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**NAVAL WAR COLLEGE
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Joint Remotely-Controlled Component Command:

An Enabler for the Future of Unmanned Systems

by

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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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3 May 2010

Abstract

The use of unmanned systems has grown substantially over the past decade, yet the current supply of unmanned systems cannot keep pace with the demand for their capabilities. While there has been a great deal of discussion on the need for more unmanned systems and the need for these systems to be interoperable, very little discussion has been devoted to the joint doctrine governing command and control of unmanned systems. This paper examines the growing trend of unmanned technology development and some of the lessons learned from the employment of unmanned systems in combat. It goes on to consider the current DOD programs and command and control doctrine in place to support these systems. Finally, the paper draws conclusions concerning current DOD initiatives in the field of unmanned systems, and recommends areas for further research and analysis to improve the development and employment of unmanned systems to better serve combatant commanders.

INTRODUCTION

In July 2008, during the Battle of Wanat in eastern Afghanistan, nine American soldiers were killed as they moved into a village they thought was safe. The unmanned surveillance drone supporting the platoon had a different vantage point, yet despite signs of an impending attack, the drone was diverted to a higher priority mission.¹ While this is just one example, it is illustrative of how critical unmanned systems have become to the ground forces in Afghanistan. It also shows that the U.S. military is still in the beginning stages of learning how to allocate and employ multi-mission capable unmanned systems.

Only a decade ago, U.S. military services had a handful of unmanned aircraft. Today, they have nearly 20,000 unmanned aircraft and ground vehicles.² The growth in demand for unmanned systems has prompted a great deal of discussion on the proper development and employment of unmanned systems. Every military service either currently employs or is planning to employ a type of unmanned system. This has prompted each service to develop a comprehensive plan or strategy on how they will develop and employ these unmanned systems. The Department of Defense (DOD) has even published its second document in a four-year period to provide a “Defense-wide vision for unmanned systems and related technologies” called the *FY2009–2034 Unmanned Systems Integrated Roadmap*.³

Most discussions involving unmanned systems have been about how to get more systems fielded to support commanders due to their high demand. For instance, DOD’s 2005 UAS Roadmap stated that unmanned aircraft “have a role to play in the top half of all

¹ David Martin, “Battle of Wanat-Inside the Ambush,” *CBS News*, 5 October 2009, <http://www.cbsnews.com/stories/2009/10/05> (accessed 12 March 2010).

² Katherine M. Peters, “Up in the Air,” *Global Executive* 42, no. 2 (Feb 2010): 28.

³ U.S. Department of Defense, *FY 2009-2034 Unmanned Systems Integrated Roadmap*, 6 April 2009, iii.

COCOM's priorities, including supporting the #1 priority for five of the nine COCOM."⁴

The demand-pull for more unmanned capability has caused an explosion in the field of developing unmanned systems. While much of the dialogue has been devoted to the need for multi-service unmanned systems to operate with one another, there has been little written on the adequacy of command and control (C2) doctrine in place to govern the use of unmanned systems. Due to the anticipated increased use of unmanned systems, DOD needs to provide a more robust and integrated organization to oversee and coordinate unmanned systems employment. Furthermore, C2 doctrine for unmanned systems needs to be refined to provide better support to combatant commanders now and in future operations.

As a case study that can be applied to all unmanned systems, this examination will provide a review of current and future unmanned aerial systems (UAS) to include missions for which these systems are designed and the different categories of UAS. Current programs and organizations will be addressed to show how DOD is attempting to enable the transition to a military force that includes unmanned systems. This paper will also examine applicable current C2 doctrine being used to guide the employment of UAS, and conclude with recommendations on a way ahead for the UAS community.

BACKGROUND

The role of unmanned systems in the current conflicts of Iraq and Afghanistan has expanded dramatically. Typically, UAS are the popular choice to perform missions characterized as "dull, dirty or dangerous."⁵ These missions refer to those that are long in duration, have potential for exposure to chemical or biological agents, or risk of injury to personnel or equipment. Primarily, UAS missions to date have been mostly to support

⁴ U.S. Department of Defense, UAS Roadmap 2005, 4 August 2005, 42.

