

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 25 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

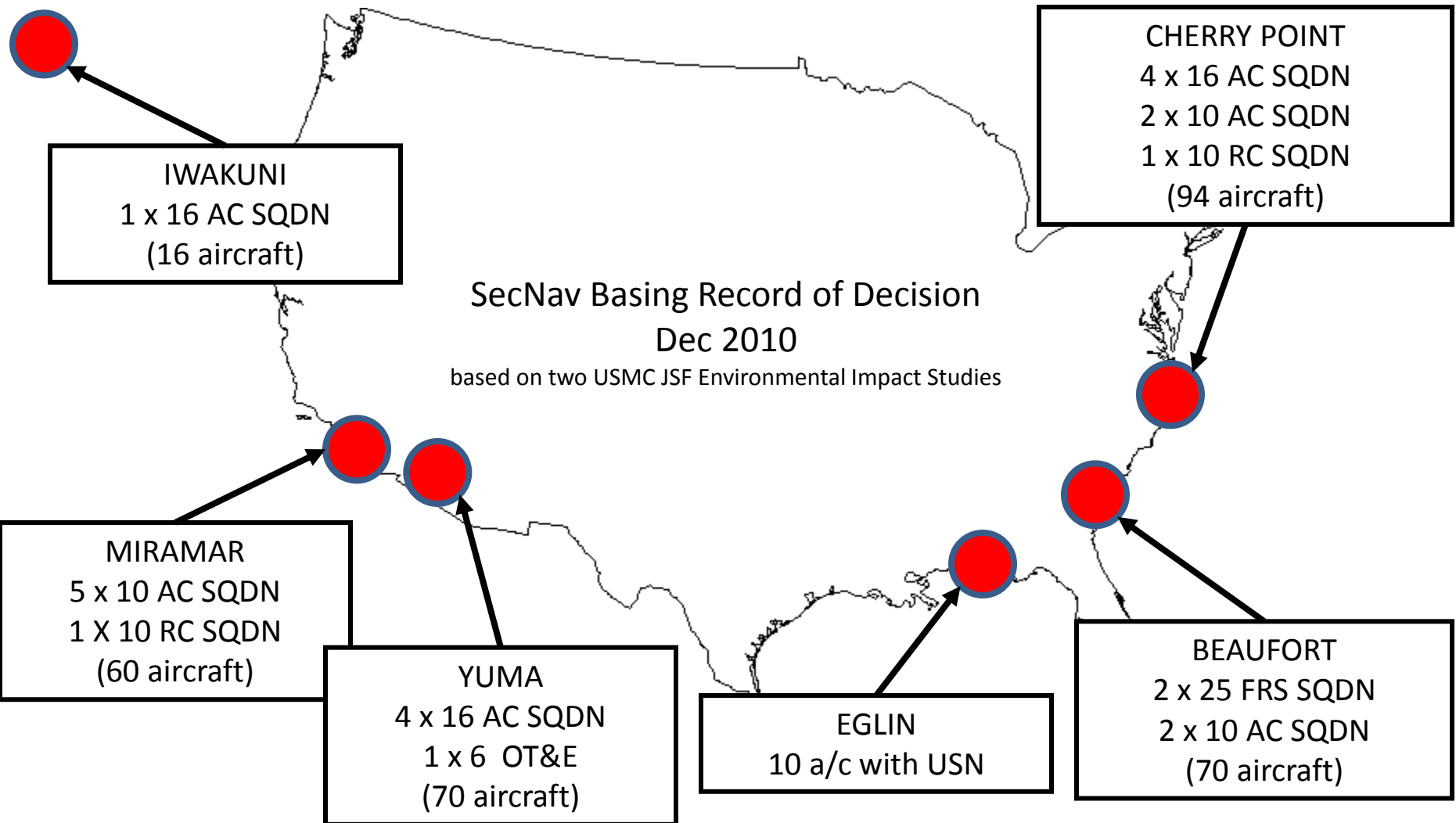
F-35B INITIAL OPERATIONAL CAPABILITY:

