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**Robots in the Sky—The Legal Effects and Impacts of UAV on the
Operational Commander**

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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31 October 2008

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Abstract

Robots in the Sky—The Legal Effects and Impacts of UAVs on the Operational Commander

Recent advances in surveillance and targeting technology have made unmanned aerial vehicle the weapon of choice for operational commanders. With this developing technology has evolved a whole host of new legal issues that operational commanders must now be familiar with. This paper discusses the issues involving the operational commander's legal responsibilities as they pertain to command, contractors, and the global nature of UAV operations. Realizing the legal implications involved in UAV employment, operational commanders will be able to ensure that the law of armed conflict issues involving UAVs are properly implemented in the design of operational plans.

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Introduction

I fear that the current generation of weaponry may pose a yet stiffer challenge [than nuclear weapons] to just-war theory, not because it has made war thinkable, but because it has made war too thinkable.

Dr. Timothy M. Resnick, "Making the Unthinkable Thinkable; Technology and the Justice of War"

Every day operational commanders rely on unmanned aerial vehicle (UAV) pilots to execute critical missions on the battlefields of Iraq and Afghanistan. Quite often, thanks to satellites, these pilots are flying their missions from air conditioned offices in the Continental United States (CONUS). Frequently these missions are flown not by members of the armed forces but by contractors. The use of UAVs in warfare has developed into a critical capability in the operational commander's menu of force projection. As the operational commander works to create his forces in theater, he needs to be aware that certain legal restrictions and complications exist involving UAVs operators and their employment on the battlefield. This paper will set forth the issues involving the operational commander's legal responsibilities as they pertain to command, contractors, and the global nature of UAV operations. Realizing the benefit of this knowledge in advance, operational commanders will be able to ensure that LOAC issues involving UAVs are properly implemented in the design of operational plans.

"Unmanned aerial vehicles (UAVs) are part of the great American tradition of substituting technology for human beings."¹ "The UAV has been known by a variety of generic names including "drones", "pilotless vehicles", "uninhabited aircraft", "remotely piloted vehicles", and "remotely operated aircraft."² Regardless of what you call them, the Department of Defense, over the last eight years, has embraced the UAV and UAV

¹ Anthony J. Lazarski, "Legal Implications of Uninhabited Combat Air Vehicle," Aerospace Power Journal, Maxwell AFB, AL: Department of the Air Force, Summer 2002: 1.

² Sean Wheatley, "*The Time is Right: Developing a UAV Policy for the Canadian Forces*, (Online, paper presented at the 7th Annual Graduate Student Symposium, October 2002), <<http://www.cda-cdai.ca/symposia/2004/Wheatley,%20Stephan.pdf>>(1 October 2008), 2.

technology as weapons of choice on the Global War on Terrorism. “UAVs provide the capability to reduce the kill chain (find, fix, track, target, engage, assess) from hours to minutes and ultimately from minutes to seconds.”³

This unique ability does not come without consequences. These consequences come from the fact that “UAV operations differ significantly from that of manned aircraft, and these differences result in problematic implications when observing the law of armed conflict.”⁴ It is the legal responsibilities that an operational commander incurs when dealing with autonomous or semi-autonomous UAVs that should concern the operational commander the most. The reduced control or “absences of human intervention during the weapons release process proves problematic when determining who is to be held accountable following violations of the law of armed conflict.”⁵ This is further compounded by the fact that most UAV technology is an emerging technology that is heavily reliant contractor support.

Contractors provide an important link in the evolution of a new system. They provide the intensive care that is necessary to bring a new system on line. In the DOD’s attempt to expedite the employment of UAVs since 9/11, they have fielded weapons systems that do not have enough military pilots trained to operate them. Contractors have been used to fill this gap in the AOR inadvertently placing the combatant status of these contractors in jeopardy. In a number of cases, these contractor may have moved from non-combatant to belligerent status by their actions regarding the operation of UAVs. Given the autonomous, semi-

³ Michael A. Guetlein, “Lethal Autonomous Weapons – Ethical and Doctrinal Implications” Unpublished Research Paper, U.S. Naval War College, Newport RI: 14 February 2005, 2.

