MQA-10: OPD #2 – CAS AIRCRAFT

PREREQUISITES: MQA-9

REQUIRED READING: JP 3-09.3; TO 1M-34; AFFTP 3-1 Vol 26 (ASOC & TACP Operations) Chapter 6

PURPOSE: Familiarize new ALO with Officer Professional Development briefing on CAS aircraft.

Introduction - (Slide 2)

Many different kinds of aircraft do CAS. Some aircraft are better built for CAS than others. One thing to keep in mind is that each airframe brings something different to the fight and all aircraft have their advantages. This lesson will provide a basic understanding of the capabilities and limitations of combat fixed/rotary wing aircraft that support air and ground operations. The aircraft discussed in this lesson are:

- A-10/OA-10 Warthog
- AC-130 Hercules
- F-16 Fighting Falcon
- AV-8B Harrier
- F-18 A/C/E Hornet
- AH-64 Apache
- OH-58 Kiowa Warrior
- F-15E Strike Eagle
- B-52 Stratofortress (Buff)
- B-1B Lancer
- B-2A Spirit
- EA-6B Prowler
- Foreign Fighter

***** Most of the information in this lesson was taken form Joint Firepower Control Course (JFCC) paper as well as the Air Force On-line Library.

A-10/O-A10 Warthog – (Slide 3)

