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UNMANNED AIRCRAFT SYSTEMS IN A FORWARD AIR CONTROLLER (AIRBORNE) ROLE

by

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14. ABSTRACT
The ability to deliver weapons systems and the increased capabilities of unmanned aircraft systems (UAS) has sparked debate on their ability to conduct forward air controller (airborne) (FAC(A)) operations. UASs can execute several of the eight mission tasks of the FAC(A) mission under the Joint Close Air Support (JCAS) Action Plan Memorandum of Agreement (MOA) 2004-02, Joint FAC(A) Update. After careful analysis of the MOA and the Joint Publication 3-09.3, UASs are limited in their ability to effectively and safely execute all requirements inherent in the FAC(A) mission. Based on these limitations, doctrine and the FAC(A) mission cannot be adjusted or changed to reflect the capabilities of a weapons system. UASs have contributed greatly to the success of ground commanders on the battlefield and will continue to do so. But the current platforms and the pilot, sensor operator, and mission commander capabilities do not grant the required situational awareness and experience to coordinate and de-conflict aviation fires, ground maneuver elements, indirect fires, and air and ground coordination measures safely and effectively. Limited field of view due to sensor capability, decreased lack of survivability compared to manned aircraft, required training, geographical separation, and limited voice communications all contribute to the inability of a UAS to conduct the full spectrum of duties required of a FAC(A).

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Preface

As a Marine pilot and a qualified forward air controller (FAC), I understand the demanding requirements of a JTAC, FAC, or FAC(A) in the execution of their duties in support of a ground commander. It is a very dynamic environment when you are responsible for the terminal control of aircraft, coordination and de-confliction of supporting fires, and the management of the coordination measures implemented during operations. After reading several articles on the topic of UASs fulfilling this role, I became interested on the current capability of the UAS platforms and the pilots, operators, and mission commanders and if they possessed the necessary skills to safely and effectively serve as FAC(A)s.

I would like to thank Mr. Budd Jones for his guidance and assistance during the research and production of this research paper. I would also like to thank several Marine Corps and Air Force UAS and FAC(A) subject matter experts in their assistance in gathering the required information for this paper.

Abstract

The ability to deliver weapons systems and the increased capabilities of unmanned aircraft systems (UAS) has sparked debate on their ability to conduct forward air controller (airborne) (FAC(A)) operations. UASs can execute several of the eight mission tasks of the FAC(A) mission under the Joint Close Air Support (JCAS) Action Plan Memorandum of Agreement (MOA) 2004-02, Joint FAC(A) Update. After careful analysis of the MOA and the Joint Publication 3-09.3, UASs are limited in their ability to effectively and safely execute all requirements inherent in the FAC(A) mission. Based on these limitations, doctrine and the FAC(A) mission cannot be adjusted or changed to reflect the capabilities of a weapons system.

UASs have contributed greatly to the success of ground commanders on the battlefield and will continue to do so. But the current platforms and the pilot, sensor operator, and mission commander capabilities do not grant the required situational awareness and experience to coordinate and de-conflict aviation fires, ground maneuver elements, indirect fires, and air and ground coordination measures safely and effectively. Limited field of view due to sensor capability, decreased lack of survivability compared to manned aircraft, required training, geographical separation, and limited voice communications all contribute to the inability of a UAS to conduct the full spectrum of duties required of a FAC(A).

Introduction

The thesis of this research paper is that the current unmanned aircraft systems (UAS) do not possess the required platform capabilities or training necessary to safely and effectively fulfill the forward air controller (airborne) (FAC(A)) mission. Even with the increased capability and technology of the current operational UASs, they cannot maintain the appropriate level of situational awareness to successfully conduct the eight missions required of a FAC(A) in accordance with the Joint Close Air Support Action Plan Memorandum of Agreement (JCAS AP MOA) 2004-02 which states the training, certification, and qualification requirements for the FAC(A).[1] Additionally, UAS operators are not trained or qualified to conduct a majority of those same missions effectively. The requirements to train, qualify, and certify UAS operators as FAC(A)s would be difficult to accomplish. This is mainly based on the already high demand of training and sorties required to qualify joint terminal attack controllers (JTAC) and manned aircraft FAC(A)s. The focus of this paper will be on the capability of a UAS to conduct the full spectrum of operations and duties of the FAC(A) role. Although current UASs have the ability to accomplish some of the FAC(A) responsibilities that does not necessarily mean they are prepared to assume the qualification and responsibility inherent in the role.

