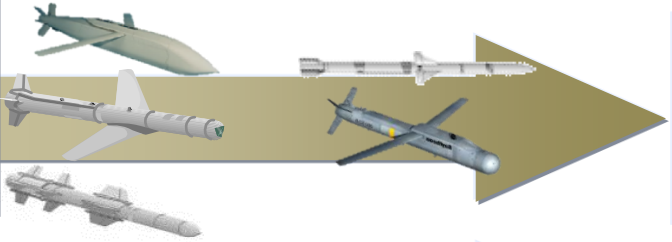
Guided Rockets/MG Ammo
- APKWS II with M282 warhead
- F/W APKWS II
- 20mm/25mm/30MM/GAU-21

Direct Attack
- GP Bomb
- LGB/DMLGB
- JDAM/LJDAM
- Hellfire
- TOW
- Maverick



Direct Attack
- GP Bomb
- DAMTC (LJDAM)
- JAGM

Stand-off Weapons
- JSOW A/C
- SLAM-ER
- Harpoon 1-C
- HARM/AARGM



Stand-off Weapons
- JSOW C-1
- SLAM-ER
- Harpoon 1-C
- HARM/AARGM
- SDB II
- LJDAM-ER

Air-to-Air Weapons
- AIM-9
- AIM-120

Air-to-Air Weapons
- AIM-9X Blk II & III
- AIM-120 C/D

FUTURE WEAPONS EMPLOYMENT

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.

F/W and R/W teaming with net-enabled weapons

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.

F-35

AH-1Z

MV-22

Improved Lethality

The M282 warhead in conjunction with APKWS will provide the UH-1Y an anti-armor PGM capability.

F-35

UH-1Y

AH-1Z

TACP

FARP / Distributive 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 distributive 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 interoperability with HMS *Queen Elizabeth* and LHD class ships will provide robust and flexible maritime power projection for Allied forces.

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.

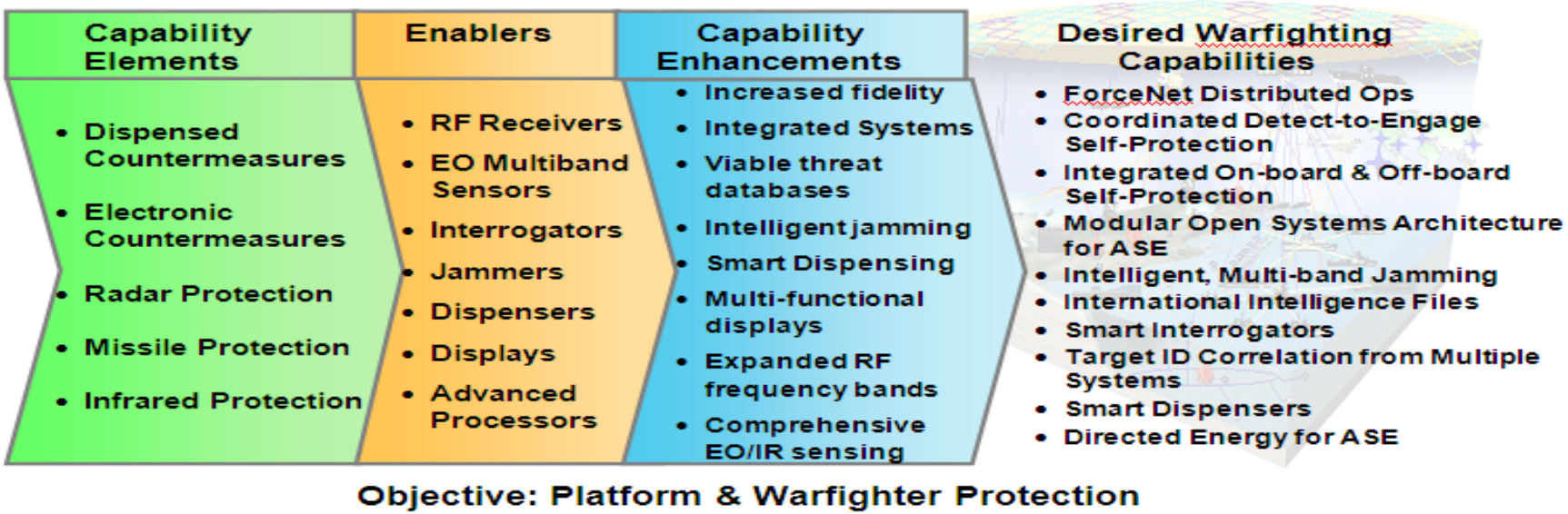
Current baseline mission sensor capabilities equip Marine Corps fixed-wing, tilt-rotor and rotary-wing aircraft with a variety of situational awareness (SA) and countermeasure capabilities in the RF and EO/IR spectrums. Many of these capabilities are aircraft platform-specific solutions that support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

HQMC Aviation collaborates with numerous DoD and service-specific entities, including MAWTS, NAVAIR, PMA-272, 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

- Achieves 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).
- Addresses 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.
- Employs 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:



MARINE ASSAULT SUPPORT ASE PLAN

Rotary Wing/Tilt Rotor ASE:
All forward-deployed assault support aircraft are 100% equipped with upgraded Missile Warning Systems (MWR) 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.

- CONUS aircraft upgrades ongoing (priority given to deploying units)
  - Complete MWS sensors upgrade to latest B(V)2 configuration (Improved Detection (Pd) in cluttered environments) with HFI
  - Estimate completion of B(V)2 HFI CONUS MWS upgrade: FY-13

Advanced ASE suite

- Priority given to most-vulnerable aircraft:
  - CH-53E: Continue improvements on MWS, CMDS and install DIRCM
- Expedite all other assault support aircraft:
  - H-1, V-22 and KC-130: Improve MWS, CMDS and develop light weight DIRCM
  - Improvements for MWS/CMDS began Nov 08 for MEU squadrons.
  - 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: MWS software drop OFP 30.24, FF Flares development complete. FF Bucket installs ongoing. Carriage of 90 expendables. Upgrade MWS to B(V)2 HFI. Develop and install advanced ASE suite controller. Smart dispense.
MID TERM: Install IRMWS and DIRCM Jam-head
LONG TERM: Integrated ASE

H-1:

TTP: Reevaluate for new systems
NEAR TERM: Upgrade MWS to B(V) 2 HFI. Develop and install advanced ASE suite controller. Smart dispense.
MID TERM: Develop and install IRMWS and DIRCM. Develop visually degraded environment solution.
LONG TERM: Integrated ASE

CH-53:

TTP: Reevaluate for new systems
NEAR TERM: MWS software drop OFP 30.24, FF Flares development underway. Additional FF dual dispenser development ongoing. Installation of IRMWS and DIRCM Jamhead ongoing. Implement DVE Phase I solution via CSU.
MID TERM: Upgrade MWS to B(V)2, FF ALE development & Install. Complete installation of IRMWS and DIRCM Jamhead. Develop and install Advanced ASE suite controller & SMFCD.
LONG TERM: Complete installation of IRMWS and DIRCM Jamhead & HFI.

KC-130:

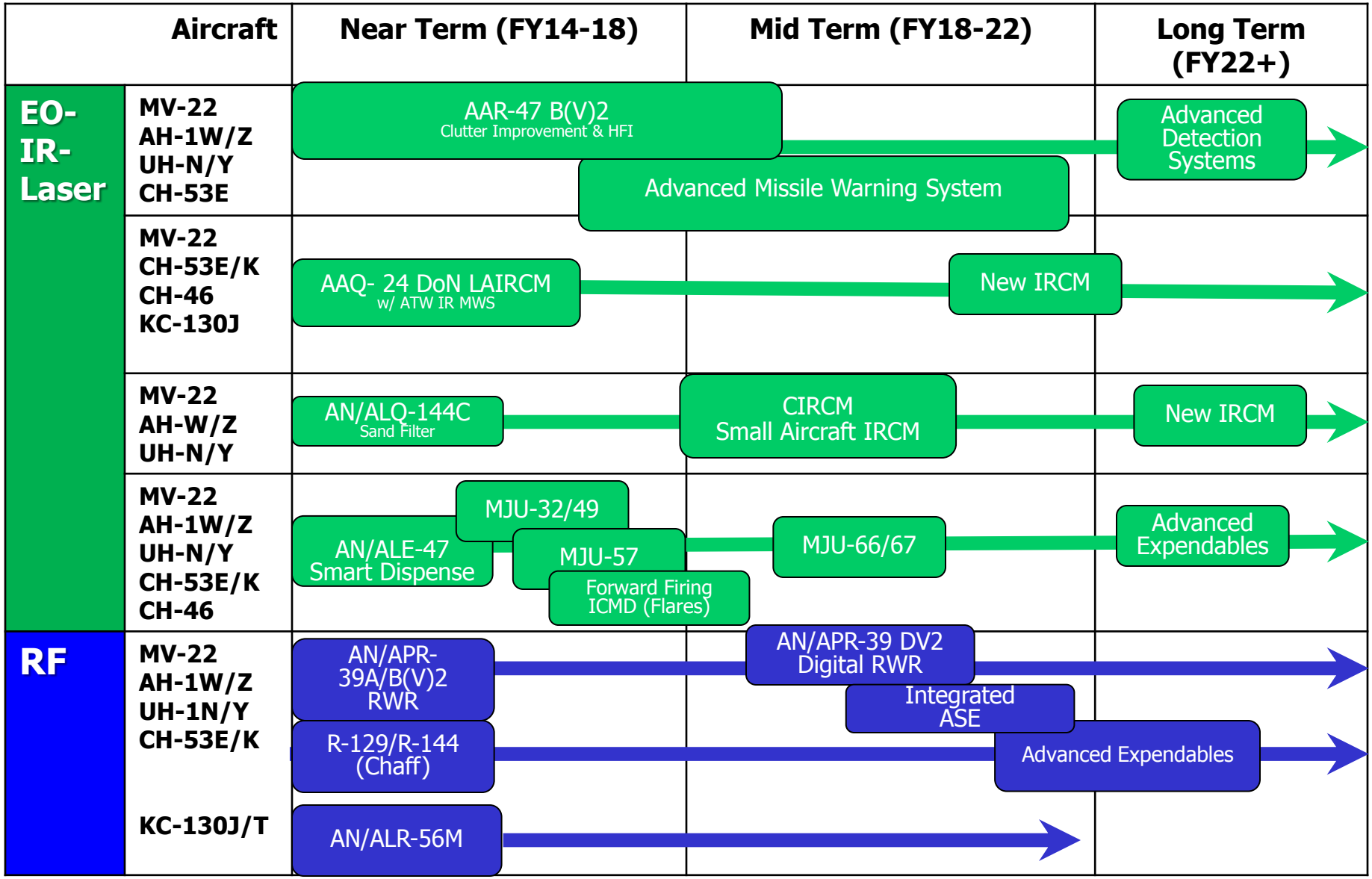
TTP: Reevaluate for new systems
NEAR TERM: MWS software drop OFP 30.24.
MID TERM: Upgrade MWS to B(V) 2: potential for IRMWS and DIRCM Jamhead. Smart dispense via AAR-47, then DoN LAIRCM. Install IRMWS and DIRCM Jamhead.

Chaff/Flares:

TTP: Reevaluate techniques for advanced threats, future AOR
NEAR TERM: MJU-57 now available for (KC-130); testing MJU-66 for near term fielding.
MID TERM: Evaluating foreign multi-spectral device for USMC use. Develop techniques for using flares and DIRCM for FNC 10 threats
LONG TERM: Development of advanced expendables in multiple domains.

NEAR TERM:	FY14-18
MID TERM:	FY18-22
LONG TERM:	FY22+

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 DRFM
- All platforms are evaluating mission data files for maximum effectiveness
- Development of integrated ASE capabilities

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 for TAI squadrons

AV-8B:
TTP: Reevaluate for new systems
NEAR TERM: Continue ALE-47 installations.
MID TERM: Complete ALE-47 integration. Sustain ALR-67(v)2. Explore upgrade to ALR-67(v)4 and incorporation of ALQ-165 / ASPJ

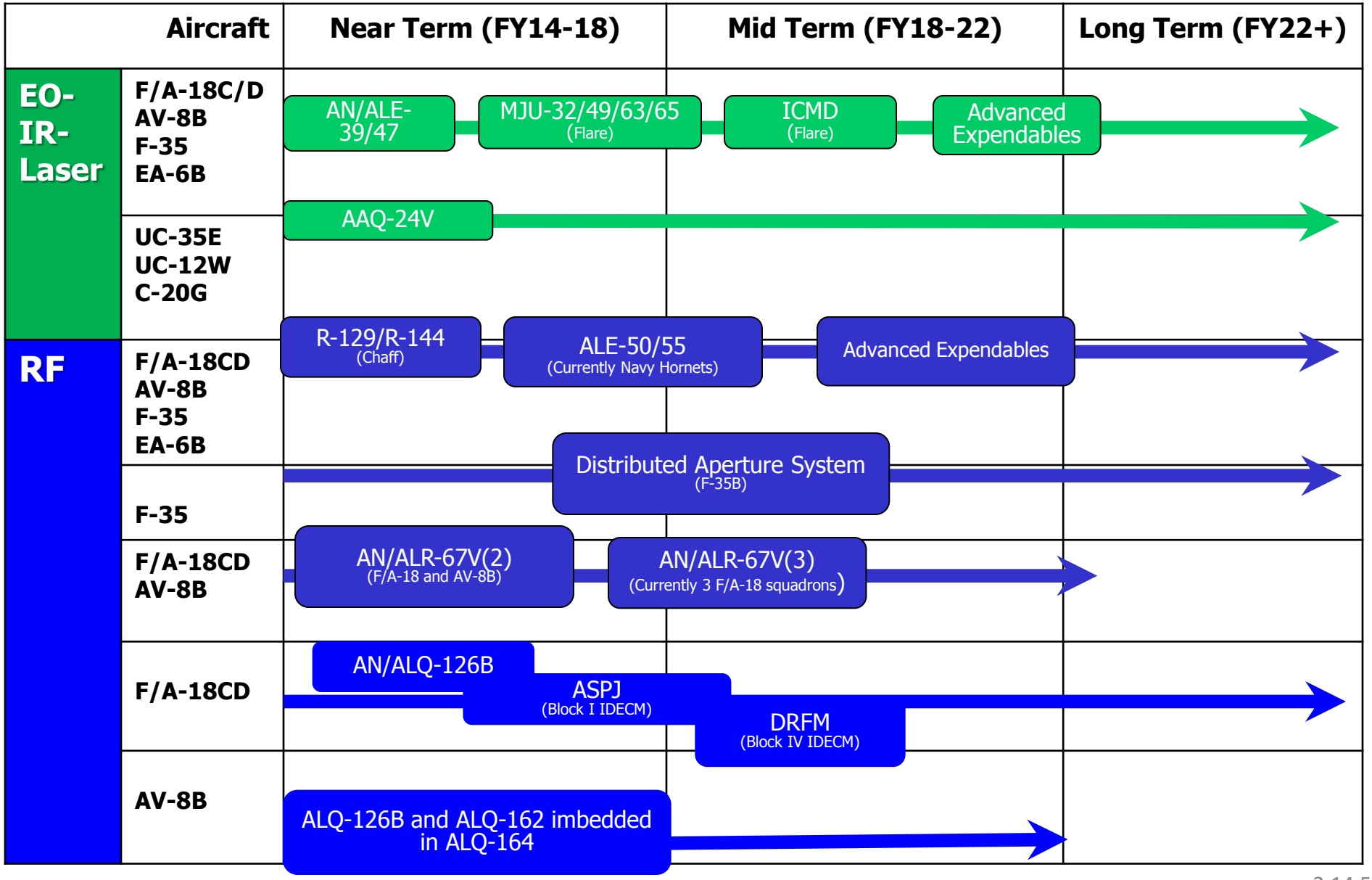
NEAR TERM:	FY14-18
MID TERM:	FY18-22
LONG TERM:	FY22+

EA-6B:
TTP: Reevaluate for new systems
NEAR TERM: Upgrading to ALE-47 countermeasure systems

F-35B:
TTP: Continue development of TTPs
NEAR TERM: Evaluate for DRFM
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 foreign multi-spectral device for USMC use
MID TERM: Develop techniques for using flares and DIRCM for imaging threats.
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.

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.

NEAR TERM:	FY14-18
MID TERM:	FY18-22
LONG TERM:	FY22+

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. Testing and integration of a 3rd flare dispenser for the UC-12W started in FY14. This will include 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 will begin in FY15, enhancing forward deployed capability and dynamic tasking through beyond-line-of-sight communications.

TRANSITION PLAN:

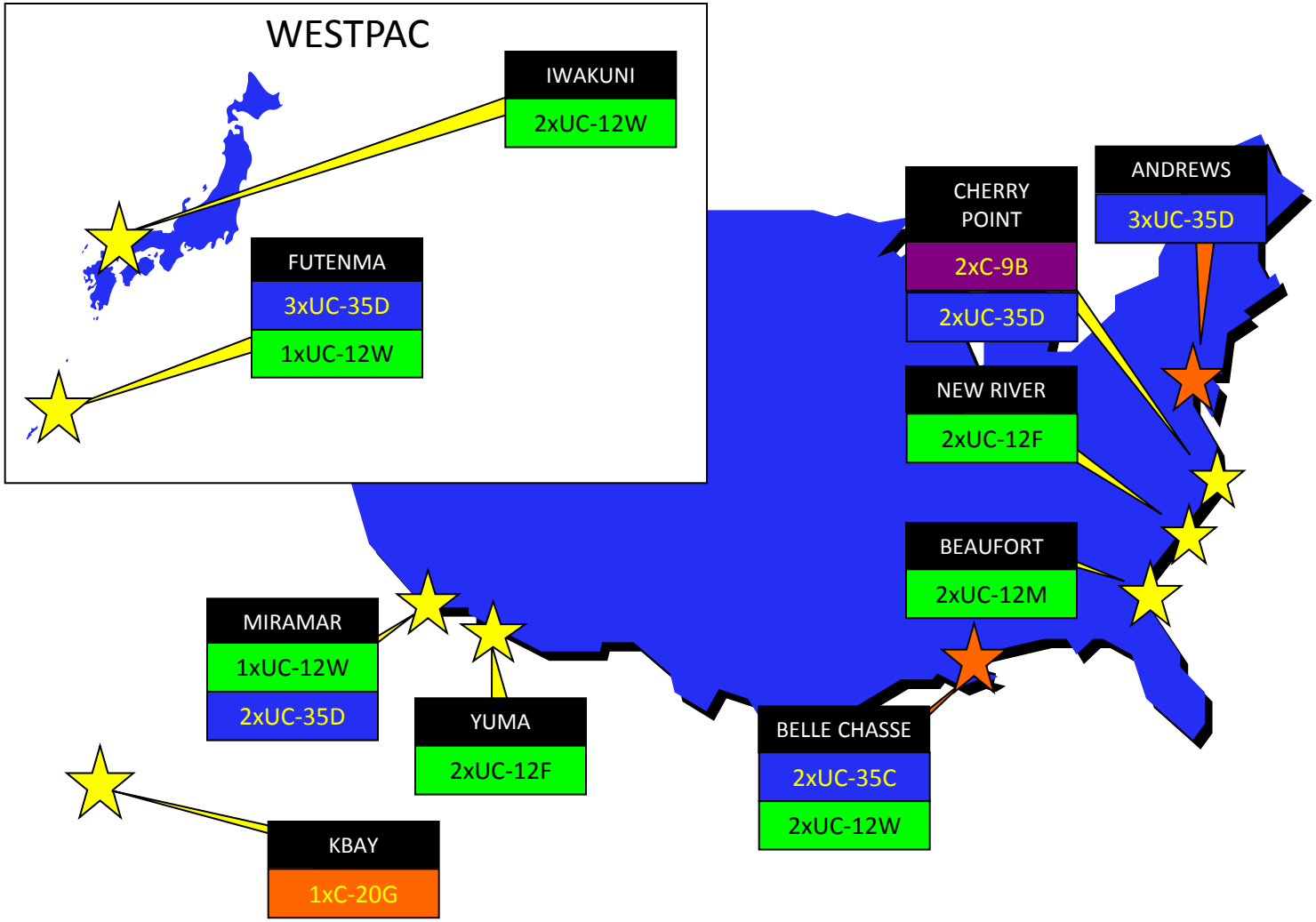
The UC-12W transition has five legacy UC-12F/M aircraft remaining to be replaced. The Marine Corps will begin transition from the obsolete and expensive-to-operate C-9B aircraft to the C-40A starting in FY18. These transitions, along with continued use of low-density, high-demand UC-35C/D aircraft will posture the Marine Corps to support the forward deployed MAGTFs with air mobility.

- UC-12W transition complete for reserve component
- USMC will continue to operate 2 x C-9B until a second C-40A is delivered
- UC-35C/D & C-20G do not have an established service life limit, and USMC will continue to operate until sustainment costs become prohibitive

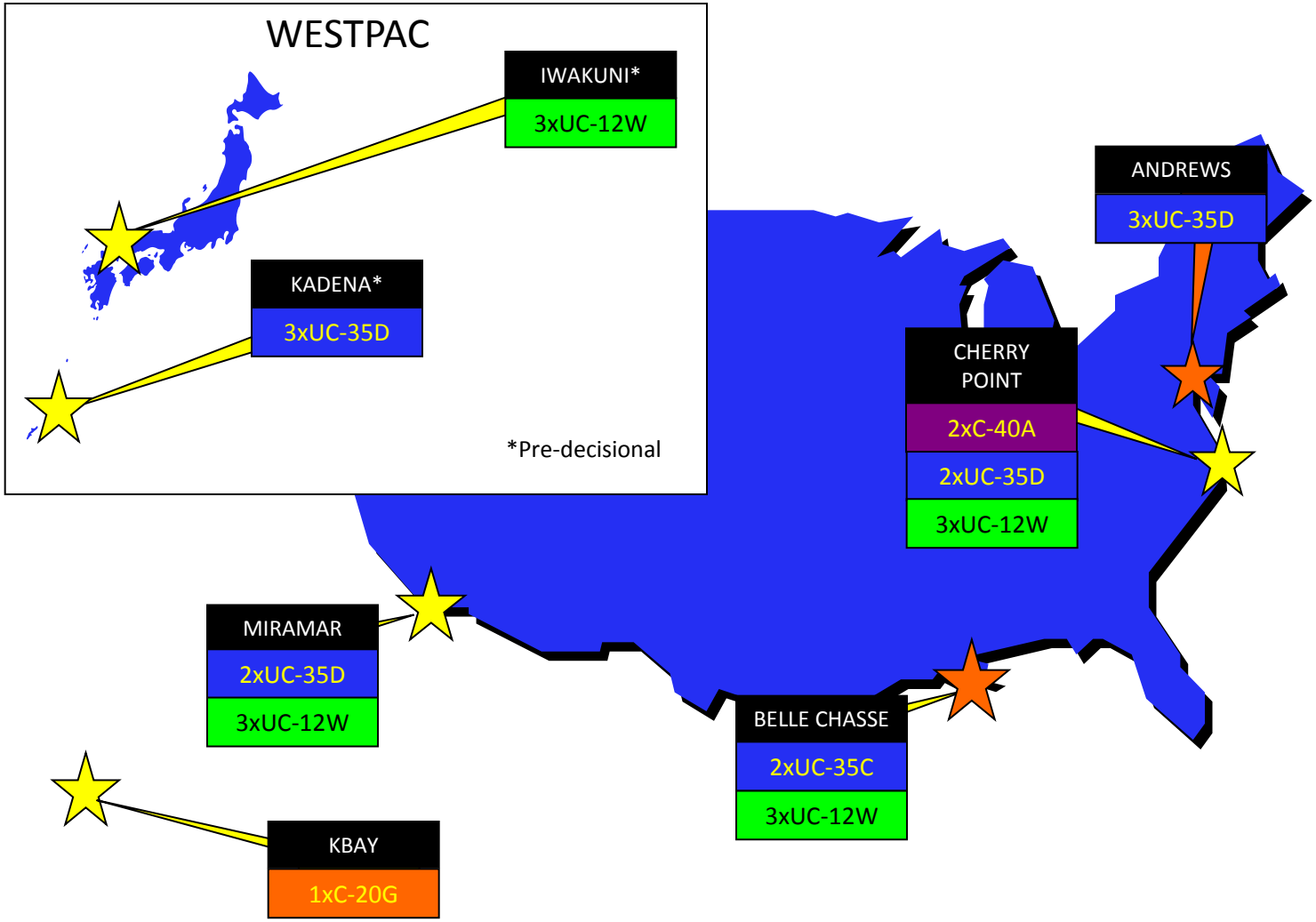
FUTURE:

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 for FY15 and beyond 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.

FY15 USMC OSA LAYDOWN



FY22 USMC OSA LAYDOWN



MARINE OPERATIONAL SUPPORT AIRLIFT (OSA) PLAN

	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
POAI PLAN											
UC-12F/M	5	5	5	5	5	5	5	0	0	0	0
UC-12W	7	7	7	7	7	7	7	12	12	12	12
UC-35C/D	12	12	12	12	12	12	12	12	12	12	12
UC-35 "ER" *	0	0	0	0	0	0	0	0	0	0	0
C-20G	1	1	1	1	1	1	1	1	1	1	1
C-20RA	0	0	0	0	0	0	0	0	0	0	0
C-9B	2	2	2	2	2	2	2	0	0	0	0
C-40A	0	0	0	1	1	1	1	2	2	2	2
TOTAL	**27**	**27**	**27**	**28**	**28**	**28**	**28**	**27**	**27**	**27**	**27**

GENERAL NOTE:
COMMENCING IN FY18, HQMC AVIATION INTENDS TO MAKE C-40A DETACHMENTS AVAILABLE IN HAWAII IOT IMPROVE MEDIUM LIFT OSA SUPPORT IN MARFORPAC AOR. MCAS KANEOHE BAY C-40A EXPERIENCE WILL INFORM PLANNING FOR FUTURE C-40A DETACHMENTS THROUGHOUT WESTPAC.

*UC-35 C/D ARE COMMERCIAL VARIANT AIRCRAFT WITHOUT A SERVICE LIFE LIMIT. UC-35 ER PROCUREMENT WILL BE ESTABLISHED BASED ON C/D SUSTAINMENT'S BECOMING COST-PROHIBITIVE.