⁴ John J. Klein, “The Problematic Nexus: Where Unmanned Combat Air Vehicles and the Law of Armed Conflict Meet” Air and Space Power Journal, Maxwell AFB, AL: Department of the Air Force, Summer 2003, 3.

⁵ Ibid., 5

autonomous, and global nature of UAVs, in some cases the contractors may be performing actions reserved for combatants from locations deep in within CONUS.

This leads to the final concern that operational commanders must keep in mind; the global, computer driven nature of UAVs. If a UAV mission were to inadvertently proceeded in a direction that differs from the air tasking order (ATO); “would account ability lie with the civilian software programmer who wrote the faulty target identification software, the UAV system’s commanding officer, or the combatant commander who authorized the operational use of the UAV?”⁶ Additionally, the MQ-1 Predator flies most of its sorties over Iraq and Afghanistan from the comfort of air conditioned trailers located on an Air Force base in the desert outside of Las Vegas, Nevada. Is that Predator pilot or contractor a “legal target” as he drives to his home in Las Vegas each night?

All of this must be considered by the operational commander as he approves the air tasking order (ATO) each and every day. It is paramount that operational commanders understand the legal effects and impacts that UAVs will play in their area of responsibility (AOR). Without a firm grasp on how each of the aforementioned issues effect the law of armed conflict, the operational commander can inadvertently jeopardize not only his mission but the legal status of his UAV warfighting team.

Background

Man’s desire to achieve autonomous flight is almost as old as his desire to achieve manned flight. Since the early days of manned flight, engineers have been seeking ways to remove the human element and its associated possibility for error from the aviation equation. Once aircraft became a vital part of the war equation, ways were sought to make pilot-less aerial vehicles combat capable. “This became a reality in 1971 when engineers from

⁶ Ibid., 6.

Teledyne Ryan Aeronautical placed an AGM-65 Maverick missile on a Model 234 remotely piloted vehicle. This was the first successful firing from an unmanned vehicle.”⁷

Unfortunately for this new capability, it arrived in the waning years of the Vietnam Conflict. It would be another twenty years before this capability would once again surface.

UAVs as we know them today, first appeared over the skies of Bosnia and Kosovo as a means to collect intelligence, surveillance, and reconnaissance (ISR). It was not until after the terrorist attacks of 9/11 that armed UAVs made their public debut. “In November 2002, a RQ-1 Predator UAV fired two AGM-114 Hellfire missiles into a vehicle containing six Al-Qaeda operatives as it travelled down a desert road east of the Yemeni capitol of Sana’a, debuting a capability that the Air Force had secretly developed and tested in early 2002 and first used in combat in Afghanistan in March of 2002.”⁸ The panacea to all the dangers and limitations of manned-flight had arrived.

As the evolution of UAVs has evolved, the question that must be asked is “Why are UAVs so high-valued in the GWOT?” The answer is that UAVs have high endurance, can be operated by multiple users, are small in size and low in noise signature, have the ability to swap out crews, and are less risk to their human operators.⁹ Each of the aforementioned capabilities is useful, in and of itself, but to have all of this without risk of losing the pilot is truly a useful capability. This evolution was taken one step further with the development of the MQ-9 Reaper. The Reaper is the Predator’s deadlier cousin. “The Reaper has a weapons load ten times that of the Predator. A fully-armed F-16 will most probably be in the target

⁷ Sean R. Bailey, “Armed UAVs in the Future Battlespace – The Need for Command and Control Doctrine” Unpublished Research Paper, U.S. Naval War College, Newport RI: 14 February 2005, 3.

⁸ Ibid., 3.

⁹ Altman, Bern J. “Cultural Resistance to the Introduction of Unmanned Aerial Systems” Unpublished Research Paper, U.S. Naval War College, Newport RI: 13 October 2005 (1000421790), 8.

area for 30 minutes before having to air refuel. An MQ-9 Reaper, with a comparable weapon load, could orbit the area for 18-20 hours.”¹⁰

The Reaper is only the tip of the iceberg. The military is continually seeking to replace manpower with high technology solutions such as UAVs. “UAVs may offer the solution to waging a ‘zero casualty’ warfare. As the United States pursues more and more unmanned weapon systems and incorporates increasing intelligence into these systems, it will inch closer and closer to waging war without human intervention.”¹¹ “Nearly all future UAVs will have increased levels of autonomy in operation, meaning they will rely less and less on operator input for functional control.”¹² If operators are no longer in control, where does the responsibility lie? How does an operational commander deal with these issues when no one is in the cockpit? All of this bring even further ambiguity to the operational commander who must sort out the details when things do not go as planned in the AOR.