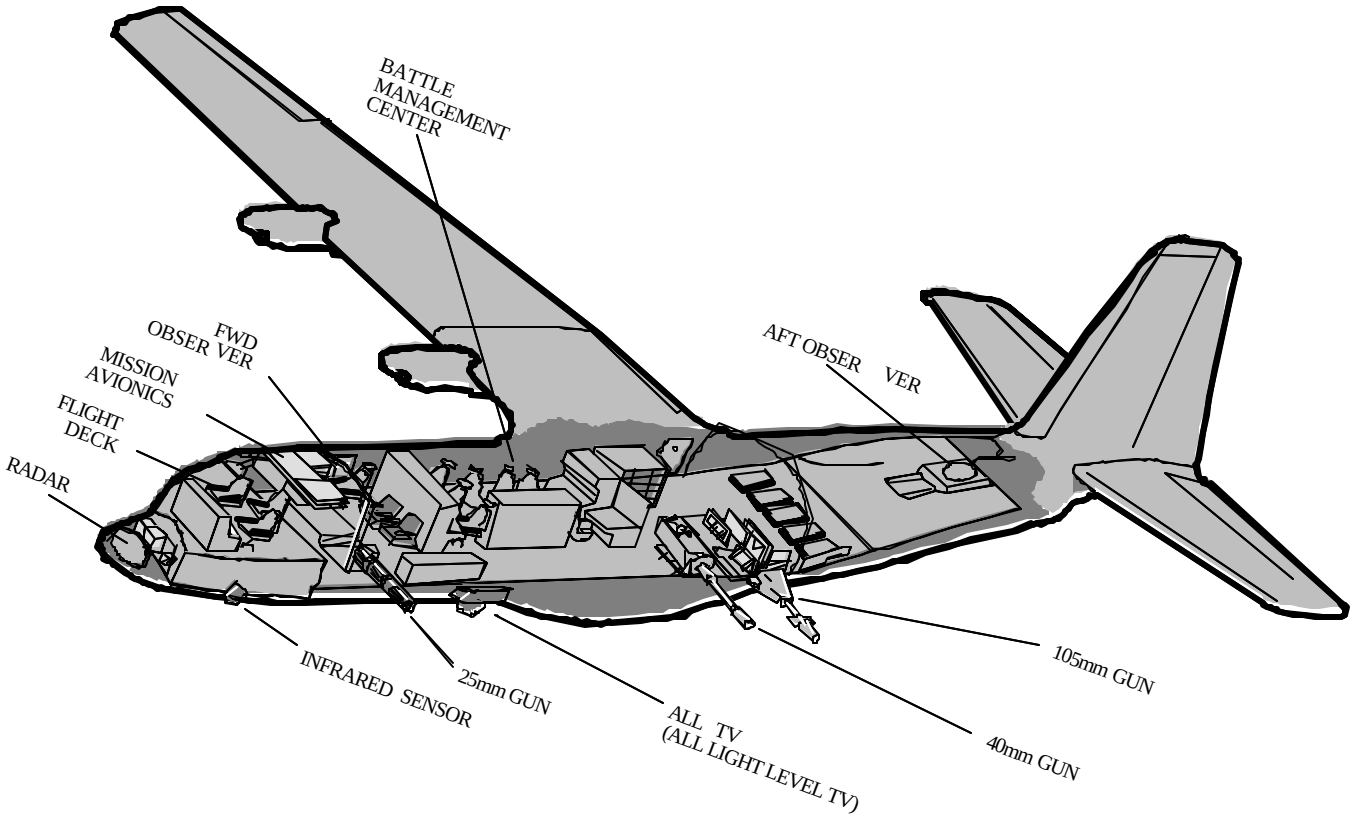
A-10 firing a Maverick

The A-10 is a single seat aircraft specifically designed for close air support. It is compatible with most conventional munitions, has a long loiter time, and a wide combat radius. The A-10 carries up to 16,000 pounds of ordnance and has an internally mounted GAU-8 30mm gatling gun. The gun carries 1174 rounds, and is usually fired in 100 round bursts. The gun is extremely accurate and effective against a wide variety of ground targets, including tanks and armored personnel carriers. It is a rugged, twin-engine aircraft with excellent maneuverability, designed for short field takeoff and landing. The aircraft's primary armament consists of its 30mm gun and Maverick AGM-65 missiles. The aircraft can also carry the Pave Penny laser acquisition system, which allows a pilot to see targets illuminated by a laser designator. Its bombing and gunnery computer make it an accurate platform allowing effective gunshots in excess of 12,000 feet against non-armor targets. The aircraft has a limited night capability, using any combination of Night Vision Goggles, Pave Penny laser acquisition pod, and/or infra-red Maverick missiles. However, it must have reasonably good weather for both day and night operations. The OA-10 is the same aircraft as an A-10 but its mission is Forward Air Controller-Airborne (FAC-A) and talks other aircraft onto targets on the battlefield.

The A-10 is well suited for CAS because of high pilot proficiency in the CAS role, long loiter time, and survivable airframe. However, one of its weak points is its slow speed that allows it to be more easily acquired by enemy air defense artillery.

Some A-10's have been fitted with a new system compatible with an Army tracking system. The system is called Situational Awareness Data-link (SADL). SADL integrates with the Army Enhanced Position Location Representation System (EPLRS), which allows the pilot to see friendlies in the Heads Up Display (HUD) with a friendly symbology over it. This system will reduce the chances of fratricide. Another use for SADL is to data burst 9-lines directly from the ETAC in the field to the aircraft. The 9-line will then appear in the pilots HUD. This system will reduce transmission time so the ETAC can be found by direction finding equipment and the pilot will not have the chance to write items incorrectly or miss the transmission.

AC-130 Hercules – (Slide 4)



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AC-130 Hercules

The AC-130 is a versatile aircraft that can fly close air support and special operations missions and is a highly effective weapon system, flying primarily at night. The aircraft is vulnerable to enemy air defense systems and must operate in low threat environments. There are currently two models of the AC-130, the H model and the U model. The Air Force has only 8 H models, and 13 U model aircraft in the inventory. The AC-130H has two 20mm guns, one 40mm gun, and a 105mm howitzer. The 40mm and 105mm are trainable, that is can be aimed with a targeting system. The AC-130U model has trainable 25mm, 40, and 105mm guns. All models have sensors and target acquisition systems, including infrared and low-light TV. The U model has a radar sensor tie-in with the gun aiming systems, giving an all-weather capability against radar-significant targets. Weapons employment accuracy is very good. The AC-130 typically flies with special operations and light infantry units. The aircrews are very proficient at working with Special Forces, and in urban environments.

The AC-130 excels in the CAS role because it has an extremely long loiter time, plenty of ammunition, and crews that are focused on providing fire support. However, because of limited numbers, there may not be enough AC-130s to support your unit. It will be found primarily in low threat environments.