MARINE OPERATIONAL SUPPORT AIRLIFT (OSA) PLAN

CURRENT FORCE:
12 UC-35C/D
12 UC-12F/M/W
1 C-20G
2 C-9B

FORCE GOAL:
12 UC-35 Extended Range Replacement aircraft
12 UC-12W
1 C-20 Replacement Aircraft
2 C-40A

T = TRANSITION

UNIT/LOCATION	PAI	FY15 1 2 3 4	FY16 1 2 3 4	FY17 1 2 3 4	FY18 1 2 3 4	FY19 1 2 3 4	FY20 1 2 3 4	FY21 1 2 3 4	FY22 1 2 3 4	FY23 1 2 3 4	FY24 1 2 3 4	FY25 1 2 3 4
MCAS CHERRY PT												
VMR-1	2 UC-35D											
	2 C-9B					T 1 C-9B			T			
	2 C-40A				T 1 C-40A				T			
	3 UC-12W								T			
SPMAGTF-CR												
MCAS NEW RIVER												
VMR DET NR	2 UC-12F								T			
MCAS BEAUFORT												
VMR DET BFT	2 UC-12M								T			
MCAS MIRAMAR												
VMR DET MIR	2 UC-35D											
	1 UC-12W											
VMR-3	2 UC-35D		T									
	3 UC-12W		T	2 UC-12W					T			
	1 UC-12F		T						T			
SPMAGTF-CENT												
MCAS YUMA												
VMR DET YUMA	2 UC-12F	T										
MCAF K-BAY												
VMR DET K-BAY	1 C-20G											
MCAS FUTENMA												
VMR DET FUT	3 UC-35D											
	1 UC-12W											
MCAS IWAKUNI												
VMR DET IWA	3 UC-12W											
NAF ANDREWS												
VMR-5	3 UC-35D											
MEU PTDO												
NAS JRB NO												
VMR-4	2 UC-35C											
	3 UC-12W	2 UC-12W							T			
MEU PTDO												

T = Transition

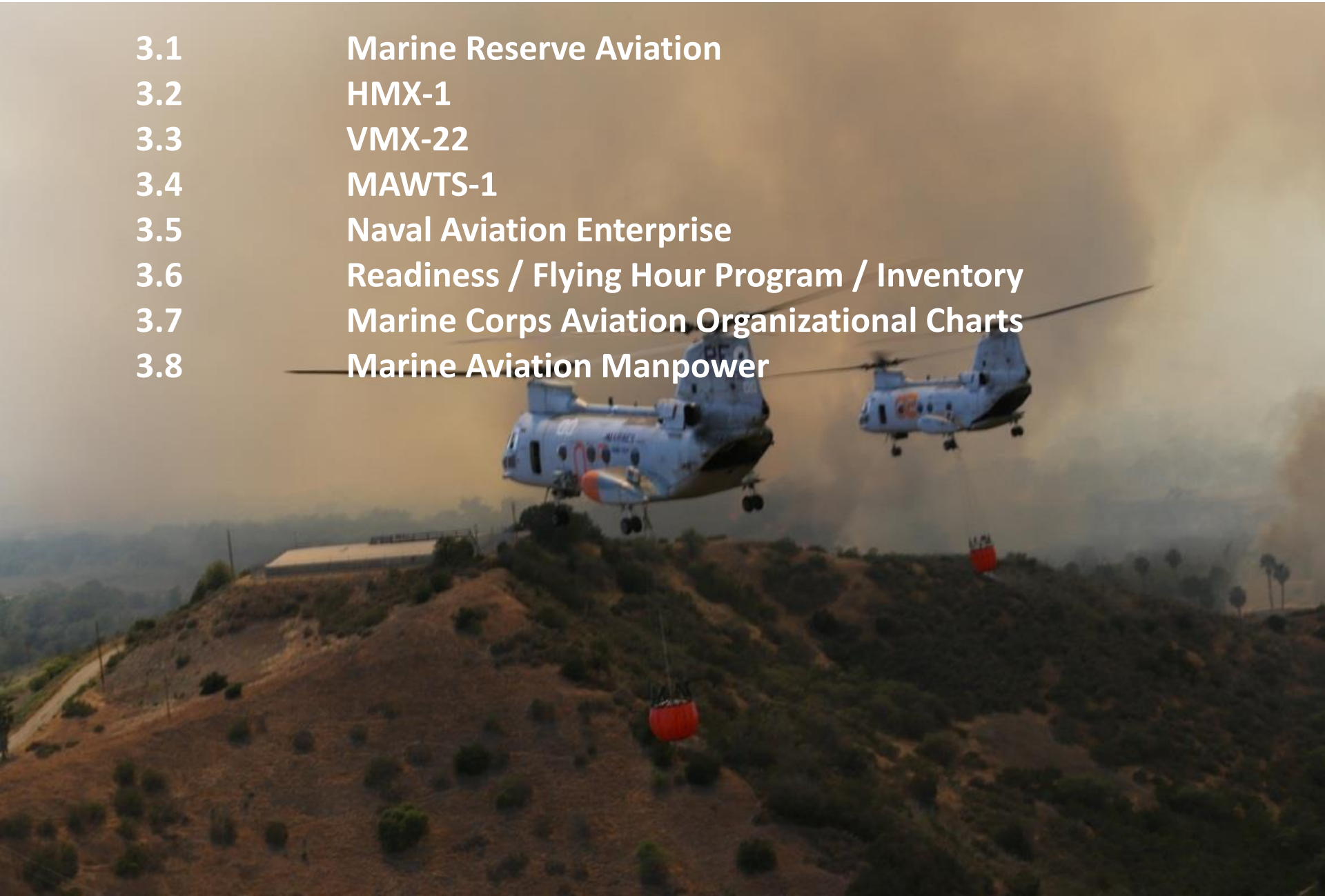
Basing plans are subject to change pending further environmental analysis

MARINE OSA TRANSITION

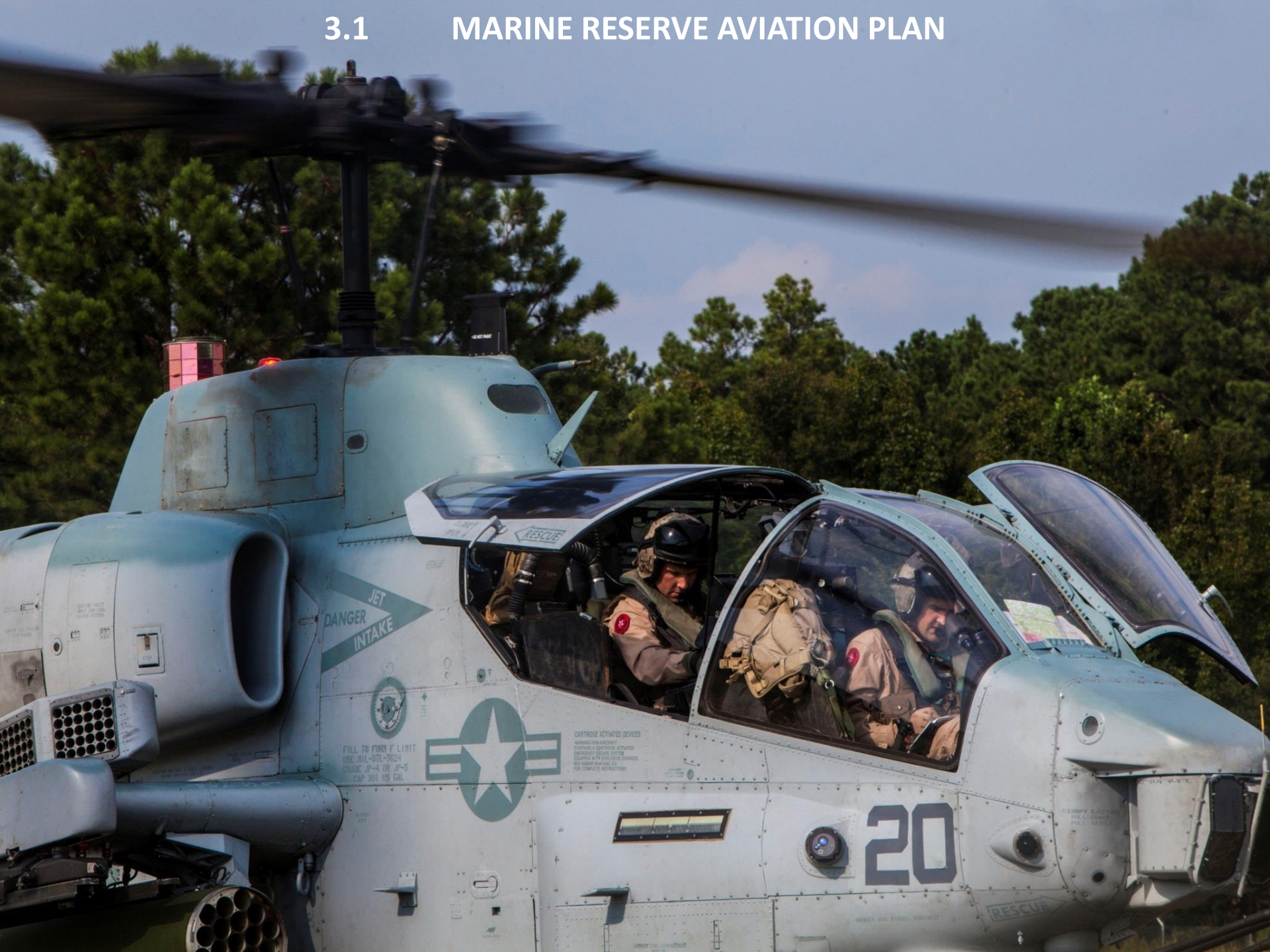
ASE Has Aircraft Survivability Equipment (ASE)

ASE Will have Aircraft Survivability Equipment

SECTION THREE MARINE AVIATION ORGANIZATION AND ENTERPRISE



3.1 MARINE RESERVE AVIATION PLAN



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

4TH MAW's mission is to augment, reinforce, and sustain the active component with an operational aircraft wing under a total force construct. In order to maintain the total force, Reserve aviation must be postured to meet Combatant commander requirements on an immediate, sustained and enduring basis. With the draw-down, sequestration, and fiscal austerity in full swing, 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:

THE CURRENT FIGHT: 4TH MAW will continue 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. Recent examples include sustained VMR UC-35D and UC-12W deployments in support of combat operations in Afghanistan and VMGR operations across the globe in support of overseas contingency operations.

UNIT DEPLOYMENT PROGRAM: 4TH MAW will support the Unit Deployment Program (UDP) 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.

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.

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 and MARSOC's Exercise Raven at both East and West Coast training venues .

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. Recent examples include Exercises Ulchi Freedom Guardian and Key Resolve.

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.

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 tactics, techniques, and procedures (TTPs), and common platforms. By ensuring the commonality of aircraft, equipment, and TTPs, the Marine Corps truly fosters an interoperable "total force reserve." Maintaining commonality is fundamental to recruiting, sustaining and employing this essential capability.

HQMC (AVN) is exploring the restructuring of select units within 4th MAW, optimizing the reserves in order to efficiently and effectively augment, sustain and reinforce the active component. Possible initiatives include the establishment of additional VMFT squadrons and detachments and the reincarnation of a reserve HMLA. Programmed transitions include:

KC-130J**:** The accelerated transition to the KC-130J is the number one Reserve aviation priority for HQMC. Currently, the three active MAWs are providing aircraft in support of this critical initiative. VMGR-234 began receiving their first aircraft in FY2014 and will achieve IOC during the 4th quarter FY2015. Legacy VMGR-234 personnel and equipment will transfer to VMGR-452 to preserve this capability until VMGR-452 begins their transition to the KC-130J.

UH-1Y/AH-1Z**:** HMLA-773 began its transition to the UH-1Y in FY2014 and will be complete by the end of the 1st quarter FY2015. Transition to the AH-1Z is currently programmed for FY2020. HMLA-773 will also consolidate from three to two sites in order 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 in FY2017, adding strategic depth to reserve aviation and preserving HMLA operational capacity in support of the total force.

MV-22B: The transition of VMM-764 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, the last CH-46E in the Marine Corps inventory will be retired by HMM-774 at the end of FY2015. HMM-774 will transition to VMM-774 in FY2016 aboard NS Norfolk, where it remains best positioned to sustain reserve recruiting requirements and support East Coast forces.

MQ-21A: VMU-4 (-) will replace the RQ-7B with the MQ-21A in FY2015 to provide operational depth for this high demand / low density asset. In the long-term, VMU-5 (-) is planned to activate in FY23 to provide additional flexibility and depth to the VMU community, while plans are in work to accelerate the VMUT (FRS) standup date to support these squadrons.

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, to include CAS capability and additional detachment capability. Establishment of an East Coast-based VMFT-401 detachment is under analysis based on the availability of additional F-5N airframes and structure.

OSA: 4th MAW will continue to play a pivotal role in the Operational Support Aircraft (OSA) community. As part of the plan to "operationalize" OSA, during FY15 VMR Det Belle Chasse and VMR Det Andrews will redesignate as VMR-4 and VMR-5 respectively. Establishment of remaining CONUS-based OSA assets under the MAWs is under analysis based on the 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 beginning in FY2019.

CH-53K: At the start of the CH-53K transition in FY2019, HMH-772 (-) will be "plussed-up" with additional CH-53E assets, followed by the reestablishment of HMH-769(-) aboard MCAS Miramar on the West Coast in FY2023. Both squadrons will eventually transition to the CH-53K.

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. Marine aviation is exploring the re-activation of VMFA-134 as an F-5 adversary squadron as soon as possible based on aircraft availability and manpower. VMFA-134 will transition from the F-5 aircraft to the F-35 B aircraft and assume the operational mission in 2030 in accordance with the published TACAIR Transition Plan

Aviation Training Systems (ATS): 4th MAW has aggressively pursued procurement of flight training devices and various other aviation training systems as part of ongoing and programmed transitions. Funding for the majority of these systems has been provided through annual National Guard and reserve equipment appropriations.

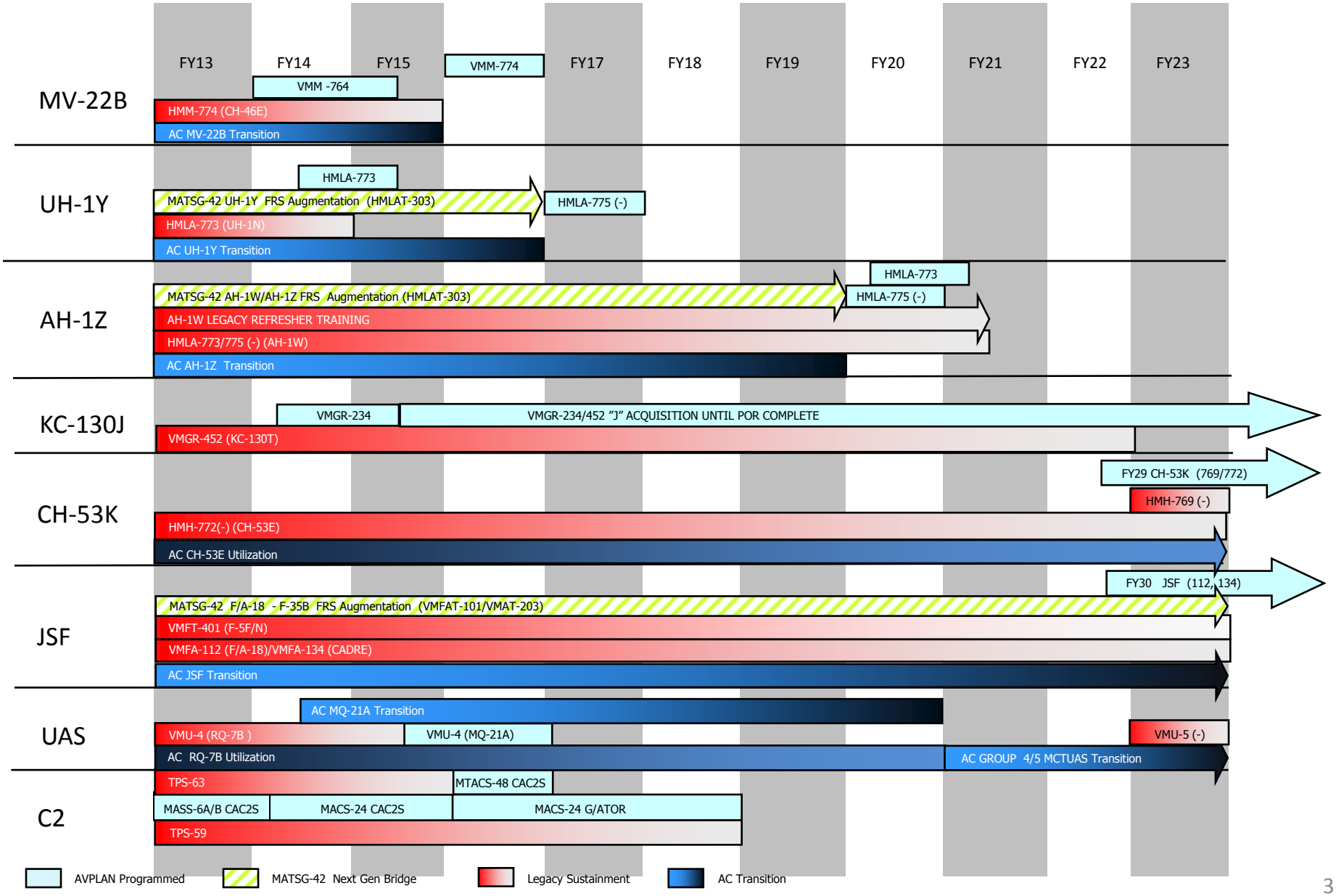
AVRIS OVERVIEW

Complete (FY 2010-2014)	Near/Mid-Term (FY 2015-2019)	Long Term (FY 2020-2030)
RIS INITIATIVES		
• ATS IOC • MATSG-42 ACTIVATE • VMU-4 ACTIVATE • VMR (UC-12W) TRANSITION • MACS-23 DECOMMISSION • HQ, MWSG-47 DECOMMISSION • VMM-764 (MV-22B) TRANSITION • HMLA-773 (UH-1Y) TRANSITION	• LEGACY SUSTAINMENT • VMGR-234 (KC-130J) TRANSITION • HMLA-773 (-) RELOCATE (JB MDL) • VMU-4 (MQ-21A) TRANSITION • VMM-774 (MV-22B) TRANSITION • HMLA-775 (-) ACTIVATE • VMFT-401 DET A ESTABLISHED • OSA REORGANIZATION • ATS FOC • G/ATOR TRANSITION • METMF (R) ACCEPT	• LEGACY SUSTAINMENT • AH-1Z TRANSITION • VMGR-452 (KC-130J) TRANSITION • VMU-5 (-) ACTIVATE • HMH-769 (-) ACTIVATE • VMFA-134 ACTIVATE (CADRED) • CH-53K TRANSITION • F-5 UPGRADE • F-35B TRANSITION

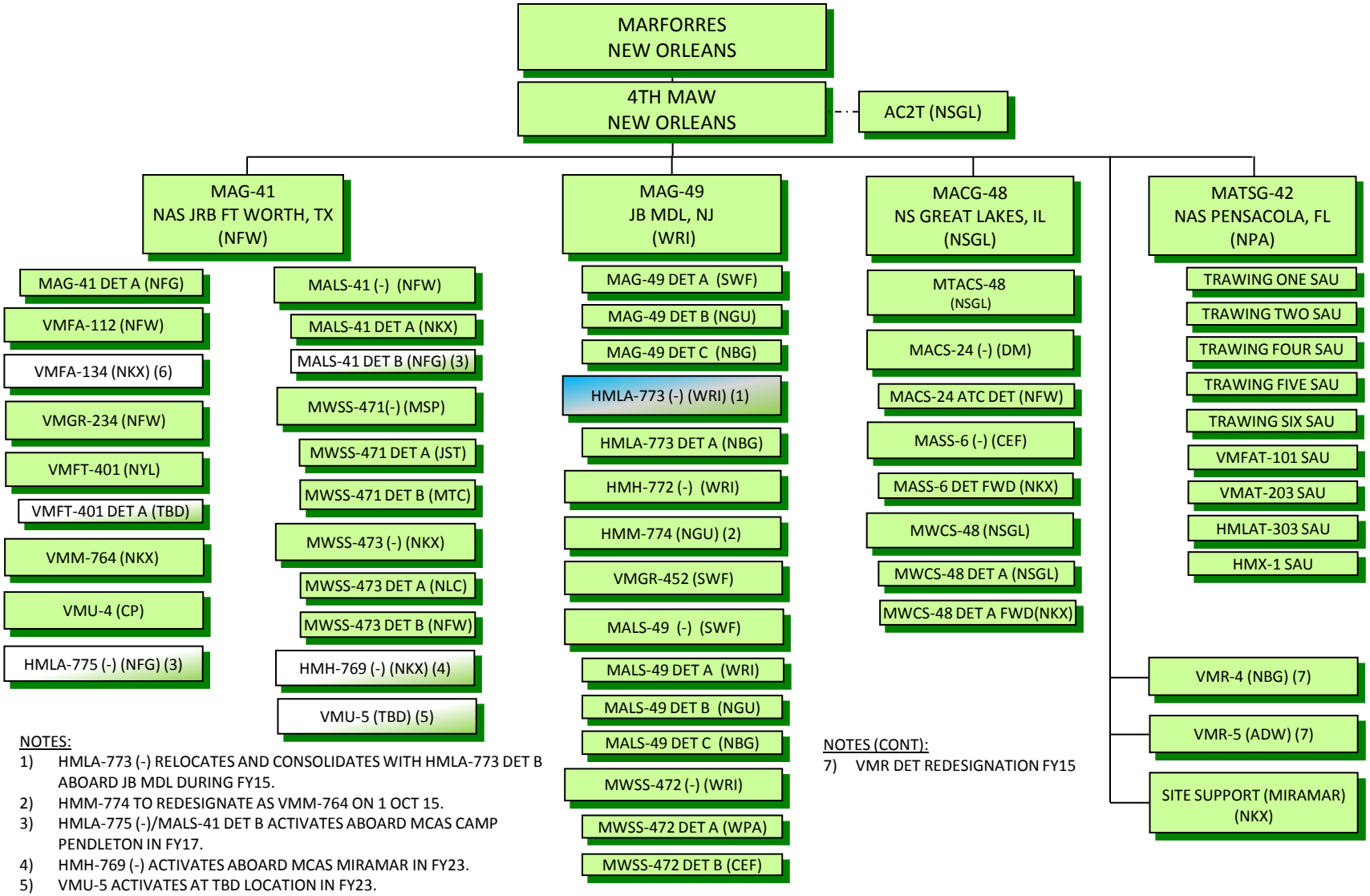
Reserve Aviation Strategic Goals

- 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



4TH MAW ORGANIZATIONAL CHART



NOTES:

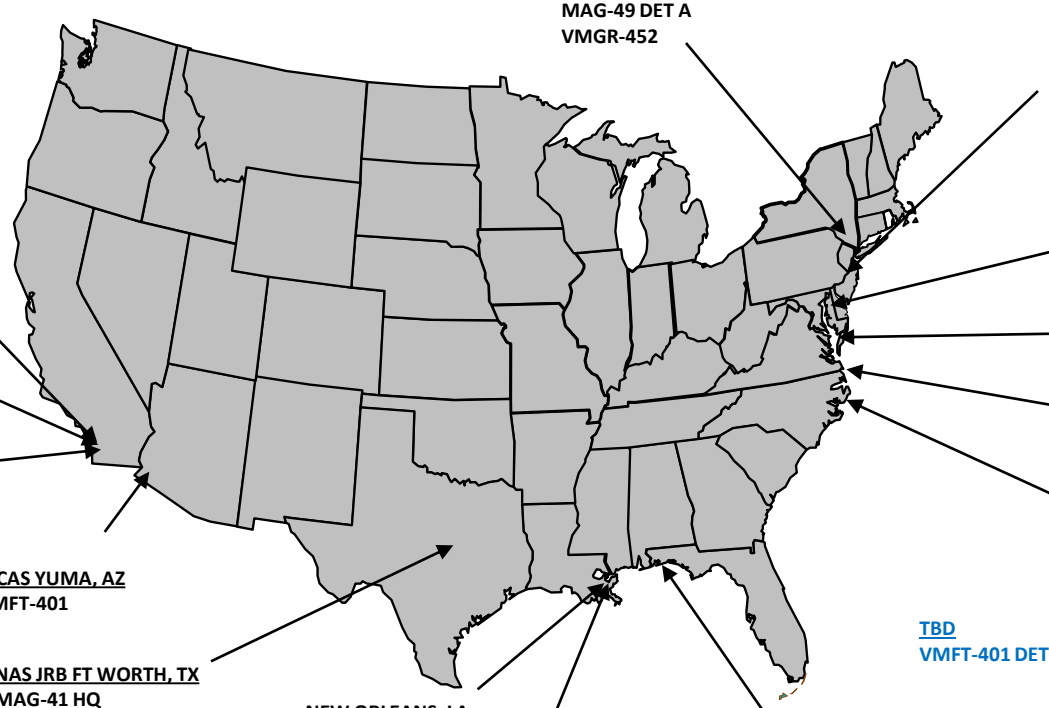
1) HMLA-773 (-) RELOCATES AND CONSOLIDATES WITH HMLA-773 DET B ABOARD JB MDL DURING FY15.
2) HMM-774 TO REDESIGNATE AS VMM-764 ON 1 OCT 15.
3) HMLA-775 (-)/MALS-41 DET B ACTIVATES ABOARD MCAS CAMP PENDLETON IN FY17.
4) HMH-769 (-) ACTIVATES ABOARD MCAS MIRAMAR IN FY23.
5) VMU-5 ACTIVATES AT TBD LOCATION IN FY23.
6) VMFA-134 ACTIVATES ABOARD MCAS MIRAMAR IN FY30.

NOTES (CONT):

7) VMR DET REDESIGNATION FY15

ADW – Joint Base Andrews, MD
BKF – Buckley AFB, CO
CEF – Westover ARB, MA
CP – MCB Camp Pendleton, CA
DM – Dam Neck/Oceana, VA
JST – Johnstown, PA
MTC – Selfridge ANGB, MI
MSP – Minneapolis, MN
NBG – NAS JRB New Orleans, LA
NFG – MCAS Camp Pendleton, CA
NFW - NAS JRB Fort Worth, TX
NGU – NS Norfolk, VA
NKX – MCAS Miramar, CA
NLC – NAS Lemoore, CA
NPA – NAS Pensacola, FL
NSGL – NS Great Lakes, IL
NYL – MCAS Yuma, AZ
SWF – Stewart ANGB, NY
WPA – Wyoming, PA
WRI – Joint Base McGuire-Dix-Lakehurst, NJ

4TH MAW FLYING SQUADRON AND GROUP LAYDOWN



STEWART ANGB, NY
MAG-49 DET A
VMGR-452

JB McGUIRE-DIX-LAKEHURST (JB MDL)
MAG-49 HQ
HMLA-773 (-) (FY16 CONSOLIDATION)
HMH-772 (-)

JB ANDREWS, MD
VMR-5 (REDESIGNATE IN FY15)

MCB QUANTICO, VA
HMX-1 SAU

NS NORFOLK, VA
MAG-49 DET B
HMM-774 (FY16 TRANSITION TO VMM)

MCAS CHERRY PT, NC
VMAT-203 SAU

TBD
VMFT-401 DET A (FY15 ACTIVATION)

MCB CAMP PENDLETON, CA
MAG-41 DET A
VMU-4 (-)

MCAS CAMP PENDLETON, CA
HMLAT-303 SAU
MAG-41 DET A (FY16 RELOCATION)
HMLA-775 (-) (FY17 ACTIVATION)

MCAS MIRAMAR, CA
SITE SUPPORT (MIRAMAR)
VMFAT-101 SAU
VMM-764
HMH-769 (-) (FY23 ACTIVATION)
VMFA-134 (FY30 ACTIVATION)

MCAS YUMA, AZ
VMFT-401

NAS JRB FT WORTH, TX
MAG-41 HQ
VMFA-112
VMGR-234

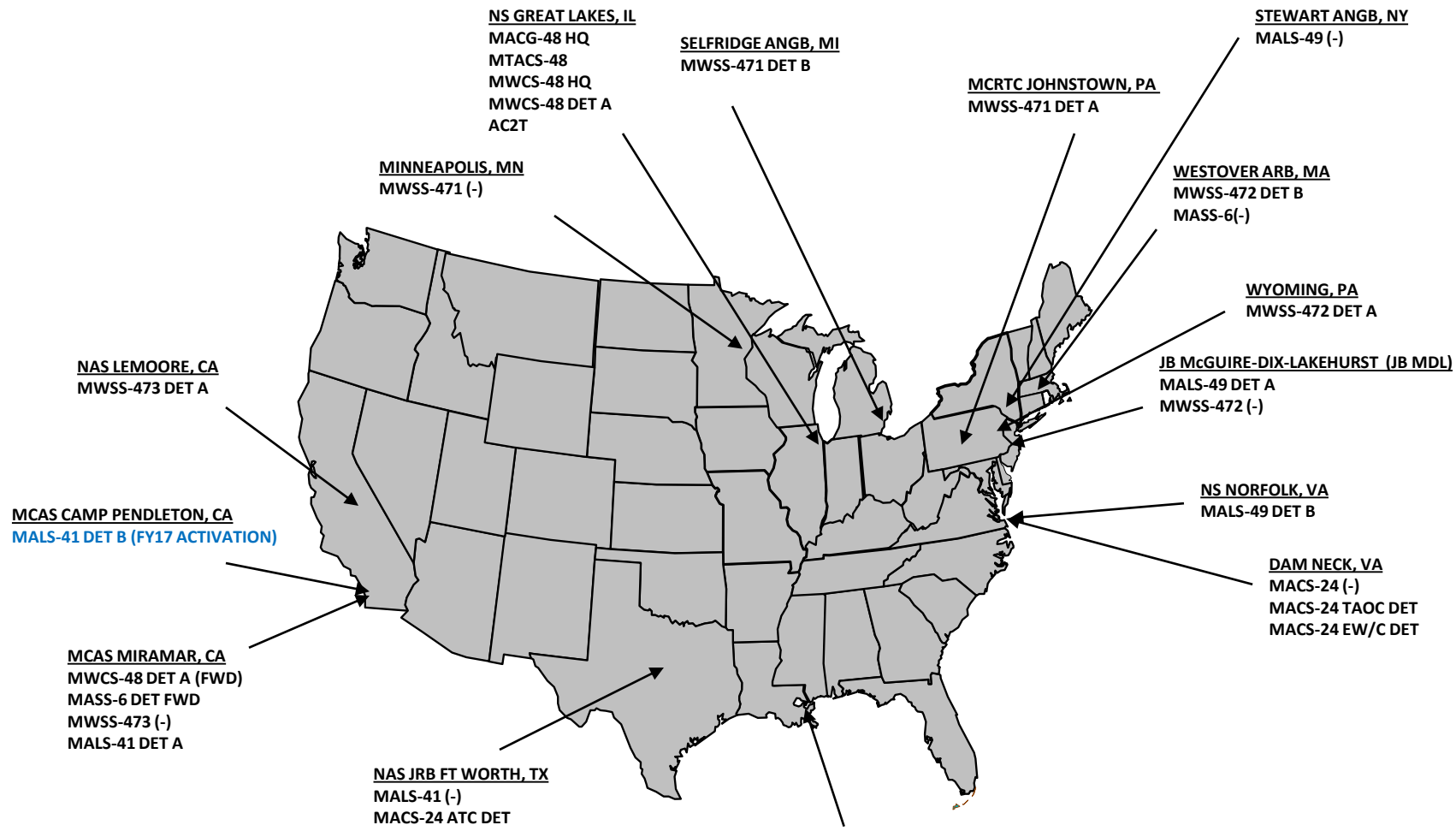
NEW ORLEANS, LA
4TH MAW HQ

NAS JRB NEW ORLEANS, LA
MAG-49 DET C
HMLA-773 DET A
VMR-4 (REDESIGNATE FY15)

NAS PENSACOLA, FL
MATSG-42 HQ

BLACK = Current Laydown
Blue = Future Restructuring

4TH MAW AGS, MACCS, AND MALS LAYDOWN



BLACK = Current Laydown
Blue = Future Restructuring

3.2 MARINE HELICOPTER SQUADRON ONE

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 both aid the Fleet Marine Force in their transition efforts and 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. The squadron began providing dedicated operational test involvement during the summer of FY14 and aircraft transition will begin in FY19.