Few doubt the impact that UASs have had on recent military operations. The ability to provide accurate and timely intelligence and data to ground troops, other aviation assets, and commanders has been paramount to mission success. Ten different types of UASs were flown in support of Operation IRAQI FREEDOM (OIF).[2] UASs (not including hand-launched systems) have flown over 400,000 flight hours in support of Operation ENDURING FREEDOM (OEF) and OIF as of October 2006.[3] During 2008 and 2009 to date, the MQ-1 Predator and MQ-9 Reaper have flown over 144,000 flight hours and over 7,800 sorties supporting troops in contact

(TIC), raids, and intelligence, surveillance, and reconnaissance (ISR) missions in support of ground commanders.[4] Technological advances in sensors and weapons systems have widened the capabilities of the UAS allowing them the ability to perform more robust operations than before. Reflecting on this increased capability, advocates have argued for the use of UASs in the conduct of the FAC(A) role.

The FAC(A) mission is more than just the terminal control of aircraft or radio relay procedures. As the Joint Publication 3-09.3 states, a FAC(A) must also "be able to coordinate supporting arms missions in conjunction with CAS missions, without assistance from the TACP."[5] This requires the FAC(A) to possess the capability and skills to not only control aircraft, but to control direct and indirect fires in coordination with maneuvering forces. Consideration needs to go further than the capability to terminally control an aircraft and focus on whether the UAS and its operators maintain the situational awareness, skill, and ability required for this level of de-confliction and coordination inherent in the FAC(A) role.

Although current UASs may possess the capability for terminal control of aircraft, the remainder of the FAC(A) role requires attention prior to using them in that role. If the United States military wants to consider the UAS contribution to the FAC(A) role, validation needs to go beyond the current operational requirements. The UASs need to be able to control air and surface fires in not only an asymmetric but a conventional capacity. The FAC(A) mission is accomplished through a system and a process. Before looking at utilizing new weapons platforms for this role, an analysis of the FAC(A) system requires attention. UASs are able to conduct some of the eight tasks under the FAC(A) mission, but saying they can fulfill the FAC(A) requirement with exceptions is not the answer. The FAC(A) mission cannot be adjusted or changed to fit the current operational environment or to match a weapons system.

Improvements in platform capabilities and the proper training and qualifications of operators require serious attention before these assets can truthfully contribute to FAC(A) operations.

The purpose of this paper is to initiate continued discussion and research into the UAS ability to conduct FAC(A) missions. It will address the FAC(A) mission in detail and to what extent UASs can execute the required tasks. This paper will discuss the capabilities and limitations of UASs and how that affects their ability to properly and successfully conduct the FAC(A) mission in accordance with the JP 3-09.3 and the JCAS AP MOA 2004-02. This paper will also address what considerations require attention if the United States military would formally integrate UASs into this role.

FAC(A) Mission

The FAC(A) mission was first successfully introduced during the Korean War. The function began as strike control using aircraft to attack fast-moving targets. The task of visual reconnaissance over front lines and controlling aircraft for CAS were added.[6] The JP 3-09.3 defines a FAC(A) as "A specifically trained and qualified aviation officer who exercises control from the air of aircraft engaged in close air support of ground troops. The forward air controller (airborne) is normally an airborne extension of the tactical air control party."[7] Furthering the definition, the Marine Aviation Weapons and Tactics Squadron One FAC(A) Handbook states that the FAC(A) tasks include the detection and destruction of enemy targets, coordination of target marking, terminal control of CAS missions, air reconnaissance, providing artillery and naval gunfire spotting, radio relay, and passing BDA.[8] The FAC(A) mission is simply not the terminal control of other aircraft conducting CAS operations. It encompasses the detailed planning and integration with the ground commander, time and space de-confliction and control of aviation fires, surface fires, and indirect fires, and the de-confliction of all maneuver forces.

The JP 3-09.3 refers to the requirement for the clear situational awareness of the battlefield in all aspects as battle tracking. According to the publication, battle tracking "is the process of building and maintaining an overall picture of the battle space that is accurate, timely, and relevant."[9] This clear picture is essential to the safe and effective de-confliction of all fires, ground forces, and aircraft in the operational area. As mentioned previously in this paper, there are several limitations of UASs that would prevent maintaining this required clear operational picture.

The JCAS AP MOA 2004-02 states that the FAC(A) must be prepared to conduct eight specific missions. These eight missions are terminal attack control, radio relay, reconnaissance, call for fire (CFF) missions, asset coordination/de-confliction, BDA, target marking/designation/coordinate generation, and suppression of enemy air defenses (SEAD) coordination.[10] Each of these will be discussed briefly to illustrate whether a UAS is capable of fulfilling that mission requirement.