⁵ U.S. Department of Defense, *FY 2009-2034 Unmanned Systems Integrated Roadmap*, 6 April 2009, 11.

intelligence, surveillance and reconnaissance (ISR) requirements. However, based on the versatility and persistence of UAS, the role of UAS has expanded into other mission areas such as: signals intelligence (SIGINT); precision target designation; mine detection; and chemical, biological, radiological, nuclear (CBRN) reconnaissance.⁶

Iraq and Afghanistan are not the only areas that are receiving support from the UAS community. U.S. Central Command is planning to establish an unmanned patrol to assist in combating pirates around the Horn of Africa.⁷ The Air Force community is considering the roles of UAS to expand into mission areas such as strategic airlift, electronic attack, strike and in-flight aerial refueling.⁸ Even the newly established Missile Defense Agency “is examining how to integrate UAS into the sensor architecture to provide early tracking of ballistic missiles.”⁹

Flight hour statistics also show how quickly the demand for UAS is increasing. Based on planned UAS inventories in fiscal year 2013, DOD is estimating that the military services will require more than 1 million flight hours just to train UAS personnel.¹⁰ By comparison, coalition UAS have flown over 500,000 flight hours in support of Operations Enduring Freedom and Iraqi Freedom (as of October 2008).¹¹ The expanding mission areas and flight hours show the tremendous growth potential of unmanned systems. In order to garner the maximum capability of unmanned systems, DOD needs to ensure that there are adequate organizations and C2 doctrine in place to guide the employment of these systems.

⁶ Ibid., xiii.

⁷ David W. Small, “The Demand for Unmanned,” *The Officer*, November 2009, 24.

⁸ Stew Magnuson, “Next Generation: Future Remotely Piloted Aircraft Will Do More Than Surveillance,” *National Defense*, March 2010, 32.

⁹ Amy Butler Washington, “Missile Agency Refines Concepts for Unmanned Aerial Systems,” *Aviation Week & Space Technology*, 4 January 2010, 52.

¹⁰ John Liang, “GAO Warns Lack of DOD-Managed Airspace Will Impact Future UAS Training,” *InsideDefense.com*, 26 March 2010, <http://www.insidedefense.com/> (accessed 31 March 2010).

¹¹ U.S. Department of Defense, *FY 2009-2034 Unmanned Systems Integrated Roadmap*, 6 April 2009, xiii.

There are a variety of different kinds of UAS. The Joint UAS (JUAS) Concept of Operations (CONOPS) describes two classification systems for UAS: JUAS categories which are driven by intended military mission and Domestic Use UAS Levels which are based on speed, size and altitude of operation of the UA (unmanned aircraft).¹² While the Domestic Use UAS Levels are used to improve coordination with the Federal Aviation Administration (FAA), this paper will be concerned with the JUAS categories, as they are most applicable to the joint force. The five JUAS categories are: Tactical 1 (T1), Tactical 2 (T2), Tactical 3 (T3), Operational/Theater (O), and Strategic (S).¹³ Generally speaking, the altitude of operation of each UA increases as a system moves from the tactical to the strategic category. For instance, a T1 UA would operate up to an altitude of 1,000 feet while an operational/theater UA would operate as high as 30,000 feet. Also, since the JUAS categories fall nicely in line with the three levels of war (tactical, operational, and strategic), it suggests that the category of UAS should indicate the type of objective that system is supporting (i.e., an operational UAS should be supporting an operational objective).

While these categories have proven useful in most instances, their establishment has not been without controversy. The Air Force applied to be the “executive agent for all medium- and high-altitude UAVs—those that fly above 3,500 feet,”¹⁴ but was subsequently turned down by the Secretary of Defense (SECDEF). This decision arrived at the end of a heated debate between the Army and the Air Force on which service would be able to control unmanned aerial vehicles (UAVs), which, despite being operated at higher altitudes, were being used to support land component objectives. The Army won the battle, and was

¹² Joint Unmanned Aircraft Systems Center of Excellence, “Joint Unmanned Aircraft Systems Concept of Operations,” March 2007, 2-2-b.

¹³ Ibid.

¹⁴ G Goodman, “UAV Turf Fight Boils Over,” *Journal of Electronic Defense*, June 2007, 20.

allowed to acquire its own “organic” UAS to provide reconnaissance, surveillance, and target acquisition (RSTA) support to its ground troops engaged in combat.¹⁵ This anecdote shows that the services are still trying to determine how UAS are controlled in theater. Some contend that control should depend on the medium in which the asset operates (air, land, sea) while others believe that control of an asset should be based on the objective the asset is supporting. This debate will be revisited in a later section to show that the nature of the objective should determine the control of the asset. Despite the on-going debate regarding control of UAS, there has been plenty of effort in maintaining oversight of their use.