F-16 Fighting Falcon – (Slide 5)

F-16 Fighting Falcon

The F-16 is a single engine, single seat, high performance aircraft. This highly maneuverable fighter excels in both air-to-surface and air-to-air capabilities. The F-16 comes in 3 different flavors, a Block 30, Block 40, and Block 50 aircraft. The Block 30 is the earliest version of the F-16 and is primarily designed for day, good weather operations. The Block 40 has the LANTIRN system, and will primarily be used for interdiction/laser guided bomb missions. The Block 50 has the HARM Targeting System, and will be used for suppressing enemy air defenses. There are many F-16 squadrons, and CAS proficiency will depend on whether or not the squadron is tasked to perform CAS in a combat role, and how often the pilots fly CAS training missions. Generally, the Block 30 jets will be more proficient at CAS, the Block 40s will be less proficient than the Block 30s, and the Block 50s will be less proficient than the Block 40s.

The F-16 is a fast moving aircraft that can avoid the threat better than an A-10. It has very accurate delivery systems, and the Block 40 jets can drop laser-guided bombs on tanks in the nighttime as well as the daytime. However, CAS proficiency will be generally lower than that of the A-10, and it has a shorter loiter time and payload than an A-10.

The F-16 is now picking up the Airborne Forward Air Controller roll to supplement the OA-10. Some A-10's have been fitted with a new system compatible with an Army tracking system. The system is called Situational Awareness Data-link (SADL). SADL integrates with the Army Enhanced Position Location Representation System (EPLRS), which allows the pilot to see friendlies in the Heads Up Display (HUD) with a friendly symbology over it. This system will reduce the chances of fratricide. Another use for SADL is to data burst 9-lines directly from the ETAC in the field to the aircraft. The 9-line will then appear in the pilots HUD. This system will reduce transmission time so the ETAC can be found by direction finding equipment and the pilot will not have the chance to write items incorrectly or miss the transmission.

AV-8B Harrier – (Slide 6)

AV-8B Harrier

The AB-8B is primarily designed to perform CAS. It has a secondary role of Deep Air Support and Anti Air Warfare. The Harrier has the capability to operation from austere bases, amphibious assault ships, roads, and very short runways.

The Harrier is armed with a 25mm cannon that is effective against soft targets and troops, and can carry up to 9200 pounds of external stores. Most likely it will carry two to three thousand pounds of munitions. There are 3 different versions of the Harrier, the day attack AV-8B, the night attack AV-8B, and the AV-8B Plus radar equipped version. The day attack Harrier has a laser spot tracker and is only used in the daytime. The night attack Harrier also includes a NVG compatible cockpit, and a Forward Looking Infrared System that allows it to be effective at night. The Harrier II Plus is a night attack Harrier with an APG-65 (radar inside a F-18 Hornet) instead of a laser spot tracker that allows it to perform system deliveries at night.

The Harrier can operate very close to the FLOT, and the crews are very proficient at CAS. However, it has a very small payload, short loiter time, and its slow speed makes it vulnerable to enemy air defense artillery.

F-18 A/C/E Hornet – (Slide 7)

F-18C Hornet

The F-18 comes in 3 main flavors, the F-18A, F-18C, and F-18E. The B model is a 2 seat version of the A model. The D model is a 2-seat version of the C model, and the F model is a 2-seat version of the E model.

The F-18 is a very capable multi-role aircraft that can perform Anti Air Warfare, Deep Air Support, Electronic Warfare, Reconnaissance, and Close Air Support. There are many F-18 squadrons, and different combat tasking for each individual squadrons. CAS proficiency will vary, and will be higher in those squadrons tasked to perform CAS.

This jet can carry up to 13,700 lbs external stores, but typically will carry 4000-6000 lbs of munitions. Depending on the mission, F-18s can carry a laser designator, and a laser spot tracker. There is a reconnaissance version of the F-18D that replaces the 20mm gun with a reconnaissance pod.