UASs possess a robust capability to conduct radio relay, reconnaissance, and BDA. But there are still a few items to consider. The communications suite in a UAS allows for reach back and increased situational awareness to the ground commander through radio relay. Although the communications suites are robust, UASs are limited to the use of one radio compared to manned aircraft that have a minimum of two. Coordination and de-confliction of ground and air assets requires monitoring multiple frequencies to maintain situational awareness during operations and UASs do not possess this capability. Additionally, a clear knowledge and understanding of the ground concept of operations and scheme of maneuver is necessary to pass valuable information. To understand ground operations, the UAS pilot, sensor operators, and mission commander need to conduct detailed planning and integration with the ground forces prior to the operation. This can be difficult when the crews who fill these billets are operating the UAS from outside the theater of operations.

UASs have proven their ability to conduct reconnaissance missions and conduct BDA. According to the Joint Publication 3-55.1, *Joint Tactics, Techniques, and Procedures for Unmanned Aerial Vehicles*, "The primary mission of UAV units is to support their respective Service component commands as a tactical RSTA system providing the commander a capability to gather near-real-time data on opposing force position, composition, and state of readiness."[11] The integrated sensor and data link systems in UASs allows it to conduct reconnaissance and BDA in an exceptional manner especially in those locations that are difficult for manned aircraft to reach either due to range or threat.

The terminal attack control of aircraft using Type 1, 2, or 3 is one of the primary functions of a FAC(A). Over 67 percent of aviation delivered weapons from 19 March to 18 April 2003 in support of OIF was PGMs.[12] Normally Type 2 control is utilized for PGMs based on their standoff distance and delivery tactics where the controller may not be able to observe the attacking aircraft or the target. A UAS could successfully control an aircraft under Type 2, but the lack of FOV prevents its ability to conduct Type 1 control. Although most aviation delivered ordnance in support of OIF and OEF involves Type 2 or 3 control and PGMs, the requirement to understand and maintain the capability to conduct Type 1 still exists.

Asset coordination and de-confliction is actually one of the most difficult tasks imposed on a FAC(A). This mission can be quite difficult for a UAS with limited FOV. Not only does this mission require the coordination and de-confliction of multiple manned and unmanned aircraft, but also that of indirect fires, direct fires, maneuvering forces, and the management of all airspace coordinating measures (ACM). And according to the U.S. Air Force Scientific

Advisory Board, "Additional research will be required to develop the interfaces and autonomous systems to enable safer flight in close proximity to manned systems, avoid crashes, and communicate with all other members in the net-centric operations space."[13]

Additionally the FAC(A) needs to understand what each aircraft brings to the fight and their limitations to effectively incorporate them into the battle plan. UAS crews need to be involved in the operational planning to understand what part all assets, ground or air, are playing. As Major Shannon Brown stated in his article, "the biggest threat that our aircrew face may not be from the enemy, but rather from other friendly assets."[14] UASs are limited in this capacity not only by the limited FOV, but they lack the ability to "see and avoid" and operate as a single ship lacking the mutual support provided by a wingman. Manned aircraft maintain an advantage over UASs in this capacity because they can move their sensors real time and looking outside the cockpit can give the aircraft the big picture of the operational area helping the ground commander better position his limited assets.[15] This restriction limits UASs in their ability to safely and effectively coordinate all assets in the operational area to provide the ground commander the desired effects for his operational plan.

The ability to effectively and accurately call for and adjust indirect fires can greatly assist the ground forces in the execution of their operations. UASs maintain the systems capability to accurately conduct this mission but it requires the appropriate training to do so. The conduct of SEAD missions can assist in allowing CAS aircraft into the objective area where they may be prohibited due to the threat. This task can be quite difficult for a UAS. As previously stated, UASs do not possess the overall situational awareness through their limited FOV to coordinate and de-conflict all air and ground assets in an operational area. Conducting SEAD requires the coordination, timing, and de-confliction of indirect and direct ground fires and aviation fires.

UASs have the capability to mark and designate targets using the targeting suites on the MQ-1 and MQ-9. They also have the ability to generate target coordinates through the same systems. This ability can greatly assist ground commanders when unable to visually acquire an intended target. Manned aircraft do possess an advantage over UASs in the execution of this mission. Manned aircraft not only possess the ability to use laser designators to generate coordinates and mark targets, they can mark targets via other means to include infrared (IR) pointers, rockets, or gun tracers. This may be required for any aircraft that does not possess laser capability with their weapons systems or if that system is inoperative. This technique could also be used for landing zone (LZ) identification for non-laser equipped assault support helicopters. Manned aircraft also maintain the capability to utilize illumination rockets to illuminate a target area if required during night operations.