Discussion / Analysis

The operational commander is ultimately held accountable for all actions that occur in his AOR. He is to ensure that the warfighters within his command conduct operations according to accepted rules of law. One of the ways that he ensures this is to enforce the Law of Armed Conflict (LOAC). “LOAC, also known as the Law of War, has two main sources: customary international law and treaty law. It regulates the methods of warfare and defines who is an appropriate target.”¹³ Another vital piece of LOAC is its intent to ensure hostile actions directed against enemy forces, “while minimizing unnecessary human misery or physical destruction. The law of armed conflict reveals relevant considerations for UAV

¹⁰ John A. Tirpak, “UAVs With Bite,” *Air Force Magazine*, January 2007, 1.

¹¹ Guetlein, p.15.

¹² Bailey, p. 14.

¹³ Col David G. Ehrhart ed., *The Military Commander and the Law* (Alabama; AFJAGS Press, 2003), 596.

operations, especially regarding who should control the vehicle and how combat power is applied.”¹⁴

This brings about a related relevant issue that all operational commanders must keep in mind; command and control and the concept of operations. A prime example of how an operational commander employs a UAV can be found in the current command and control structure of the Predator and the Reaper. “The concept of employment for the MQ-1 and MQ-9 states that the Predator is an operational level asset, with operational control (OPCON) normally delegated to the joint force air component commander (JFACC) by the joint force commander (JFC).”¹⁵ According to both doctrine and practice, “tactical control (TACON) is delegated with the air component operational chain of command from the air operations officer (A3) to the Squadron Operations Center, tasked by the Air Tasking Order (ATO) process and operated under the guidance of the Air Operations Center (AOC).”¹⁶ Currently the Predator and Reaper are ground controlled and the delineation of responsibility is quite clear. What happens when the UAV is semi-autonomous or autonomous?

The U.S. military is well on its way to developing and fielding UAVs that are able to fly semi-autonomously for hours and even sometimes for days on end. The Global Hawk Intelligence platform is a prime example of the next evolution of UAVs. “Human operators have poor long-term attention spans and some UAVs undertake long endurance missions (Global Hawk can stay aloft for up to 40 hours), which increase the risk of pilot error.”¹⁷ The

¹⁴Klein, p. 3.

¹⁵ United States Air Force Air Combat Command, *Concept of Employment for the MQ-1 and MQ-9 Multirole Endurance Remotely Operated Aircraft*, (Langley AFB, Virginia: 2 May 2002), 19

¹⁶ United States Air Force Air Combat Command, *Enabling Concept MQ-9 Hunter-Killer*, (Langley AFB, Virginia; 16 July 2004), 47

¹⁷ S. Manning et al, *The Role of Human Causal Factors in the US Army Unmanned Aerial Vehicle Accidents* (Online: US Army Aeromedical Research Laboratory, 2004) <<http://www.usaarl.army.mil/techreport/2004-11.pdf>> (1 October 2006), 6-7.

removal of mundane tasks on long sorties is a benefit to operators. Unfortunately it does provide additional risk to the operational commander. “The Air Force has dictated that all future UAVs will have increased levels of autonomy in operation, meaning they will rely less and less on operator input for functional control.”¹⁸ Who, then, is responsible when the UAV computer makes a mistake? “Can a computer deal with proportionality or humanity? Can a computer weigh casualties against advantages anticipated? Can an autonomous system differentiate between suffering or superfluous injury?”¹⁹ As UAV technology develops and UAVs venture more and more on their own, operational commanders are becoming saddled with this vexing legal question. How will they legally operate in such a permissible environment?