The F-18D is a 2 seat combat capable version of the F-18C. It is being used in a reconnaissance, night interdiction, and Forward Air Controller-Airborne roll.

The F-18 is well suited for CAS, but CAS proficiency will vary. The high speed makes it survivable, and its loiter time and payload is slightly higher than an F-16.

The F-18 E/F is a new version of the F-18 that will provide approximately a 25% increase in range and payload over an F-18 C/D. It is just beginning to be procured.

AH-64 Apache – (Slide 8)

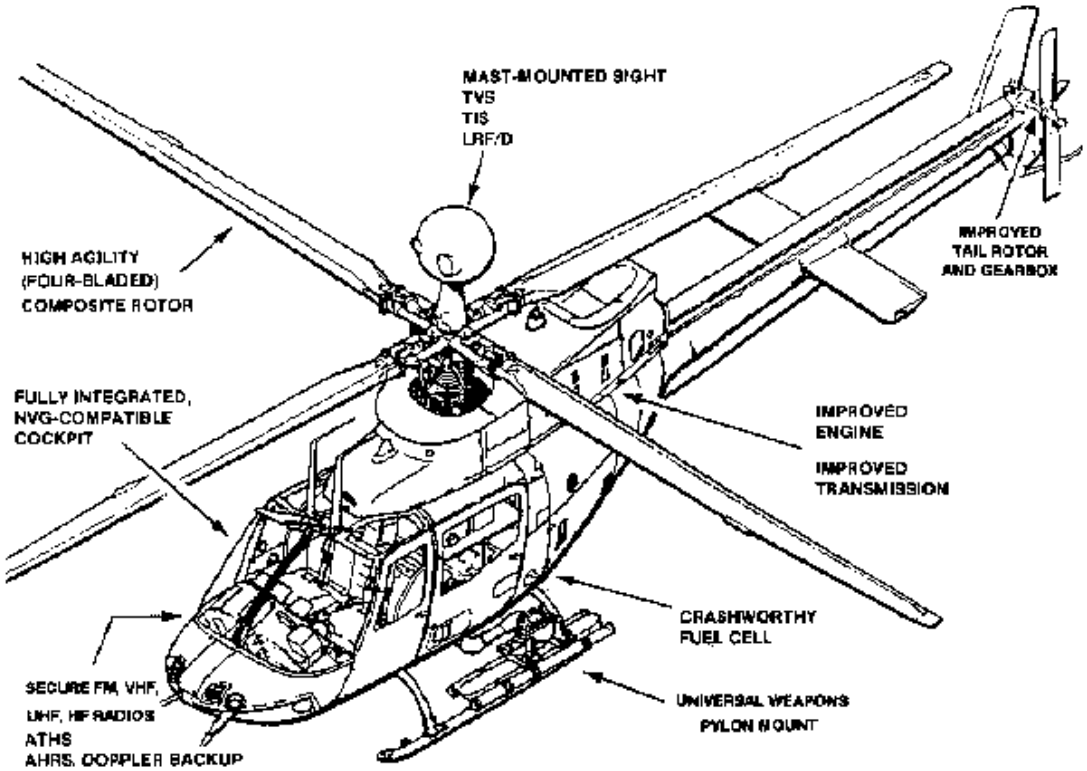
AH-64 Apache

The AH-64A Apache is the Army's primary attack helicopter. It is a quick-reacting, airborne weapon system that can fight close and deep to destroy, disrupt, or delay enemy forces. The Apache is designed to fight and survive during the day, night, and in adverse weather throughout the world. The principal mission of the Apache is the destruction of high-value targets with the HELLFIRE missile. It is also capable of employing a 30MM M230 chain gun and Hydra 70 (2.75 inch) rockets that are lethal against a wide variety of targets. The Apache has a full range of aircraft survivability equipment and has the ability to withstand hits from rounds up to 23MM in critical areas.

The Apache can carry up to 16 Hellfire laser designated missiles. With a range of over 8000 meters, the Hellfire is used primarily for the destruction of tanks, armored vehicles and other hard material targets. The Apache can also deliver 76, 2.75" folding fin aerial rockets for use against enemy personnel, light armor vehicles and other soft-skinned targets. Rounding out the Apache's deadly punch are 1,200 rounds of ammunition for its Area Weapons System (AWS), 30MM Automatic Gun.

