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14. ABSTRACT In the late 1990s the United States Air Force started conducting single-seat FAC(A) with their F-16 and A-10 aircraft. As a result, in 2005, the United States Marine Corps had their Weapons and Tactics squadron, MAWTS-1, conduct a qualitative assessment to ascertain the applicability of single-seat FAC(A) in the Marine Corps. The results of this assessment were to allow the F/A-18 and AV-8B single-seat aircraft to conduct FAC(A) with appropriate training. Aligning with the United States Air Force's stance on single-seat FAC(A) has been a controversial move that sparked numerous ready room debates throughout Marine aviation squadrons. This paper is an analysis of the methods used and conclusions/recommendations drawn by the MAWTS-1 single-seat FAC(A) qualitative assessment and presents some alternative recommendations for single-seat FAC(A) in the joint environment. Implementation of the recommendations in this paper would require some minor changes to Joint Publications 1-02, 3-09, and 3-09.3; more importantly, it would limit the scope of single-seat FAC(A).					
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All FAC(A)s Are Not Created Equal

by

Arthur R. Behnke

Major USMC

A paper submitted to the faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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4 May 2009

Seminar 7

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Abstract

In the late 1990s the United States Air Force started conducting single-seat FAC(A) with their F-16 and A-10 aircraft. As a result, in 2005, the United States Marine Corps had their Weapons and Tactics squadron, MAWTS-1, conduct a qualitative assessment to ascertain the applicability of single-seat FAC(A) in the Marine Corps. The results of this assessment were to allow the F/A-18 and AV-8B single-seat aircraft to conduct FAC(A) with appropriate training. Aligning with the United States Air Force's stance on single-seat FAC(A) has been a controversial move that sparked numerous ready room debates throughout Marine aviation squadrons. This paper is an analysis of the methods used and conclusions/recommendations drawn by the MAWTS-1 single-seat FAC(A) qualitative assessment and presents some alternative recommendations for single-seat FAC(A) in the joint environment. Implementation of the recommendations in this paper would require some minor changes to Joint Publications 1-02, 3-09, and 3-09.3; more importantly, it would limit the scope of single-seat FAC(A).

Thesis

When a Joint Terminal Attack Controller (JTAC) or operational ground commander calls for a line of Forward Air Controller (Airborne) [FAC(A)] on the Air Tasking Order (ATO), the assumption is the responding aviation assets will bring the same core capabilities and proficiency to the fight. Such capabilities allow the FAC(A) to become an integral part of the fight at hand – saving time and lives while prosecuting targets or conducting any of the eight primary FAC(A) missions. However, above today's battlefield, though all FAC(A)s have the title of 'FAC(A)' and are supposed to be trained to meet the same minimum standards, not all FAC(A)s possess the same core capabilities. Therefore, due to the importance of the mission and the lives at hand, it is imperative that the JTAC and operational ground commander understand this potential discrepancy and know the capabilities of the specific FAC(A) responding to their requested ATO line. The best way to accomplish this is to create a 2-tiered FAC(A) qualification.

What is a Forward Air Controller (Airborne)?

A forward air controller (airborne) is “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. Also called a FAC(A).”¹

As an airborne extension of the Tactical Air Control Party (TACP)², “FAC(A)s are required to support the TACP and/or JTAC with capabilities defined in the Joint Mission

¹ Chairman, U.S. Joint Chiefs of Staff, *Department of Defense Dictionary of Military and Associated Terms*, Joint Publication (JP) 1-02 (Washington, DC: CJCS, 12 April 2001 – As Amended Through 17 October 2008), p. 218.

² TACP – “A subordinate operational component of a tactical air control system designed to provide air liaison to land forces and for the control of aircraft.” Ibid, p. 537.

Task Lists (JMTLs). To function as an airborne extension of the TACP and/or JTAC a FAC(A) must be prepared to conduct the following missions:”³

- Terminal Attack Control (Type 1, 2, and 3)
- Radio Relay
- Reconnaissance
- Call for Fire Missions (Indirect)
- Asset coordination / Deconfliction
- Battle Damage Assessment
- Target Marking / Designation / Coordinate Generation
- Suppression of Enemy Air Defenses Coordination⁴

“FAC(A)s will be capable of performing Types 1, 2 and 3⁵ terminal attack control with fixed wing and rotary wing assets, control indirect fires, and conduct their missions in day, night, permissive and restrictive threat environments.”⁶