This discussion of the eight missions associated with the FAC(A) role demonstrates the limitations in the ability for a UAS to safely and effectively fulfill this requirement. Although it has the capability to conduct some of these mission requirements better than manned aircraft with its targeting and sensor systems, the FAC(A) role encompasses the ability to conduct all missions at a level determined by the JP AP MOA 2004-02. This paper will now turn to a discussion on the capabilities and limitations of UASs to further assess their ability to conduct the FAC(A) mission.

UAS Capabilities

Before discussing further the extent that UASs can effectively conduct the FAC(A) mission, it is important to understand the capabilities and limitations associated with the systems. According to the Joint Publication 1-02, a UAV is “a powered aerial vehicle that does not carry a human operator, uses aerodynamic forces to provide vehicle lift, can fly autonomously or be piloted remotely, can be expendable or recoverable, and can carry a lethal or nonlethal payload." It also defines a UAS as "That system whose components include the necessary equipment, network, and personnel to control an unmanned aircraft."[16] UASs have many capabilities that have successfully contributed to modern success on the battlefield conducting intelligence, reconnaissance, and surveillance (ISR), radio relay, battle damage assessments (BDA), communicating target information, target designation, directing attacks, and employing their own weapons. Their success and demand has reached such important levels that, according to the *Unmanned Systems Roadmap: 2007*-2032, the Department of Defense's (DoD) goal is to have one third of its aircraft in the operational deep strike force to be unmanned by 2010.[17]

The addition of laser systems on UASs has provided the capability to both designate targets for other manned aircraft, other UASs, or for self employment of precision guided munitions (PGM). The MQ-1 Predator is equipped with a Multi-spectral Targeting System integrating electro-optical, infrared, laser designator, and a laser illuminator in one sensor package.[18] The concept was tested successfully in Yemen in 2002 when a Predator destroyed a terrorist vehicle using a Hellfire missile.[19] The Predator has successfully delivered multiple Hellfire missiles in support of OIF and OEF. The MQ-9 Reaper also possesses a laser rangefinder and designator for guidance of its Hellfire missiles or laser guided bombs (LGB).[20] Just as the Predator, it can either designate targets for other manned aircraft or for itself. The Reaper successfully expended two 500-pound laser guided bombs (GBU-12) for the first time destroying the target of enemy combatants in Afghanistan on 7 November 2007.[21] Both systems have proven their capability to effectively employ laser guided munitions in combat environments. For the entire year of 2008 and for 2009 to date, the Predator and Reaper have executed 120 Hellfire shots, 44 LGB deliveries, and conducted 15 laser designations for other aircraft.[22]

In addition to targeting systems, UASs are equipped with electro-optical, infrared, and synthetic aperture radar (SAR) systems.[23] This capability provides the commander, ground forces, or other aircraft with a near-real time video feed of the battlefield. This capability has assisted in the identification of possible improvised explosive devices (IED) and mortar and rocket points of origins (POO). It can also assist a Joint Terminal Attack Controller (JTAC) with full motion video while assisting in target positive identification (PID). The remote operations video enhanced receiver (ROVER) provides other personnel and forces the ability to share video and images viewed by the UAS. Using this system gives the JTAC or manned aircraft FAC(A) the confidence that the UAS has eyes on the same target area as they do and can safely employ its weapons systems. This allows the JTAC or other terminal controller to coordinate Type 2 and 3 CAS attacks using targeting information from the UAS as an observer.[24] By seeing what the aircraft sees, troops and commanders on the ground can see the battlefield in a three dimensional view greatly enhancing situational awareness on the battlefield.

Another capability of UASs is their increased loiter time and range compared to manned aircraft. Limited time on station (TOS) capabilities of manned aircraft can create gaps in necessary coverage during operations. This advantage over manned aircraft can alleviate the requirement for external tanker support to provide continuous operations to the commander. The MQ-1 Predator and MQ-9 Reaper, for example, have an endurance of 24 hours.[25] Manned aircraft loiter time is extensively less and to cover a 24 hour operational commitment would require multiple aircraft and a robust aerial refueling capability. With fewer assets, UASs can provide that required continuous coverage during operations without the requirement for refueling assets. It also reduces the requirement for multiple coordination and battle handover (BHO) briefs required with multiple manned aircraft phasing into the operational area. This has proven effective during stability operations in support of OIF and OEF where longer dwell times are required from aviation assets providing requested coverage.

Crew fatigue is another advantage that UASs have over manned aircraft. Due to service operational restrictions, manned aircrew or limited to normally a 12 hour crew day that may be reduced further for night time operations. This requires the frequent handover between assets for the conduct of long-term operations. UAS pilots and sensor operators are more easily rotated since they conduct their flight duties on the ground in the control center. Crew changeovers can also be completed face to face alleviating confusion for mission requirements and ongoing operations. Another crew related advantage is the absence of risk to aircrew when flying in undesirable weather or a medium or high threat environment.