Organizations have been established to provide oversight of the employment of UAS. In March 2005, U.S. Strategic Command (STRATCOM), as the manager of the global ISR mission, established a separate joint functional component command called the Joint Force Component Command for Intelligence Surveillance and Reconnaissance (JFCC-ISR).¹⁶ One of the primary missions of JFCC-ISR is to “execute DOD ISR operations to satisfy combatant command and national operational and intelligence requirements.”¹⁷ Due to the growing use of UAS to perform the theater ISR mission, JFCC-ISR has become the de-facto manager of theater-capable UAS platforms (categories O and S mentioned earlier) even though those national assets can be a substitute for portions of the tactical ISR mission.¹⁸ The ability of these assets to perform a myriad of missions while supporting objectives in all levels of warfare (strategic, operational, and tactical) has been the source of debate among the military services. An example is the aforementioned debate between the Army and the

¹⁵ Stew Magnuson, “Next Generation: Future Remotely Piloted Aircraft Will Do More Than Surveillance,” *National Defense*, March 2010, 28.

¹⁶ U.S. Strategic Command Fact Sheets, “Joint Functional Component Command for Intelligence, Surveillance and Reconnaissance (JFCC-ISR),” <http://www.stratcom.mil/factsheets/isr/> (accessed 26 February 2010).

¹⁷ Ibid.

¹⁸ Del C. Kostka, “Moving Toward a Joint Acquisition Process to Support ISR,” *Joint Force Quarterly*, 4th Quarter 2009, 70.

Air Force over UAVs that operate over 3,500 feet. The argument was about who should control UAVs that support multiple objectives at multiple levels of warfare? The question for JFCC-ISR is whether they have the necessary degree of span of control over theater-capable UAS as those systems are taking on roles that go beyond the typical ISR mission.

Another organization was established in 2007 under U.S. Joint Forces Command called the Joint Unmanned Aircraft System Center of Excellence (JUAS COE), which is charged with providing “support to the joint operator and services...and provide joint integrated solutions and improved interoperability”¹⁹ of UAS. JUAS COE focuses on “joint UAS employment and training standards, providing support to the joint operator, the Services and Combatant Commands (COCOM).”²⁰ JUAS COE is located at Creech Air Force Base (AFB), Nevada where the Air Force operates Predator and Reaper UAS.²¹ This gives the organization a real-time look at how UAS are being employed and what kind of lessons learned can be gleaned from their use. It is unclear how JUAS COE currently coordinates with JFCC-ISR regarding unmanned systems, if they coordinate with them at all. It is also unclear how involved other services are at the JUAS COE. The organization was established in following the Air Force’s unsuccessful bid to become the executive agent for UAS. “The Army, Navy and Marine Corps declined to send representatives to an Air Force-hosted meeting to discuss”²² the executive agency issue. This highlights the lack of service cooperation when it comes to unmanned systems.

¹⁹ Scott R. Gourley, “Joint Unmanned Aircraft Systems Center of Excellence: Saving More Lives,” *Army*, January 2009, 44.

²⁰ U.S. Joint Force Command Fact Sheet, “Joint Unmanned Aircraft Systems Center of Excellence (JUAS COE),” http://www.jfcom.mil/about/com_juas.html (accessed 26 February 2010).

²¹ Scott R. Gourley, “Joint Unmanned Aircraft Systems Center of Excellence: Saving More Lives,” *Army*, January 2009, 43.

²² G Goodman, “UAV Turf Fight Boils Over,” *Journal of Electronic Defense*, June 2007, 20.

Doctrine governing unmanned systems is severely lacking. Joint Publication 3-30, *Command and Control for Joint Air Operations*, states that unmanned systems should be treated similarly to manned systems, but it emphasizes there are some issues for planners and commanders to consider when employing these systems.²³ In the context of theater-capable UASs, which is the primary focus of this paper, joint doctrine admits the low density/high demand nature of these assets as it cautions the Joint Force Commander (JFC) and the Joint Force Air Component Commander (JFACC) “when making apportionment and allocation decisions.”²⁴ The JFC is encouraged to “meet the organic needs of the component commanders, while ensuring the JFACC has the assets available to execute JFC assigned JOA-wide operations.”²⁵ While this guidance is intentionally vague to give the JFC flexibility in allocating UAS, it illustrates a weakness in the C2 doctrine for UAS as it conflicts with the principle of unity of command. The overarching purpose of command and control doctrine is to ensure that there is unity of command and/or unity of effort in a given operation. Joint doctrine for UAS, as stated, implies that there can be two different commanders requiring UAS support, but gives no mechanism for resolving that conflict. This has manifested in units being denied UAS support, which adversely impacted their ability to accomplish a mission (as in the Wanat example provided at the beginning of this paper). Some potential improvements to UAS command and control doctrine will be discussed in a later section.