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) and 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 FY15, 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 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. Marine Helicopter Squadron One (HMX-1) began providing dedicated operational test involvement during the summer of FY14 and aircraft transition will begin in FY19.

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 2nd Qtr FY15

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 2nd Qtr FY15

FUTURE INITIATIVES:

- Presidential Helicopter Replacement Program (VXX)
  - Planned IOC 4th Qtr FY20
  - Planned FOC 4th Qtr FY22

VH-92 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

* "VH-92" designation is not yet official

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: VXX x 21
MV-22B X 14

		FY14				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	1	2	3	4
UNIT/LOCATION	TAI																																															
HMX-1 QUANTICO	11 x VH-3D																					H								X																	
	8 x VH-60N																					H												X													
	21 x VXX																					H																X									
	1 x TH-60N																																	D													
	1 x TH-3D																													D																	
	14 x MV-22B	M			V																																										
	6 x CH-46E	M			V																																											

M = MV-22B TRANSITION BEGINS
H = VH AIRCRAFT TRANSITION BEGINS
V = MV-22B TRANSITION COMPLETE
X = VH AIRCRAFT TRANSITION COMPLETE
D = TH-60N DIVESTING
D = TH-3D DIVESTING

	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
AIRCRAFT TYPE/TAI												
VH-3D	11	11	11	11	11	11	11	3	0	0	0	0
VH-60N	8	8	8	8	8	8	8	8	4	0	0	0
VXX	0	0	0	0	0	3	4	10	16	21	21	21
TH-3D	1	1	1	1	1	1	1	0	0	0	0	0
TH-60N	1	1	1	1	1	1	1	1	0	0	0	0
CH-46E	6	0	0	0	0	0	0	0	0	0	0	0
MV-22B	12	13	14	14	14	14	14	14	14	14	14	14
TOTAL HMX-1 TAI	**39**	**34**	**35**	**35**	**35**	**38**	**39**	**36**	**34**	**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

3.3 MARINE OPERATIONAL TEST AND EVALUATION SQUADRON TWENTY-TWO

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 V-22 Osprey, the mission of Marine Operational Test and Evaluation Squadron 22 (VMX-22) is expanding to include all manned and unmanned platforms 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 (TTP's) 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 the 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 our cargo UAS capability 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 assist in requirements generation for future cargo delivery systems through experimentation.

In 2014, VMX-22 will assume responsibility for operational testing and experimentation of unmanned systems, beginning with the MQ-21 Blackjack. After completion of the Initial Operational Test and Evaluation (IOT&E) of the MQ-21, VMX-22 will operate a single system of three 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 colocation with MAWTS-1 will ensure rapid development of TTP's associated with new weapons systems of the MQ-21 and follow-on unmanned aerial systems.

V-22: In 2015, four MV-22 Ospreys and the VMX-22 main body relocate to MCAS Yuma and serve as the command element of a permanent composite aviation combat element dedicated to operational testing and experimentation. V-22 Osprey testing of new capabilities such as airborne C2, aerial refueling, and future weapons delivery systems is improved through the use of Yuma's extensive ranges and airspace.

MARINE OPERATIONAL TEST AND EVALUATION SQUADRON TWENTY-TWO

Marine Air Command and Control Systems: Concurrent with the standup of a dedicated UAS test capability, Marine aviation is improving the way we test MACCS equipment such as CAC2S and the TPS-80 Ground/Air Task Oriented Radar (G/ATOR). By assigning VMX-22 as the lead squadron supporting testing on MACCS equipment, we ensure that future C2 systems can operate effectively with the rest of the rest of the MAGTF and meet Marine aviation needs.

Additionally, the standup of a permanent MACCS test organization collocated with MAWTS-1 supports evaluation of future MACCS concepts such as the Marine Air Operations Center, merging the traditional Tactical Air Operations Center (TAOC) with the Direct Air Support Center (DASC).

CH-53: VMX-22's two CH-53E aircraft will remain at MCAS New River and continue to support operational and developmental testing. 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 CH-53 detachment will join the VMX-22 main body in Yuma.

F-35B: VMX-22 Det Edwards is in the process of accepting four F-35B Lightning II aircraft, to start spin-up training for operational testing scheduled to begin in 2015. The detachment will grow to six aircraft and support the Joint Operational Test Team in Edwards AFB through the Initial Operational Test and Evaluation (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 will also support initial tactics development as new software capabilities are introduced and support Marine Corps Initial Operating Capability standup of VMFA-121.

H-1: In 2015, AH-1 and UH-1 operational testing will relocate from VX-9 at NAS China Lake, CA and join VMX-22 in MCAS Yuma, AZ. By co-locating our Venom and Viper 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 support for long range raids by the Infantry Officers Course 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 support the MAGTF.

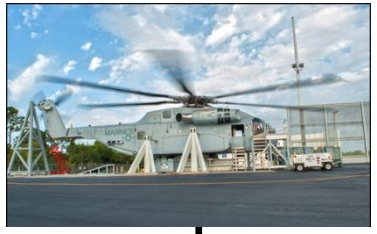
MARINE OPERATIONAL TEST AND EVALUATION SQUADRON TWENTY-TWO

MACCS arrives from Camp Pendleton, CA

VMX-22 HQ and 4 x MV-22 from MCAS New River, NC – July 2015

6xF-35B from Edwards AFB, CA

2xCH-53K, 2xCH-53E arrive from MCAS New River, NC



2013 2014 2015 2016 2017 2018 2019 2020 2021 2022

VMX-22 TRANSFORMATION AND MOVEMENT TO MCAS YUMA

Initial USMC UAS Operational Test Capability

H-1s arrives from VX-9, NAWS China Lake, CA
2xAH-1Z, 2xUH-1Y, 1xAH-1W

MAGTF Integration

- VMX-22 move to Yuma in FY-15 will bring all assets of the future MAGTF aviation combat element under one command.
- Collocation with MAWTS-1 enables year round tactical demonstrations and tactics, techniques and procedures development.
- Vast capability to experiment and validate concepts for joint digital interoperability

3.4 MARINE AVIATION WEAPONS AND TACTICS SQUADRON ONE

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 (WTTP) for all of Marine aviation. The cornerstone of the WTTP 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 MCTOG and MCLOG to create a MAGTF Weapons School environment, responsible for the development of individual advanced tactical training, as well as exercise design for the MAGTF Training Program. This construct creates both an individual and collective training environment based on a MEB-level construct, 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. 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 showcase every function of Marine aviation. These evolutions, such as anti-air warfare, assault support tactics, offensive air support, 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 MACCS participates in three simulated exercises which focus solely on the MACCS and enables higher level training and readiness events unable to be accomplished in any other training venue. After the simulated exercises, the agencies participate in 10 events and 3 major evolutions which encompass the integration of all six functions of Marine aviation. The number of live aircraft sorties and the sheer size of the MACCS 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 make its debut at WTI 1-15 where the Tactical Air Command Center, Direct Air Support Center, and Tactical Air Operations Center will operate out of three different operation facilities, but for the first time ever all three agencies will operate off the same equipment and hardware. MAWTS-1 looks forward to the future as we transform the MACCS and enable a MACCS which supports the vision and concepts of Expeditionary Force 21.

MARINE AVIATION WEAPONS AND TACTICS SQUADRON ONE

SPMAGTF-CR

As the Marine Corps looks to pursue new concepts like SPMAGTF-CR, MAWTS-1 continues to define and standardize aviation's role in future MAGTF operations. The strategic environment compels the Marine Corps to operate in an increasingly distributed manner. 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 Marine aviation enables such rapid response now. With aviation weapons systems like the KC-130J, F–35B, MV–22, and RQ–21, the MAGTF will be equipped to quickly respond to crisis at all levels of intensity.

MAWTS-1 has facilitated experimentation and collaboration in multiple venues to hone our collective skills when embarking for long range crisis response. On 15 December 2013, MAWTS-1, upon guidance from the Deputy Commandant for Aviation, partnered with the Infantry Officer's Course to plan and conduct a long-range raid from Marine Corps Air-Ground Combat Center Twentynine Palms to Fort Hood, TX—a distance of 1,083 miles— featuring collaborative planning between the MACCS, AV-8Bs, MV-22Bs, KC-130Js, and infantry officers en route using tactical links and tablet computers. The mission capitalized 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 Osprey and Herc communities further explore our range of capabilities within this arena while conducting a humanitarian assistance and embassy reinforcement mission between Yuma, Arizona and Las Cruces, New Mexico – a distance covering 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 options 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 the WTI courses a composite detachment of DASC and TAOC Marines are being combined to perform a proof-of-concept for future MACCS agency design. The Multifunction Air Operations Center (MAOC) will control WTI evolutions using the Common Aviation Command and Control System (CAC2S), the AN/TPS-80 Ground/Air Task Oriented Radar (G/ATOR) and the mobile Tactical Air Operations Module (MTAOM). 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, MAG-14, Marine Corps Information Operations Center (MCIOC), Marine Corps Forces Cyberspace Command (MARFORCYBER), Marine Corps Forces Special Operations Command (MARSOC), and 1st 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 live 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 now issues 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 plans. 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 in the Marine Corps.

Defense of the Expeditionary Airfield

WTI now incorporates air base ground defense operations for the first time 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's has been involved providing guest instructors who demonstrate the intricacies of how to run a combat operations center. The AGS department recently provided instruction to students at MCLOG's Intermediate MAGTF Logistics Officers Course and the MCLOG instruction continues to strengthen the collaborative efforts between these institutions.

Distributed Operations

The MV-22 routinely practice conducting distributed operations missions with the AV-8B Harrier at Laguna Army Airfield. For the demonstration event, MV-22Bs will conduct ADGR and weapons reload for the AV-8B in support of AV-8B offensive air support execution. 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 "spider" forward arming and refueling points (FARPs). These rapidly deployable FARPS relocate on call reacting to mission requirements and maturation of the battlespace, and provide 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 perspective 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.

3.5 NAVAL AVIATION ENTERPRISE

Naval Aviation Enterprise & Current Readiness Mission: Advance and sustain Naval Aviation warfighting capabilities at an affordable 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.

The demand for naval aviation forces will increase, while resources will decrease. The security environment will continue to pose a threat to our national interests. Within the NAE, it is our mission to intelligently optimize those resources to meet today's and tomorrow's threats.

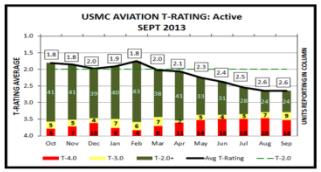
Marine aviation commanders and leaders – in concert with the Naval Aviation Enterprise – will plan, execute, and manage the current readiness (CR) process in order to maximize equipment and personnel readiness. The focus must be on optimizing material resource allocations and expenditures while minimizing 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:

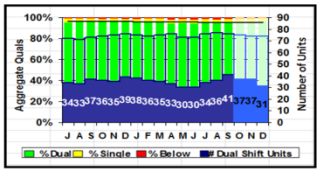
- Increase aircraft readiness
  - Increase aircraft availability
  - Increase in-reporting (IR) rates / Decrease out-of-reporting (OOR) rates
  - Reduce depot turnaround time
- Reduce workload on Marines
- Understand and manage costs and schedule
- Extend service life for legacy aircraft / achieve programmed 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

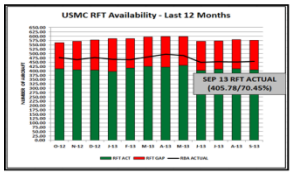
USMC TOP 5



T-RATING

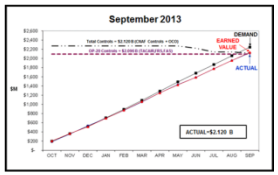


MAINTAINER CORE COMPETENCY



RFT AVAILABILITY

AIRCRAFT LIFE MANAGEMENT



COST PERFORMANCE

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 (T/M/S) 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 T/M/S 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.

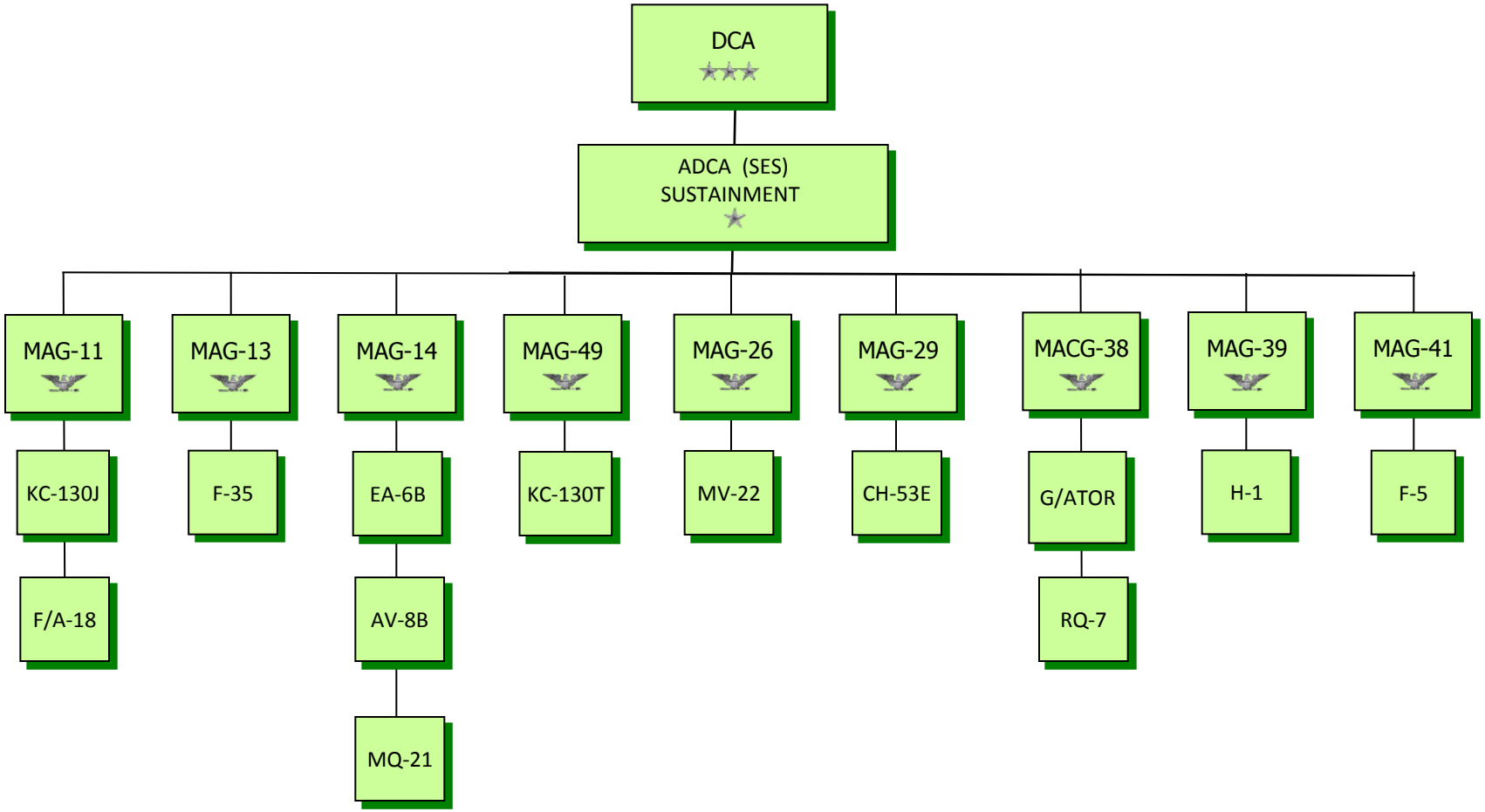
-Aircraft Life Management: Proper management of aircraft utilization ensures airframes attain the expected service life, including managing airframe usage within an acceptable range of life-limiting parameters (flight hours, fatigue, etc.).

-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 T/M/S to service targets
- Reduce Cost Per Flight Hour (CPFH) by the percentage assigned for each T/M/S
- Develop methodology for managing fully burdened Operating and Support (O&S) costs
- Apply the 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) to address future O&S costs in new acquisitions
- Modify TMS briefs to provide focus on both key readiness degraders and cost initiatives/progress
- Increase PM engagement in submission of affordability initiatives Future Readiness (FR) CFT
- Merge the Maintenance and Supply Chain Management (M&SCM) and CR CFT VTCs and focus combined event on validating TMS team analysis, filter issues for 3-star level engagement

MARINE AVIATION TYPE/ MODEL/ SERIES LEADS



FLYING HOUR PROGRAM (FHP) AND CORE COMPETENCY RESOURCE MODEL (CCRM)

Marine Corps flying hour program management is generated by MCO 3125.1B.

The term "Flying Hour Program" refers to the allocation and obligation of funds from the Operation and Maintenance, Navy (OM,N) and Operation and Maintenance, Navy Reserve (OM,NR) 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 tilt-rotor 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.

Schedule C: Fleet Air Support (FAS) FHP

Deployable and non-deployable AC operational support aircraft (OSA), SAR, HMX-1, and VMX-22 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) has experienced significant cost growth. In an effort to mitigate these increases, the Assistant Commandant of the Marine Corps released the 'Marine Corps Aviation Flying Hour Marine Corps 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 that each level of command reviews its funded contracts for efficacy and necessity and eliminate those without requirement. Proceeding as directed by the message will decrease CMS costs and allow the operating forces to regain diminished skill sets resulting from CMS.

Core Competency Resource Model (CCRM)

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 maintaining required T-level readiness ratings. 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.

CG, Training and Education Command (TECOM) Aviation Training Division Branch (ATB) is the custodian of the CCRM for each T/M/S. The CCRM and predictive scheduling tools are maintained on the TECOM website (https://vcepub.tecom.usmc.mil/SITES/DIRECTORATES/MTESD/ASB/DEFAULT.ASPX).

Marine Corps SBTP Guidance

In recent years the Marine Corps FHP has 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 that could potentially put the T-2.0 flight hour requirement at risk and possibly lead to decreased USMC FHP budgets despite no decreases in requirements for the future.

In order to promote accurate and executable SBTPs that successfully achieve readiness goals that mirror the CCRM requirements, HQMC Aviation, 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.

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

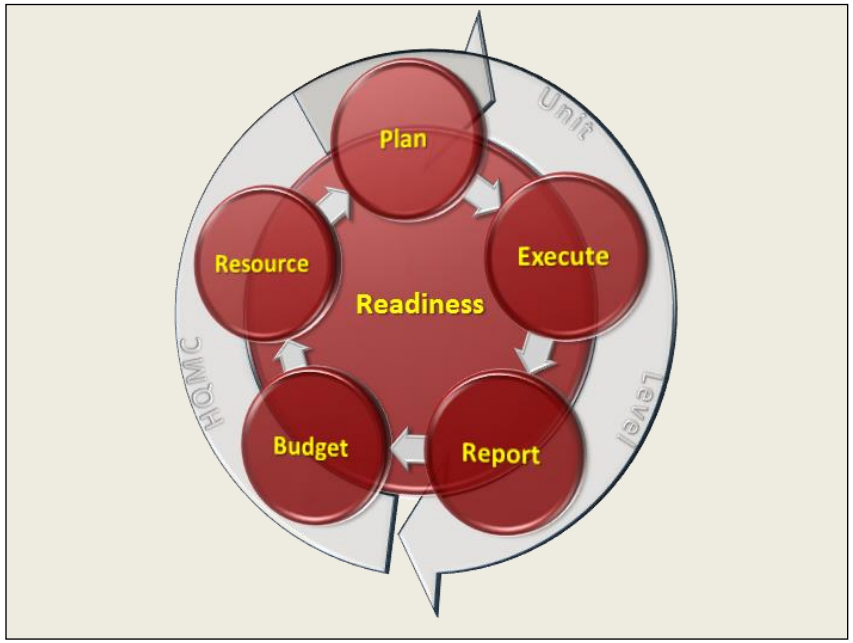
The Marine aviation Training and Readiness (T&R) program aligns with Department of Defense (DoD) and joint requirements by prescribing training standards required to develop core competent units that can fulfill operational requirements of combatant commanders. The T&R program implements a comprehensive, capabilities-based training system which develops and provides 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.

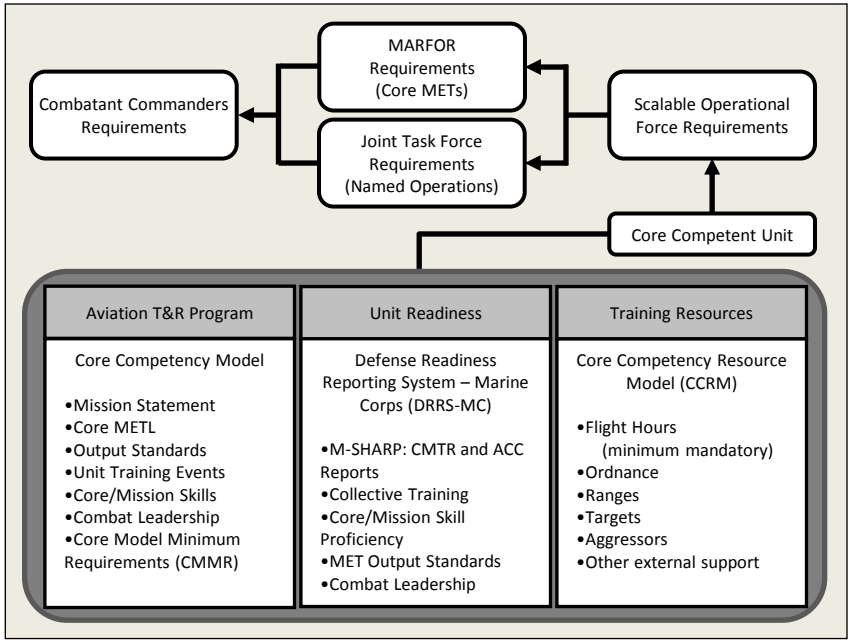
T&R Program Manual

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 T-2.0 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.

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) in order to attain and maintain a T-2 level of readiness per NAVMC 3500.14C. 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.

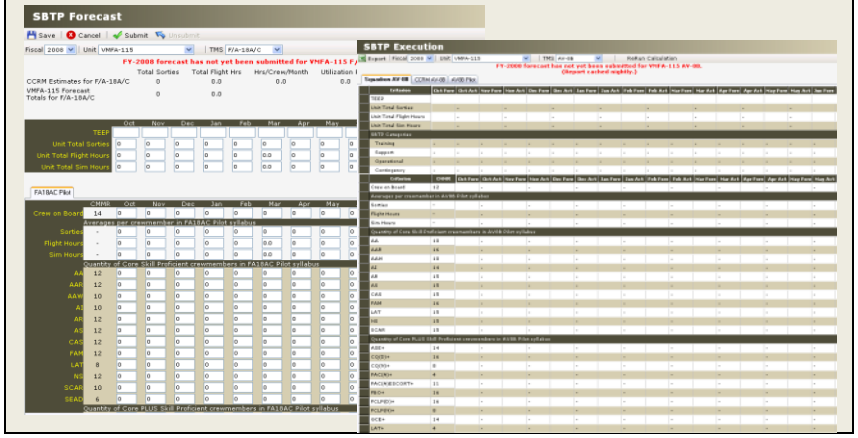
Annual Unit SBTP Submission. An annual SBTP forecast is developed at the squadron level, then reviewed and approved through the MAG/MAW/MCI/MARFOR/DCA chain of command. Unit SBTP forecasts shall be submitted by squadrons NLT 26 August each year for the following fiscal year (FY) or as specified by the SBTP Message. HQMC Aviation Plans and Policy (APP) consolidates the MARFOR-approved inputs into a single Marine aviation SBTP by T/M/S. APP uses each T/M/S T&R Core Competency Resource Model (CCRM) and the MARFOR T/M/S SBTP submissions for the development of the FHP for DCA approval and final submission to OPNAV N43.

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.

MET to Core/Mission/Core Plus Skill Matrix

METL	CORE SKILLS 2000 PHASE							MISSION SKILLS 3000 PHASE				
	NS (H)	LDN	TN	LAT	SEC FORM	DIV FORM	TR TR	ALO	CPL	AAR	RGR	AD
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

M-SHARP SBTP Forecast/Execution Reports



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 an 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 the automation of objective, rules-based risk management within M-SHARP designed to help the commander prevent the unmitigated 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 is development to increase functionality for flying squadrons and the sustained use of M-SHARP by MACCS and METOC units. TECOM (ASB) assumes responsibility for the management of M-SHARP for Marine aviation.

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 though 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 for to better inform the DRRS-MC assessment.

TRAINING MANUAL VERSION / UPDATES:

ANTTP – Air Naval Tactics, Techniques, and Procedures

T/M/S	Class	Current ANTTP	Last Conference	Next Conference
CH-46E	U	JUL 10	MAY 10	N/A
CH-53 E	U	JUL 12	MAY 12	MAY 14
AS TACSOP	U	AUG 12	FEB 12	JAN 14
AH-1 W/Z	U	MAR 13	JAN 13	JAN 15
UH-1 N/Y	U	MAR 13	JAN 13	JAN 15
USMC RW	S	JUL 09	JAN 09	JAN 14
MV-22	U/S	JUN 13	FEB 13	FEB 15
KC-130 T/J	U/S	APR 12	JAN 12	FEB 15
AV-8B	U/S	APR 12	FEB 12	FEB 14
F/A-18	S	MAY 05	JUN 04	
EA-6B	S	SEP 12	FEB 11	TBD
UAS	U/S	JUL 11	MAY 13	MAY 15

NOTES:
- AH-1 and UH-1 incorporated Y/Z information during last conference.
- Rotary Wing TACSOP has been renamed Assault Support TACSOP.
- JSF NTTP design / content is being staffed through the JSF community. Initial JSF 3-1 is being routed for signature by USMC, USN, and USAF.
- USN is the model manager for F/A-18A & C. VMFAT-101 is model manager for F/A-18D.
- USN handed over EA-6B model manager to VMAQT-1 in April 2014.