The communications suites incorporated in UASs provide additional capability over that of manned aircraft. These systems offer multiple avenues to communicate voice, data, and video information to ground forces and other aircraft. These additional communication avenues include telephone, chat through mIRC, hard-line intercom, e-mail, and internet.[26] This assists the UAS pilots and sensor operators in maintaining the latest friendly and enemy locations with the added advantage of graphics.

UASs require a much smaller footprint than traditional manned aircraft units deploying in support of operations. For example, a Predator squadron includes 55 personnel, a ground control station van, four Predator unmanned aerial vehicles, electrical generators, two HMMWVs, and a satellite dish communications trailer.[27] Deploying a fighter squadron to maintain the same operational tempo requires a much larger support capability. This greatly reduces the logistical requirements and response time for aviation assets required to deploy in support of operations.

The capabilities discussed provide a force multiplier to commanders to increase situational awareness, identify and designate enemy targets, and relay crucial time-sensitive information through video. Increasing reach back and persistence on the battlefield greatly increases the commander's operational capability contributing to success. The addition of PGM weapons systems on the Predator and Reaper augment the highly demanded capabilities of manned aircraft. This added capability makes the UAS a good candidate for the conduct of interdiction, close air support (CAS), or strike coordination and reconnaissance (SCAR) missions. The next section of this paper will discuss UAS limitations that will affect their capability in functioning in the FAC(A) role.

UAS Limitations

As this paper has discussed, UASs bring many capabilities to the fight in support of the ground commander. Many of these capabilities have the potential to contribute to its ability in the conduct of the FAC(A) role but do not fully qualify UASs to execute the entire spectrum of duties. A discussion of the limitations of UASs requires attention to determine the capacity that a UAS can fulfill the FAC(A) requirements.

UASs possess great sensor capabilities providing near-real time video increasing situational awareness to ground forces and commanders. This sensor capability provides a limited field of view (FOV) for the sensor operator. Although sensors provide the UAS the ability to gain and maintain a detailed picture of a named area of interest (NAI) or target area of interest (TAI), the limited FOV limits the overall situational awareness of the pilots and operators. For example, the Predator FOV is no more than 120 degrees compared to the theoretical 360 degree FOV in manned aircraft.[28] This restricts a UAS pilot or sensor operator to visually acquire both the target and the attacking aircraft which prohibits its ability to conduct Type 1 terminal attack control according to the JP 3-09.[29] This limits a UAS's capability to conduct all types of terminal attack control required of a FAC(A). The requirement of multiple UASs operating in support of operations would be necessary to match the FOV possessed by a manned aircraft to capture different attack angles, timing, collateral damage estimates (CDE), and target analysis.[30]

The communications suite of UASs greatly enhances their capability to maintain the most current and accurate information and provide a very robust reach back capability to ground units and command centers, but there is also a two second delay in communications and video relay.[31] These two seconds may be extremely important in the FAC(A) control of aviation or ground fires based on sequenced time on targets (TOT) or immediate support required by ground forces. UASs currently are limited to one radio. The FAC(A) mission requires the communication and coordination with several agencies to include command centers, other aircraft, and fires support centers. The use of one radio can greatly inhibit a UAS's capability to coordinate among these agencies and effectively support the ground commander. Additionally, integrating a multiple channel and frequency capability in the UAS command and control suites could possibly compromise situational awareness.

Comparable to manned aircraft, UASs are less maneuverable and slower increasing their vulnerability to enemy integrated air defense systems (IADS) and ground fire. The limited speed of UASs greatly reduces their response time for an immediate request involving a troops in contact (TIC) situation compared to manned aircraft. The Predator and Reaper have maximum airspeeds between 118 and 230 knots compared to manned FAC(A) platforms that can operate faster than Mach 2.[32] UASs do not possess the aircraft survivability equipment (ASE) that manned aircraft have. The ability to detect surface-to-air threats and launch manual or automatic countermeasures is nonexistent. This combined with limited maneuverability and speed limitations, continued use in a medium or high threat environment would be restricted when the requirement for an armed platform or FAC(A) is most needed.

Pilot and sensor operator training and qualifications are an additional limitation of the UAS in a FAC(A) role. Currently, UAS pilots, sensor operators, and mission commanders are not subjected to any FAC(A) training or certification process unless they previously have that designation from their previous platform. Additionally, unlike the Air Force, other services do not utilize rated pilots as the UAS pilots or sensor operators. The training, certification, and qualification process for a FAC(A) is time, aircraft, and ordnance intensive requiring multiple assets to effectively train them.