CAS and FAC(A) – An Historical Perspective

To fully understand the role and importance of a qualified FAC(A), one must first understand CAS; aircraft attacking enemy ground targets “in close proximity to friendly forces,” requiring detailed integration in order to mitigate any chance of fratricide.⁷

Close air support got its start in 1917, during World War I (WW-I), when the Royal Air Force (RAF), then known as the Royal Flying Corps (RFC), started an intense and structured strafing of both trench-lines and ground forces, along the western front, in

³ Lt. Gen. John R. Wood, Lieutenant General, U.S. Army Deputy Commander, memorandum for implementation, *Subj: Joint Close Air Support (JCAS) Action Plan Memorandum of Agreement (MOA) 2004-02, Joint Forward Air Controller (Airborne) [FAC(A)] Update*, 21 July 2008, p. 4.

⁴ Ibid.

⁵ “There are three types of terminal attack control (Type 1-3). *Type 1* control is used when the JTAC must visually acquire the attacking aircraft and the target for each attack. *Type 2* control will be used when the JTAC requires control of individual attacks but assesses that either visual acquisition of the attacking aircraft or target at weapons release is not possible or when attacking aircraft are not in a position to acquire the mark/target prior to weapons release/launch. *Type 3* control is used when the JTAC requires the ability to provide clearance for multiple attacks within a single engagement subject to specific attack restrictions. *Type 3* control does not require the JTAC to visually acquire the aircraft or the target; however, all targeting data must be coordinated through the supported commander’s battle staff.” JP 3-09.3 p. xiv.

⁶ Wood, loc. cit.

⁷ Chairman, U.S. Joint Chiefs of Staff, *Joint Tactics, Techniques, and Procedures for Close Air Support (CAS)*, Joint Publication (JP) 3-09.3 (Washington, DC: CJCS, 3 September 2003 – Incorporating Change 1 2 September 2005), p. I-1.

relatively close proximity to their own forces.⁸ The procedure of CAS was slowly, but continually improved, and through their experiences in the “small wars” of the 1920s and 1930s, the United States Marine Corps (USMC) developed an inseparable tie to its aviation assets by using their attack aircraft as a form of aerial artillery – which proved to be very effective.⁹ In the Korean War, the use of CAS assets proved to be a catalyst when Forward Air Controllers (FACs) on the ground were positioned in the T-6D Mosquito observation aircraft.¹⁰ From the Korean War to present, in one way or another, FAC(A)s have continually been employed as airborne extensions of the TACP in support of the ground forces.

USMC FAC(A) Platforms in 2005

Due to the high task loading of the FAC(A) mission, it has historically been a mission for dual/multi-crewed aircraft. In fact, the FAC(A) platforms for the USMC in 2005 were the: F/A-18D Hornet, UH-1 Huey and the AH-1 Cobra – all multi-crewed aircraft. However, in June 2005, Marine Aviation Weapons and Tactics Squadron-1 (MAWTS-1) published a Qualitative Assessment (QA) for Marine Corps aviation that recommended the employment of single-seat FAC(A)s in both the F/A-18 A/C Hornet and the AV-8B Harrier.¹¹

Single-Seat FAC(A) – The Politics

In the late 1990s with Operation Allied Force (OAF), the United States Air Force started to employ F-16 Fighting Falcon and A-10 Thunderbolt II squadrons under the auspice

⁸ Dr. Richard P Hallion, “Battlefield Air Support: A Retrospective Assessment,” *Airpower Journal*, Spring 1990, <http://www.au.af.mil/au/cadre/aspj/airchronicles/BackIssues.html> (accessed 20 April 2009), para. 4.

⁹ Ibid, para. 5.

¹⁰ Bruce R. Pirnie, Alan Vick, Adam Grissom, Karl P. Mueller, David T. Orletsky, *Beyond Close Air Support: Forging a New Air-Ground Partnership*, RAND Project Air Force (Arlington, VA: RAND, 2005), http://www.rand.org/pubs/monographs/2005/RAND_MG301.pdf (accessed 20 April 2009), p. 134.