²³ Chairman, U.S. Joint Chiefs of Staff, *Command and Control for Joint Air Operations*, Joint Publication (JP) 3-30 (Washington, DC: CJCS, 12 January 2010), III-32.

²⁴ *Ibid.*, III-33.

²⁵ *Ibid.*

DISCUSSION / ANALYSIS

In examining the expansion of unmanned systems, several similarities emerge relating to the establishment of the U.S. Special Operations Command (USSOCOM). USSOCOM was established in June 1987 after years of congressional debate involving was to improve command and control issues with special operations forces operating in a joint environment (examples include the Desert One disaster, the bombing of the Marine barracks in Lebanon and the invasion of Grenada).²⁶ Each service had a special operations capability but challenges emerged when those forces had to operate together or with conventional forces. In January 1984, DOD created the Joint Special Operations Agency (JSOA), but it had no authority over any Special Operations Forces (SOF).²⁷ In the case of UAS, each service now has an unmanned systems capability, but challenges have emerged as those systems have had to operate together. The JUAS COE mentioned earlier bears a strong resemblance to the JSOA established for SOF to deal with some of the issues of employing a unique type of force (SOF or UAS). It is not the opinion of the author that UAS should be given their own unified combatant command. However, the establishment of USSOCOM “fostered interservice cooperation [as a] single commander for all SOF promoted interoperability.”²⁸ The current mechanism for ensuring interoperability is for unmanned systems to be approved by the Joint Requirements Oversight Council (JROC). This interoperability refers to how the systems are built (design specifications, common networks, frequencies, etc.) and not necessarily how the systems are employed (organizations, procedures, terminology, etc.). A single command in charge of building, training and

²⁶ U.S. Special Operations Command, “United States Special Operations Command History, 6th Edition,” 31 March 2008, 5.

²⁷ Ibid.

²⁸ Ibid., 7.

equipping unmanned systems would allow unmanned systems to be interoperable in design and employment while enabling services to leverage common system architectures. This could potentially save time and money in the long run.

One consideration to establishing such a command would be how to integrate all of the services under one unified command. One might argue that the services have been down this road before, as discussed earlier, when the Air Force bid to be the executive agent for all UAS. One alternative approach would be to assign each service as an executive agent (EA) for a specific type of UAS. For instance, the Air Force would be the EA for those UAS that support operational and strategic objectives. On the other hand, representatives from the Army and Marine Corps could be the EA for smaller, tactical UAS. The Navy and the Coast Guard could join forces and become the EA for all unmanned systems employed in the maritime domain. The idea is for this unified command to provide the services a mechanism to better coordinate their unmanned systems operations. This approach would allow Air Force Major Matt Martin, a Predator and Reaper Operations Branch chief, to realize his vision of a “joint forces commander expecting the same level of support from an Air Force UAS unit supporting an Army movement as they would receive from an Army unit and vice versa.”²⁹ Services building, training, and equipping themselves with unmanned systems and then subsequently attempting to make sure that the fielded systems are interoperable would take excessive time and would risk forces being unable to work together. A single command to manage the development and employment of unmanned systems would present a unique opportunity to field a truly joint force.

²⁹ Army News Service, “New Joint Unmanned Aerial System Plans,” 3 July 2008, <http://www.military.com/news/article/> (accessed 23 February 2010).

In a November 2008 Government Accountability Office (GAO) Report, it was recommended, “DOD designate a single entity accountable for integrating efforts related to UAS.”³⁰ A separate, unified command with representation from all services would be a step in the right direction. This command could also be responsible for developing a “comprehensive and strategic plan to align departmental and service efforts to improve the management and operational use of UAS,”³¹ which was another recommendation made by the GAO. The GAO report listed seven different initiatives/organizations with seven different reporting lines of authority that were created to improve the management and operations of ISR and UAS.³² DOD could save a great deal of time, effort, and manpower by consolidating the personnel and goals of these organizations into one command.