According to the JCAS AP MOA 2004-02, Joint FAC(A) update, the certification process entails a combination of academics, simulators, and flights including Types 1, 2, and 3 control, day and night events, permissive and restrictive threat environments, supporting fires coordination, and fixed and rotary CAS.[33] Once certified, all FAC(A)s are required to maintain a prescribed level of currency and may have to conduct a re-qualification, all requiring additional time, aircraft, and ordnance. Individual services also maintain additional requirements based on platform. According to the MOA, each individual is required to conduct a minimum of twelve controls covering Type 1, fixed-wing, expended live or training ordnance, and night controls. Currency and re-qualification processes require the same.[34] This requirement can become quite tasking and untenable considering ground JTACs and FACs must adhere to similar requirements and CAS assets are extremely tasked in operational theaters. As Major Matthew Brown, a

FAC(A) subject matter expert (SME) for the Marine Corps, stated, "Creating another community that is a FAC(A) platform that now requires care and feeding (i.e. sorties, controls, ordnance, etc.) has a huge negative impact on current JTAC and FAC production."[35] An additional limitation to the creation of a new community is that the already high demand assets required for JTAC and FAC production are currently focused on operational requirements in support of OIF and OEF.

Although UASs possess multiple capabilities to enhance a ground commander's ability for operational success, limitations can restrict their ability to conduct the FAC(A) role effectively. Limited FOV, inability to conduct all three types of terminal control, delays in communications, lack of maneuverability and speed compared to manned aircraft, and the lack of ASE all restrict operations for a UAS to a low threat environment in the conduct of the FAC(A) role. Based on the previous discussions of the FAC(A) mission and the UAS capabilities and limitations, this paper will now address the assessment of UASs in the FAC(A) role.

Assessment of UASs in the FAC(A) Role

Proponents of using UASs in the FAC(A) role are mainly based on the systems' ability to conduct Types 2 and 3 terminal attack control, longer loiter times, smaller logistical footprint, and reduced crew fatigue and harm factors. These assumptions are based on UAS capabilities and the current operational requirements in support of OIF and OEF. This section will assess the feasibility of UASs to operate in the full capacity of the FAC(A) mission.

Many believe that UASs are capable of conducting the first mission task of the FAC(A) role which is terminal control of aircraft. With the targeting suites and PGMs on the MQ-1 and MQ-9, they have the ability to conduct terminal control of aircraft while designating or marking targets. As previously discussed, this capability is limited to Types 2 and 3. According to the JP 3-09.3, for Type 2 the terminal controller is not required to visually acquire both the target and the aircraft for weapons release and for Type 3 is not required to visually acquire the attacking aircraft or the target.[36] The limited FOV of the UAS systems physically prevents the conduct Type 1 control which requires the terminal controller to visually acquire both the target and the attacking aircraft.[37]

The majority of terminal attack controls in the current operational theaters are conducted using Types 2 and 3.[38] This is mainly due to the fact that the majority of weapons employed are PGMs and the delivery profiles are conducted to a point where the controller may not visually acquire the aircraft especially during the delivery of guided bomb units (GBU). Although UASs are capable of terminally controlling aircraft during Types 2 and 3, Type 1 control is still a required skill set under the mission requirements of the FAC(A) role. For UASs to conduct all three types of control, Type 1 would either require deletion or adjustment to fit the capabilities of those platforms. That may work for current operational requirements, but for future conventional warfare, Type 1 control will be essential to ground operations. Especially for the conduct of rotary-wing attacks with rockets and guns, the ability to execute Type 1 control is required. Changing doctrine on the types of terminal control to match the capabilities of a weapons system is not the answer. As Troy Caraway stated, “A FAC(A) is not a platform…but a specifically trained and qualified aviator.”[39]

Lack of maneuverability, limited speed, and the absence of aircraft survivability equipment (ASE) of UASs compared to manned aircraft limit its operational flexibility. These limitations restrict the UAS to conduct FAC(A) mission requirements in a low threat environment only. Proponents of UASs fulfilling the FAC(A) role argue that they are capable of conducting duties of this mission in the current operational environment which is low threat to aviation assets. This may be the case, but conduct of the FAC(A) mission is not itself limited to a low threat environment. Assets trained and equipped to fulfill the requirement are done so to cover the full spectrum of aviation operations in any threat. If UASs are to be used in this capacity, they must possess the capability to operate in medium and high threat environments. The U.S. military trains for and possesses the ability for all contingencies and UASs should not be an exception. It is not prudent to organize, train, and equip for a single operational environment. As with the terminal attack control discussion, they cannot conduct the mission with exceptions. Their capability allows conduct of some of the FAC(A) missions in the current operational environment, but they also need to be prepared for future conflicts and war to include conventional warfare requirements.