The Oxford Dictionary defines autonomous as “self-governing or independent,”²⁰ whereas the Merriam-Webster dictionary defines it as “existing or capable of existing independently” and “responding, reacting, or developing independently of the whole.”²¹ This can be viewed in two separate aspects; semi-autonomous and autonomous. “Autonomous command and control procedures only require direct ground control during take-offs and landings. The routing is pre-programmed and computers take care of all combat operations.”²²

“Semi-autonomous UAVs on the other hand requires command and control ground input during critical portions of flight such as take-off, landing, weapons employment, and

¹⁸ Bailey, p. 14.

¹⁹ Richard McMahan, “Unmanned Questions: Who Bears the Burden of Autonomous Warfare?” Defense News, 10 March 2008, p.42

²⁰ Compact Oxford English Dictionary, Autonomous,” AskOxford.com <http://www.askoxford.com/concise_oed/autonomous?view=uk> [2 October 2008]

²¹ Merriam-Webster Online Dictionary, Autonomous,” Merriam-Webster Online <<http://www.m-w.com>> [2 October 2008]

²² Lazarski, p. 3.

evasive maneuvers.”²³ Semi-autonomous would denote that a weapons system would operate until a defined parameter was met. For example, a UAV would be programmed to fly to a specified grid coordinate and await further instructions or await removal from a pre-programmed flight plan. A human operator would then take over and carry out the prescribed mission. In many cases this is what is happening right now with the RQ-1. The Predator is taken off in one location, put on auto-pilot while the slow moving aircraft makes its way to its destination and removed from auto-pilot for combat operations.

On the other hand, Global Hawk, which is primarily an strategic ISR platform, is fully autonomous. It is taken-off from a location flies to a specified point to perform its mission, and then returns. Unless the mission parameters change while the aircraft is in flight, no human interference is involved. The RQ-4 Global Hawk is not an armed platform but what if this same technology was used to make a similar armed platform. “The absence of human intervention during weapons release would prove problematic when determining who is to be held accountable following violations of the law of armed conflict.”²⁴ Currently with manned aircraft accountability is much easier. Typically the aircrew, in particular the aircraft commander is normally held liable for incorrectly targeting a position, however in a fully autonomous UAV, the blame plume widens.

Accountability for fully autonomous UAVs brings about a unique question: “would accountability lie with the civilian software programmers who wrote the faulty identification software, the UAV squadron’s commanding officer, or the combatant commander who authorized the operational use of the UAV?”²⁵ These are questions that need to be answered prior to employing such a weapon in combat. It is difficult enough for an experienced,

²³ Ibid., p. 3.

²⁴ Klein, p. 5

²⁵ Ibid., 6

combat pilot to make the determination to use lethal force. He must determine the threat, analyze the rules of engagement that he was provided, compare this to LOAC, and decide what sort of weapon to employ. “Active skills such as considering, deciding upon appropriate actions, assessing military advantages and justifying targets would challenge any human operator. How could a machine understand and address these issues?”²⁶ These are fundamental questions that the operational commander must be able to answer.

An even more vexing issue that operational commanders must be able to address is “whether allowing machines to independently target, engage, and kill humans will likely provoke public concerns that fall outside of the legal and ethical dimensions of warfare and deal more with the humanity of warfare.”²⁷ There is a “certain benevolence associated with an airman going to war for their country. Not so for machines. They are incapable of emotion and are governed by a complex set of equations.”²⁸ “Of course, the situation is much tougher for the software engineer. How can he capture all the scenarios to ensure that an autonomous UAV makes the correct decision—for every engagement?”²⁹ Operational commanders need to grasp this down side of the autonomous UAV equation. They must ask themselves if the lethal use of UAVs pass the scrutiny of the public back home. The operational commander needs to understand that “allowing machines to independently target, engage, and kill humans will likely provoke public concerns that fall outside of the legal and ethical dimensions of warfare and deal more with the humanity of warfare.”³⁰ The second major concern, that the operational commander will have to be aware of when dealing with UAVs, is the prominence in the use of contactors.

²⁶ McMahan p. 43.

²⁷ Guetlein, p. 12

²⁸ Ibid., 13

²⁹ McMahan, p. 43.