MACCS & Aviation Ground Support T&R Manuals

T&R Manual	NAVMC	Complete	Update
TACC Operations	NAVMC 3500.81	20 Oct 10	EST FY15
TACC 5900 Maint	NAVMC 3500.73	16 Mar 12	Will be combined with TACC
TAOC (combined)	NAVMC 3500.119	At MARFOR	EST FY16
MATC Operations	NAVMC DIR 3500.94	2 Feb 12	EST 3rd Qtr, FY14
MATC 5900 Maint	NAVMC 3500.76	17 Oct 13	Will be combined with MATC
DASC (combined)	NAVMC 3500.120	1 Nov 13	EST FY15
LAAD	NAVMC 3500.57	22 Nov 11	EST 2nd Qtr FY14
METOC	NAVMC 3500.38	11 Dec 07	EST 3rd Qtr, FY14
METEM	NAVMC 3500.62	1 Apr 13	Will be combined with METOC
AES	NAVMC 3500.45	31 Mar 08	Superseded by ARRF, EAF, and EAFSO (will be canceled once EAFSO is signed)
ARRF	NAVMC 3500.114	28 Aug 12	FY 14
EAF	NAVMC 3500.113	20 Nov 13	FY 15
EAFSO (Exp Airfield Services Officer)	TBD	2nd Qtr 14	FY 16

Aviation T&R Manuals

T&R Manual	NAVMC	Complete	Update
Program Manual	NAVMC 3500.14C	23 Aug 11	EST Dec 14
F/A-18	NAVMC 3500.50B	26 Jun 12	EST Jun 15
F-35B	NAVMC 3500.111	15 Dec 11	Revision in Staffing
AV-8B	NAVMC 3500.51A	9 Jul 13	EST Jul 16
KC-130T	NAVMC 3500.52B	I Nov 13	EST Nov 16
KC-130J	NAVMC 3500.53A	19 Apr 13	EST Apr 16
MV-22B	NAVMC 3500.11B Ch 1	1 Jul 13	Next T&R Conf – Jul 16
EA-6B	NAVMC 3500.1A Ch 1	2 Apr 13	EST Apr 16
AH-1W	NAVMC 3500.49	8 Mar 11*	Revision in staffing
UH-1N	NAVMC 3500.48	8 Mar 11*	Sundown
AH-1Z	NAVMC 3500.104	8 Mar 11	Revision in staffing
UH-1Y	NAVMC 3500.20A	20 Sep 13	Next T&R Conf Sep 16
CH-46E	NAVMC 3500.46A Ch 1	14 Dec 10	Sundown
CH-53D/E	NAVMC 3500.47A	8 Mar 11	D Sundown. E/K revision in staffing
HH-46 SAR	NAVMC 3500.21	Feb 14	Next T&R Conf as required for HH-1Y Conversion
HH-1N SAR	NAVMC 3500.91	18 Mar 11	Next T&R Conf as required for HH-1Y Conversion
UC-35C/D	NAVMC 3500.92	18 Nov 10	EST Nov 14
UC-20G	NAVMC 3500.93	11 May 11	EST Aug 14
F-5E/N	NAVMC 3500.83	24 Dec 09	EST Dec 14
C-9B	NAVMC 3500.31A	22 Nov 11	EST Nov 14
UC-12W	NAVMC 3500.102	13 Oct 10	EST Oct 14
UC-12B/F	NAVMC 3500.30A	10 Dec 10	EST Dec 14
RQ7B UAS	NAVMC 3500.34	14 Dec 10	EST Jun 14
RQ7B Maint	NAVMC 4790.02	15 Jun 12	EST Jun 15

MARINE CORPS FLYING HOUR PROGRAM

FY15 Core Competency Resource Model
Fleet Aircraft FHP requirement by T/M/S

T/M/S	Hours
AV-8B	19,309
CH-46E	1,522
MV-22B	38,437
F-35	4800
CH-53E	27,043
KC-130J	23,051
AH-1W	19,370
AH-1Z	8,746
UH-1Y	19,670
F/A-18A/C	22,525
F/A-18D	13,772
EA-6B	4,339
TOTAL	**202,584**

Source: CCRM FY15 Ch4

	FY14	FY15	FY16	FY17	FY18	FY19
Fleet aircraft (TACAIR)	193,383	198,260	197,878	194,885	196,882	193,652
Fleet Replacement Squadron aircraft	33,737	31,077	32,627	33,156	31,835	31,530
Fleet Air Support aircraft	26,240	26,072	25,877	26,301	26,255	26,272
Reserve aircraft	28,195	28,124	36,575	34,606	34,605	38,792
USMC FHP TOTAL BUDGETED HOURS	**224,779**	**283,533**	**292,957**	**288,948**	**289,577**	**290,246**

Source: OP-20 v3305 FY14 / v3394 FY15-19

MARINE AVIATION AIRCRAFT INVENTORY

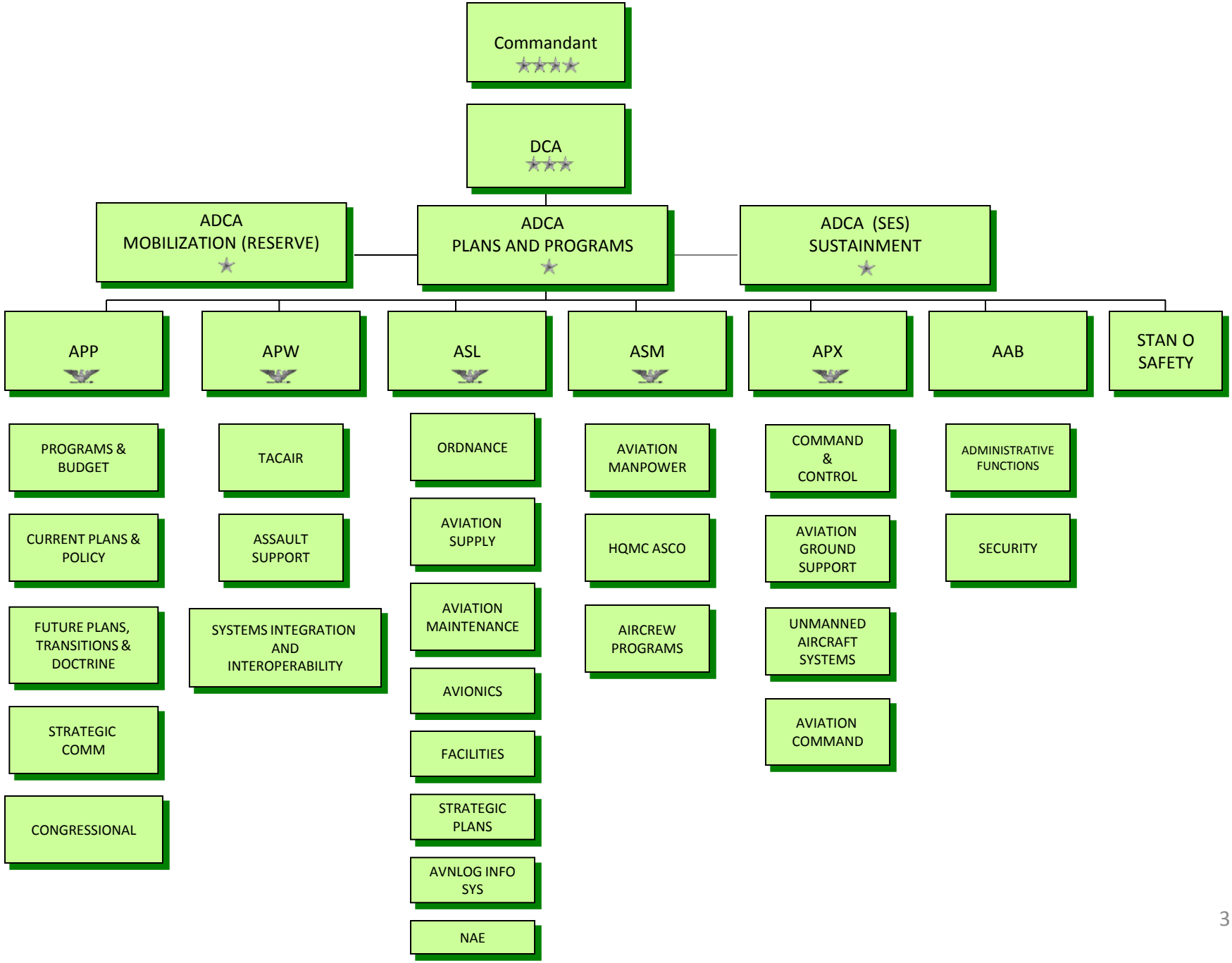
Operational T/M/S	AVG AGE OF FLEET	CURRENT INVENTORY
AH-1W	23	128
AH-1Z	2	37
UH-1N	42	4
UH-1Y	3	98
CH-46E	46	23
MV-22B	4	216
CH-53E	26	150
AV-8B	18	115
F/A-18A+/++	28	56
F/A-18C	21	107
F/A-18D	20	93
F-35B	1	32
EA-6B	27	27
KC-130T	25	23
KC-130J	7	47
TOTAL		1156
Other T/M/S		
HH-1N	42	4
UH-3H	46	1
HH-46E	44	4
VH-3D	38	11
VH-60N	26	8
TAV-8B	25	16
F/A-18B	28	7
F-5F	36	1
F-5N	28	11
C-20G	19	1
C-9B	34	2
UC-12M/F/W	26/27/3	12
UC-35C/D	14/10	12
T-34C	36	3
TOTAL		93
GRAND TOTAL		1249

END OF FY 2014 MARINE AVIATION INVENTORY

		Total Required[1]	Current Inventory[2]	Inventory Shortfall[3]	Flight Line Entitlement[4]	In Reporting[5] #	In Reporting[5] %	POR[6]	Still to Deliver
LEGACY	F/A-18A +/++	50	56	(+6)	30	27	48%	47	Complete 1987
	F/A-18B	5	7	(+2)	4	4	57%	5	Complete 1987
	F/A-18C	118	108	10	69	55	51%	114	Complete 1998
	F/A-18D	91	93	(+2)	60	51	55%	88	Complete 2000
	AV-8B	142	131	11	120	107	82%	156	Complete 2003
	EA-6B	29	27	2	21	21	79%	128	Complete 1990
	KC-130T	28	23	5	24	18	77%	28	Complete 1996
	CH-53E	193	149	44	127	119	79%	177	Complete 1998
	AH-1W	135	128	7	112	113	88%	200	Complete 1998
	CH-46E	40	24	16	24	21	88%	600	Complete 1971
	RQ-7B	13	13	0	12	10	78%	13	Complete 2011
	VH-3D	11	11	0	8	7	62%	11	Complete 1975
	VH-60N	9	8	1	6	5	66%	9	Complete 1998
FUTURE	MV-22B	360	216	144	200	186	86%	360	123
	KC-130J	79	47	32	69	40	85%	79	32
	UH-1Y	118	99	19	88	90	91%	160	61
	AH-1Z	74	39	35	33	35	90%	189	150
	F-35B	32	31	1	29	28	90%	323	318
	F-35C	67	0	67	0	0	0%	67	67
	RQ-11B	178	439[7]	(+422)	N/A	N/A	N/A	178	Complete 2012
	RQ-20A	87	15	72	N/A	N/A	N/A	87	72
	RQ-12A	143	42	101	N/A	N/A	N/A	143	101
	MQ-21A	32	1	31	30	1	100%	32	31
	CH-53K	220	0[8]	0	168	0	0%	200	200
	VXX	21	0	0	16	0	0%	21	21

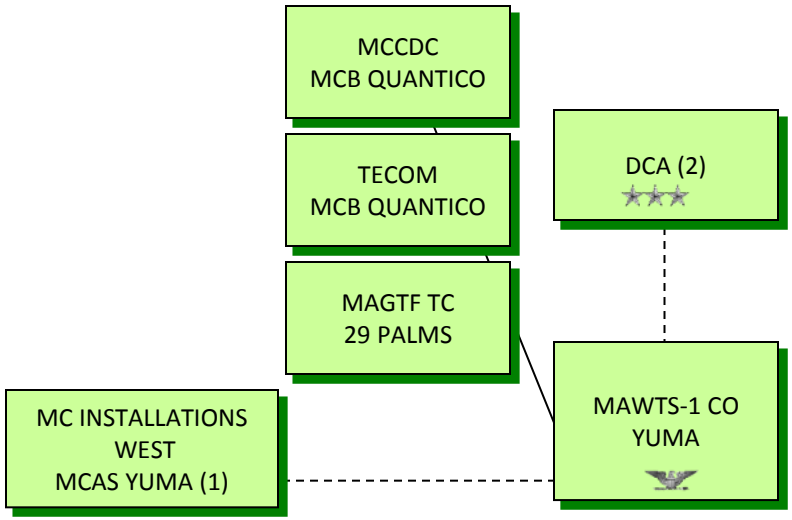
1- Total requirement reflects a community's Mission, Training, Test, Back-Up (Pipeline) and Attrition aircraft which support the Program of Record
2- A community's present total inventory
3- The difference between Total Requirement and Current Inventory
4- Represents degraded Primary Aircraft Inventory due to "Pipeline," this does not change Primary Aircraft Authorized
5- Derived from Director of Air Warfare Aircraft Inventory Planning Factors (5 YR AVG) of Current Inventory aircraft "Out of Reporting" (aircraft not managed by unit commanders due to mods, depot level maintenance, and scheduled rework). F/A-18 community utilized FY14 AVG due to Pipeline percentages which are dramatically impacting aircraft inventory
6- The total number of aircraft procured which supports a community's requirements at the time of procurement
7- Requirement decrease due to introduction of additional improved UAS platforms into the family of small UAS.
8- The CH-53K has entered Developmental Test with three of five test aircraft delivered, these test aircraft are not included in the POR

3.7 HEADQUARTERS MARINE CORPS AVIATION ORGANIZATIONAL CHARTS

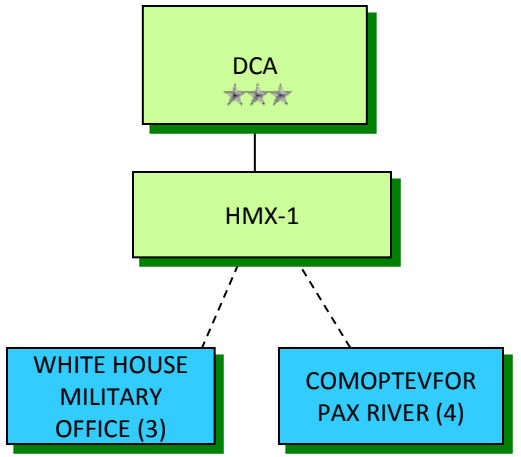


AVIATION-UNIQUE ORGANIZATIONAL CHARTS

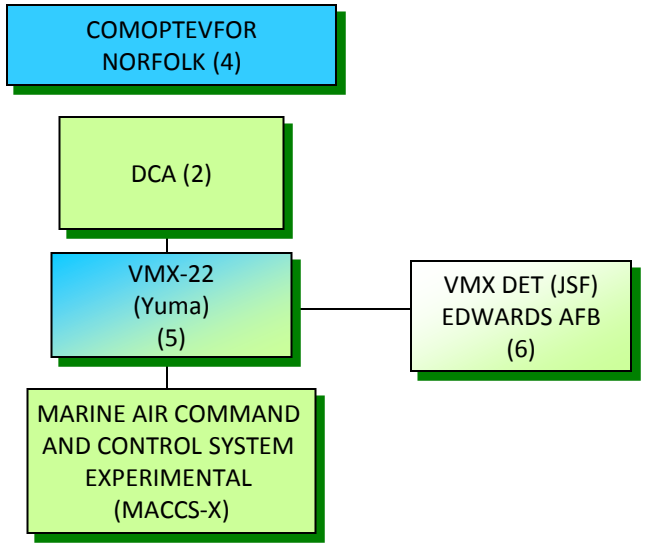
MARINE AVIATION WEAPONS AND TACTICS SQUADRON ONE



MARINE HELICOPTER SQUADRON ONE



MARINE OPERATIONAL TEST AND EVALUATION SQUADRON TWENTY-TWO

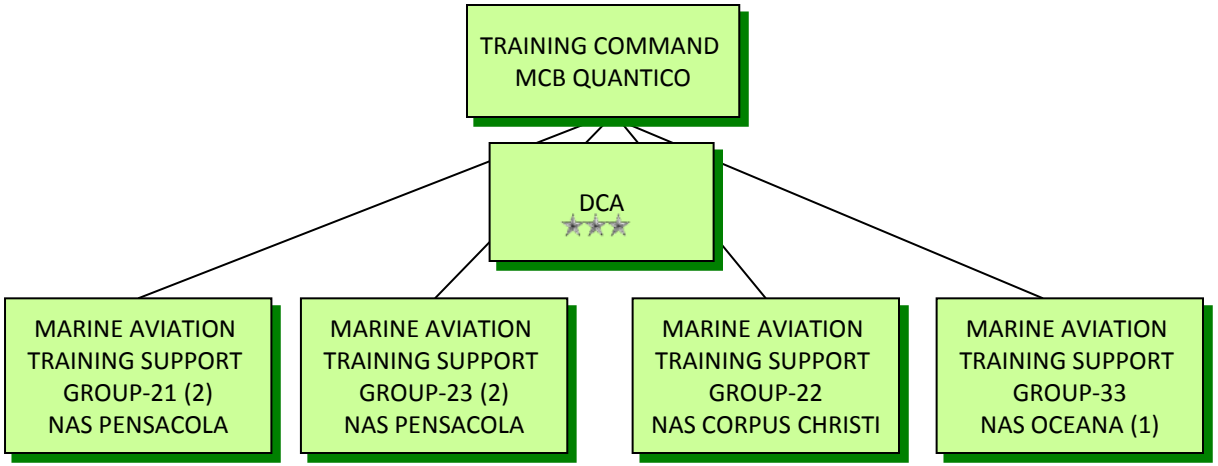


NOTES:

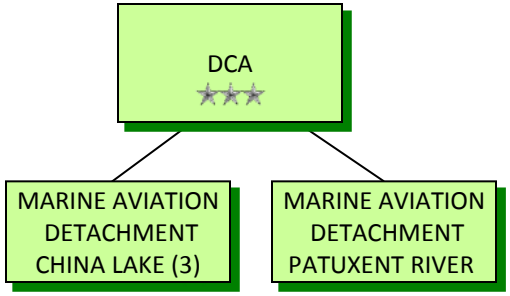
1) FISCAL/COMPTROLLER SUPPORT.
2) ADVOCATE
3) TASKING FOR PRESIDENTIAL MISSIONS.
4) OPCON FOR OPERATIONAL TEST MISSIONS.
5) VMX-22 TO RE-LOCATE TO MCAS YUMA IN 2015.
6) VMX DET (JSF) RE-LOCATES TO MCAS YUMA AT COMPLETION OF JSF SYSTEM DESIGN AND DEVELOPMENT (SDD) IN 2015 (EST).

AVIATION-UNIQUE ORGANIZATIONAL CHARTS

MARINE AVIATION TRAINING SUPPORT GROUPS (MATSGs)



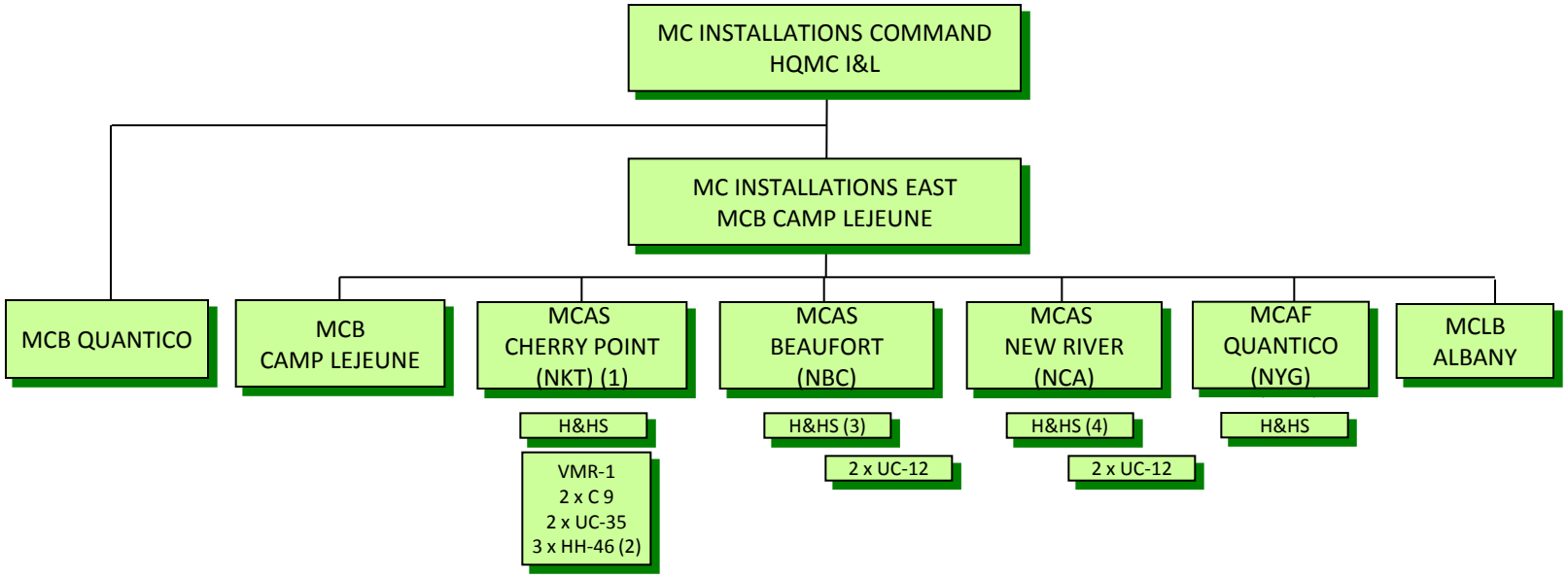
MARINE AVIATION DETACHMENTS (MADs)



NOTES:

1) MATSG-33 CLOSES IN FY 15.
2) MATSG-21 AND MATSG-23 COLOCATED.
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

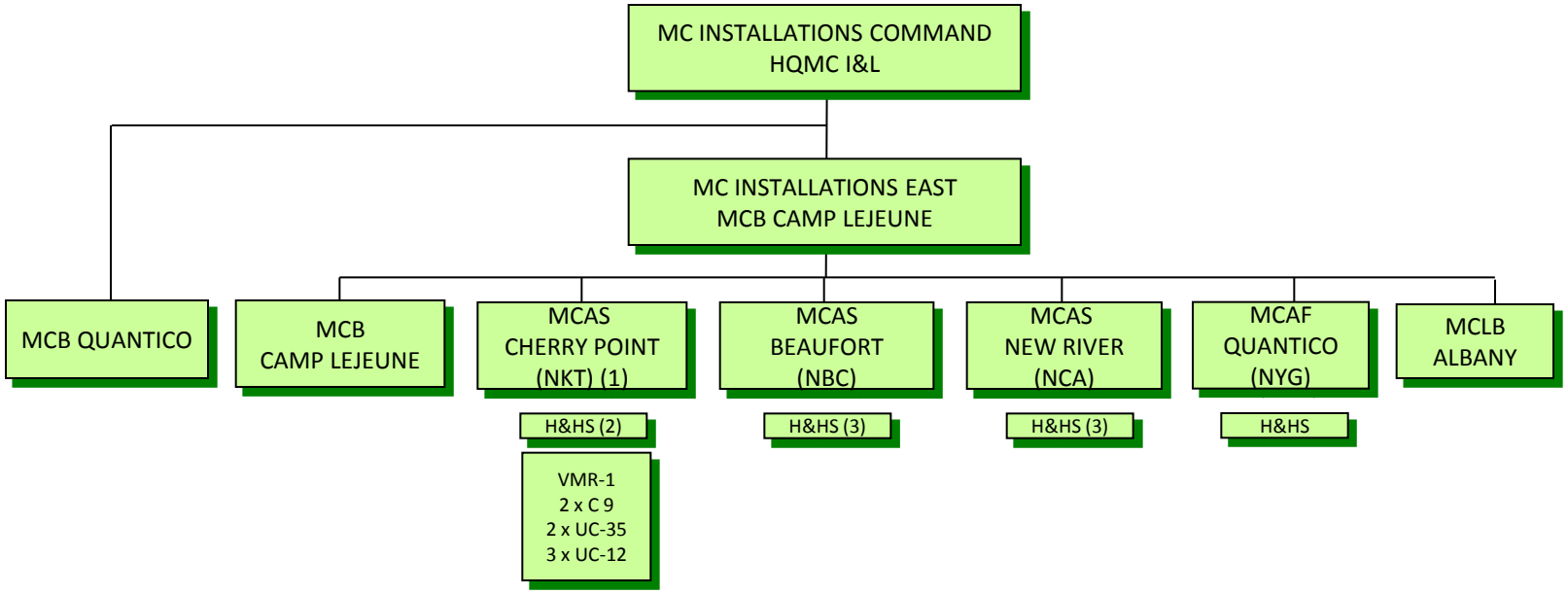


NOTES:

1) VMR-1 IS AN ACTIVE DUTY SQUADRON ASSIGNED TO MCI EAST STATIONED AT MCAS CHERRY POINT.
2) H&HS MCAS CHERRY POINT SAR TRANSITION FROM HH-46 TO UH-1Y IN CALENDAR YEAR 2017.
3) H&HS MCAS BEAUFORT 2 X UC-12M.
4) 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

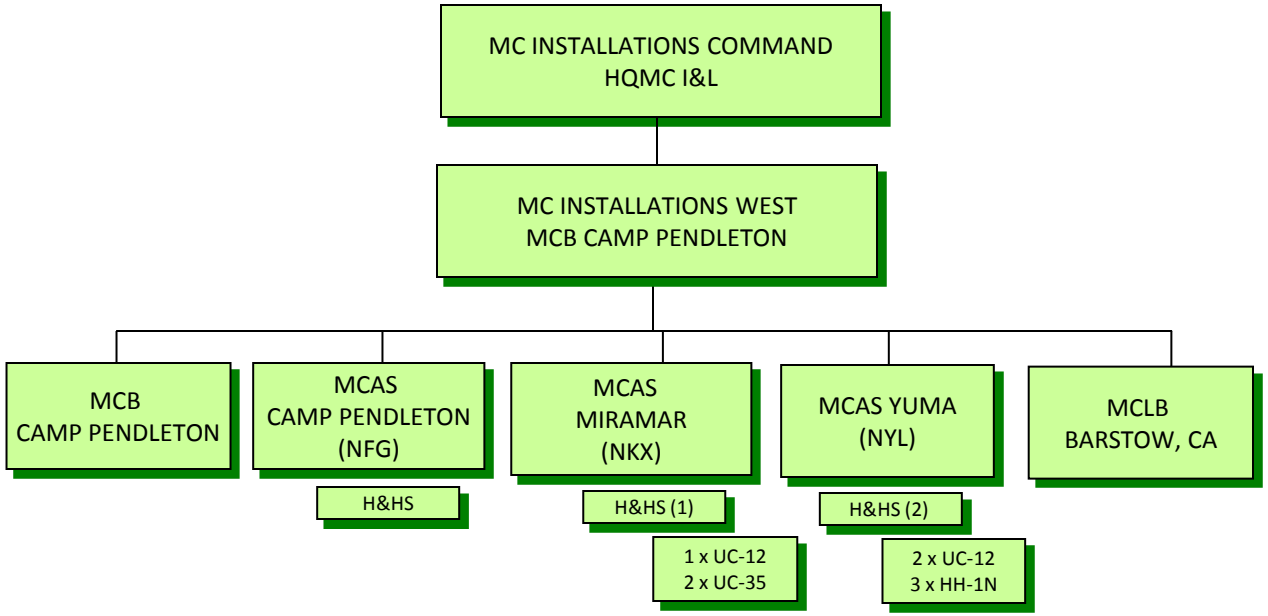


NOTE:

1) DCA INITIATIVE TO ALIGN OSA UNDER MARINE AIR WINGS HINGES ON CONSOLIDATION OF ASSETS AND STRUCTURE UNDER A DEPLOYABLE, VMR SQUADRON.
2) DCA INTENT: ALIGN VMR-1 UNDER 2D MAW BY 1ST QTR FY16
3) DCA INITIATIVE: CONSOLIDATE OSA ASSETS FROM BEAUFORT AND NEW RIVER UNDER VMR-1 IN CHERRY POINT (4 S UC-12S)

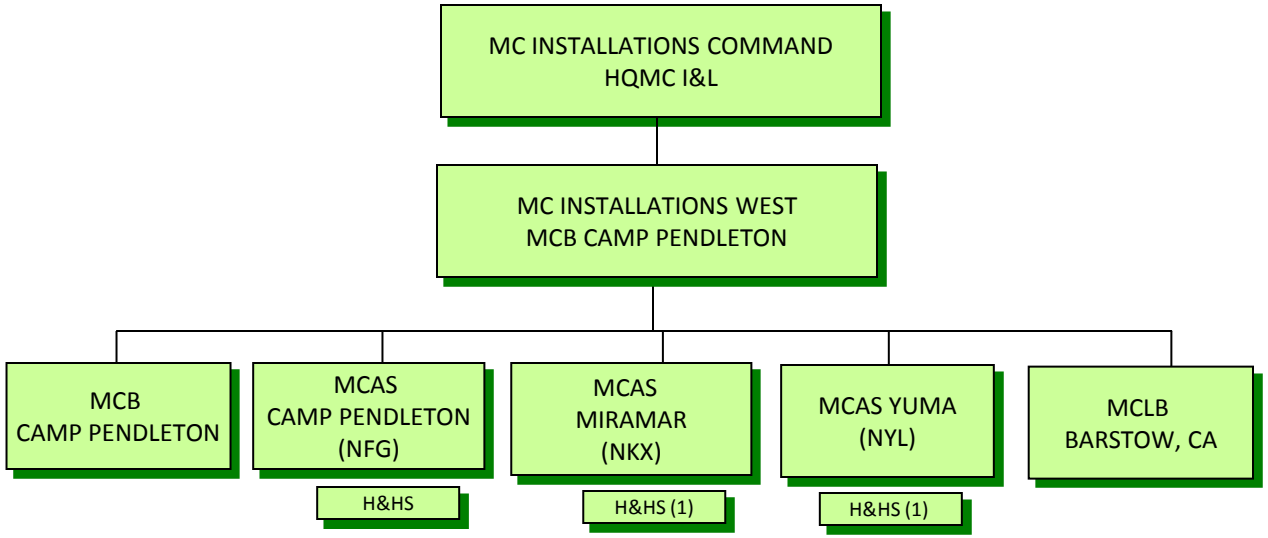
* Air station commanding officers have advocacy relationship with Wing commander and staff for prioritization and planning for aviation issues.