Another benefit of establishing a command to manage UAS is that it will provide upward mobility for potential career unmanned system operators. For example, The Air Force recently “launched a trial program to train a first-ever group of officer with no aviation background or training to fly the Predator.”³³ Couple this with the high demand of unmanned systems support and you have a situation where drone pilots “aren’t being allowed to leave bases such as Creech for other assignments that would give them the experience they need to ascend to higher ranks.”³⁴ This situation could be mirrored in other services where a naval officer starts his/her career operating an unmanned surface or subsurface vehicle. How would that officer be able to rise in rank without a command in which to exercise this specific skill set? A separate component command would give operators of unmanned

³⁰ U.S. Government Accountability Office, *Unmanned Aircraft Systems: Additional Actions Needed to Improve Management and Integration of DOD Efforts to Support Warfighter Needs*, (Washington, DC: GAO, 2008), 27.

³¹ *Ibid.*, 23.

³² *Ibid.*, 21.

³³ Greg Jaffe, “Modern Warfare Raises Identity Crisis for Air Force,” *Richmond Times-Dispatch*, 3 April 2010, section P.

³⁴ *Ibid.*, P12.

systems a command opportunity at their respective service EA level as well as at the level of command of the entire unmanned system component. Even Secretary of Defense Gates mentioned the new career track for unmanned aerial operators as a sign of progress in a 2009 *Joint Forces Quarterly* article.³⁵ The introduction of such a command could prevent some senior Predator and Reaper commanders, such as Col. Eric Mathewson, from leaving the military “because they probably won’t make general.”³⁶

A second area of discussion involves the C2 doctrine for managing theater-capable UAS. The scope of this discussion is limited to theater-capable UAS since these assets are in the most demand. There is also very little debate about allowing smaller tactical UAS to remain under control of the smaller ground units that may be employing those systems. The sought-after capability of theater-capable UAS is their ability to provide persistent support. When UAS were first fielded, the persistent coverage was ideal for the mundane task of loitering in an area and collecting imagery intelligence. This pushed UAS into the primary role of global and theater-strategic ISR under the control and managed by JFCC-ISR.

Other forces, such as those engaged in enemy combat, are now seeing the utility of persistent UAS support. Air Force Colonel Dale Fridley flew F-16s for fifteen years and described a typical mission: “You watch them [the supported unit] going up the mountain passes and enter a village, follow them out, and give them directions in the middle of the night when they get lost.”³⁷ An Army official put it another way, by stating that “the UAS is a component of the unit they are overwatching.”³⁸ These examples describe a persistent capability that allows the UAS to be constantly engaged with a ground unit almost as if it

³⁵ Secretary of Defense Robert M. Gates, “Striking the Right Balance,” *Joint Forces Quarterly*, 1st Quarter 2009, 2-3.

³⁶ *Ibid.*

³⁷ Katherine M. Peters, “Up in the Air,” *Global Executive* 42, no. 2 (Feb 2010): 34.

³⁸ Sandra I. Erwin, “Friendly Advice,” *National Defense* 94, no. 674 (Jan 2010): 20-21.

were a member of the team. These examples also reinforce the conflict described earlier between the Army and the Air Force about which service should control medium-high altitude UAS. The conflict resulted in the SECDEF supporting the Army's request to acquire their own medium-high altitude UAS to support their operations. Medium-high altitude UAS are now able to perform longer duration missions (making them theater-capable), which actually presents a new set a problems.

The persistent nature of theater-capable UAS presents a C2 dilemma where assets can be allocated to support a more tactical objective, while having the potential of being pulled away to support a higher-level collection requirement. Such a situation can manifest itself in the disaster that occurred in the Battle of Wanat mentioned earlier. The Army's solution to this problem was to acquire its own persistent assets to support its operations in order to prevent those assets from getting pulled away for other tasking. Another way to resolve the issue is to revise the C2 doctrine to better support commanders engaged in combat.

Command and control structures should be based more on the nature of the objective to be accomplished rather than on the type of forces involved (service) or the medium (air, land, sea) in which that force operates. All services are planning to acquire unmanned systems, the majority of which will operate in the air. While the JFACC will have a vital role in coordinating airspace for the use of UAS,³⁹ operational control (OPCON) of the UAS should remain with the supported commander giving him the flexibility to move that asset where needed and not risk the asset being re-tasked. For instance, if the objective is supporting a land or maritime component mission, OPCON should rest with the JFLCC or JFMCC, respectively, with the JFACC coordinating the airspace required.