¹¹ Maj E. T. Rush, LtCol T. C. Walsh, Maj S. P Mowery, Tactical Development and Evaluation (TAC D&E) Final Report, *Qualitative Assessment of the USMC Single Seat Forward Air Controller (Airborne) Concept in the FA-18 A/C and AV-8B*, June 2005, p. iv.

of being FAC(A) capable.¹² The USAF continued this trend in Operations Enduring Freedom (OEF) and Iraqi Freedom (OIF) – a trend that was not looked upon favorably by a number of Marines as the USMC’s position remained that FAC(A) was a mission for a dual-crewed aircraft. As a result, some in the USMC argued it was time to start single-seat FAC(A). In addition, the aircraft that will be replacing all of the Marine Corps’ F/A-18 A-D fleet (single- and *dual*-seat models) is the F-35 Lightning II, Joint Strike Fighter (JSF) – a single-seat aircraft.¹³ Therefore, if one is perspicacious enough to look to the Marine Corps’ near future, it is a necessity for Marine aviation to accept single-seat FAC(A). Not accepting the single-seat FAC(A) mission will eventually leave Marine aviation lacking a key fixed-wing (FW) capability in the Marine Air-Ground Task Force (MAGTF) – an unacceptable situation.

Single-Seat FAC(A) – Structure for MAWTS-1’s Qualitative Assessment (QA)

With a cursory discussion of CAS, FAC(A) and single-seat FAC(A) in the USAF, it is time to focus on the Qualitative Assessment of the USMC Single Seat Forward Air Controller (Airborne) Concept in the FA-18 A/C and AV-8B. The Aviation Development, Tactics, and Evaluation (ADT&E) department of MAWTS-1 conducted a single-seat FAC(A) QA composed of 6 phases. **Phase One** was to develop a thorough understanding of applicable single-seat FAC(A) concepts.¹⁴ During this phase, a MAWTS-1 F/A-18D qualified FAC(A) Instructor [FAC(A)I] flew “three flights (day low threat FAC(A), day high threat FAC(A), and night low / medium threat FAC(A))”¹⁵ as a single-seat FAC(A). **Phase Two** modified the F/A-18D FAC(A) syllabus in order to accommodate single-seat FAC(A) for evaluation purposes only. **Phase Three** placed two MAWTS-1 instructor pilots (IPs),

¹² Maj Jeffrey R. McDaniels, “Viper FAC-A Effectiveness of the F-16 Block-40” (research paper, Maxwell, AL: Air Command and Staff College, 2000), pp. 4-9.

¹³ Joint Strike Fighter, “The F-35 Lightning II,” <http://www.jsf.mil/program/> (accessed 22 April 2009).

¹⁴ Rush, op. cit., pp. 6-7.

¹⁵ Ibid.

through a modified (to include ground simulators) FAC(A) ground syllabus in preparation for the evaluation flights. **Phase Four** involved taking the same two MAWTS-1 IPs and having them fly the F/A-18D FAC(A) training and readiness (T&R) syllabus, but in single-seat aircraft – one instructor would be flying an F/A-18 A/C and the other an AV-8B. **Phase Five** was one flight conducted at a MAGTF level operation. Finally, **Phase Six** was the final assessment and discussions of various limitations and capabilities that a single-seat FAC(A) could effectively execute.¹⁶

Single-Seat FAC(A) – MAWTS-1’s QA Conclusion and Recommendations

Conclusion: “With proper Training and pre-flight planning, the single seat [sic] FAC(A) can be a capable asset on [sic] the battlefield.”¹⁷

Recommendations: With the above stated conclusion, MAWTS-1 had four recommendations to the USMC in the implementation of single-seat FAC(A):

1. **Cost**: Due to the high cost (in money, time, and assets) of both training and maintaining additional FAC(A)s for the Marine Corps, Marine Aviation and Weapons Tactics Squadron-1 recommended that the USMC either increase funding to accomplish the additional training or cut core competencies, or portions thereof, from the already full F/A-18 A/C and AV-8B T&R manuals to facilitate the implementation of single-seat FAC(A) into their T&R manuals.
2. **Targeting Pods**: Analyzing what a 3rd generation targeting pod brought to the FAC(A) environment, increased lethality and survivability, MAWTS-1 recommended that all single-seat FAC(A) aircraft be equipped with a 3rd generation targeting pod.

¹⁶ Ibid.

¹⁷ Ibid, p. 16.