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

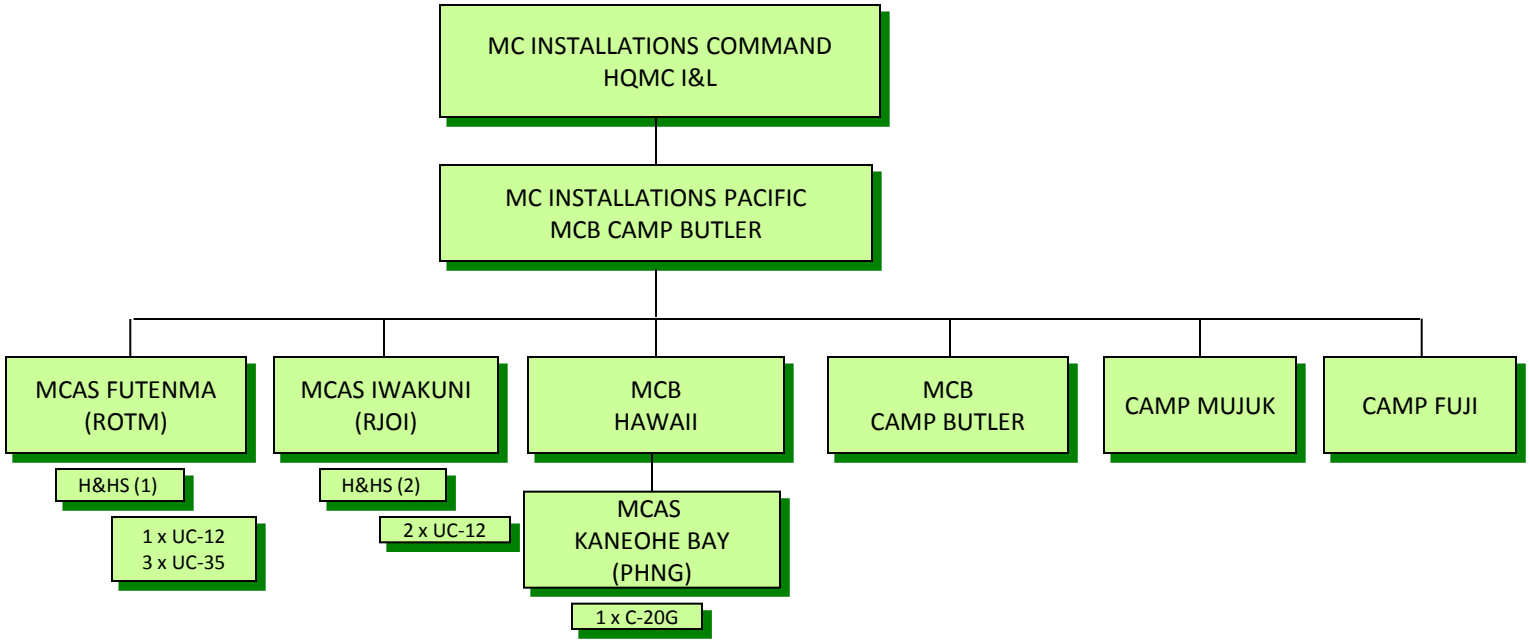


NOTE:

1) DCA INITIATIVE TO ALIGN OSA UNDER MARINE AIR WINGS HINGES ON CONSOLIDATION OF ASSETS AND STRUCTURE UNDER A DEPLOYABLE, VMR SQUADRON.

* 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

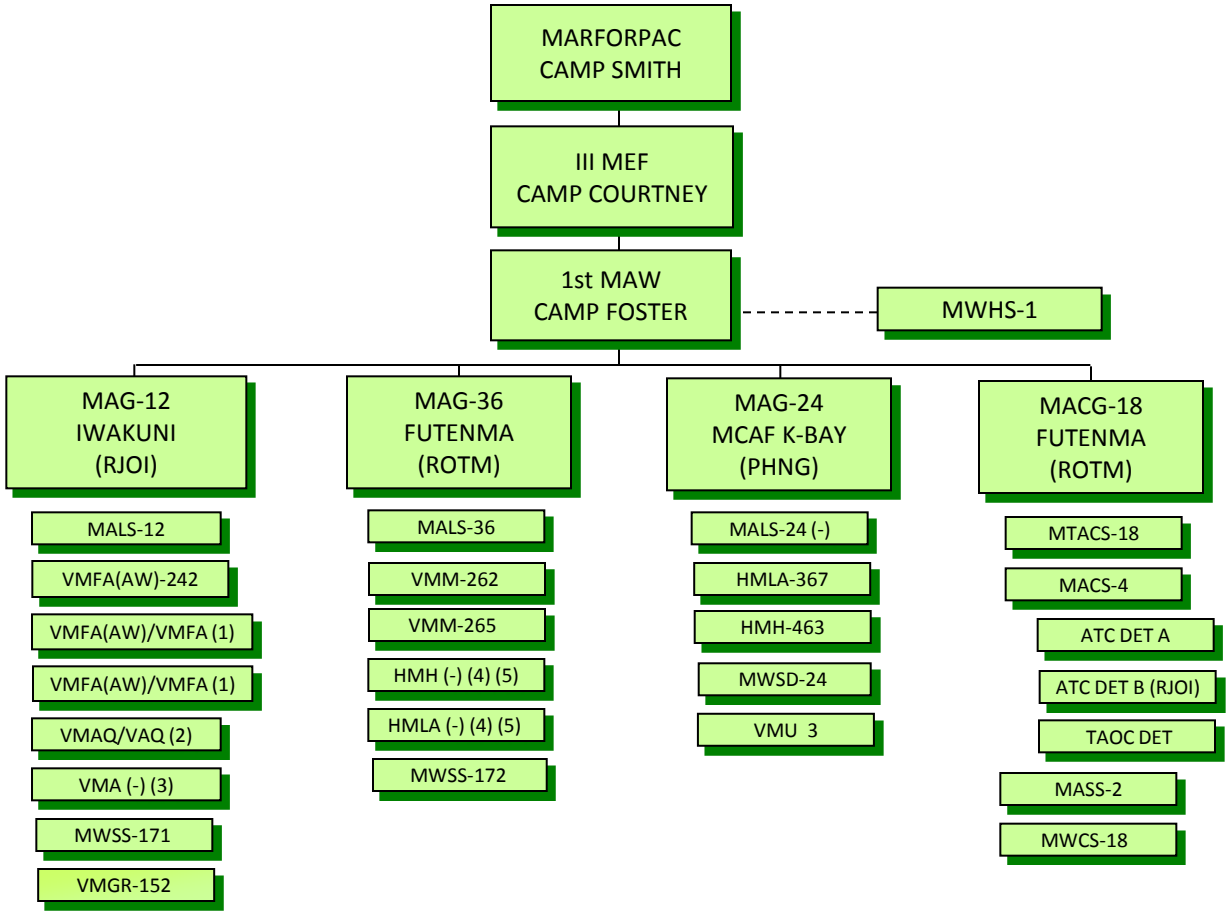


NOTES:

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.

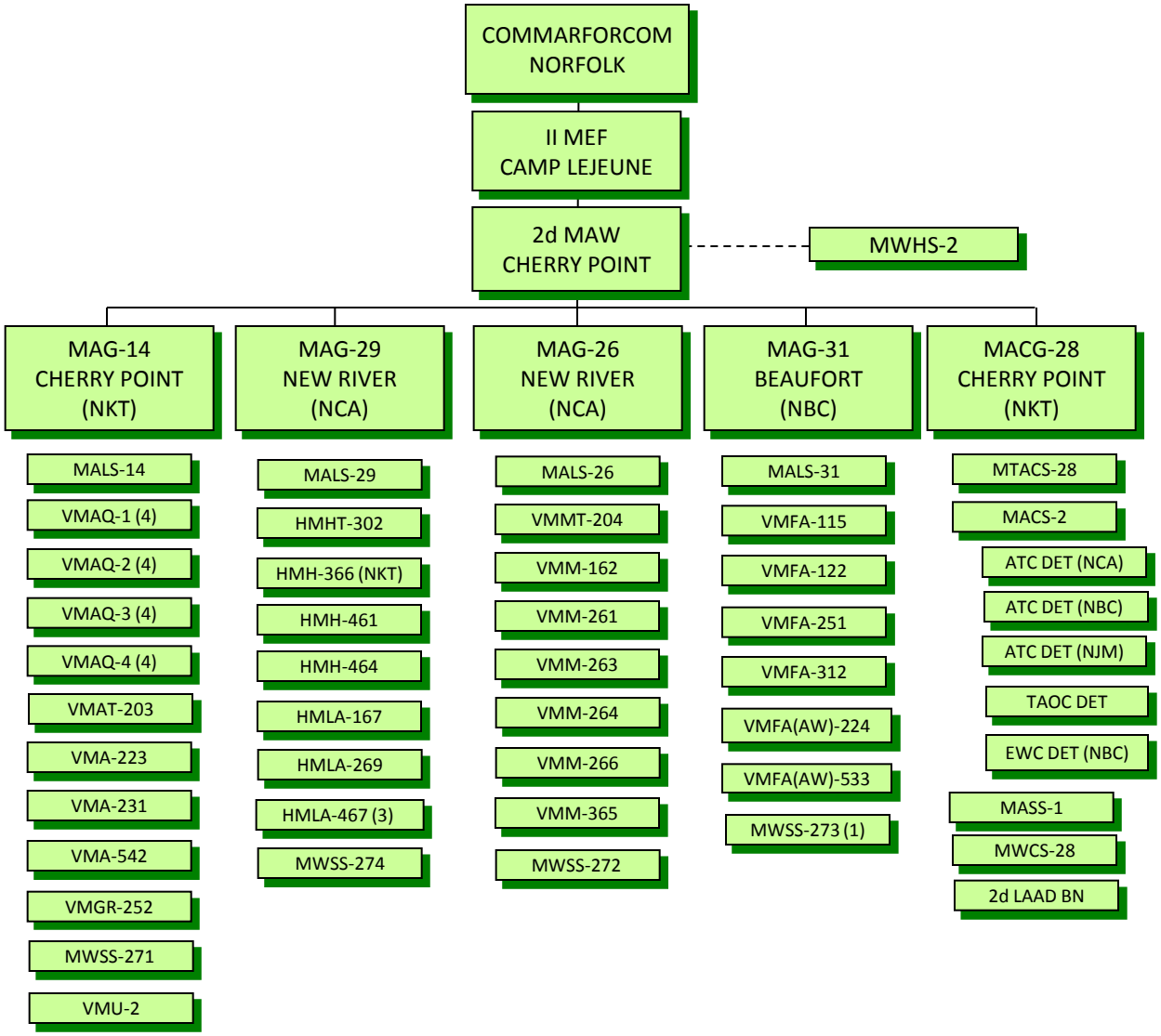
FY15 MARFORPAC/1st MAW ORGANIZATIONAL CHART



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 BY1stMAW/3dMAW.

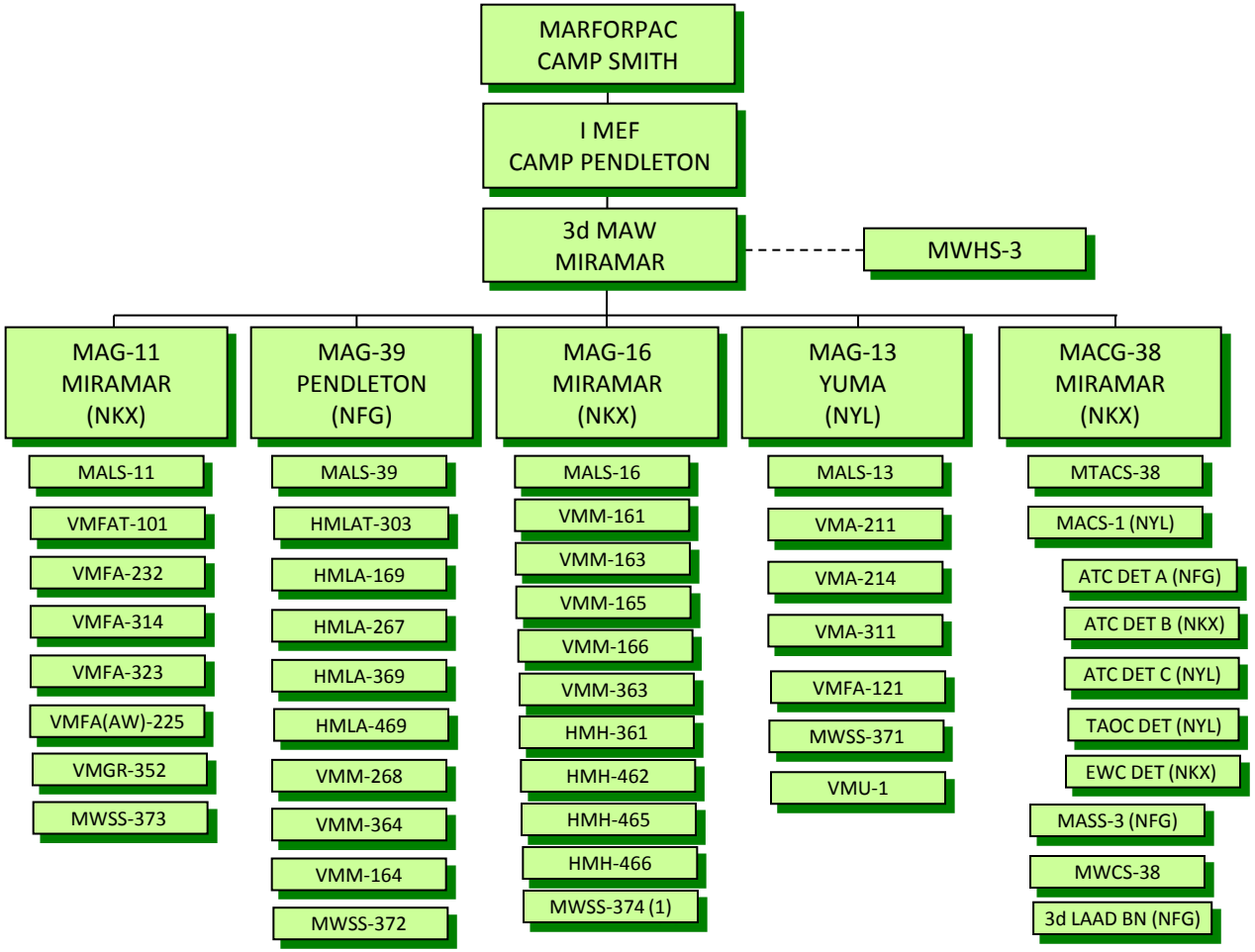
FY15 MARFORCOM/2d MAW ORGANIZATIONAL CHART



NOTES:

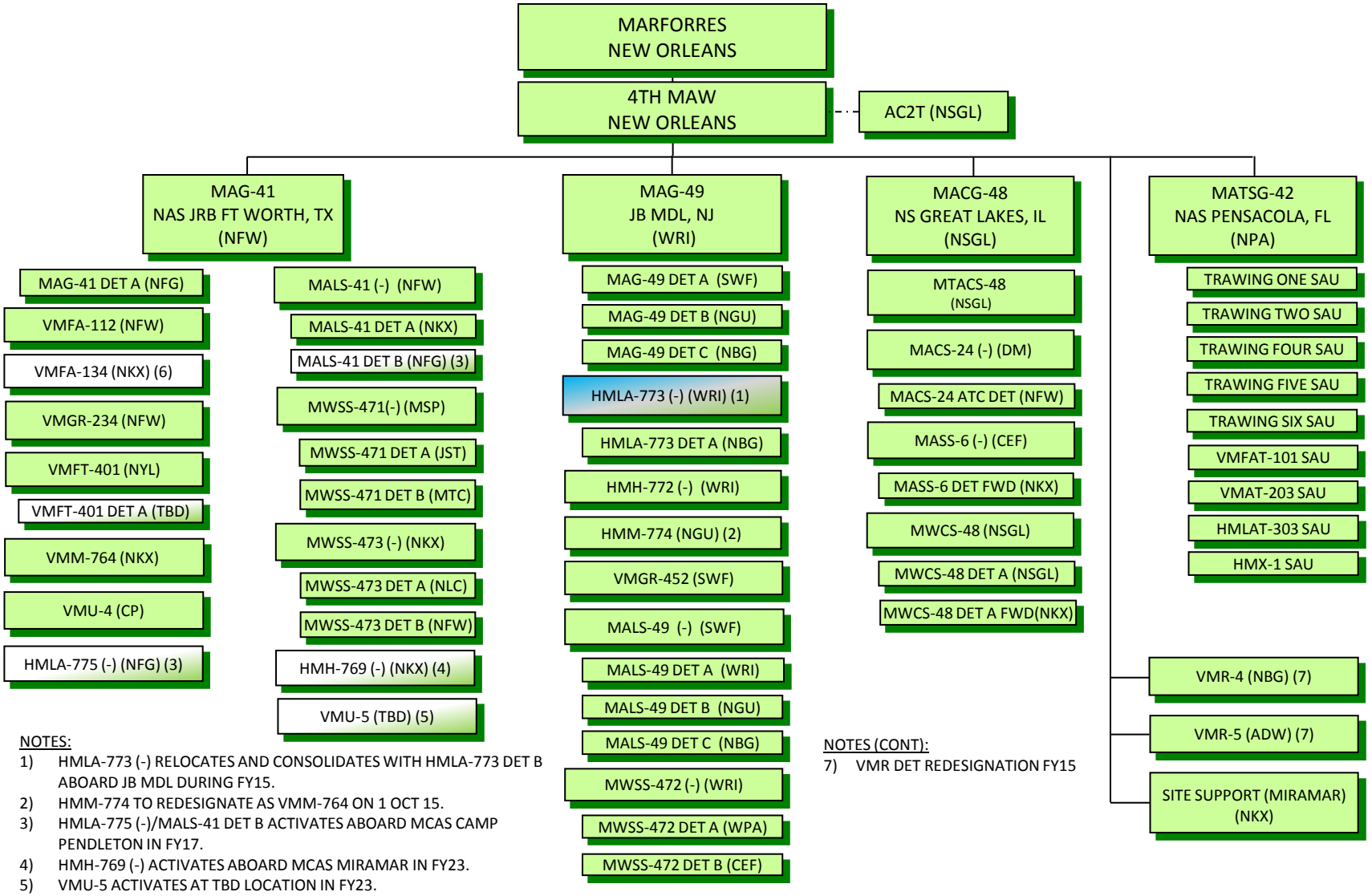
1. MWSS-273 BECOMES MWSD-31 IN FY-17.
2. HMH-366 WILL MOVE TO (NCA) DURING 2ND QTR FY15
3. HMLA-467 MOVES IN Q2 FY15 FROM CHERRY POINT TO NEW RIVER. SQUADRON DISESTABLISHES Q4FY16.
4. VMAQ SQUADRONS SUNDOWN PLAN: VMAQ-1 in FY16; VMAQ-4 in FY17; VMAQ-3 in FY18; VMAQ-2 in FY19

FY15 MARFORPAC/3d MAW ORGANIZATIONAL CHART



NOTES:
1) MWSS-374 BECOMES MWSS-374 (-) IN FY17

4TH MAW ORGANIZATIONAL CHART



NOTES:

1) HMLA-773 (-) RELOCATES AND CONSOLIDATES WITH HMLA-773 DET B ABOARD JB MDL DURING FY15.
2) HMM-774 TO REDESIGNATE AS VMM-764 ON 1 OCT 15.
3) HMLA-775 (-)/MALS-41 DET B ACTIVATES ABOARD MCAS CAMP PENDLETON IN FY17.
4) HMH-769 (-) ACTIVATES ABOARD MCAS MIRAMAR IN FY23.
5) VMU-5 ACTIVATES AT TBD LOCATION IN FY23.
6) VMFA-134 ACTIVATES ABOARD MCAS MIRAMAR IN FY30.

NOTES (CONT):

7) VMR DET REDESIGNATION FY15

ADW – Joint Base Andrews, MD
BKF – Buckley AFB, CO
CEF – Westover ARB, MA
CP – MCB Camp Pendleton, CA
DM – Dam Neck/Oceana, VA
JST – Johnstown, PA
MTC – Selfridge ANGB, MI
MSP – Minneapolis, MN
NBG – NAS JRB New Orleans, LA
NFG – MCAS Camp Pendleton, CA
NFW - NAS JRB Fort Worth, TX
NGU – NS Norfolk, VA
NKX – MCAS Miramar, CA
NLC – NAS Lemoore, CA
NPA – NAS Pensacola, FL
NSGL – NS Great Lakes, IL
NYL – MCAS Yuma, AZ
SWF – Stewart ANGB, NY
WPA – Wyoming, PA
WRI – Joint Base McGuire-Dix-Lakehurst, NJ

3.8 AVIATION MANPOWER

AVIATION MANPOWER

Aviation Manpower Plans

The focus of Aviation Manpower is to ensure both current and future readiness through active management of structure. Our Marines continue to operate at a tempo unparalleled by that of any previous all-volunteer force. Our future is framed by transitions to new aircraft in a fiscally constrained environment. The following information highlights the initiatives by aviation manpower to meet the balance between transformation and downsizing.

182,000 End Strength

In the fall of 2010, the Marine Corps conducted a Force Structure Review (FSR) to evaluate and refine the organization, posture, and capabilities of America's post-OEF expeditionary force in readiness. The FSR Group (FSRG) was tasked with developing a smaller, equally capable Marine Corps. The results reversed several Marine aviation growth initiatives and reduced overall Marine Corps end strength from 202K to 184K. In 2012, the Marine Corps continued to refine its budget and established the Force Optimization Review Group (FORG) to find cost saving measures within existing manpower constraints. Aviation's current operational needs, continued transitions, and future force requirements were factored into the Force Optimization strategy. 2013 concluded with a gradual reduction in end strength to 175,000 (175K) active - duty Marines by the end of FY17. As Marine Corps requirements were further refined, the end strength number was adjusted upward to yield a steady-state force of 182,000 active duty Marines.

Manpower Inventories

Healthy manpower inventories provide flexibility as Marine aviation executes dynamic transitions and future plans. As force shaping matures, and structure reductions are realized, a near term rise in MOS health is expected. Within the Human Resources Development Process (HRDP), the Grade Adjusted Recapitulation (GAR) represents the target inventory requirement for each MOS to ensure the future force is properly staffed.

Enlisted Manning

This year's inventory of Marines keeps pace with the reductions outlined by the FSRG and 180K plan.

Additional indicators used in assessing the health of the enlisted force are the First Term Alignment Plan (FTAP) and Subsequent Term Alignment Plan (STAP) re-enlistment programs. The FTAP is constrained by the FY in which a Marine executes his first reenlistment. However, STAP is a rolling twelve-month requirement for career Marines. Aviation will continue to utilize the decision making process (OODA) to ultimately determine and achieve the desired manpower end-state.

AVIATION MANPOWER

Enlisted Retention

The Selective Reenlistment Bonus (SRB) program evolved to meet the demands associated with Marine aviation's portion of the 202k growth plan. It has further evolved to meet the drawdown toward a smaller force. The previous growth and associated program requirements challenged aviation in keeping the best Marines in critical (high-demand / low-density) MOSs.

The Marine Corps will shape manpower policies to keep these high demand/low density assets- our skilled aircraft maintenance Marines. As force requirements evolve, expectations and incentives will be modified to ensure the Marine Corps' end strength supports initiatives across all affected MOSs and ranks. For the Marines maintaining our highly complex modern aircraft, experience matters.

Enlisted Time to Train (T3)

Marine aviation continues to work within the Naval Aviation Enterprise (NAE) to develop and implement improved solutions to expedite the training and production of aviation maintenance personnel. This effort is closely tied with TECOM on T3 management of enlisted Marines.

Aviation Training System (ATS) Initiatives

We continue to refine our comprehensive and fully integrated training continuum for all Marine aviation platforms. Key program initiatives include standardization and evaluation for flight leadership and for T&R events across all tactical and training evolutions, to include all aircrew, maintenance and C2 personnel. In the long term, we expect higher-quality training at reduced costs through a systems approach to training with an increased reliance on high-fidelity simulators for aircrew and maintenance diagnostics for aviation maintenance Marines.

Officer Time to Train (T3)

Increased efficiencies throughout the aviation training continuum decreased T3 in several communities. Table 4-1 depicts the full time to train from the beginning of introductory flight screening (IFS) to that officer's arrival in his/her fleet squadron.

DCA has taken several steps to decrease time to train for VMFAT-101 (which is 31 weeks more than such training at VFA-106). He has fenced VMFAT-101 aircraft and maintainers to ensure a steady state training/production pipeline, and is adding four aircraft to bring their flight line entitlement to 31 in-reporting aircraft. This will allow them to take approximately one year off of time to train for FA-18 aircrew.

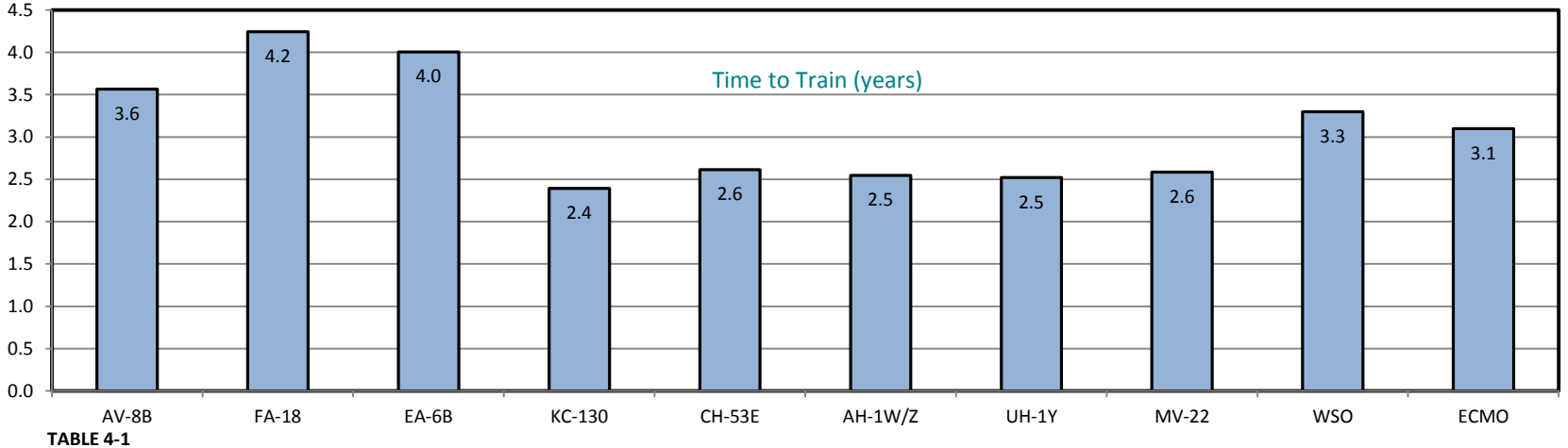


TABLE 4-1

Note: Table 4-1 is inclusive of all preload requirements and is calculated from a student's IFS start date. T-34 / T-6 pipeline and VMFAT-101 / VFA-106 pipelines were averaged. F/A-18 FRS times were averaged due to extended time to train at VMFAT-101 as compared to VFA-106 (approximately 75 and 44 weeks respectively).