³⁹ Chairman, U.S. Joint Chiefs of Staff, *Command and Control for Joint Air Operations*, Joint Publication (JP) 3-30 (Washington, DC: CJCS, 12 January 2010), xi.

Another benefit of this C2 arrangement is that it permits the JFACC to re-focus its mission on more air dominance-related missions. UAS operations to date have enjoyed the luxury of operating in uncontested airspace. As more UAS are employed into the airspace, the air component may need to focus more on the protection of UAS.⁴⁰ If Air Forces take on a more coordination role for UAS instead of control, it could free assets to ensure our forces maintain airspace dominance.

Regardless of the component or service identified to control theater-capable UAS, the command authority should be kept at the operational level. The commander of these types of assets needs to have an appreciation for both the strategic level and the tactical level. This will allow the commander to properly weigh the risk of re-allocating a theater asset.

RECOMMENDATIONS

From the analysis presented, two recommendations are presented to improve the employment of unmanned systems. The first recommendation is for DOD to establish a separate component command to be the single joint authority on employing unmanned systems. While JFCC-ISR and the JUAS COE have been good initial steps toward a joint approach in unmanned systems employment, a command should be established that could expand in parallel with the roles, missions and platforms of current and future unmanned systems. It is recommended that this command be a sub-unified component command under STRATCOM and should combine the existing organizations JUAS COE and JFCC-ISR. A notional title of this organization would be the Joint Remotely-Controlled Component Command. The term remotely controlled is growing in popularity as it reinforces the fact that there is a human in the loop controlling the system and it is not literally “unmanned”.

⁴⁰ Stew Magnuson, “Next Generation: Future Remotely Piloted Aircraft Will Do More Than Surveillance,” *National Defense*, March 2010, 33.

The primary reason to keep this command under STRATCOM is that unmanned systems are reliant on a network of systems to function. Due to the recently established Cyber Command, it would be wise for the unmanned systems command to be nested with the efforts in Cyber Command to protect our networks and computer systems. Another common request from UAS operators is the need for more bandwidth to manage the volume of information that UAS can disseminate. A sub-unified command of STRATCOM would be able to acquire the resources needed to improve the shortage of bandwidth. Given the push for all services to begin employing unmanned systems, it should be mandated that they provide representation to the newly-established component command in order to leverage the lessons learned thus far and implement these lessons into their strategies for future employment of unmanned systems.

The second recommendation is to improve C2 doctrine at the theater level to make UAS more responsive across all levels of warfare. The Joint Force Commander (JFC) based on which commander has the preponderance of objectives requiring UAS support should set C2 of theater-capable UAS. C2 doctrine should go further to put theater UAS assets under OPCON of that commander. This gives that commander the flexibility to move forces as needed to support dynamic and time-sensitive operations. This also gives the commander the flexibility to assign that UAS TACON to other forces as needed. The supported/supporting commander relationship is too vague to govern a persistent asset such as a theater-capable UAS. Regardless of the commander assigned to have control of theater-capable UAS, they should be controlled at the operational level of war. This allows the commander to have visibility of the tactical and strategic situation to determine how to best assign forces. These

recommendations will put DOD on a better path to realizing the full potential of unmanned systems.

CONCLUSIONS

In an article about the history of submarine warfare, Karl Lautenschläger described a “general problem that military organizations face in adopting appropriate strategies for exploiting and countering fundamentally new technologies and capabilities.”⁴¹ Unmanned systems present some unique capabilities to the modern day war fighter. They can go places that we can’t, they can stay longer and they do not complain about it. All services are realizing the potential benefits of having an unmanned capability and they are pursuing that capability at a rapid pace. If DOD does not anticipate some of the challenges and establish organizations and policies to manage the growth of this part of the force, it may find itself in a similar situation to how USSOCOM was founded. All service unmanned systems have some commonality and if the future holds a force where all service unmanned systems will operate together in a truly joint fashion, the time is now for the services to start laying the foundation for that future to be realized.

⁴¹ Karl Lautenschläger, “The Submarine in Naval Warfare,” *International Security* 11, no. 4 (Winter 1986-87): 95.

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