3. **Escort:** As a result of high task loading in the dynamic FAC(A) environment, MAWTS-1 identified the value of an experienced escort. As such, MAWTS-1 would ideally like to see the single-seat FAC(A) employed with a fully qualified single-seat FAC(A) flying in the escort role. However, due to the senior nature and experience required to make single-seat FAC(A)s in an F/A-18 A/C squadron, MAWTS-1 identified the possibility of a FAC(A) escort as remote. Therefore, MAWTS-1 recommended a minimum of a section lead to fly as the escort of a single-seat FAC(A).
4. **T&R Implications:** MAWTS-1 recommended that single-seat FAC(A) “be incorporated into the Core Plus¹⁸ (400 level) of the current FA-18 A+/C and AV-8B T&Rs.”¹⁹

In addition, MAWTS-1 concluded that single-seat FAC(A) aircraft should not be limited or constrained in mission and/or employment. That is, “[e]ither a single seat [sic] FAC(A) should be able to execute in all mission areas or he should execute none.”²⁰

FAC(A) – Essential Elements

In the ‘What is a Forward Air Controller (Airborne)?’ section of this paper there was a brief description covering the definition of a FAC(A), as well as the eight primary missions of a FAC(A). Though this was a good starting point, before there is a more detailed analysis of the single-seat FAC(A) limitations, a comprehensive understanding of essential elements in the FAC(A) mission is imperative. This understanding will highlight some of the single-

¹⁸ Core Plus – “Core Plus Skills have a low probability of execution, or are theater specific. Core Plus training (400 T&R level) is generally not considered essential to achieve unit core competency.”

Commandant of the Marine Corps, *Aviation Training and Readiness (T&R) Program Manual*, NAVMC 3500.14 (Washington, DC: CMC, 3 July 2007), <http://www2.marines.mil/news/publications/Documents/NAVMC%203500.14.pdf> (accessed 25 April 2009), p. I-8.

¹⁹ Rush, op. cit., p. 17.

²⁰ Ibid, p. iv.

seat FAC(A) shortcomings to be covered in the ‘Single-Seat FAC(A) – The Limitations’ section.

Joint Publication 3-09.3 – *Joint Tactics, Techniques, and Procedures for Close Air Support (CAS)* – the ‘go to’ joint publication for CAS and FAC(A) players alike, states:

A FAC(A) must be able to coordinate supporting arms missions in conjunction with CAS missions, without assistance from the TACP. The FAC(A) must be capable of executing the desires of the ground commander in day, night, and adverse weather conditions.²¹

Underlined in the JP 3-09.3 excerpt above are the operative words. These essential elements will underscore some of the single-seat limitations.

Single-Seat FAC(A) – The Limitations

In the interest of objectivity, the limitations in this section are not derived from biased ready room discussions of various platform capabilities. Instead, many of the limitations are drawn directly from the qualitative assessment itself, by analyzing the words of the aviators who conducted the single-seat FAC(A) QA. Other limitations are pulled from an independent single- versus dual-crew analysis conducted in 1985, and the analysis of a former MAWTS-1 Instructor Weapons and Systems Officer (IWSO).

Single-Seat FAC(A) QA: In **Phase One** of the QA the MAWTS-1 FAC(A)I Instructor Pilot (IP) had a number of notes that raise question to the execution of a single-seat FAC(A):

- “Mission planning is crucial...I was lucky in the fact that I was familiar with the working area, and could compose 9-line briefs prior to getting airborne.”²²

This rises to question the applicability of a single-seat FAC(A) in combat where the pilot is likely to be completely unfamiliar with the target area.

²¹ JP 3-09.3, op. cit., p. III-30.

²² Rush, op. cit., p. 11.

- During the night low threat flight, “I was unable to provide any indirect fire due to comm time / attention required.”²³ This begs the question, “Can a single-seat FAC(A) realistically and reliably ‘coordinate a supporting arms mission in conjunction with CAS missions, without assistance from the TACP?’”²⁴
- In the IP’s summary, he states, “The single seat [*sic*] FAC(A) CANNOT provide the same coordination and control that the two seat aircraft can...If employed as a FAC(A) the single seat [*sic*] jet MUST make use of the FAC or his escort to accomplish all the tasks that must be performed.”²⁵ This assertion directly opposes the JP 3-09.3 excerpt.

In **Phase Four**, the two MAWTS-1 IPs selected to go through the modified single-seat FAC(A) T&R syllabus both “had significant experience in their respective platforms.”²⁶ While their escorts were “qualified MAWTS-1 IP FAC(A)Is in a configured FA-18D.”²⁷ An unrealistic asset to a single-seat FAC(A) in combat. In addition, all flights for Phase Four were flown in either the R-2507 or R-2501 range complexes – both IPs would be extremely familiar with these ranges, creating an artificial environment for the QA. Throughout this phase, one of the common threads pulled from the flights was that the single-seat FAC(A) was not as survivable as a dual-seat FAC(A). Highlighting this point is the following excerpt from one of the MAWTS-1 IPs:

I felt I would not have survived...when operating under ‘high threat.’ I simply was not able to fly at 300 feet and generate target coordinates, make the call for fire, pass 9-lines, etc. So, I arced around at 1000 feet and did all these things in an un-

²³ Ibid, p. 12.