The AH-64D Longbow Apache is a remanufactured and upgraded version of the AH-64A Apache attack helicopter. The primary modifications to the Apache are the addition of a millimeter-wave Fire Control Radar (FCR) target acquisition system, the fire-and-forget Longbow Hellfire air-to-ground missile, updated T700-GE-701C engines, and a fully integrated cockpit. In addition, the aircraft receives improved survivability, communications, and navigation capabilities. Most existing capabilities of the AH-64A Apache are retained.

OH-58D Kiowa Warrior – (Slide 9)



Kiowa Warrior features.

OH-58D Kiowa Warrior

The OH-58D Kiowa Warrior is a two-place single engine armed reconnaissance helicopter. The OH-58D's highly accurate navigation system permits precise target location that can be handed-off to other engagement systems. The OH-58D has an infrared thermal imaging capability and can display night vision goggle flight reference symbology. Its laser designator/laser rangefinder can provide autonomous designation for laser-guided precision weapons. Air-to-Air Stinger (ATAS) missiles provide the Kiowa Warrior with protection against threat aircraft. The primary mission of the Kiowa Warrior is armed reconnaissance in air cavalry troops and light attack companies.

The Mast Mounted Sight (MMS) is one of the key elements of the Kiowa Warrior. Its unique day/night capabilities allow the crew to scan the battlefield with the ability to acquire, identify, and derive the coordinate locations of potential targets.

The OH-58D can carry Hellfire and Stinger Missiles as well as rocket pods, but it is not designed to engage enemy forces. It is designed to spot enemy forces and call in Apaches or artillery on those targets.

F-15E Strike Eagle – (Slide 10)

F-l5E STRIKE EAGLE

The F-l5E STRIKE EAGLE has both air-to-air and air-to-ground capabilities. Primarily it flies all-weather/night, strategic attack and air interdiction missions. It does this using terrain following radar and advanced target acquisition systems. It can carry a wide variety of air-to-surface weapons to include precision laser guided munitions. The aircraft has the capability to laser designate targets for itself, using the Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) pods. The F-15E also flies counter-air missions. It is a two-seat aircraft that carries a pilot and weapon systems officer. The F-15E's air to air weapons includes the AIM-9, AIM-7 and AIM-120, which give it an all-weather intercept capability.

B-52 Stratofortress – (Slide 11)

B-52 Stratofortress

The B-52 Stratofortress is the oldest bomber aircraft in our inventory. It is capable of carrying a variety of conventional and nuclear munitions. It can operate in low or high altitude environments, at night and in adverse weather. It also carries a sophisticated electronic countermeasure package for protection against ground and airborne radar threats. Its accuracy, coupled with the enormous amount of munitions it can expend, make it a very viable weapon system. The B-52 flew extensively in Vietnam and Operation DESERT STORM, and was very effective in destroying targets and the morale of the opposing forces. The B-52 primarily will fly air interdiction or strategic attack type missions.

B-1B Lancer – (Slide 12)

B-1B Lancer

The B-1B Lancer is a long range, all weather bomber. It has low observable technology giving it radar cross section that is one percent of the B-52's. The four-man crew consists of a pilot, co-pilot and two weapon system operators (one defensive and one offensive). The three internal bomb bays are capable of carrying nuclear or conventional weapons. Four engines, variable sweep wings and a terrain following radar allow the aircraft to fly low altitudes at subsonic speeds or supersonic at high altitudes. The B-1 depends on its sophisticated electronic counter measures package, low altitude and high speed for self-protection. Currently the only certified conventional weapons the aircraft carries are 500 lb MK-82 bombs and CBUs. Certification to carry other conventional munitions and precision guided weapons is in progress. The B-1 will primarily fly strategic attack and interdiction missions.