The limited FOV of UASs greatly inhibits its ability to conduct asset coordination and de-confliction. As previously stated, this encompasses not only the coordination and de-confliction of other aviation assets, but that of ground forces, indirect fires, and battle space coordination measures such as ACMs and fire support coordination measures (FSCM). The FAC(A) is required to understand and implement all of these in the operational environment and the FOV of a UAS greatly limits its ability to do so. Detailed planning, coordination, and understanding of the ground concept of operations are a must. Additionally the understanding of what all aviation and ground units bring to the fight is necessary to effectively advise the commander on how to incorporate aviation assets into operations.

The limitation of a single radio further deteriorates the capability of a UAS in this capacity. As a FAC(A), the pilot, flight officer, weapons officer, or navigator is responsible for the coordination of aviation and ground fires while de-conflicting ground maneuver units. This requires the use of multiple frequencies to include command nets, fire support nets, and air nets.[40] The limited FOV and the restriction of one radio reduces the UAS's ability to safely and effectively coordinate and de-conflict all assets in the operational environment to provide the ground commander his required support.

Pilot and sensor operator training and qualifications are an additional limitation of the UAS in a FAC(A) role. Currently, UAS pilots, sensor operators, or mission commanders are not subjected to any FAC(A) training or certification process unless they previously have that designation from their previous platform. Additionally, unlike the Air Force, other services do not utilize rated pilots as the UAS pilots or sensor operators. The training, certification, and qualification process for a FAC(A) is time, aircraft, and ordnance intensive requiring multiple assets to effectively train them. As previously discussed, the training and certification of a FAC(A) is quite aircraft, sortie, and ordnance intensive. The JCAS AP MOA 2004-02 focuses on the required terminal control of aircraft as the minimum requirements. Considerations must be included to cover the control of indirect fires and de-confliction measures to include air and ground coordination measures. FAC(A)s also require extensive knowledge of those assets that will support the FAC(A) in the execution of his duties. Adding an additional community to be trained with already over extended assets will be difficult and may detract from current JTAC, FAC, and FAC(A) qualification and currency requirements.

Geographical separation can also hinder the effectiveness of a UAS to conduct the FAC(A) role. Pilots, sensor operators, and mission commanders are normally located outside of the operational theater and controlling the UAS while it is in flight and conducting operations. Detailed planning and integration with the ground commander and forces is a necessity to understand and fulfill the commander's request for aviation and ground fires support.

Lastly, UASs have a limited capability in the marking of targets for other unmanned or manned platforms. The targeting suites provide a robust capability in using laser technology to mark targets for laser guided weapons and to establish target coordinates. Although the majority of aviation ordnance delivered during current operations has been PGMs that may not always be the case. Additionally not all aircraft employ laser guided weapons 100 percent of the time. Manned FAC(A) platforms have additional capabilities to use IR pointers, gun tracer rounds, and high explosive or white phosphorous rockets to mark targets for those aircraft without laser capability. This especially can assist aircraft without weapons systems in the identification of LZs or casualty locations during casualty evacuation missions.

This section has demonstrated that UASs are not ready to assume the full responsibility of the FAC(A) mission. Although they possess multiple capabilities and advantages over manned aircraft, their ability in the conduct of FAC(A) is limited. The following section will focus on several factors requiring attention before moving forward and implementing UASs as a FAC(A) platform.

The Way Ahead

Following the analysis of the FAC(A) mission, the capabilities and limitations of UASs, and the assessment of UASs performing the FAC(A) role, it is apparent that you cannot change the mission to meet the capabilities of a weapons system and UASs cannot currently fulfill the full mission requirements of the FAC(A) mission. Based on this information, at a minimum, several factors require exploration before utilizing these assets in this capacity.

The first factor requiring attention is the establishment of a test plan for UASs in the FAC(A) role. Troy Caraway, while serving as the Senior Analyst for Det 4, 53rd TNG, proposed the conduct of a test plan to determine the capability of UASs to operate in the FAC(A) role.

The test recommendation incorporated a fully integrated test team from the services, realistic scenarios, ground commander's intent, replication of operational and tactical communications, fire support planning, and CAS qualified aircrew.[41] The importance of the test is to include all services involved with the FAC(A) mission roles and responsibilities to ensure the procedures cover the entire spectrum of the mission from a joint perspective.