²⁴ JP 3-09.3, loc. cit.

²⁵ Rush, op. cit., p. 12.

²⁶ Ibid, p. 13.

²⁷ Ibid.

survivable manner. I do believe that single seat [sic] FAC(A)s can survive vs. a low to medium threat, but the single seat [sic] FAC(A)'s escort will have to be attached and focus on threat lookout whenever the SSFACA [sic] is heads down using the TPOD or passing calls for fire, 9-lines, etc.²⁸

Again, this analysis from a different MAWTS-1 IP opposes the 3-09.3 excerpt stating essential elements of the FAC(A) mission, regardless of aircraft platform.

In addition, below are some other miscellaneous excerpts from various FAC(A)s, FAC(A)Is, Escorts, and CAS players conducting the QA. MAWTS-1 states that the comments “do not necessarily reflect the opinions of MAWTS-1 nor do they necessarily support the conclusions of the QA.”²⁹

- “Single seat [sic] FAC(A) had the wrong target and ran aircraft on a target that was 700M away from the intended target.”³⁰ ³¹ or “Both sections attacked on the wrong final attack heading and still received cleared hot calls.”³² While either of these could happen to any FAC(A) given the ‘wrong’ circumstances, the fact that these incidents happened during the QA, brings the MAWTS-1 conclusions of single-seat FAC(A) under question.
- “I felt task saturated today and had to read pre-planned 9-lines directly off my kneeboard card vice putting them into the system.”³³ This is an example of another unrealistic combat scenario and questions the true capability of a single-seat to conduct FAC(A) the way it is intended to be executed.

²⁸ Ibid.

²⁹ Ibid, p. 14.

³⁰ Ibid.

³¹ According to LtCol Joseph Craft, a former VMFA(AW)-121 F/A-18D squadron CO, “a scenario such as this one could have strategic implications on today’s urban battlefields such as Ramadi or Haditha, Iraq.” LtCol Joseph Craft, telephone call/interview, 30 April 2009.

³² Rush, op. cit., p. 15.

³³ Ibid, p. 14.

- “I had the FAC coordinate suppression and mark.”³⁴ This again is in opposition to the 3-09.3 excerpts.

With all the above citations in Phase Four of the QA, MAWTS-1 summarized this phase by saying, “given the proper experience, preparation, and training, [single-seat FAC(A)] can be a viable asset on the battlefield.”³⁵

Though **Phase Five** was supposed to have a separate evaluation flight involving MAGTF level operations, limitations prevented the execution of the phase. As a result, Phase Four was assessed to have met the evaluation requirements desired in Phase Five.³⁶ However, given the single-seat FAC(A) questions raised in this paper, this student questions the omission of Phase Five.

F/A-18 Single- Versus Dual-Seat Crew Simulation Results: In 1985 there was an independent study conducted by the Center for Naval Analyses (CNA) to compare the “performance of the single- and dual-seat crews” in the F/A-18.³⁷ In the study, 12 crews flew five different missions, with three elevating scenarios. This led to a total of 15 scenarios and 180 simulator sorties; 90 sorties for the single-crew and 90 for the dual-crew.³⁸

This study indeed had some issues:

- Small sample size: Six single-seat pilots and six dual-seat crews.

³⁴ Ibid, p. 15.

³⁵ Ibid.

³⁶ Ibid.

³⁷ Tamara L. Eyler, Robert W. Ward, *F/A-18 Single- Versus Dual-Seat Crew Simulation Results: Measures of Mission Success*, Center for Naval Analyses, CRM 86-105, July 1986, p. i.

³⁸ Ibid, p. 1.

- Disparity of experience: All pilots have approximately 600 hours of F/A-18 flight time, while Naval Flight Officers (NFOs) filling the back seat had “much less experience”³⁹ in the F/A-18.
- No training time to develop crew coordination for dual-crews.
- Limitations of the simulators.⁴⁰

However, there are still a couple key deductions. First, in the 15 scenarios flown, 14 of the 15 were proven to be more survivable by the dual-crew, based on analyses of detailed measures of mission success.⁴¹ Second, when the crew rankings were scaled for all the missions and simulator sorties, five of the top six crews were dual-crew.⁴²