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 has established that first- tour TACAIR aviators will spend four years in a fleet squadron, and tiltrotor and helicopter pilots three years in a fleet squadron, with no individual augment commitment, before those aviators become eligible for PCS orders.

F-35B Transition

Manpower requirements have been programmed to support all squadron transitions from legacy TACAIR TMSs (F/A-18A/C/D, EA-6B and AV-8B) to F-35B 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 maintenance training is located at the Joint Integrated Training Center (JITC), 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-35B squadrons while maintaining legacy TMS capability. Aviation will continue to convene F-35B transition selection boards to harvest fleet experience to meet squadron staffing requirements. Targeted communities for maintenance transition are open to all TMSs.

F/A-18A/C/D FRS Training

VMFAT-101 is now supported by an O-6 command as it prepares to become the Marine Corps' sole F/A-18 aircrew producer with the divesture of VFA-106's legacy production in FY18.

Marine Corps structure will move from VFA-106 to VMFAT-101 to provide supplemental support of student throughput. VMFAT-101 student production will decrease beginning in FY18 with the transition of the first F/A-18 squadron to the F-35.

EA-6B Training

VMAQT-1 at MCAS Cherry Point has assumed USMC EA-6B FRS aircrew training responsibility, in support of the three USMC EA-6B fleet squadrons. Sundown of the platform will begin in FY16 with a squadron per year beginning with VMAQT-1 and completing in FY19.

In place of the EA-6B, the USMC will create an organic and distributed electronic warfare system known as MAGTF EW. This will be an integration of manned and unmanned EW capabilities.

The Marine Corps will transition EA-6B Electronic Countermeasures Officers into billets within the MAGTF EW, cyber and UAS structure to capture and leverage their expertise.

KC-130J Conversion

Active component VMGR squadrons have completed KC-130J transition and are now fully focused on supporting operational commitments.

The reserve component began its transition to the KC-130J in FY14 and will continue the transition as new KC-130J aircraft are procured. Nine years of KC-130J operational experience since IOC in 2005 positioned the community to re-evaluate its manpower requirements. As a result, the KC-130J loadmaster and crew chief have been merged into a single "crewmaster" MOS.

Additionally, the armed KC-130J Harvest HAWK mission requires a Fire Control Officer (FCO) to operate the fire control station. In FY15 and beyond, KC-130J pilots serve as Harvest HAWK FCOs.

MANPOWER INITIATIVES WITH A TRANSITIONING FORCE

MV-22 Transition

First and Second Marine Aircraft Wings' HMM to VMM transitions are complete. Transitional focus is now on the west coast and reserve transitions. Once the MAG-39 transition is complete, two VMM squadrons will relocate to Hawaii to better position and capitalize on Osprey capabilities globally.

In 2013, as the capabilities of the MV-22 continued to expand, Marine aviation recognized the benefits of building a scalable MV-22 detachment capable squadron. This concept allows commanders to match the right size force against a requirement while ensuring manpower resources are efficiently utilized. FY14 marked the transition of the first two detachment-capable MV-22 squadrons in the pursuit of transitioning all MV-22 squadrons to the detachment capable concept.

The annual DCA transition/conversion board process continues to select fixed and rotary-wing pilots from outside the MV-22 community for transition to the MV-22 platform. B-billets for officers and enlisted will be staffed by MMOA and MMEA from the MV-22 community as the health of those populations allows. As the HMM to VMM transition approaches maturity, manpower requirements will continue to be evaluated and improved as required.

In 2014, four enlisted air frames maintenance billets from each MV-22 squadron were converted to avionics maintenance billets to better support the requirements of the MV-22 community.

UH-1Y/AH-1Z Conversion

The sequence of conversion is: 3D MAW, 1ST MAW, 2D MAW, and then 4TH MAW.

The UH-1Y/AH-1Z conversion is now complete for HMLAT-303, HMLA-169, and HMLA-267. As of the summer of 2014, 3D MAW had 27 UH-1Y aircraft and 27 AH-1Z aircraft , and continues to convert legacy platforms to these new models. 2d MAW has 36 UH-1Y aircraft, and will begin converting to the AH-1Z.

HMLA-369 is next to convert to the AH-1Z aircraft in FY15, followed by HMLA-469. HMLA-467 is scheduled for deactivation by the end of FY16 while HMLA-775 will be reactivated as the 2nd reserve HMLA in FY17.

Because of the increased performance of the UH-1Y, in 2012 DCA changed the Primary Mission Aircraft Authorization (PMAA) mix of HMLA squadrons from 18 AH-1W and 9 UH-1N to 15 AH-1Z and 12 UH-1Y. Accordingly, manpower increased the total number of UH-1Y pilots and crew chiefs and decreased the number of AH-1Z pilots and flight line mechanics.

Tables of organization have been modified to reflect this change and production requirements adjusted to meet known and anticipated requirements.

MANPOWER INITIATIVES WITH A TRANSITIONING FORCE

CH-53K Transition

The CH-53K transition is scheduled for 2D MAW, 3D MAW, 1ST MAW, and 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 Squadron (VMU) tables of organization are structured and manned to support both the RQ-7 Shadow and MQ-21 Blackjack. The 7315 Unmanned Aircraft System Officer MOS created in FY12 continues to populate through initial accessions from TBS and annual MOS conversion boards. In FY16, structure and personnel from the 7588 EA-6B Electronic Warfare Officer MOS will begin to migrate to the UAS community as the 7315 and 7588 merge, bringing EW capability to the VMUs. This merger will ultimately double the size of the 7315 presence throughout the MAGTF.

Beginning in the summer of FY14, VMU-3 began its relocation from MCAGCC Twentynine Palms, CA to MCAS Kaneohe Bay, HI. This move will evenly distribute the VMUs between I, II, and III MEF and coincide with the President's strategic rebalance to the Pacific.

UAS capability will continue to expand with the acquisition of a Group 4/5-sized UAS in the future. This system will exceed the current RQ-7B capability and drive additional manpower skill requirements for intelligence, weaponization, and EW for continued support of future MAGTF requirements.

Marine Aviation Training Support Groups

The Marine Corps began realigning the Marine Aviation Training Support Groups (MATSG). MATSG-23 relocated from NAS Lemoore to NAS Pensacola in June 2013 and MATSG-53 deactivated in October 2013. Marine Corps representatives (MARCORREPs) have been established at NAS Lemoore and NAS Whidbey Island to continue providing administrative support as needed for aviation logistics training. MATSG-23 reached FOC at NAS Pensacola in September 2014 under the command of an AVLOG O6, providing advocacy for entry level A and C school aviation logistics training. Additionally, MATSG-23 absorbed the Enlisted Aviation Maintenance Training Management Unit (EAMTMU) into its headquarters and became the classification authority for aviation logistics entry level enlisted Marines. In FY16, MATSG-33 will deactivate, leaving three active MATSGs. Administrative support will continue at NAS Oceana until the F/A-18 pilot and maintenance training pipeline is closed.

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 and 4-3 depicts current USMC aviation exchanges. More information can be found on the HQMC Aviation website.

http://www.aviation.marines.mil/Branches/ManpowerandSupport/PersonnelExchange.aspx

Country/Service	USMC Billets with Foreign Nation or Inter-sevice
Australia	ARH Tiger (RAA)
	F/A-18 (RAAF)
	F/A-18 Maintenance Officer (RAAF)
	Air Traffic Control/Support (RAAF)
Canada	F/A-18 (CAF)
	CC-130 (CAF)
Italy	AV-8B (Italian Navy)
Spain	AV-8B (Spanish Navy)
United Kingdom	Typhoon F2 (RAF & RN)
	Mk4 Sea King (RN)
	Mk7 Lynx (RM)
	Air Defense Controller (RAF)
United States Air Force	F-16 (Luke AFB)
	F-16 (Shaw AFB)
	F-35 (Nellis AFB)
	JTAC (AGOS/JFCC) (Nellis AFB)
	MC-130P (Eglin AFB)
	HH-60G (Davis-Monthan AFB)
	Air Traffic Control (Eglin AFB)
	Tactical Air Defense Controller (Hill AFB)
	EC-130 EWO (Davis-Monthan AFB)
	CV-22 (Two billets, Cannon AFB and Hulbert AFB)
United States Army	AH-6 (TF-160) (Fort Campbell)
United States Navy	F/A-18 (NSAWC) (NAS Fallon)

TABLE 4-2

Current Aviation Exchanges

	Foreign Nation or Inter-service Billet with USMC
Australia	AH-1 (MAG-39)
	F/A-18 (MAG-31)
	F/A-18 Maintenance Officer (VMFAT-101)
	Air Traffic Control (MACG-38)
Canada	F/A-18 (MAG-31)
	KC-130J (VMGR-252)
Italy	AV-8B (MAG-14)
Spain	AV-8B (MAG-13)
United Kingdom	F/A-18 (VMFAT-101)
	MV-22 (MAG-26)
	AH-1W (MAG-39)
	Air Defense Controller (MAWTS-1)
United States Air Force	F-5 (VMFT-401)
	F/A-18 (MAG-31)
	UH-1Y (MAG-39)
	KC-130J (VMGR-252)
	JTAC (EWTGPAC)
	Air Traffic Control (MACS-1)
	EA-6B ECMO (MAG-14)
	Tactical Air Defense Controller (MACS-1)
United States Army	UH-1 (MAWTS-1)
United States Navy	F/A-18 (MAWTS-1)
	EA-6B ECMO (MAWTS-1)

TABLE 4-3

SECTION FOUR MARINE AVIATION ALMANAC

F-35 B/C Lightning II

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:

- 32 aircraft delivered into Marine Corps service
- 2 USMC squadrons in place
- Block 2B DT underway
- F-35B IOC July 2015
- First planned deployment: Spring 2017

Program Update

- F-35B has flown more than 4000 sorties and over 6000 flight hours
- F-35B successfully completed 2 successful ship test trials in 2011 and 2013
- 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

Working Issues

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

Performance / Systems

- Combat radius: F-35B = 450 nm; F-35C = 600 nm
- Internal fuel: F-35B = 14,000 lbs; F-35C = 20,000 lbs
- Ordnance load-out: F-35B = 15,000 lbs; F-35C = 18,000 lbs
- Internal carriage: F-35B 2 x 1,000 lb. class + 2 x AIM-120 AMRAAM
  F-35C 2 x 2,000 lb. class + 2 x AIM-120 AMRAAM
- Max gross weight: F-35B = 61,500 lbs; 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)
- Very low observable, 360° integrated fused sensor information

F/A-18A-D Hornet

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 permanently forward deployed
- RFF-1200/SPMAGTF CR-Cent: 1 rotational squadron commitment

Contingency Operations
- TBD

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
- 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
- Weapons
  - APKWS
  - Net Enabled Weapons study
  - AIM-9X Block II
  - AIM-120D

Working Issues

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
- G4 LITENING
- Digital CAS Interoperability – Gen 5 radio with 27X
- JHMCS - Complete
- LINK 16 - Complete
- AIM-9X Block II
- AIM-120D

Performance / Systems

- 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 lbs (13,700lbs 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)

AV-8B Harrier

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/97 Aircraft
• FRS:	1 Squadron/29 Aircraft
• Test:	4 Aircraft
• FS Custody:	2 Aircraft (Day attack configuration)
• Total:	132 Aircraft

Enduring Missions

• MEU:	12 Aircraft deployed / 12 in work ups
• UDP:	8 Aircraft deployed ISO 31st MEU
• SPMAGTF-CENT:	12 aircraft (rotational 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 WTI 1-15
  - Digital Video Recorder – funded drop-in replacement, installs summer 2015
- Digital Improved Triple Ejector Rack (DITER) – funded, installs spring 2015
- Airborne VMF Terminal (AVT) procurement in FY14/FY16, installs in FY15/17
- CNS/ATM
  - RNP/RNAV funded for GPS approach
  - RVSM clearance expected by Q1 of 2015
  - IFF Mode 5/S – partially funded replacement for current APX-100
- Stores
  - AIM-120 A/B –upgrade to C/D partially funded
  - APKWS - JCTD complete with AV-8B as threshold platform
  - Intrepid Tiger II – Continuous capability / block upgrades

Working Issues

- 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
  - H6.0 OFP Upgrade (currently in Fleet)
    - Digital Improved Triple Ejector Racks (enables 10xGBU-38)
    - ALE-47 Integration
    - APG-65 23X Integration
  - H6.1 Maintenance upgrade (projected Jan 2015)
    - MSC/WMC Processor Upgrade
    - LITENING Gen 4 and Common OFP integration
    - AGM-65E self-lase capability
    - GBU-54 Laser JDAM In Weapon LAR full integration
  - H6.2 Maintenance upgrade (projected Jan 2017)
    - RNP/RNAV (GPS approach)
    - Mission Planning update

Performance / Systems

Combat Radius: ~300nm (500nm w/tanks)

Weapons Stations: 7

Empty Weight: 14,912 lbs

Max Gross Weight: 32,000 lbs

Propulsion: Rolls Royce F402-RR-408 turbo fan providing 23,400 pounds of thrust

Top Speed: 585 KCAS/1.0 IMN

- Cruise Speed w/ Attack Payload: 0.75–0.85 IMN

Armament: 500/1000lb 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

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

EA-6B Prowler and AEA Systems

Working Issues

MAGTF EW

- ICD approved
- CPD in work

EA-6B

- ICAP III transition complete
- VMAQT-1 (FRS) FOC April 2014

ALQ-231 Intrepid Tiger II

- EOC of Block '0' pod conducted in OEF in 2012
- MEU focused –
  - Organic EW capability/ two MEU deployments completed
  - Currently deployed on AV-8B
  - AH/UH series QRA set for 1st Qtr FY15
- F/A-18 EOC currently underway with deployed squadron

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

Performance / Systems

- 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; Multi-mission Advanced Tactical Terminal / Integrated Broadcast System (MATT/IBS)

KC-130J Hercules

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: 79 KC-130J aircraft (TOAA)
  - 3 active squadrons of 15 KC-130Js (PMAI)
  - 2 reserve squadrons of 12 KC-130Js (PMAI)
  - 10 pipeline assets (BAI), one of which supports T&E
- 47 KC-130J aircraft delivered as of the date of this publication.
  - 1 additional aircraft on contract for delivery in FY15.
  - 48 total aircraft delivered or on contract is 31 aircraft short of POR
- 6 aircraft programmed in the PB-15 FYDP (FY15-19)

- Survivability Upgrade Roadmap:
  - AAQ-24B(V)25 DoN LAIRCM/ATW
- Interoperability Upgrade Roadmap:
  - BFT I (Harvest HAWK)
  - Dual Vortex (Harvest HAWK)
  - Block 7.0/8.1 with LINK-16
  - SRP

Working Issues

- 4th MAW KC-130J Transition: POA&M to transition reserve component VMGR squadrons from the KC-130T to the KC-130J aircraft, beginning in FY14.
- Development and integration delays of the next C-130J block upgrade will impact compliance with CNS/ATM mandates.

Performance / Systems

- Range (20,000-lb Payload) . . . . . 3,250 nm
- Empty Weight . . . . . 91,000 lb
- Fuel Capacity . . . . . .58,500 lb
- Maximum Normal Takeoff Weight (2.0g). . . . . 164,000 lb
- Maximum Cruise Speed . . . . . 320 kts
- Cruise Ceiling . . . . . .25,000 ft
- Fuel Offload @ 1200nm / 20,000 ft . . . . . 30,000 lb
- 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

KC-130J Harvest HAWK

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. Following OEF, Harvest HAWK capability will support each CONUS based MEU and SPMAGTF.

Performance / Systems

- 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

Future upgrades (FY16 and beyond):

- Relocate a more capable sensor and regain the 18k lb fuel capacity.
- Upgrade mission operators pallet
- Hellfire P+ compatibility.
- Full Motion Video (FMV)/Common Tactical Data Link.
- Digitally Aided CAS.
- JAGM

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KC-130T Hercules

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, transferred to CNAFR and COMOPTEVFOR, or retired as KC-130Js are delivered. VMGR-234 (Fort Worth, TX) will transition to the KC-130J first, followed by VMGR-452 (Newburgh, NY).

- Projected IOC (5 KC-130Js):
  - VMGR-234 – FY15
  - VMGR-452 – FY23
- Projected FOC: (12 KC-130Js):
  - VMGR-234 – FY21
  - VMGR-452 – FY27

NOTE: KC-130Ts will continue to operate in 4th MAW until the reserve KC-130J transition timeline can be defined

Working Issues

- 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 Sundown: POA&M to manage sundown of existing inventory of Warrant Officer and Enlisted Tactical Systems Operators.

Performance / Systems

- Range (20,000-lb Payload) . . . . . 3,000 nm
- Empty Weight . . . . . 87,000 lb
- Fuel Capacity . . . . . 58,500 lb
- Maximum Normal Takeoff Weight (2.0g) . . . . . 155,000 lb
- Maximum Cruise Speed . . . . . 300 kts
- Cruise Ceiling . . . . . 25,000 ft
- Fuel Offload @ 1200nm / 20,000 ft . . . . . 30,000 lb
- 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

MV-22B Osprey

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 again and again, from land-based operations in Iraq and Afghanistan 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.

Program Update

Survivability Upgrade Roadmap:

UUNS DON LAIRCM – 2016

RF Threat Protection System

Interoperability Upgrade Roadmap:

Software Reprogrammable Payload (SRP) radio replacement, Spiral II FY17

Enhanced situational awareness through beyond line of sight (BLOS) voice, data, still photos, and network-enabled full motion video (FMV)

Airborne gateway functionality for multiple waveforms, including Link-16

Radio frequency identification (RFID) of cargo and personnel

Lethality Upgrade Roadmap:

Traffic Collision and Avoidance System (TCAS)

Enhanced Weapon System; PGM

ATS with EO/IR optics, LTD-R, IR Marker, and VDL

VARS

Reliability Upgrade Roadmap:

MCOI - 2014

Working Issues

- 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, eCASEVAC, enhanced defensive weapons)
- Extended range (Aft Sponson, Additional receivers KC-10/KC-46)

Performance / Systems

- Combat Radius: 325nm
- Empty Weight : 35,000lbs
- Max Gross Weight: 52,600lbs VTOL / 57,000lbs STO
- Payload: Internal / External - 24 passengers / 12 litters / 12,500lbs
- 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

UH-1Y Venom

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.

Program Update

- Interoperability Upgrade Roadmap: Blue Force Tracking, Software Reprogrammable Payload (SRP) with LINK 16, FMV SPIRAL 1 – 2016 and FMV SPIRAL 2 (integrated) – 2018
- Relevancy Enhancements: Structural / power upgrades – 2020
- Reliability Upgrade Roadmap: Block IV Upgrade – 2021
- Lethality Upgrade Roadmap: APKWS, Advanced Missile Warning System, DRL Digital Rocket Launcher, Brite Star w/Laser Spot Tracker
- Future Upgrades:
  - Integrated Aircraft Survivability Equipment (ASE)
  - Degraded Visual Environment solutions
  - Advanced Threat, Missile, and Laser Warning System

Working Issues

132 UH-1Ys (Lots 1-11) on contract
- 101 aircraft delivered to date (as of Sep 14)
- All active component HMLAs are complete with initial UH-1Y conversion BRITE Star Block II
- Forward fit from UH-1N Full Motion Video (FMV)
- Fleet Installations to commence 1st Qtr. 2016 for Advanced Precision Kill Weapon System (APKWS) laser guided rocket system
- The UH-1Y achieved its Initial Operational Capability (IOC) on 08 Aug 2008 and was granted Full Rate Production (FRP) approval on 17 Sep 2008.
- The UH-1Y has supported sustained combat operations in Afghanistan since November 2009
- The UH-1Y employs the Advanced Precision Kill Weapon System (APKWS), which achieved IOC.
- All active and reserve squadrons have completed their initial UH-1Y conversion and are currently building inventory towards their full authorization of 12 UH-1Ys.

Performance / Systems

- Combat Radius*: 119 nm
- Weapons Stations: Two
- Empty Weight: 11,700 lbs
- Max Gross Weight: 18,500 lbs
- Use Payload (HOGE): 5,930 lbs
- 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 HOGE, 10 minutes on station, and 20 minute fuel reserve)

AH-1W Super Cobra

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 services in support of both OEF and Marine Expeditionary Units.
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

▪Blue Force Tracking and Software Reprogrammable Payload (SRP) with LINK 16.

Working Issues

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

Performance / Systems

• Combat Radius*: 58 nm
• Weapons Stations: Four
• Empty Weight: 10,750 lbs
• Max Gross Weight: 14,750 lbs
• Useful Payload (HOGE): 3,986 lbs
• 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)

AH-1Z Viper

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).

Program Update

- Interoperability Upgrade Roadmap: Blue Force Tracking, Software Reprogrammable Payload (SRP) with LINK 16, FMV SPIRAL 1 – 2016 and FMV SPIRAL 2 (integrated) – 2018
- Relevancy Enhancements: Power Upgrade – 2020
- Reliability Upgrade Roadmap: Block IV Upgrade – 2021
- Lethality Upgrade Roadmap: APKWS, JAGM Advanced Missile Warning System, DRL Digital Rocket Launcher, 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

Working Issues

76 AH-1Zs (Lots 1-11) are currently on contract.
- 39 AH-1Zs have been delivered to date (as of Sep 14).

Advanced Precision Kill Weapon System (APKWS)
- APKWS Initial Operating Capability (IOC) scheduled 1st Qtr. 2015
- Laser guided rocket system

Full Motion Video (FMV)
- Fleet installations to commence 1st 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 of2011 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.

Performance / Systems

- Combat Radius*: 139 nm
- Weapons Stations: Six
- Empty Weight: 11,700 lbs
- Max Gross Weight : 18,500 lbs
- Useful Payload (HOGE): 5,764 lbs
- 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)

CH-53E Super Stallion

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 lbs 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:

Blue Force Tracking 1.0 to 1.5, Software Reprogrammable Payload (SRP) with LINK 16

Reliability Upgrade Roadmap:

Integrated Mechanical Diagnostics System, 419 Engine Upgrade (increases payload by 5 to 8K 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 Symbology 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

Working Issues

- 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.

Performance / Systems

- Max range 540 nm; max endurance: 4 hours (unrefueled) / indefinite (HAAR)
- Empty Weight: 37,500 lbs
- Max Weight on Wheels: 69,750 lbs
- Max Gross Weight with External load: 73,500 lbs
- Internal Load: 32 troops or 24 litter patients or 7 40”x48” Warehouse pallets
- External Load: Hook rated to 36,000 lbs
- 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

CH-53K King Stallion

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 lbs 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, 88,000lbs 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.

Working Issues

- 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: First flight , Capability Production Document (CPD), and Milestone "C"

Program Update

- Acquisition Procurement Baseline (APB) approved Apr 2013, Program of Record (POR) 200 aircraft
- Engineering Demonstration Model (EDM) 2 delivered for Development Test (DT) Dec 2013, remaining three EDMs to be incrementally delivered through 1st QTR 2015
- Entered DT Dec 2013
- Ground Test Vehicle (GTV) Bare Head Light Off Jan 2014
- First Flight scheduled for 2014
- Milestone C (LRIP authorization) scheduled for FY 2016
- Initial Operating Capability (IOC) scheduled for 3rd QTR FY19
- Full Operating Capability (FOC) scheduled for FY 2028

Performance / Systems

Max range 507 nm; Endurance: 4 hours (unrefueled) / indefinite (HAAR)

Empty Weight: 43,750 lbs

Max Weight on Wheels: 74,500 lbs

Max Gross Weight with External load: 88,000 lbs

- 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 lbs
- 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

CH-46E Sea Knight

Program Description

Mission: Conduct expeditionary medium-lift assault support, to include combat troop assault, transportation of personnel and supplies, Tactical Recovery of Aircraft and Personnel, and casualty evacuation in support of sea-based and sustained operations ashore. Conduct search and rescue.

Program Update

- IOC: 1964
- Planned retirement: 2015
- Inventory: 50 CH-46E, 4 HH-46E
- All upgrades have been completed

Working Issues

- The CH-46E is standing down concurrently with MV-22B standup
- Mod efforts completed to upgrade ASE (LAIRCM)

Performance / Systems

- Combat Radius: 75 nm
- Max Gross Weight: 24,300 lbs
- Payload: Up to 4,000 lbs
- Cruise Speed: 120 kts
- Defensive Systems: AAR-47, ALE-47, ALQ-157, APR-39, 2 x XM-218 .50 cal

Presidential Aircraft

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 (VXX)

- 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

Working Issues

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)

Performance / Systems

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))

RQ-7B Shadow (MCTUAS)

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 ACDU VMU squadron possesses three RQ-7B systems with two systems for the reserve squadron. 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.

Program Update

- Fielding
  - The RQ-7B has been fully fielded to all (three) active duty squadrons,
  - One system has been fielded to VMU-4 (4th MAW).
- Payloads
  - Laser Designator and Communications Relay payloads upgrades have been added to the RQ-7B Shadow fleet.
  - These upgrades have provided an unprecedented level of fires integration and rapid and effective air-ground coordination.
- Wing extensions and engine upgrades have improved performance for carrying payload upgrades.

Working Issues

Stand-up of VMU-4 (4th MAW) complete with system fielded when the main det was established at Camp Pendleton.

Upgrades are coordinated via Army PM UAS and include the following efforts:

- Laser Designator (fielded)
- Universal GCS
- TCDL (Tactical Common Data Link) (FY14 training begins)
- Wing Extension (fielded)
- Weaponization

MCTUAS requirements will be fulfilled by a larger and more capable Group-4/5 system planned to replace the RQ-7B (Group-3 UAS) in the near future.

Performance / Systems

- Combat Radius - 75nm
- Weapons Stations – TBD
- Max Gross Weight & Use Payload - 467lbs
- Top Speed – 105 Kts (dash)
- Cruise Speed w/ Payload – 65 Kts (loiter)
- Offensive Systems – POP300D Laser Designator
- Payloads-
  - Communications Relay (VHF/FM)
  - EO/IR Sensor
  - Laser Pointer
  - Laser Designator

MQ-21A (STUAS)

Program Description

Primarily an aerial reconnaissance system supporting target acquisition, command & control and ISR 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 ACDU VMU squadron will possesses nine STUAS systems with three systems for the reserve squadron. Each system comprised of five air vehicles and two ground control stations. VMUs are organized to provide up to nine detachments of nine Marines capable of providing 12 hours surge to 18 hours of reconnaissance support to the ground commander.

- STUAS is a Group 3 rail-launched, Sky Hook recovered UAS; five air vehicles with EO/IR and COMM relay payloads and two GCSs/ system.
- Launcher, Sky Hook, RVTs, associated support equipment and (4) HMMWVs per system.
- Permanent Maintenance. Logistics and Training TBD after two years of contractor provided support.
- 150 lbs, Dual EO/IR Camera, 10+ hours endurance, and 50+ nm range. Capable of operating ashore and from ships in support of MEU/ARG.

Working Issues

Program Update

- Source selection complete: Insitu MQ-21 Integrator is the STUAS platform.
- Fielding priority to operational VMU squadrons
- Manpower structure allottment captured on current T/O.
- New Equipment Training (NET) to provide initial conversion training for VMU operators has begun.
- Program currently in EMD, with (2) Early Operational Capability (EOC) systems in operation to baseline EMD, inform VMUs on the capability, and support PTP at 29 Palms.
- POR aircraft renamed Blackjack.