B-2A Spirit – (Slide 13)

B-2A Spirit

The B-2A Spirit (Stealth Bomber) is a long-range bomber, specifically designed to have a very low radar cross-section. It is capable of carrying either nuclear or conventional munitions (cruise missiles, general purpose bombs or cluster munitions). It can operate at low or high altitudes, normally at night or in adverse weather. With air refueling, the endurance of the two-person crew limits the aircraft range. The B-2 will primarily fly air interdiction or strategic attack of high value targets.

EA-6B Prowler – (Slide 14)

EA-6B Prowler

Function: electronic warfare. Operated by Marine tactical electronic warfare squadrons (VMAQ). Description: Four-seat, twin-engine, jet aircraft. Operates from aircraft carriers and expeditionary airfields. Crew consists of one pilot and three Electronic Countermeasures Officers (ECMO). Jams enemy early warning, target acquisition, target tracking, and missile guidance radars in support of aviation and ground combat elements. Four wing stations and one centerline station allow up to five jamming pods. Each pod has a ram air turbine generator that supplies electricity to two powerful transmitters. Each transmitter has a stabilized directional antenna. Can also carry up to four High Speed Anti-Radiation Missiles (HARM) on the wing stations in place of pods. Current version, ICAP II (Improved Capability II) is equaled by no other aircraft in the world. Active inventory: four 5-plane squadrons.

ACFT	PRIMARY MISSIONS	ALL WEATHER	NIGHT	PRIMARY WEAPONS	SPECIAL CAPABILITIES	RADIOS
F-15E[2]	Air Interdiction Strategic Attack Counter Air	yes	yes	Precision Guided Munitions Air to Air missiles	Synthetic Aperture Radar LANTIRN[1]	2 UHF
F-16[2]	Full Range of Combat Missions	Limited	yes with LANTIRN[1] otherwise limited	Full Range of Air to Air and Air to Surface Weapons	Radar Some Aircraft LANTIRN[1] Equipped	UHF VHF-AM/FM
F-117	Air Interdiction Strategic Attack	Limited	Specifically	LGB	Stealth Design Laser Designator FLIR	
A-10	Close Air Support Limited Air Interdiction	no	yes, limited	30mm Gun Maverick Missile General Purpose Bombs Cluster Munitions	Pave Penny Laser Acquisition Device, some w/NVG's	UHF VHF-AM/FM
AC-130	Special Operations Close Air Support	Limited	yes	20/25mm guns 40mm guns 105mm howitzer	Forward looking IR Low Light TV IR Spot Light Radar (U model)	3 UHF 3 VHF-AM/FM 2 HF
B-52	Air Interdiction Strategic Attack	yes	yes	Full Range of Conventional and Nuclear Munitions	Terrain Following	2 UHF HF SAT COM
B-1 & B-2	Air Interdiction Strategic Attack	yes	yes	Mk-82 Other nuclear munitions CBU test in progress for B-1	Terrain Following Synthetic Aperture Radar	UHF/VHF HF SAT COM

NOTES:

1. LANTIRN (Low Altitude Navigation, Targeting Infra-Red for Night) - Provides the pilot with a forward looking infrared picture through the heads up display along with laser designation and targeting capabilities.
2. Aircraft can perform both air to surface and air-to-air operations as primary missions.

Foreign Fighters – (Slide 15)

Numerous foreign fighters do the CAS mission. They use aircraft like F-5's, GR-1's, etc… There are so many we are not going to discuss them all. The things to be aware of are the differences when do CAS with foreign pilots or aircrafts. Foreign countries use different CAS cards, authenticators, and request cards. For examples of these cards, look it the TACP Handbook and it will explain how to fill them out. There might also be problems understanding the pilots due to language barriers or pronunciation of English words. Just be prepared to take a little more time making sure all parties in the CAS execution understand exactly what is going to happen.

Conclusion – (Slide 16)

Many aircraft do the CAS mission. Some airframes train to CAS and are better built for the CAS mission than other aircraft. Always remember what kind of aircraft your working with and what limitations they might have. This is especially true when working with foreign fighters. There are a lot of inherent risks incorporated into controlling CAS so remember the basics and don't rush to failure. For further information on aircraft discussed, reference the Air Force On-line Library at www.af.mil and select "library".