In the air of full disclosure, two other points need to be covered. First, the number one ranked crew was a single-crew⁴³; it can be speculated that this water-walker was the one single-crew that had vastly more F/A-18 hours and total flight hours compared to all other aviators, pilot or NFO, in the study. Second, though the dual-crew proved to be more survivable, the single-crew proved to be more accurate in their bombing.⁴⁴ However, since none of the simulators were halted to kill-remove an F/A-18, one can hypothesize that had kill-removal been in play, the survivability of the dual-crew would have trumped the accuracy of the single-crew.⁴⁵ In addition, it is theorized that due to task saturation, the single-crew chose to ignore threats and target fixate.⁴⁶

Though the F/A-18 single- versus dual-crew study does not directly tie to the JP 3-09.3 excerpt, it does highlight a couple significant points. First, with single-crew being

³⁹ Ibid, p. 2.

⁴⁰ Ibid, pp. 2-3.

⁴¹ Ibid, p. 4.

⁴² Ibid, p. 20.

⁴³ Ibid.

⁴⁴ Ibid, p. 5.

⁴⁵ Ibid, p. 22.

⁴⁶ Ibid, p. 27.

‘significantly’ less survivable⁴⁷, do they make a viable FAC(A) platform in all threat environments? Second, with the high task loading in FAC(A), does it not make sense to save the more complex FAC(A) missions (high threat or nighttime scenarios) for dual-crews only?

Core Plus FAC(A) Single-Seat Training: In the current T&R manuals for both the F/A-18 A/C and the AV-8B, as per the MAWTS-1 recommendation number 4, the FAC(A) syllabus is part of the Core Plus (400 level) training. As a result, single-seat FAC(A) is not a core capability for these FW platforms; thus, the FAC(A) training is optional.⁴⁸ Couple this “[w]ith all the training requirements levied on pilots in multi-purpose, multi-mission aircraft, [and] it’s exceptionally rare that anything ‘extra’ will get done.”⁴⁹ Therefore, the likelihood of a large base of FAC(A) knowledge and expertise in a single-seat squadron is unlikely.

Recommendation for FAC(A) – JP 3-09.3

The recommendation of this paper is to divide FAC(A) into two levels. Like today’s FAC(A) qualification, FAC(A) level 1 would cover all missions and threat levels – day or night. The FAC(A) level 2 would cover all missions, but only in threat levels comparable to day low to medium threat. This recommendation is formed based on two items:

1. The potential capabilities displayed by the MAWTS-1 single-seat FAC(A) qualitative assessment.
2. The fact that JSF, a single-seat FW platform, is replacing a number of FW platforms (single- and dual-seat models) across all services.

⁴⁷ “Survivability is arguably a much bigger deal than it was in the past considering the cost of modern aircraft and their limited numbers. If they are less survivable, commanders will be less inclined to provide them for this mission, leaving the guy on the ground without a tremendous force multiplier.” LtCol Joseph Craft, telephone call/interview, 30 April 2009.

⁴⁸ Maj Michael P. Shand, “JTAC and FAC(A) Training: How History Illustrates the Path to the Future” (research paper, Quantico, VA: USMC Command and Staff College, 2008), p. 16.

⁴⁹ Ibid.

- a. Therefore, it is imperative to build a FAC(A) base in the single-seat community. However, based on single-seat performance, task saturation, lack of current technology supporting single-seat FAC(A), increased possibility of fratricide and a decreased combat survivability, this student would elect to limit the scope of single-seat FAC(A) for the near-term/foreseeable future.

Counterarguments

A recommendation to reverse the decision on such a controversial subject as single-seat FAC(A) is a difficult endeavor, and as such, there will likely be numerous counterarguments to the case presented in this paper. Though it is futile to try and refute every possible counterargument, this paper will address the three most common counterarguments:

1. The USAF has been flying single-seat FAC(A) for the past several years.
2. Modern technology now makes the task loading in FAC(A) more manageable; therefore, allowing a single-seat aircraft to effectively execute FAC(A).
3. The JSF, a single-seat platform, is replacing the two-seat aircraft that currently conduct FAC(A); thus, the transition to single-seat FAC(A) must be accomplished.

Counterargument 1: The USAF Flies Single-Seat FAC(A)

As mentioned earlier, in the late 1990s the USAF started to employ F-16s and A-10s as FAC(A)s during OAF, and has continued to do so in OEF and OIF.⁵⁰ Therefore, it stands to reason that the USMC and other services should be able to employ single-seat FAC(A) – a statement with which the MAWTS-1 QA agrees.

Rebuttal 1: USAF Single-Seat FAC(A) is not a *complete* FAC(A)

⁵⁰ McDaniels, loc. cit.