- Combat Radius – 50nm (min)
- Max Gross Weight & Use Payload - 150 lbs (max)
- Top Speed - 85 kts (min)
- Offensive Systems – IR Marker

Performance / Systems

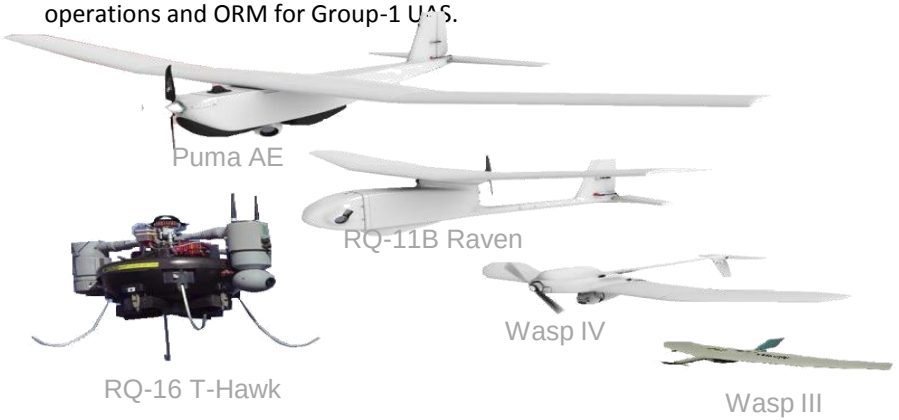
Program Description

Aerial reconnaissance system supporting tactical situational awareness to battalion and company level commanders. The electro-optical or infrared optics support surveillance, pre-raid reconnaissance, harassment, deception, target acquisition, and battle damage assessment for battalion and company level commanders and their subordinate units.

Smallest and most numerous UAS in the Marine Corps, 461 systems (each with three aircraft) are being fielded to battalion level units across all MARFORs. Four systems are assigned to infantry, LAR, and tank battalions and one system to other units such as artillery, MWSS, CEB, H&S battalions, and MLG units. Two Marines will operate one system with an rechargeable aircraft battery life of 90 minutes.

Program Update

- Fielding of systems now reaching non-infantry units (MAW and MLG units).
- NAVMC 3500.107A, Group 1 UAS T&R, was revised and approved 2nd qtr FY14.
- OPNAV 3710.7 also contains general provisions for standardized flight operations and ORM for Group-1 UAS.



RQ-11B Raven (SUAS)

- Raven systems controlled via Digital Data Link (DDL)
- Training & Standardization continues to be shaped by HQMC, TECOM and NAVAIR; development of sustainment training, T&R, and record keeping (T&R updated/approved 2qtr FY14)
- Two new Group 1 Training and Logistics Support Activity (TALSA) locations have been stood up; Camp LeJeune and Camp Pendleton.
- Several other small UAS procured with OCO (non-PoR) in inventory: WASP (Blk 3&4); Puma; T-Hawk
- Marine Corps reviewing SUAS requirements to determine best mix of different small UAS systems required

Working Issues

RQ-11B Raven:

- Combat Radius – 15km (DDL) line of site
- Max Gross Weight & Use Payload – 4.2 lbs
- Backpack Weight – 17 lbs
- Speed – 17 to 44 kts

Payloads

- Front-look and side-look high-resolution color EO camera with electronic Pan-Tilt-Zoom and digital stabilization; or black-white low light, and infrared payload

- 320x240 thermal imager

Performance / Systems

Cargo UAS

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 lbs / resupplying up to 6K lbs per day / 108 nm range / day & night operations. A GOCO Cargo UAS contract awarded to two vendors: Boeing A160 Hummingbird and Kaman/Lockheed Martin KMAX. Each system consists of 2 Air Vehicles, 1 main ground control station (GCS), and 3 remote ground control stations. The KMAX system went forward to OEF as part of the Military Users Assessment (MUA).

Program Update

- Kaman KMAX selected and deployed for a six month Military Utility Assessment (MUA) to OEF in 1Q FY12.
- KMAX contract extended several times, current extension through OEF conclusion.
- KMAX can fly 6 flights a day, carrying up to 4500 lbs per load at 70 KIAS and 14k ft density altitude.
- VMU supporting MUA with two Mission commanders
- Team has moved over 4M lbs of cargo to date
- Hot hover hook-up for retrograde, hot refuel capability and internal fuel tank have been approved as common practice for KMAX missions.
- Army JCTD landing beacon implemented June 2012
- MCCDC has lead on developing enduring POR requirement; coordinating with HQMC AVN/I&L on joint cargo UAS requirements

Working Issues

- Requirement for continued OEF support determined necessary.
- Effectiveness of system surpassed requirements while ISO OEF.
- Establishment of IPT to review future Program of Record suitability.
- June 2013 mishap halted operations temporarily and reduced aircraft to one

Performance / Systems

- Combat Radius - 75nm
- Top Speed – 70 kts
- Delivery Accuracy – 10m grid, homing beacon, drop on coordinates
- Payload Capability – 4500 lbs at 12,000'MSL (HOGE)

OSA

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

  * 2 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

- Transition of CONUS OSA aircraft and personnel from Marine Corps Air Stations to Marine Aircraft Wings:
  - 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

FY15 UPDATES

- UC-12W Transition:
  - 1 of 6 required aircraft funded in FY14

- UC-12W Upgrades:
  - 3rd ASE Bucket
    - 1 aircraft equipped, remaining aircraft funded for completion by 4QFY15
  - Extended Range (ER) Tanks
    - Increases range from 1500 – 2400 NM
    - 3 of 6 aircraft currently equipped
    - Remaining 3 aircraft are funded for completion by 4QFY15
  - NVIS Compatibility (Interior and Exterior)
    - First 2 aircraft funded in FY13
  - Satellite Phone
    - First 2 aircraft funded in FY13

- UC-35D ASE
  - 6 of 10 aircraft currently equipped
  - Remaining 4 aircraft are funded for completion by 4QFY15

- C-40A Transition:
  - 1 of 2 required aircraft funded in FY16
  - Plan to retain 2 X C-9B and 1 X C-40A until second C-40A replacement is procured

- OSA assets cannot operate from Futenma Replacement Facility. WESTPAC relocation alternatives currently under review

C-20G

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 lbs of cargo and has an operational range of 4,250 nautical miles while carrying 8 passengers. $62 million (new cost). 18 years old, acquired in FY93.

Program Update

HQMC 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 .

Working Issues

- Acquisition of "like in kind" aircraft to replace legacy C-20G.
- Sustaining C-20G readiness until replacement aircraft acquisition complete.
- CNS-ATM compliance

Performance / Systems

- 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 lb
- Empty weight: 35,500 lb
- Powerplant: 2× Rolls-Royce Tay turbofans
- Max Speed: M.85/459 KIAS
- Cruise Speed: M.85/459 KIAS

C-40A

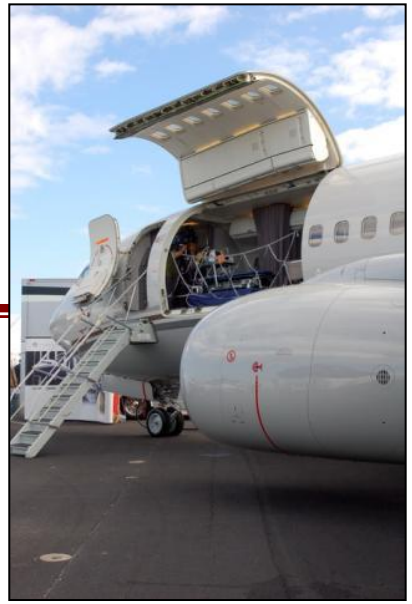
Program Description

Mission: Provide time sensitive air transport of high priority passengers and cargo between and within a theater of war.

Description: Military version based on Boeing B-737-700C combination passenger/cargo aircraft. Capable of transporting 121 passengers for 3200 nautical miles, or 40,000 lbs of cargo for a operational range of 2,800 nautical miles.

Program Update

HQMC intent is to replace the (2) C-9s with (2) C-40As.



Working Issues

- Acquisition of USMC C-40A aircraft
- Sustaining C9B until C-40 deliveries

Performance / Systems

- Range: 2,800 NM with 40,000 lbs cargo
  3,200 NM with 121 passengers
- Crew: 5 to 8
- Length: 110 f t 4 in
- Wingspan: 112 ft 7 in
- Height: 41 ft 2 in
- Max takeoff weight: 171,000 lb
- Empty weight: 59,700 lb
- Power plant: 2 × CFM high bypass turbofan engines
- Cruise Speed: M.80/461 KTAS

C-9B

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, or 20,000 lbs of cargo for a operational range of 1,740 nautical miles.

Average Age: 37

Program Update

HQMC intent is to replace the (2) C-9s with (2) C-40As.

Working Issues

- Acquisition of USMC C-40A aircraft
- Universal Needs Statement for C-9 Replacement Aircraft validated
- Sustaining C9B until C-40 deliveries
- FAA SFAR 88 Fuel Tank compliance
- CNS-ATM compliance after 2014

Performance / Systems

- Range: 1,740 NM with 20,000 lbs
  2,500 NM with 5,000 lbs
- Crew: 5 to 8
- Length: 119 ft 3 in
- Wingspan: 93 ft 5 in
- Height: 27 ft 6 in
- Max takeoff weight: 110,000 lb
- Empty weight: 59,700 lb
- Powerplant: 2× P&W JT8D-9 turbofan
- Max Speed: M.84/340 KIAS
- Cruise Speed: M.78/485 KTAS

UC-35C/D Citation

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 lbs of cargo for a operational range of 700 nautical miles.
- Cost: $9M (new cost)
- Acquired: FY98-06

Program Update

HQMC intent is to replace current (12) UC-35C/D aircraft with (12) "Super Mid-Size" class transport with improved range and payload capabilities.

Working Issues

- 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.
    - Six aircraft complete
    - Four installs FY-12/13
  - Identify improved engine monitoring component.
  - Fix false over speed/ over temp indications.

Performance / Systems

- 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 lb for C/ 16,830 for D
- Empty weight: 9,395 lb for C / 10,642 for D
- Powerplant: 2× P&WC JT15-D turbofans
- Cruise Speed: M.755/420 KTAS

UC-12F/M Huron

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 or 1,500 lbs of cargo for a operational range of 700 nautical miles.
- Cost: $6M (new cost)
- Average Age: 23 Yrs

Program Update

HQMC intent is to replace all UC-12F/M with UC-12W Huron aircraft.

Working Issues

- 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
- No install of Aircraft Survivability Equipment for legacy UC-12F/M planned: Negative impact to payload.

Performance / Systems

- 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 lb
- Empty weight: 7,755lb
- Powerplant: 2× P&WC PT6A-41/42 turbo-prop
- Max Speed: 294 KIAS

UC-12W Huron

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 or 2,500 lbs of cargo for a operational range of 1,500 nautical miles.
- ASE installed.
- CNS/ATM compliant
- RVSM compliant
- Cargo door
- Cost: $15.1M

Program Update

Marine aviation intent is to replace all UC-12F/M with UC-12W Huron aircraft.

Working Issues

- Acquisition of 5 x UC-12W aircraft to replace legacy UC-12F/M
- Test & Evaluation of UC-12W unimproved landing zone performance
- Retrofit Extended Range Tanks for remaining 4 x Block One aircraft
- Acquire and integrate 3rd forward firing kinematic flare dispenser for Block One aircraft

Performance / Systems

- 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 lb
- Empty weight: 10,200lb
- Powerplant: 2× P&WC PT6A-60A turbo-prop
- Max Speed: 300 KIAS

CAC2S

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, supports the tenets of Expeditionary Force 21 and fosters joint interoperability

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
  - Government developmental test commenced Feb 14
  - AAO (50) Aviation Command and Control Systems (AC2S)
  - (75) Communication Subsystems (CS)
- Phase 2: CDR Q1FY14
- Phase 2: MS-C Q2FY15
- Phase 2: IOT&E Q2FY16

- Increment I replaces equipment within:
  - TACC (176 seats)
  - TAOC (17 seats)
  - DASC (17seats)
- Operational Impact
  - 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

CTN

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

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)

Working Issues

- CTN AN/USG-4B upgrade FUE conducted Aug 2012.
- CTN-G/ATOR integration testing begins Nov 2012.
- CTN-CAC2S Integration testing begins 4Q FY2013.
- CAB integration testing begins 1Q FY2014.
- DDS trailer integration testing begins 1Q 2014.
- Complete manpower assessment to support fielding of full AAO
  - Fielding decision was limited to 10 of the 25 systems due to incomplete assessment of manpower workload analysis across the entire MACCS.

Performance / Systems

- System performing
- Limited fielding decision: 10 systems
- Fielded systems interface with AN/TPS-59 in support of sea shield only, C2 interface will be available with CAC2S fielding, testing begins FY-14 with CAC2S.
- Letter of Clarification for Requirements signed by C2ID 11 Jun 2012

G/ATOR

Program Description

The Ground/Air Task Oriented Radar (G/ATOR) is a 3D, rapidly deployable, medium range, multi-role radar designed to detect unmanned aerial systems, cruise missiles, air breathing targets, rockets, artillery and mortars.

- G/ATOR satisfies warfighters' expeditionary needs across the MAGTF spectrum and replaces five legacy radar systems with a single MAGTF solution.
- G/ATOR performs air surveillance , Air Traffic Control, and ground weapons locating missions.
- Will Contribute to CEC/CTN networks by providing fire quality track data that enables weapons platforms to engage at maximum kinematic range.

Program Update

- Designated ACAT IC in AT&L ADM 28 Oct 2011

G/ATOR Block 1
- Milestone C decision approved and authorized LRIP lot 1 & Block II RFP on 24 Jan, 2014. Full rate Production begins in 2019.
- IOC/FOC: 2017/2024

G/ATOR Block 2
- LRIP lot 2: 2015
- IOC/FOC: 2018/2024

G/ATOR Block 4
- Funding is a BISOG POM16 issue

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

Working Issues

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.

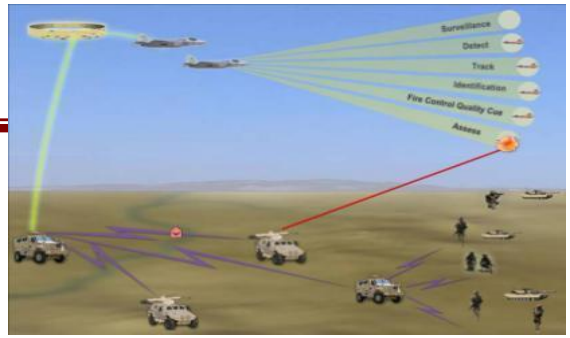
Program Update

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.



LAAD

Working Issues

- 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 C: 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.

Performance / Systems

- 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.

AN/TPS-59 (V3)

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 Marine Air Ground Task Force (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

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)
  - Fielding Decision = Nov 2015
  - 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

Working Issues

- HQMC DCA guidance to sustain radar to 2025. 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

Performance / Systems

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	29 Palms, CA	1
Depot	Tobyhanna, PA	1
Total		11

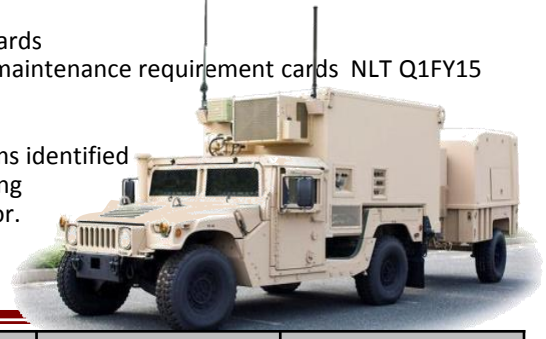
Program Update

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 = ~$13.5 - 15M
  - A new competitive contract must be awarded
  - Earliest delivery of a "NEXGEN-like" capability to Intel Bns is FY18
- MCAS Camp Pen and Beaufort delivery ~Q1/2FY15.
- MACG-48 delivery ~Q4FY15 (contract yet to be awarded)
- System exercised at WTI 1-14 (briefly) and ITX (MACS 1 Det B ISO MAG-13)
- One METMF(R) NEXGEN supported operations in AFG. Same system now in support of SPMAGTF.
- NEXGEN supported deployments/exercises
  - Afghanistan, S. Korea (HSV), Philippines (C-130), WTI, ITX
  - Scheduled; Guam, fall 2014

Top 5 Identified Issues

- NOWCAST capability (as of 5 August)
  - 6 of 6 fielded NEXGENs have upgrade installed.
  - 2 of 5 units have tested and are mission capable
- MilCon – Significant work remains to be completed.
  - Sites required to have secured site w/ SIPR prior to delivery
  - MILCON/PSE action required at all MACGs
- 5951 Training / Network Training / Software Configuration Training
  - 5951 graduates are entering the fleet slowly
- Maintenance Requirement Cards
  - PMW 120 to deliver maintenance requirement cards NLT Q1FY15
- Det A NEXGENs deliver delay
  - Shelter/ECU problems identified during acceptance testing procedures at contractor.



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	Yes
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	Yes
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	07/07/2014	07/07/2014	TBD	Q1/2FY15	N/A
MCAS Beaufort, SC - MACG-28 Det A	07/31/2014	TBD	TBD	Q1/2FY15	N/A
NAS JRB Fort Worth Tx, MACG-48 Det A		Q3 FY15	TBD	TBD	N/A
1st Intelligence BN, Camp Pendleton CA					
2nd Intelligence BN, Camp Lejeune, NC					
3rd Intelligence BN, Camp Hanson, Okinawa					

Unfunded Requirement

P-19A Replacement (P-19R)

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.

Program Update

- Test Readiness Review (TRR) completed 27 Jan 2014.
- Pre-Production Qualification Test (PPQT) begins at Aberdeen Proving Ground (2 vehicles) in February 2014.
- Limited User Evaluation (LUE) in July-Aug 2014.

Chart reflects current funding profile as of 4 Feb 2014

APPN	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY13-19
RDTEN	$6.5	$.9	$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	$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**

Working Issues

• P-19A Replacement Initial Operational Capability (IOC) is planned for Fiscal Year (FY) 2018. 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 .

Performance / Systems

- 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 lbs)
- 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)

EAF Sustainment Lighting System (SLS)

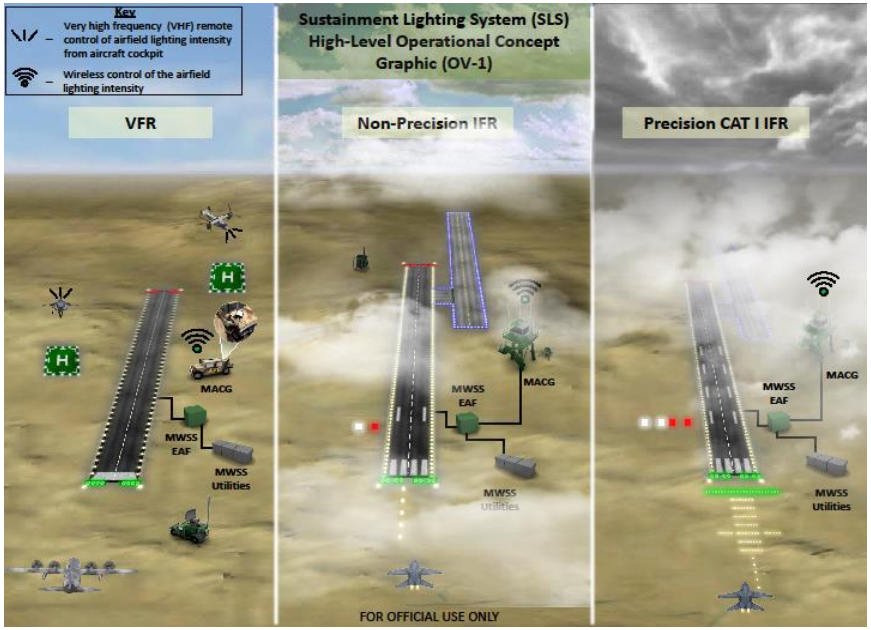
Program Description

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.

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

Industry responses to RFP received in Sept '13.

Milestone B on track for 4th QTR FY14.

Operational Testing & Evaluation planned for FY 18 - OPTEVFOR lead, MCOTEA, is actively involved in T&E WIPT.

CDD being staffed VIA MCATS for MROC approval

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 47 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 Training Environment (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, and AV8B)
- ADTVE next generation and the TEn Technical Refreshers (TR) in FY15-16 will target:
    - Integration of 1st and 4th MAW into the ADVTE architecture
    - Creation of a USMC Common Visual Gaming Area (CVGA)
    - 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

How ATS is improving

•Delivering higher fidelity simulation :

- •new acquisition and technical refreshes of existing devices using future modeling and simulation industry technology
- •development of a USMC Common Visual Gaming Area 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 (classrrooms, PTTs) 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 plaform/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, MQ-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 and Japanese Facilities Improvement Program (JFIP) 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

FY13	P-611	MCAF BEQ
FY13	P-612	ENLISTED DINNING FACILITY
FY14	P-1406	ATC TX/RX RELOCATION
FY17	P-647	ATFP GATE

CHERRY POINT

FY13	P-163	MASS-1 COMPLEX
FY13	P-601	ARMORY
FY15	P-193	WATER SYSTEMS UPGRADES AND IMPROVEMENTS
FY16	P-194	UAS FACILITIES EXPANSION
FY16	P-229	KC-130 FUSELAGE TRAINER
FY17	P-658	INDOOR FITNESS FACILITY
FY17	P-130	MWSS MOTOR TRANSPORT & COMM SHOP
FY17	P-222	AIRFIELD SECURITY IMPROVEMENTS
FY17	P-134	PHYSICAL SECURITY & ORDNANCE SAFETY IMPROV
FY18	P-173	MWCS DETACHMENT FACILITIY
FY18	P-129	MACS-2 OPERATIONS & MAINTENANCE
FY18	P-149	GUIDED MISSILE INTEGRATION FACILITY
FY18	P-223	POTABLE WATER WELLS
FY19	P-080	ATLANTIC FIELD SECURITY
FY19	P-196	RIFLE RANGE OPERATIONS BUILDING
FY19	P-167	ORDNANCE MAGAZINES
FY19	P-223	CONSTRUCT TARGET BERMS AT BT-11
FY19	P-199	JSF HANGAR (2 MODULES)
FY20	P-831	FACILITY MAINTENANCE SHOPS
FY20	P-147	ELECTRONICS VAN PAD
FY20	P-562	POST OFFICE
FY20	P-197	JSF HANGAR (2 MODULES)
FY21	P-143	MAIN GATE ACCESS CONTROL POINT
FY21	P-142	FIRE STATIONS
FY21	P-162	SECURITY OFFICE
FY21	P-204	TRAINING AND SIMULATOR FACILITY
FY21	P-210	MCALF BOGUE AIRFIELD IMPROVEMENTS
FY22	P-202	SUPPORT EQUIPMENT STORAGE
FY22	P-203	AVIATION ARNAMENT SHOP
FY22	P-205	VERTICAL LANDING PAD IMPROVEMENTS
FY22	P-206	ARM/DEARM PADS
FY22	P-207	GROUND SUPPORT EQUIPMENT SHOP
FY22	P-209	ENGINE MAINTENANCE FACILITY
FY24	P-200	JSF HANGAR (2 MODULES)
FY26	P-226	MALS 14 MAINTENANCE HANGAR / MAG14 HQs
FY27	P-228	ATC TOWER &AIRFIELD OPS
FY27	P-201	JSF HANGAR (1 MODULE)

NEW RIVER

FY10	P-652	VMMT-204 MAINT HANGAR PH 3
FY10	P-688	AIRCRAFT APRON EXPANSION PH II
FY10	P-311	PARALLEL TAXIWAY
FY11	P-683	MV-22 MAINTENANCE HANGAR
FY11	P-687	MV-22 MAINT HANGAR (HMLA)
FY12	P-705	AIRCRFT MAINT HANGAR/APRONS/CL
FY12	P-710	CALA ADDITION
FY13	P-711	IPAC FACILITY
FY14	P-726	REGIONAL COMM STATION
FY14	P-676	CH-53K MAINTENANCE TRAINING
FY14	P-674	CORROSION CONTROL HANGAR
FY16	P-729	OPERATIONAL TRAINER FACILITY
FY16	P-686	ATC FACILITY ADDITION
FY17	P-389	GROUP HEAD QUARTERS MAG-29
FY17	P-690	STATION ARMORY
FY17	P-709	ORDNANCE STORAGE
FY17	P-706	SQUADRON WAREHOUSE
FY17	P-724	LIBRARY AND EDUCATION CENTER
FY17	P-713	THEATER
FY18	P-718	CHRIMP WAREHOUSE
FY19	P-635	OSPREY SUPPORT CENTER
FY19	P-721	MALS ADDITION
FY20	P-712	DOUGLASS GATE SECURITY UPGRADE

BEAUFORT

FY13	P-427	GROUND SUPPORT EQUIPMENT SHOP
FY13	P-456	SIMULATED LHD DECK
FY13	P-459	RECYCLE/HAZWASTE FACILITY
FY13	P-465	AIRCRAFT HANGAR - VMFA
FY14	P-473	TOWNSEND BOMBING RANGE ACQ - PHASE 1
FY14	AM00037	LAUREL BAY ELEMENTARY/MIDDLE SCHOOL
FY15	DLA 1606	JET FUEL STORAGE AND PIPELINE REPLACEMENT
FY16	P-474	TOWNSEND BOMBING RANGE ACQ - PHASE 2
FY17	P-457	CRYOGENICS FACILITY
FY17	P-476	REGIONAL COMMUNICATIONS CENTER
FY17	P-458	LAUREL BAY FIRE STATION
FY17	P-485	JSF ALTERNATE MISSION EQUIPMENT STORAGE
FY17	P-483	RUNWAY OVERRUNS
FY17	P-464	AIRCRAFT HANGAR - VMFAT
FY17	P-475	AIRCRAFT HANGAR - VMFAT
FY17	P-477	JET FUEL SYSTEM CAPACITY EXPANSION
FY17	P-484	JSF MAINTENANCE TRAINING FACILITY
FY18	P-480	UPGRADE COMMUNICATION INFRASTRUCTURE

BEAUFORT (CONT.)