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
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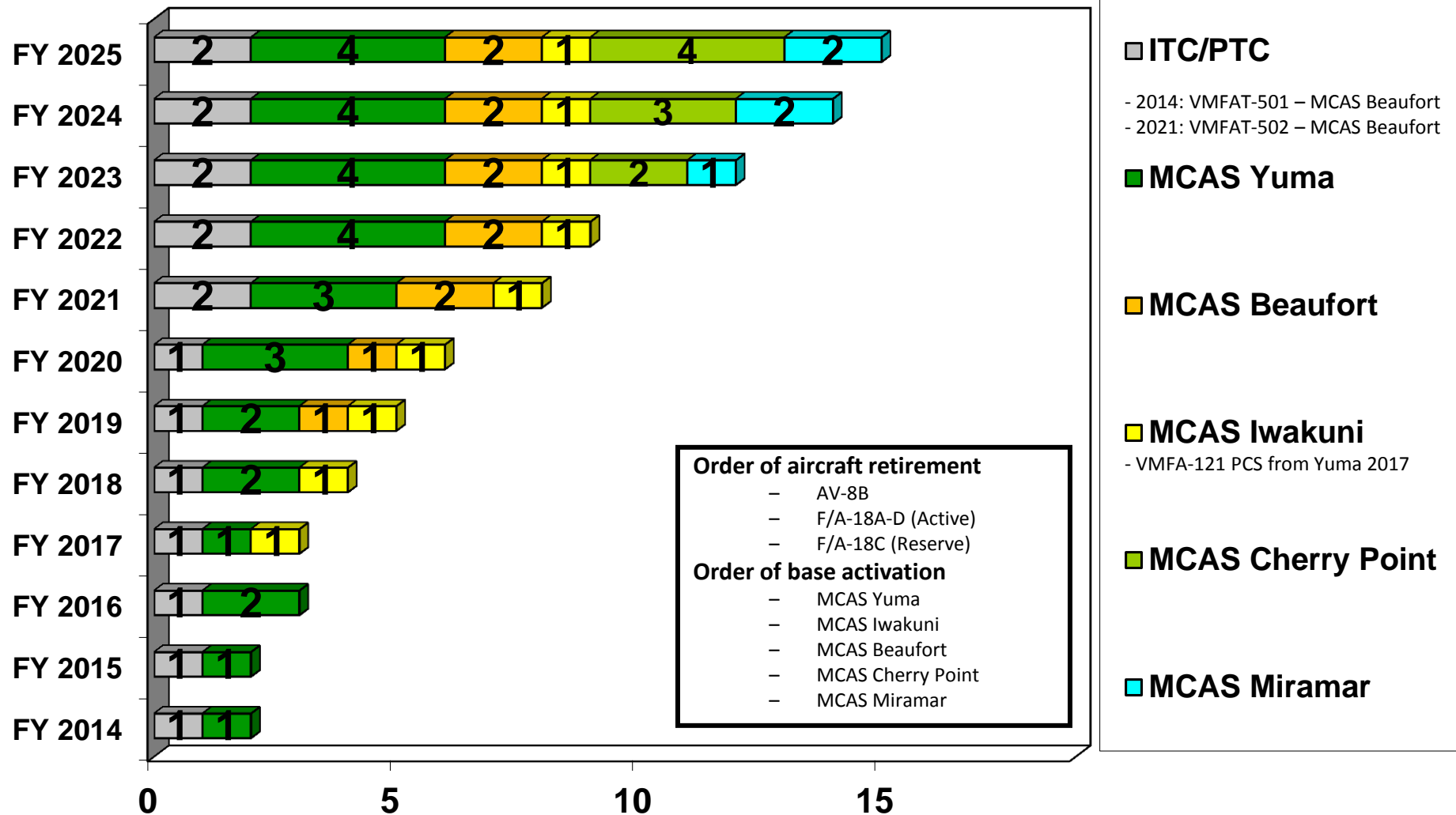
UNIT	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
VMFA-121	16B → 16B	Yuma	Iwakuni																
VMFA-211		Yuma	10B → 16B	Yuma															
VMA-311				Yuma	7B → 16B	Yuma													
VMFA-115				Beaufort	8C → 10C	Beaufort													
VMA-214					Yuma	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)																		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. 2.3.5