³⁰ Guetlein, p. 12

UAV technology is evolving at an astonishing pace. The Global War on Terrorism has facilitated the need to field these vital systems as soon as possible. “The recent push for streamlined acquisition practices and spiral development means contractors are usually the initial cadre and most often are the best trained experts for most UAV systems.”³¹ In many cases there are not enough trained military pilots to carry out the prescribed mission and deploy if necessary to the AOR. The Department of Defense is forced to use contractor pilots to carry out the mission until enough military pilots can be trained and deployed. One such case was the fielding of the RQ-4 Global Hawk during the initial stages of Operation ENDURING FREEDOM (OEF).

“During OEF, 56 contractors deployed as part of an 82-member military, civil service, and contractor team. Several of these contractors were needed to operate the vehicle during combat operations and served as Global Hawk pilots.”³² This was a substantial number of contractors considering it was the units’ first ever deployment. Since the Global Hawk is seen as an “unarmed ISR platform, some would argue that the Global Hawk was not engaged in direct combat operation. Even without kinetic weapons, piloting this aircraft can be considered as taking direct part in hostilities because the actions was a direct part of the official U.S. Air Force “kill chain”.³³

As mentioned before, “the United States Air Force views the kill chain as a six-stage target cycle of Find, Fix, Track, Target, Engage, and Assess. The unarmed Global Hawks were utilized in aspects of the kill chain, to include the actual engagement phase by

³¹ Michael J. Guidry, “21st Century Logistics; Future UAV Pilots; Are contractors the Solution? RFID Technology: Is the Capability a Boon or Burden for DOD” Air Force Journal of Logistics, Maxwell AFB, AL Department of the Air Force, Winter 2004. 9

³² Michael J. Johnson, “Contractors on the Battlefield; Walking the Legal Combatant Tightrope” Air University, Air Command and Staff College, Maxwell AFB AL April 2007. 19.

³³ Johnson, p.19.

“painting” targets for another aircraft to kill.”³⁴ This was further evidenced in “Operation IRAQI FREEDOM where the Global Hawk UAV generated 55 percent of the targeting data used to destroy time-sensitive targets in Iraq.”³⁵ It can even be said that given the Global Hawk’s extensive loiter time, they have actually shortened the kill chain time line. “The Air Force defines a direct participant as “being a member of a weapons crew...a crewman on a military aircraft in combat.” Consequently, it is easy to deduce that people who control reconnaissance vehicles over enemy territory are participating in hostilities whether they are in the same area of operations or stateside.”³⁶

The operational commander must ensure that the combatant status of his entire combat team is clarified. He must ensure that only qualified combatants engage in combat. The Hague Convention (IV) respecting the Laws and Customs of War on Land describe combatants in the section entitled “the Qualifications of Belligerents” as:

Article 1: The laws, rights, and duties of war do not only apply to armies, but also to militia and volunteer corps fulfilling the following conditions:

1. To be commanded by a person responsible for subordinates
2. To have a fixed distinctive emblem recognizable at a distance
3. To carry arms openly; and
4. To conduct their operations in accordance with the laws and customs of war³⁷

Contractors in general do not fit the above criteria and are listed as non-combatants. In the previously presented Global Hawk case, the “contracted UAV pilots were definitely conducting operations in such a way where their participation can be considered direct and/or

³⁴ Ibid., p. 20.

³⁵ Guidry, p. 3.

³⁶ Ibid., 6

³⁷ Michael Reisman and Chris T. Antoniou, *The Laws of War*. New York: Vintage Books, 1994. 132.

active. As such they can be reasonably considered to have performed an action that was illegal for them to do as noncombatants, as outlined by the laws and customs of war.”³⁸

The example poses a significant quandary for the operational commander. “The operational commander must understand that civilian personnel who are illegal combatants constitute a legitimate military target, can be legally prosecuted for their wartime action, and do not enjoy the same prisoner of war protections as lawful combatant under the Geneva Conventions.”³⁹ If these contractors were ever captured they could be legally executed. This is a great risk, one that most operational commanders should think about a great deal before implementing. The greatest risk, however, in using contractor pilots who become illegal combatants is “the repercussion that it might have to other contractors engaged legally as non-combatants. The pervasive use of illegal combatants may have serious unintended consequences—such as our adversary conducting reprisals against civilian personnel suspecting that others may also be combatants.”⁴⁰ It is also important to keep in mind that some of the contractors used in these operations are not even in theater.