When one analyzes how the USAF has been employing their single-seat FAC(A)s it becomes apparent that though they may be effective in specific and permissive environments, they are not executing FAC(A) in its true sense, and across the threat spectrum. Emphasizing this point is the following excerpt from a CAS section recalling their working time with a USAF A-10 FAC(A) section:

As we arrived on station, two USAF A-10 FAC(A)s were just dropping the last of their bombs on a target within the kill box. We checked in with them and they told us that it was an open kill box, with no friendlies in the area. The A-10 pilots then told us to ‘kill’ any vehicles that we happened to spot in bunkers, talking us onto a couple of targets prior to departing.⁵¹

This is a prime example of USAF assets calling a mission FAC(A), when in fact it meets the definition of a Strike Coordination and Reconnaissance (SCAR)⁵² mission – two key differences are that it takes place in a kill box and friendlies are not a factor.

Though the signed Joint FAC(A) MOA 2004-02 will undoubtedly improve USAF single-seat FAC(A) execution, the previously discussed issues of single-seat FAC(A) in a higher threat environment remain. Thus, the recommendation for a FAC(A) level 2.

Counterargument 2: Technology

One of the most consistent arguments for replacing dual-seat platforms with single-seat platforms is that technology is making the synthesis of information readily available and coherent for the pilot; thus, eliminating the need for an additional crew member regardless of the mission. This *technology* point is captured in the following two citations:

⁵¹ Tony Holmes, *US Navy Hornet Units of Operation Iraqi Freedom* (New York: Osprey Publishing, 2004), p. 72.

⁵² “Strike Coordination and Reconnaissance – A mission flown for the purpose of detecting targets and coordinating or performing attack or reconnaissance on those targets. Strike coordination and reconnaissance missions are flown in a specific geographic area and are an element of the command and control interface to coordinate multiple flights, detect and attack targets, neutralize enemy air defenses and provide battle damage assessment. Also called SCAR.” JP 1-02, p. 525.

The integration of multiple advanced sensors and the fused data they produce gives the Joint Strike Fighter pilot unprecedented situational awareness in the combat area and stand-off lethality against enemy targets.⁵³

The F-35 will combine radar warning, signals collection and analysis, passive emitter location and countermeasures functions in an integrated electronic warfare suite deeply linked to radar and imaging sensors. The design aims to bootstrap pilot situational awareness while boosting lethality.⁵⁴

Rebuttal 2: Technology – Man is the Limiting Factor

There are two short and simple points to rebuke this counterargument. First, regardless of the benefits attained as a result of incorporating technology into the JSF, the military is not currently flying the JSF – thus, the point is mute. To be objective and have full disclosure, technology and software improvements in the current inventory of United States military fighter and attack aircraft have improved tremendously; but it is not on par with what the JSF advancements advertises nor does it simplify the data enough to discard a capably trained back-seater. Second, no matter how synthesized and easy to comprehend the data is, it doesn't increase the size of the pilot's task bucket. In other words, at some point, regardless of technology advancements, the pilot still reaches task saturation – at this level a second human in the cockpit to manage tasks is a benefit. Below are two excerpts that support the rebuttal points:

Regardless of the added technology, a single pilot's attention will be consumed managing target acquisition and guidance systems, avoiding, threats, and delivering ordnance.⁵⁵

Increased automation may have decreased the number of overt responses the aircraft crew may be required to make, but increased systems capabilities may have disproportionately reduced the time available to make those remaining responses

⁵³ David Jensen, "F-35 Integrated Sensor Suite: Lethal Combination," *Avionics Magazine*, October 2005, <http://proquest.umi.com/> (accessed 10 March 2009).

⁵⁴ Ron Sherman, "F-35 Electronic Warfare Suite: More Than Self-Protection," *Avionics Magazine*, April 2006, <http://proquest.umi.com/> (accessed 10 March 2009).

⁵⁵ Kevin A. Campbell, "Technology Kills the Multicrew Concept," *Marine Corps Gazette*, September 2007, <http://proquest.umi.com/> (accessed 10 March 2009).

and/or added new monitoring tasks...The introduction of automation does not necessarily reduce the involvement of the crew in aircraft operations, but only changes it.⁵⁶

Of particular note, the last quotation was from an article in a 1979 August issue of the Marine Corps Gazette; 30-years later and the same arguments against technology remain. It would appear, based on today's arguments, that the technological advances in the aircraft of the 1970s and 1980s did not eliminate pilot task saturation – for that matter it didn't even eliminate crew task saturation in a multi-crewed aircraft. "Technology is not the limiting factor. The human using the technology is the limiting factor."⁵⁷

Counterargument 3: The Single-Seat JSF is Coming

Regardless of what one believes the capabilities of a single-seat FAC(A) are, the single-seat JSF is on the horizon. Therefore the transition to single-seat FAC(A) should begin now in order to build a knowledge base before the transition.