* 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

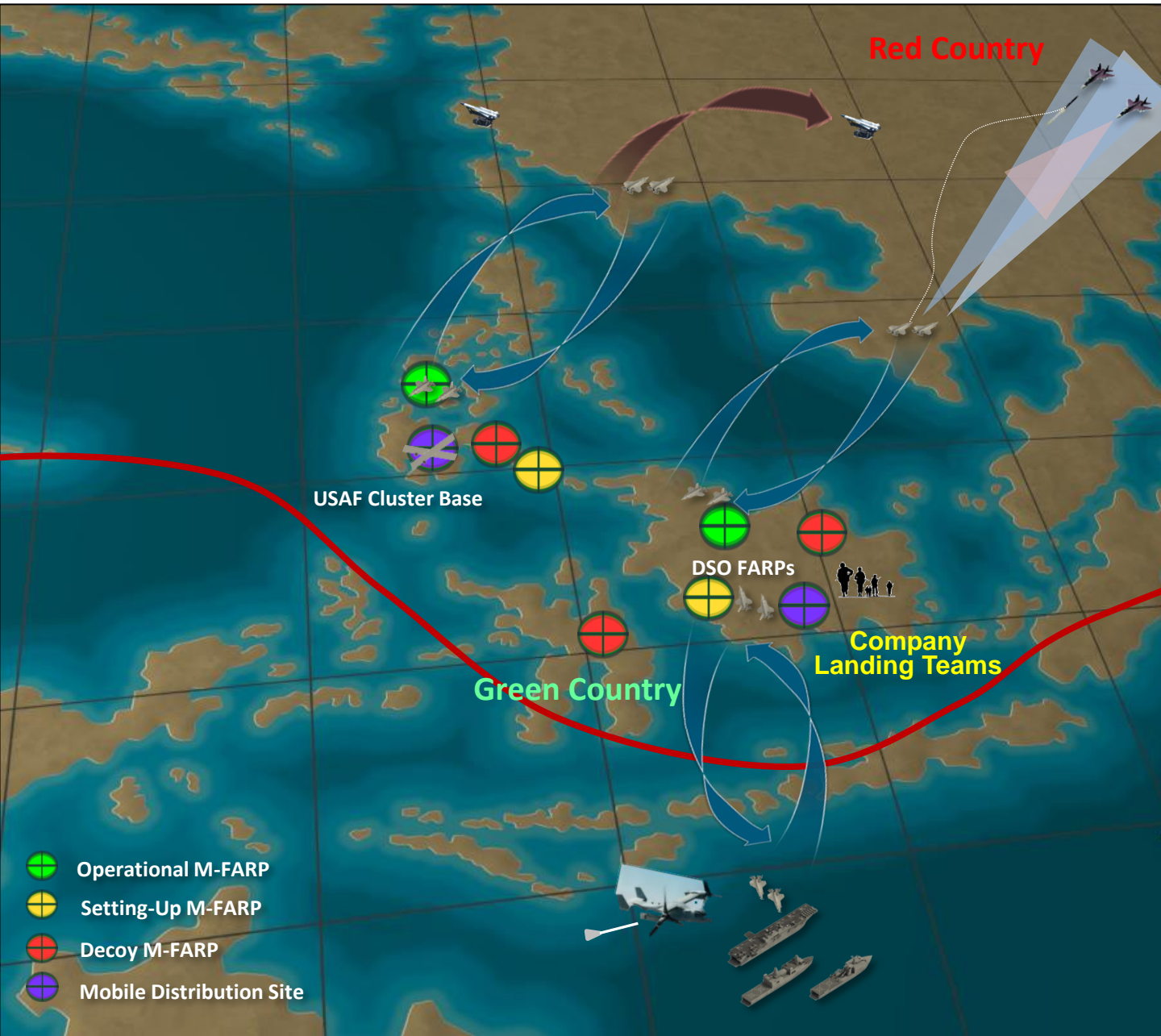
Distributed short take-off, vertical land (STOVL) operations (DSO) is a threat-based limited objective operation which occurs primarily when the entire MAGTF cannot be brought to bear against the enemy. DSO asymmetrically moves inside of the enemy targeting cycle by using multiple mobile forward arming 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