FY18	P-462	F-35B ASSAULT STRIP
FY18	P-478	STATION MAINTENANCE COMPLEX
FY19	P-445	EXPEDITIONARY AIRFIELD
FY19	P-479	EXPEDITIONARY CONSTRUCTION COMPLEX
FY19	P-461	MARINE & FAMILY READINESS CENTER
FY20	P-471	MAG-31 HEADQUARTERS
FY20	P-481	MRAP STORAGE AND MAINTENANCE FACILITY
FY20	P-482	MACS-2 VEHICLE STORAGE AND MAINTENANCE
FY21	P-486	ORDNANCE CONTROL BUNKERS
FY22	P-440	AIR EMBARKATION FACILITY

MCI WEST

YUMA

FY12	P-575	ALF PH I
FY13	P-378	SECURITY OPERATIONS FACILITY
FY13	P-123	VMU-4 MAINTENANCE FACILITY
FY15	P-617	MALS-13 FACILITIES UPGRADES (JSF)
FY16	P-602	MAWTS-1 CALA MAINT COMPLEX PH I
FY17	P-612	VMX-22 MAINT HANGAR (MV-22/CH-53K)
FY17	P-364	PHYSICAL FITNESS CENTER
FY17	P-539	ENLISTED DINING FACILITY
FY17	P-591	WATER TREATMENT FACILITY
FY17	P-596	HANGAR 95 RENOVATIONS (JSF)
FY17	P-421	STUDENT QUARTERS BOQ
FY17	P-446	CONSOLIDATED ORDNANCE DISPOSAL
FY17	P-501	FIRE STATION
FY17	P-504	CONSOLIDATED STATION ARMORY
FY17	P-538	BEQ (JSF)
FY17	P-576	ALF PH II (JSF)
FY18	P-536	MAG/MALS/STATION HQ FACILITY (JSF)
FY18	P-551	AIRCRAFT MAINT HANGAR (JSF)
FY18	P-568	CLC-16 COMPOUND
FY18	P-579	AVIATION MAINTENANCE STORAGE FAC
FY18	P-600	MAINT BUILT IN TEST PADS (JSF)
FY18	P-614	AIRFIELD LIGHTING AND POWER
FY18	P-640	AIRFIELD DUST ABATEMENT
FY19	P-531	TAC AIR COMMAND CENTER
FY19	P-553	POST OFFICE
FY19	P-587	TAXIWAY UPGRADES
FY19	P-598	CONSOLIDATED CHILLER FACILITY
FY20	P-419	LIFELONG LEARNING CENTER
FY20	P-450	RELIGIOUS EDUCATION CENTER ADD
FY20	P-493	RUNWAY 3R/21L EXTENSION
FY20	P-503	TRANSIENT QUARTERS
FY20	P-527	WATER SURVIVAL TRAINING TANK
FY20	P-532	SECURE ACCESS CONTROL FACILITY
FY20	P-542	MWSS-371 RELOCATION
FY20	P-570	AIRCRAFT MAINT HANGAR (JSF)
FY20	P-572	COMPOSITE REPAIR FACILITY (JSF)
FY20	P-577	ALF PH III (JSF)
FY20	P-580	FLIGHT LINE PARKING STRUCTURE (JSF)
FY20	P-585	RUNWAY UPGRADES (JSF)
FY20	P-589	VL PAD
FY20	P-616	LOX/N2 FACILITY
FY20	P-619	F-35B MAINTENANCE TRAINER FACILITY

MIRAMAR

FY13	P-181	HANGAR 5 MODIFICATION
FY14	P-308	POL PIPELINE
FY14	P-906	ENERGY SECURITY AND MICROGRID
FY17	P-200	KC130 EACTS FACILITY
FY17	P-249	COMMUNICATION BUILDING
FY17	P-244	MATCU OPERATIONS BUILDING
FY17	P-225	AIRFIELD TAXIWAY
FY17	P-235	LHD PAD
FY17	P-204	VEHICULAR BRIDGE
FY17	P-227	TACTICAL SUPPORT VAN PAD DRAINAGE
FY18	P-210	SIMULATOR FACILITY
FY18	P-240	COMMUNICATION UPGRADE
FY19	P-198	ACFT MAINT HANGAR AND PARKING APRON #1
FY19	P-205	PLESS AVENUE EXTENSION
FY20	P-209	RUNWAY 24L PHASE 1
FY21	P-233	RUNWAY 24L PHASE 2
FY21	P-221	AIRCRAFT WASHRACK #1
FY21	P-222	VERTICAL LANDING PADS
FY21	P-238	AIRFIELD SECURITY
FY22	P-216	RUNWAY 24R PHASE 1
FY23	P-234	RUNWAY 24R PHASE 2
FY23	P-190	TACTICAL COMMUNICATIONS OPS & TRAINING FAC
FY23	P-191	TACTICAL AIR CONTROL EQUIPMENT FACILITY
FY23	P-194	ARMORY ADDITION
FY23	P-201	AIRCRAFT MAINTENANCE HANGAR #2
FY26	P-228	AIRCRAFT WASHRACK #2
FY28	P-202	AIRCRAFT MAINTENANCE HANGAR #3
FY29	P-229	AIRCRAFT WASHRACK #3

MCAS PENDLETON & BASE PENDLETON AIR

FY11	PA109	CNATT/FRS - AV TRAINING AND BEQ
FY12	PA114	MV-22 DOUBLE HANGAR REPLACEMENT
FY12	PA116	MV-22 AVIATION PAVEMENT
FY12	PA117	MV-22 AVIATION FUEL STORAGE
FY13	PA113	MV-22 AVIATION SIMULATOR BUILDING
FY17	PA119	EXPAND HANGAR 2 & RECONFIGURE HANGAR 7 FOR TV
FY17	PA123	INTERSECTION SAFETY IMPROVEMENTS
FY17	PA118	AVIATION WAREHOUSE
FY20	PA121	PERIMETER PARKING
FY20	PA042	AVIATION DEPARTURE IMPROVEMENTS
FY20	PE121	CONVERT SIMULATED LHA DECK TO CONCRETE
FY20	PE1056	LHD PAD MODERNIZATION
FY20	PE1057	VTOL PAD MODERNIZATION
FY20	PE1058	HOLF RUNWAY LIGHTING IMPROVEMENTS

MCI PAC

KANEOHE BAY

FY12	P-822	MCAS OPERATIONS COMPLEX
FY13	P-904	MV-22 HANGAR & INFRASTRUCTURE
FY13	P-905	AIRCRAFT STAGING AREA (MV-22)
FY14	P-907	MV-22 PRKG APRON/INFRA (2ND SQD)
FY14	P-908	MV-22 HANGAR (2ND VMM SQND)
FY14	P-863	HMLA HANGAR RENOVATION
FY14	P-884	MISSION SUPPORT FACILITY (ATS)
FY14	P-864	MALS AIRCRAFT MAINT EXPANSION
FY15	P-861	VMU INFRASTRUCTURE UPGRADES
FY15	P-924	MV22 EIS TRAFFIC MITIGATION
FY16	P-902	AIRFIELD LIGHTING AND ELEC UPGRADES
FY16	P-910	BACHELOR ENLISTED QUARTERS PH I
FY17	P-913	MAG-24 ARMORY EXPANSION
FY17	P-887	LHD PAD CONV & MV22 LZ IMPRVMNTS
FY17	P-929	VMU OPERATIONS SUPPORT SHED (WAAF)
FY17	P-911	BACHELOR ENLISTED QUARTERS PH II
FY17	P-916	MV-22/HMLA WAREHOUSE
FY17	P-836	MAG-24 HQ AND PARKING BUILDING
FY17	P-915	MCCS SELF STORAGE
FY17	P-928	PTA AMMUNITION STORAGE
FY17	P-774	PTA EQUIPMENT STORAGE
FY17	P-936	VAN PAD MODERNIZATION
FY18	P-912	BACHELOR ENLISTED QUARTERS PH III
FY18	P-926	MALS ORDNANCE STORAGE
FY19	P-891	HANGAR 102 MODERNIZATION
FY21	P-882	RUNWAY CLEAR ZONE BUILDING DEMO AND AIRFIELD
FY21	P-876	AIRFIELD SECURITY FENCING & UPGRADE
FY25	P-883	RUNWAY UNDERPASS

MFR MILCON -- VARIOUS LOCATIONS

FY20	P-165	KC130J SIMULATOR BLDG ADD TO ANG SIM
FY20	P-128	MV-22 HANGAR EAST COAST PH I
FY20	P-129	MV-22 HANGAR EAST COAST PH II

OKINAWA MCAS FUTENMA

2013	MC1304	UPGRADE STORM DRAINAGE
2013	MC1308	FIRE STATION GENERATOR
2013	MC1310	AIR TRAFFIC CONTROL TOWER GENERATOR
FY14	P-201	AIRFIELD SECURITY FENCE
FY15	P-213	HANGAR & RINSE FACILITY MODERNIZATION
FY18	P-205	AIRCRAFT RUNWAY OVERRUN
FY18	P-214	JP-5 FUEL TRUCK OFF-LOAD SYSTEM (DLA)

OKINAWA IE SHIMA

FY15	P-801	LHD PRACTICE SITE IMPROVEMENTS

OKINAWA MARINE WING LIAISON KADENA

FY15	P-803	AIRCRAFT MAINT HANGAR ALTERATIONS & SAPF
FY16	P-809	MODERNIZE APRON FOR F-35
FY17	P-807	AIRCRAFT MAINTENANCE COMPLEX
FY18	P-810	MWLK BARRACKS

IWAKUNI

FY13	P-995	ACFT MAINT HANGAR IMPROVEMENTS
FY13	P-996	VTOL PAD - NORTH
FY14	P-945	TYPE III HYDRANT FUELING STYEM (DESC)
FY17	P-1005	VTOL PAD – SOUTH
FY17	P-994	ALT TRUCK FUEL RECEIPT SYSTEM (DESC)
FY17	P-1000	ACFT MAINT HANGAR IMPROVEMENTS, SOUTH
FY18	P-993	PROVIDE T-5 CAPABLE PIER (DESC)
FY18	P-992	BULK FUEL STRG TANKS-PACOM (DESC)
FY18	P-1001	ACFT MAINT HANGAR IMPROVEMENTS, NORTH

IWAKUNI (DRPI)

FY13	MC0447	EAST UTILITY PLANT
FY13	MC152T	MAG-12 WASH PAD
FY13	MC159T	MAG12/CVW-5 HQ BUILDING
FY13	MC305T	LOX STORAGE
FY14	MC948	FIRE DRILL PIT (JFIP)
FY14	MC403	MWSS 171 FUEL STORAGE SHED (JFIP)
FY14	MC407	CSSD-36 MAINTENANCE COMPOUND (JFIP)
FY14	MC155T	MALS-12 HUSH HOUSE & ENGINE TEST
FY14	MC250T	CVW-5 AIMD AVIATION MAINT FACILITY
FY14	MC169T	CVW-5 HUSH HOUSE & ENGINE TEST CELL
FY14	MC170T	VMGR-152 AIRCRAFT MAINT HANGAR
FY14	MC171T	VMGR-152 SUPPLY / STORAGE COMPLEX
FY14	MC165T	CVW-5 HANGAR
FY14	MC166T	CVW-5 AIRCRAFT HANGAR
FY14	MC168T	CORR CONTROL HANGAR WASHPAD
FY14	MC156T	MAG-12 GEN STORAGE WHSE & SHEDS
FY14	MC156T	MAG12/CVW-5 GENL STOR WHSE&SHED
FY15	MC172T	VMGR-152 CORROSION CONTROL HANGAR
FY15	MC173T	VMGR-152 APRON, WASHRACK & RINSE
FY15	MC167T	CVW-5 MAINT HANGAR
FY15	MC175T	CONSOLIDATED MAINTENANCE HANGAR
FY15	MC158T	OPERATIONAL TRAINERS COMPLEX
FY15	MC255T	FLIGHT LINE INFRASTRUCTURE

IWAKUNI (DRPI) (CONT.)

FY16	MC164T	STATION/VISTING AC APRON & SUPPORT
FY16	MC948T	AIRFIELD FIRE TRAINING FACILITY PH2
FY16	MC194T	JP5 FUEL STORAGE
FY16	MC908T	HAZADOUS CARGO LOADING AREA
FY16	MC0135	STATION AIRCRAFT MAINT HANAGER
FY16	MC263T	CVW-5 MAINTENANCE TEST AREA
FY16	MC936T	STATION AIR CARGO TERMINAL
FY17	MC320T	FLIGHT LINE PERIMETER FENCING

GUAM - ANDERSON AB (DRPI)

FY13	TBD	AAFB NR PARKING PH II
FY13	HNF	AAFB NR UTILITIES PH II
FY14	P-109	AIRCRAFT HANGAR #1
FY15	P-230	GSE SHOPS
FY15	P-240	MWSS FACILITIES
FY17	TBD	AIRCRAFT HANGAR #2
FY17	TBD	MALS FACILITIES
FY17	TBD	CORR CONTROL HANGAR
FY19	TBD	ACE GYM & DINING
FY20	TBD	ORDNANCE OPS
FY21	HNF	AVIATION INSTRUCTION FAC
FY22	TBD	AIR OPS BLDG
FY23	TBD	EARTH MAG

OKINAWA FUTENMA REPLACEMENT FACILITY (DPRI)

FY20 COM	MC1562-T	CORROSION CONTROL HANGAR
FY18 COM	MC1563-T	VMM-1 HANGAR
FY20 COM	MC1564-T	VMM-2 HANGAR
FY18 COM	MC1565-T	HMLA HANGAR
FY18 COM	MC1566-T	HMH HANGAR
FY20 COM	MC1567-T	MALS HANGAR
TBD	MC1572-T	MATSS FACILITY
FY18 COM	MC1568-T	OSA HANGAR

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 plaforms which directly contibutes 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 event s 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	1	2	3	4
ADVTE CONNECTIVITY (WIDE AREA NETWORK)																																															
MCAS Cherry Point			N/A	03-11																																												
MCAS New River																																															
Cherry Pt/New River LAN/WAN			N/A	12-11																																											
Miramar/Pendlenton LAN/WAN																																															
Yuma/Beaufort LAN/WAN			N/A	09-12																																											
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	03-11																																												
MCAS CHERRY POINT																																															
NECC[2]	2H157-1		N/A	03-11																																												
MCAS MIRAMAR																																															
NECC[2]	2H157-2		N/A	12-11																																												
MCAS CAMP PENDLETON																																															
NECC[1]	2H157-3		N/A	12-11																																												
MCAS BEAUFORT																																															
NECC[3]	2H157-6		N/A	09-12																																												
MCAS YUMA																																															
NECC[3]	2H157-5		N/A	09-12																																												

Roadmap Legend

- Trainer Operational
- New Build
- Trainer Down for Mod/Upgrade
- Planned Device Disposal
- Trainer Relocation

***Notes* (These databases include:)**

1 - NY, Okinawa, Mediterranean, Panama and Norway

2 - East & West Coasts, Bridgeport, Afghanistan and Iraq

3 - Pendleton, Atlanta and New Orleans

MARINE COMMON AIRCREW TRAINER (MCAT) ROADMAP

Common Integrated Products Team Lead: Kent Campbell PH: 407-380-4237 e-mail: kent.campbell@navy.mil

T/M/S	Type Sim	COG Name	ADVTE	Last Tech Ref Date	FY15				FY16				FY17				FY18				FY19				FY20				FY21				FY22				FY23				FY24			
					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-53/CH-46	MCAT-P1 (SBIR*)	2H160A	Feb-17	N/A																																								
MIRAMAR																																											
CH-53/MV-22/UH-1Y	MCAT-P2 (SBIR*)	2H160B	Apr-14	N/A																																								
NEW RIVER																																											
CH-53/MV-22/UH-1Y	MCAT (CFTD)	2H166A-1	Aug-17	N/A																																								
CH-53/MV-22/UH-1Y	MCAT (CFTD)	2H166A-6	Dec-19	N/A																																								
CH-53/MV-22/UH-1Y	MCAT (CFTD)	2H166A-7	Dec-19	N/A																																								
MIRAMAR																																											
CH-53/MV-22/UH-1Y	MCAT (CFTD)	2H166A-4	Feb-19	N/A																																								
CH-53/MV-22/UH-1Y	MCAT (CFTD)	2H166A-5	Feb-19	N/A																																								
PENDLETON																																											
CH-53/MV-22/UH-1Y	MCAT (FTD)	2H166B-1	Feb-17	N/A																																								
CH-53/MV-22/UH-1Y	MCAT (FTD)	2H166B-2	Jul-19	N/A																																								
CH-53/MV-22/UH-1Y	MCAT (FTD)	2H166B-3	Jul-19	N/A																																								
KANEOHE BAY																																											
CH-53/MV-22/UH-1Y	MCAT (CFTD)	2H166A-2	Jul-18	N/A																																								
FUTENMA (FRF)																																											
CH-53/MV-22/UH-1Y	MCAT (CFTD)	2H166A-3	Oct-18	N/A																																								
MCGUIRE (4th MAW)																																											
CH-53/MV-22/UH-1Y	MCAT (CFTD)	2H166A-8	Feb-20	N/A																																								
NORFOLK (4th MAW)																																											
CH-53/MV-22/UH-1Y	MCAT (CFTD)	2H166A-9	May-20	N/A																																								

Roadmap Legend

- 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	1 2 3 4
KANEOHE BAY																	
RQ-7B	UMS (#3)	TBD			N/A	TBD		TBD									
RQ-7B	IMS (#3)	2F217			N/A	02-14											
29 PALMS																	
RQ-7B	IMS (#1)	2F217			N/A	02-14											
RQ-7B	UMS (#1)	TBD			N/A	TBD	TBD										
RQ-7B	IMS (#3)	2F217			N/A	02-14											
CHERRY POINT																	
RQ-7B	IMS (#2)	2F217			N/A	02-14											
RQ-7B	UMS (#2)	TBD			N/A	TBD			TBD								
YUMA																	
RQ-7B	IMS (#4)	2F217			N/A	02-14											
PENDLETON																	
RQ-7B	IMS (#5)	2F217			N/A	02-14											
RQ-7B	UMS (#4)	TBD			N/A	TBD			TBD								

Roadmap Legend

- Trainer Operational
- New Build
- Trainer Down for Mod/Upgrade
- Planned Device Disposal
- Trainer Relocation

MV-22 AIRCREW TRAINING SYSTEMS ROADMAP

Integrated Products Team Lead: Major Chris Powers PH: (301) 757-8157 e-mail: chris.powers1@navy.mil

T/M/S	Type Sim	COG Name	Db	TEn	Last Tech Ref	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
NEW RIVER																																																
MV-22	FFS-1	2F182	NPSI, Note 1	v5.0	2013	2013	C2.01								C3.01								C4.01								C5.01								C7.01								C8.01			
MV-22	FFS-2	2F182	NPSI, Note 1	v5.0	2013	2013																																										
MV-22	FFS-3	2F182	NPSI, Note 1	v5.0	2013	2013																																										
MV-22	FTD-1	2F183	NPSI, Note 1	v5.0	2013	2013																																										
MV-22	CFTD-1	2F200	NPSI, Note 1	v5.0	2013	2013					C3.01								C4.01								C5.01								C6.01								C7.01						
MV-22	CFTD-6	2F200	NPSI, Note 1	v5.0	2012	2013																																										
MV-22	ICLE	2F212	N/A	v5.0	2012	-																																										
MV-22	CMS PTT-1	2C81	N/A	N/A	2012	-																																										
MIRAMAR																																																
MV-22	CFTD-2	2F200	NPSI, Note 1	v5.0	2012	2012							C3.01						C4.01						C5.01						C6.01								C7.01										
MV-22	CFTD-3	2F200	NPSI, Note 1	v5.0	2012	2012																																										
MV-22	CFTD-4	2F200	NPSI, Note 1	v5.0	2012	2012																																										
MV-22	CFTD-5	2F200	NPSI, Note 1	v5.0	2012	2012																																										
MV-22	CMS PTT-2	2C81	N/A	N/A	2012	2012																																										
FUTENMA																																																
MV-22	CFTD-7	2F200	NPSI, Note 2	v5.0	New	2012					C3.01								C4.01								C5.01								C6.01								C7.01						
MV-22	CFTD-8	2F200	NPSI, Note 2	v5.0	New	2012																																										
QUANTICO/HMX-1																																																
MV-22	CFTD-9	2F200	NPSI, Note 3										C3.01						C4.01						C5.01						C6.01								C7.01										
MV-22	CFTD-10	2F200	NPSI, Note 3																																													
CAMP PENDLETON																																																
MV-22	CFTD-11	2F200	NPSI, Note 3				Jan						C3.01						C4.01						C5.01						C6.01								C7.01										
MV-22	CFTD-12	2F200	NPSI, Note 3				Apr																																									
KANEOHE BAY																																																
MV-22	CFTD-13	2F200	NPSI, Note 3								Aug		C3.01						C4.01						C5.01						C6.01								C7.01										
MV-22	CFTD-14	2F200	NPSI, Note 3								Nov																																					
4TH MAW (NORFOLK)																																																
MV-22	CFTD-15	2F200	NPSI, Note 3								Mar		C3.01						C4.01						C5.01						C6.01								C7.01										
MV-22	CFTD-16	2F200	NPSI, Note 3								Jun																																					

Roadmap Legend

- Trainer Operational
- New Build
- Trainer Down for Mod/Upgrade
- Planned Device Disposal
- Trainer Relocation

***Notes* (These databases include:)**

1 - East Coast, West Coast, Bridgeport Summer/Winter, Iraq, Afghanistan

2 - Note 1 plus WestPac

3 - Note 2 plus Wash DC, Hawaii

CH-46E AIRCREW TRAINING SYSTEMS ROADMAP

Integrated Products Team Lead: Steve Coln PH: 407.380.8159 e-mail: stephen.coln@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
CAMP PENDLETON																	
CH-46E	WST	2F173-1		v4.0	Jun-10	TBD	Excess										
CHERRY POINT																	
CH-46E	APT	2F191		v3.13	Aug-03	TBD			Excess								

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: 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
QUANTICO																	
VH-3D	APT	2F180	NEUSA 5.0	v4.0	12-Aug	12-Sep											
VH-60N	CFTD	2F233	ESUSA V1.1	v5.0	NA	TBD											

Roadmap Legend

- Trainer Operational
- New Build
- Trainer Down for Mod/Upgrade
- Planned Device Disposal
- Trainer Relocation

VH Visual Database Notes:

-Washington DC and New York City. There are 51 airfields and 140 AOIs spanning the extents from Dare county, NC to Syracuse, NY.

-Washington DC and New York City. There are 85 airfields and 160 AOIs spanning the extents from Eglin AFB, FL to Syracuse, NY.

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	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	NPSI	v5.0	Mar 13	Mar 12										
CH-53E	APT	2F190-1	NPSI	v5.0	Mar 13	Nov 11										
CH-53E	EAET	2H164-1	TBD	TBD	NA	TBD										
FUTENMA																
CH-53E	APT	2F171	NPSI	v4.0	Sep 13	TBD 14										
MIRAMAR																
CH-53E	WST	2F174-2	NPSI	v5.0	Jul 13	Oct 11										
CH-53E	APT	2F190-2	NPSI	v5.0	Aug 13	Nov 11										
CH-53E	EAET	2H164-2	TBD	TBD	NA	TBD										
KANEOHE BAY																
CH-53E	CFTD	2F220	NPSI	v5.0	Aug 13	TBD										
CH-53E	EAET	2H164-3	NPSI	v5.0	NA	TBD										
JB MCGUIRE-DIX-LAKEHURST																
CH-53E	FTD	2F239	TBD	TBD	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	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															
CH-53K	CFTD #2															
CH-53K	CFTD #3															
CH-53K	CFTD #4															
CH-53K	CFTD #5															
CH-53K	AMSPTT															
CH-53K	ICLT #1															
MIRAMAR																
CH-53K	CFTD #6															
CH-53K	CFTD #7															
CH-53K	CFTD #8															
CH-53K	CFTD #10															
CH-53K	ICLT #2															
KANEOHE BAY																
CH-53K	CFTD #9															
CH-53K	ICLT #3															
JB MCGUIRE-DIX-LAKEHURST																
CH-53K	CFTD #11															
CH-53K	ICLT #4															

Roadmap Legend

- 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
CAMP PENDLETON																																																
AH-1W	APT	2F170 S/N 1	Ft. Rucker Note-3	v4.0	Feb 2012	In Work					Note 5																																							
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																																										
UH-1Y	FTD	2F196B S/N 4	NPSI Note-2	v4.0	New (Lot 4)	2015																																										
AH-1Z	FTD	2F197B S/N 2	NPSI Note-2	v4.0	New (Lot 3)	2016																																										
AH-1Z	FTD	2F227 S/N 2	NPSI Note-2	v4.0	New (Lot 4)	2018																																										
BELLE CHASSE																																																
AH-1W	APT	2F170 S/N 2	NPSI Note-2	v4.0	Aug 2012	Dec 2012																																											
UH-1Y	FTD	2F226 S/N 2	NPSI Note-2	v4.0	New (Lot 4)	2017																																										
MCGUIRE																																																
AH-1W	APT	2F170 S/N 1	Ft. Rucker Note-3	v4.0	Feb 2012	In Work	Note 5																																										
UH-1Y	FTD	2F226 S/N 1	NPSI Note-2	v4.0	New (Lot 4)	2017																																										
AH-1Z	FTD	2F227 S/N 3	NPSI Note-2	v4.0	New (Lot 4)	2019																																										
KANEOHE 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																																										

Roadmap Legend

- **Trainer Operational**
- **New Build**
- **Trainer Down for Mod/Upgrade**
- **Planned Device Disposal**
- **Trainer Relocation**

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

KC-130 AIRCREW TRAINING SYSTEMS ROADMAP

Assistant Program Manager, Training Systems: John Fuller PH: 301-995-3796 e-mail: john.fuller@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																	
KC-130J	WST	2F199-1	NPSI Note-2	v4.0													
KC-130J	HHPTT	2A85-1	Afghanistan	N/A													
KC-130J	CPT	2C87	N/A	N/A													
KC-130J	FuT	TBD	N/A	N/A													
KC-130J	OBST	TBD	TBD	TBD													
KC-130J	HHFCO TNF	TBD	TBD	TBD													
MIRAMAR																	
KC-130J	WST	2F199-2	NPSI Note-1	v4.0													
KC-130J	HHPTT	2A85-2	Afghanistan	N/A													
KC-130J	CPT	2C87	N/A	N/A													
KC-130J	FuT	TBD	N/A	N/A													
KC-130J	OBST	TBD	TBD	TBD													
KC-130J	HHFCO TNF	TBD	TBD	TBD													
FUTENMA/IWAKUNI																	
KC-130J	WST	2F199-3	NPSI Note-1	v3.5													
KC-130J	CPT	2C87	N/A	N/A													
KC-130J	FuT	TBD	N/A	N/A													
KC-130J	OBST	TBD	TBD	TBD													
FT WORTH (KC-130T/KC-130J)																	
C-130T	OFT (USN)	2F107-1	NPSI Note-1	v2.4													
C-130T	CPT (USN)	2F107A	NPSI Note-1	N/A													
KC-130T	APT	2F176	NPSI Note-1	v2.1	MAR 03												
KC-130J	WST	2F199-4	NPSI Note-1	TBD													
KC-130J	CPT	2C87	N/A	N/A													
KC-130J	FuT	TBD	N/A - Note2	N/A													
KC-130J	OBST	TBD	N/A - Note2	TBD													
STEWART ANGB (KC-130T/KC-130J)																	
KC-130J	WST	2F199-5	NPSI Note-1/2	TBD													
KC-130J	CPT	2C87	N/A - Note2	N/A													
KC-130J	FuT	TBD	N/A - Note2	N/A													
KC-130J	OBST	TBD	N/A - Note2	TBD													
WILLOW GROVE/MCGUIRE AFB (C-130T)																	
C-130T	OFT (USN)	2F152	NPSI Note-1	N/A													

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 CPT & WST has not been identified 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	OF/NT	2F185 (I3)		FY13	FY10	FY13	BLK7										
EA-6B	WST	2F188 (I3)		FY13	FY12	FY14	BLK7										
EA-6B	TTT	15E43 (I3)		FY13	FY11	FY13	BLK7										
EA-6B	OF/NT	2F143 (I2)		4.0	FY08	TBD											
EA-6B	TTT	15E22C (I2)		N/A	N/A	N/A											
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-2	NPSI Note-1	Rev5.0.1C	Aug-12	Mar-12											
AV-8B	WST	2F150F-4	NPSI Note-1	Rev5.0.1C	Mar-11	Mar-12											
AV-8B	WST	2F150F-1	NPSI Note-1	Rev5.0.1C	Jun-10	Mar-12											
AV-8B	MTT	15A23	Device unique	No	Jun-05	No											
AV-8B	DMRT	TBD	TBD	TBD	N/A	TBD											
YUMA																	
AV-8B	WST	2F150F-5	NPSI Note-1	Rev5.0.1C	Dec 09	Feb-12											
AV-8B	WST	2F150F-3	NPSI Note-1	Rev5.0.1C	Dec-10	Feb-12											
AV-8B	MTT	15A23	Device unique	No	Jun-05	No											
AV-8B	DMRT	TBD	TBD	TBD	N/A	TBD											

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), and Bridgeport, Afghanistan and Iraq

USMC F/A-18 C-D AIRCREW TRAINING SYSTEMS ROADMAP

Assistant Program Manager, Training Systems: LCDR T.J. Flora PH: 301-757-7333 e-mail: thomas.j.flora@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
IWAKUNI																																																
F/A-18D	TOFT #37	2F193B		NASMP v1.4																																												
F/A-18C	TOFT #16	2F193A		NASMP v1.4																																												
F/A-18C	TOFT #XX	XXXXX		NASMP v1.4		NAS Lemoore					Note 1																																						
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 #38	2F193A		NASMP v1.4																																												
F/A-18C	TOFT #35	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			Note 2																																									

Roadmap Legend

- Trainer Operational
- New Build
- Trainer Down for Mod/Upgrade
- Planned Device Disposal
- Trainer Relocation

Note 1: Trainer move funds need to be identificd

Note 2: 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 e-mail: 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	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																																												
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


SEMPER FIDELIS