Rebuttal 3: The Single-Seat JSF is Coming

This last argument is factual and valid. However, it does not mean the United States military should compromise safety by flying single-seat FAC(A) in task loading and threat environments beyond the capabilities of the aircrew. This only increases the possibility of losing friendly air assets over hostile terrain or having an avoidable fratricide. This does not mean that the same two misfortunes could not happen to a multi-crewed aircraft; but, the chances are fewer. As a result, the recommendation of a FAC(A) level 2 qualification presents itself as a realistic, viable, practical and safe alternative to build FAC(A) knowledge

⁵⁶ K. P. O'Mara, "Past Performance and Mission Dictate that the Corps use a Two-Seat Fighter," *Marine Corps Gazette*, August 1979, <http://proquest.umi.com/> (accessed 10 March 2009).

⁵⁷ Walter Suarez, "JSF," *Marine Corps Gazette*, October 2008, <http://proquest.umi.com/> (accessed 10 March 2009).

in the single-seat community, while not compromising the FAC(A) standards or inducing unnecessary risk.

Conclusion

After detailed analysis of the MAWTS-1 single-seat FAC(A) qualitative assessment conducted in 2005, it is evident that a single-seat FAC(A) does not possess the same capabilities of a dual-seat FAC(A), nor do they meet the essential elements of a FAC(A) presented in JP 3-09.3. As a result, due to the safety of both ground and aircrew, it is imperative that the JTAC and/or operational ground commander know the capabilities and limitations of a FAC(A) tasked to fill their requested ATO line. The best way to accomplish this is to create a 2-tiered FAC(A) qualification. This 2-tiered system has three key benefits:

- It allows the ground units to know the capabilities of their FAC(A)
- It allows the single-seat FAC(A) community to build an experience base in a relatively safe and manageable environment, facilitating a smooth transition to single-seat FAC(A) in the JSF, where hopefully technology will permit single-seat FAC(A) level 1.
- It helps mitigate risk and manage safety.

The importance and consequences of FAC(A) missions flown over today's battlefield deserves a thorough, impartial and joint analysis of the current single-seat FAC(A) with regard to the recommendations contained in this paper.

GOAT – Glossary of Acronyms and Terms

A-10	Attack -10 ‘Thunderbolt II’ aircraft
ADT&E	Aviation Development, Tactics, & Evaluation
ATO	Air Tasking Order
AV-8	Attack VSTOL -8 ‘Harrier’ aircraft
CNA	Center for Naval Analysis
CAS	Close Air Support
CO	Commanding Officer
F-16	Fighter -16 ‘Fighting Falcon’ aircraft
F-35	Fighter -35 ‘Lightning II’ aircraft
F/A-18 also FA-18	Fighter Attack -18 ‘Hornet’ aircraft
FAC	Forward Air Controller
FAC(A) or FAC-A	Forward Air Controller (Airborne)
FAC(A)I	Forward Air Controller (Airborne) Instructor
FW	Fixed-Wing
IP	Instructor Pilot
IP	Instructor Pilot
IWSO	Instructor Weapons and Systems Officer
JMTL	Joint Mission Task List
JSF	Joint Strike Fighter
JTAC	Joint Terminal Air Controller
MAGTF	Marine Air-Ground Task Force
MAWTS-1	Marine Aviation Weapons and Tactics Squadron-1
NFO	Naval Flight Officer
OAF	Operation Allied Force
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
QA	Qualitative Assessment
RAF	Royal Air Force
RFC	Royal Flying Corps
RW	Rotary-Wing
SCAR	Strike Coordination and Reconnaissance
Section	Two Aircraft
STOVL	Short Take-off and Vertical Landing
T&R	Training and Readiness
TAC	Terminal Air Controller
TAC D&E	Tactical Development and Evaluation
TACP	Tactical Air Control Party
TPOD	Targeting Pod
USAF	United States Air Force
USMC	United States Marine Corps
VMFA(AW)	Marine All Weather Fighter Attack Squadron
VSTOL	Vertical/Short Take-off and Landing
WW-I or II	World War I or II

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