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

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, the Marine Corps did away with the four Marine Wing Support Group Headquarters (MWSG HQ). We are looking at that decision and developing options to reactivate those units.

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.



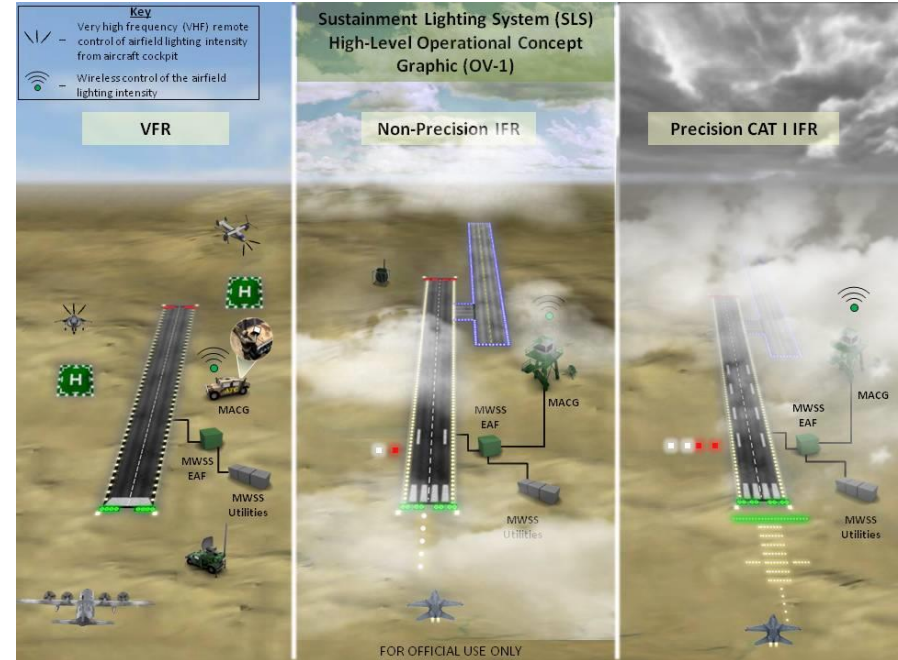
AVIATION GROUND SUPPORT MATERIEL INITIATIVES



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

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 LVSF) 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.

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

F-35 B/C Lightning II

Transition Task Force (TTF) and Cross Functional Teams (CFT)

- CFT 1: Test and Training
- CFT 2: Organization and Manpower
- CFT 3A: Maintenance/Logistics
- CFT 3B: Installations/Facilities/Environmental
- CFT-4: Requirements
- CFT 5: Autonomic Logistics Information System (ALIS) integration

Working Issues

Program Update

- F-35B has flown more than 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



- 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)
- Low observable, 360° integrated fused sensor information

Performance / Systems

F-35 AIRCREW TRAINING SYSTEMS ROADMAP

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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								
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Roadmap Legend



Trainer Operational

New Build

Trainer Down for Mod/Upgrade

Planned Device Disposal

Trainer Relocation

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 (WTTTP) 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 WTTTP 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.

MARINE CORPS AVIATION

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.

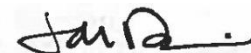
We need to focus on using every opportunity to buy new gear and transition out of our legacy gear. In my mind, that will constitute my primary strategy: to recapitalize the FMF aviation units with transformational gear like the MV-22, F-35B, CH-53K and G/ATOR. Those systems in particular give our Marines 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