The second important factor is the establishment of a UAS FAC(A) training syllabus. Prior to executing FAC(A) missions, UAS pilots, operators, and mission commanders need to complete a FAC(A) training and certification program in accordance with the JCAS AP MOA 2004-02. Currently there is no training requirement to encompass the requirements stated in the MOA for UASs. Additionally, across the services, UAS crews need to be rated aviators and have the requisite manned platform background that currently conduct the FAC(A) mission.

The same requirements and restrictions must be placed on UAS crews that are placed on service manned platform crews in the certification and execution of a FAC(A) mission. Limitations exist for the number of aircraft sorties available to support the addition of a new community for certification and training and would require attention along with the lack of enough school houses to fulfill this requirement. The training also needs to include procedures for CFF and the coordination and de-confliction of air and ground coordination measures. A FAC(A) must "be able to coordinate supporting arms missions in conjunction with CAS missions, without assistance from the TACP."[42]

The sensor and radio capabilities of UASs also require improvement to effectively fulfill the full spectrum of responsibilities associated with the FAC(A) mission. Currently UAS platforms are limited in their FOV with the installed sensors. The addition of additional sensors or a sensor with a greater FOV would greatly increase the capability of a UAS to maintain the appropriate level of situational awareness of the operational area during FAC(A) operations. UASs require the capability to conduct Type 1 terminal control to effectively be designated as a FAC(A). With an increased FOV capability, UASs would be able to increase their situational awareness of all ground forces, air forces, and appropriate de-confliction measures required to safely coordinate and de-conflict aviation and surface fires.

The incorporation of an additional radio capability would increase UAS ability to coordinate with multiple agencies as is required in the FAC(A) role. FAC(A)s are required to communicate and coordinate with multiple fires agencies to control indirect and aviation fires while de-conflicting with direct fires and ground forces. Without this capability, it will be difficult for UASs to safely and effectively de-conflict and coordinate aviation and ground actions in the same operational area.

Finally, UASs are not currently integrated into the current fires world. Granted, they have the ability to deliver ordnance, but the requirement to fully integrate them into joint and service fires doctrine is important to establish their role in this capacity prior to utilization of these weapons systems in the FAC(A) role. Updated doctrine and tactics, techniques, and procedures (TTP) requires the addition of UASs and what they bring to the fight. This will assist in creating a better understanding of what capability UASs can contribute to the fires role in the joint environment.

Conclusion

Current UASs do not possess the required platform capabilities or training necessary to safely and effectively fulfill the FAC(A) mission. This is based on several factors. The first is that the UAS FOV diminishes required situational awareness and the operational picture to conduct Type 1 terminal attack control of aircraft and the ability to safely coordinate and de-conflict all air and ground forces, supporting fires, and the air and ground coordination measures. The second is the decreased lack of survivability due to limited maneuver, reduced speeds, and the absence of ASE. These limitations restrict UAS operations as a FAC(A) in only a low threat environment. Third, the training requirements for UAS FAC(A)s require the same attention as that for manned platforms. The creation of a new community with these requirements would affect the current production and training for JTACs, FACs, and manned aircraft FAC(A)s. Fourth, geographical separation can hinder the detailed planning and coordination required to support ground operations. As a FAC(A), the pilot is an extension of the tactical air control party (TACP) and is required to support the commander and employ aviation assets in support of his plan. Lack of planning and coordination can limit the effectiveness of this support. Additional limitations of a single radio and inability to mark targets and LZs with other than laser designators also reduce their capability in this role.

There is no doubt that UASs can enhance operational capability for the ground commander during operations. They have the ability to conduct several of the FAC(A) missions to include reconnaissance, radio relay, BDA, target marking/designation/coordinate generation, and SEAD coordination. These capabilities can greatly augment the tired force of manned aircraft in the current operational environment. Before putting a UAS in the full spectrum of the FAC(A) role, an analysis of the mission is required and should not be adjusted to match the capabilities of a weapons system. Current doctrine and the FAC(A) mission are established to cover all areas of possible conflict and war and should not prematurely be changed or adjusted to match the capabilities of the U.S. UAS platforms.

The UASs are currently equipped and trained to conduct more of an interdiction or strike coordination and reconnaissance (SCAR) mission. Through these operations they can still effectively support ground commanders and augment the tired fleet of manned aircraft. They are a great force multiplier on the battlefield but are not ready to conduct and be responsible for all requirements associated with being a FAC(A). Prior to utilizing UASs in the FAC(A) role, a test plan for UASs in the FAC(A) role needs to be established, a UAS FAC(A) training syllabus must be implemented, sensor and radio capabilities need improvement, and UASs and their capabilities need to be integrated into the joint fires doctrine and TTPs. This will at least initiate further detailed analysis of the FAC(A) mission and if UASs will, in the future, be able to be integrated into the FAC(A) role.

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