The global nature of the UAV allows for a much smaller footprint in the AOR. The footprint is minimized by using reachback capabilities. Reachback is “a concept that enables wide geographic separation of the UAV and its command and control element using satellite communications and terrestrial wide area networking. Basically reachback allows the military to perform UAV operations from a remote AOR halfway around the world.”⁴¹ Given the restrictions placed on the number of combat troops in both Iraq and Afghanistan, reachback has enabled the DOD to wage part of the war from its own backyard. This has

³⁸ Johnson, p. 20.

³⁹ Klein, p. 3.

⁴⁰ Ibid., p. 5.

⁴¹ Guidry., p. 4.

also provided a substantial savings in both money and lives. All of this has not come without its own consequences.

Currently, most Predator and Reaper missions flown in Iraq are by pilots physically located at Creech AFB, Nevada. The aircraft is maintained and armed by contractors at a location in the AOR and then turned over to Air Force pilots, also located in the AOR, who take the aircraft off. At some point, the aircraft is then turned over to the pilots at Creech AFB who fly the mission, engage the target and ‘take out the bad guys’. This mission can take up to 20 hours during which several stateside crews will swap-out to ensure a fresh crew is always in control. Upon completion of the mission, the aircraft is flown back to a rendezvous point, and handed-off to a deployed pilot to land. Upon landing, the UAV is taxied back to the UAV hangars and the aircraft is regenerated by deployed contractors for the next day’s mission. This reachback capability creates a series of operational dilemmas.

One primary problem with the UAVs that must be grasped by the operational commander is the unmanned nature of the UAV. Primarily the operational commander needs to determine how the unmanned nature of UAVs conflicts with the inherent right of self-defense entitled to every warfighter. *The Commander’s Handbook on the Law of Naval Operations* (NWP 1-14M) states “A principle tenet of the US Standing Rules of Force/Standing Rules for the Use of Force is that commanders always retain the inherent right and obligation to exercise unit self-defense in response to a hostile act or demonstrated hostile intent.”⁴² Though subject to debate, “it can be argued that the “self” in self-defense applies solely to an individual person or persons and not to physical assets or property. It can

⁴² *The Commander’s Handbook on the Law of Naval Operations*, NWP 1-14M (Washington DC: Department of the Navy, 2007), 4-5.

then be presumed that UAVs do not enjoy the inherent right of self-defense prescribed under international law since they are unarmed.”⁴³

How does an operational commander deal with the aforementioned issue? If the aircraft had been manned, the aircrew would be well within its rights to defend itself. If a surface-to-air battery painted the aircraft they would have responded as necessary. Would a UAV have the same right? The operational commander must ensure that his rules of engagement cover this gap in specifics. “One way to rectify this might be by defining the UAV as national property, due to its strategic capability, or if the vehicle is considered essential for mission accomplishment.”⁴⁴ This would allow the inherent right to self-defense and enable the UAV to defend itself from potential hostile actions.

A final concern that operational commander must look at with regards to UAVs is who in the command and control chain are legitimate targets. Through the amazing capability of reachback, the tactical element of most UAV platforms resides in the U.S. As described in the Predator scenario above, the personnel engaging and eliminating targets in the AOR do not reside in the AOR. The UAV pilots who engage the enemy every day in Iraq and Afghanistan do not go back to their cots in tents or trailers like their manned counterparts do. They instead go home to their spouses and families every night. They are only at war during duty hours. Yet, they are legal combatants engaging enemy targets. Are we not engaging an enemy who has demonstrated a capability to strike within CONUS? Are these pilots in danger? Has the operational commander considered the fact that these UAV pilots, who reside a world away from the AOR, are potentially susceptible to attack? Or worse yet, the UAV pilots might be struck at their residence thereby harming their families.

⁴³ Klein, p. 6.

⁴⁴ Ibid. p. 6.

In this age of technological miracles, war by default could inadvertently move to our own front doorstep.

Conclusions / Recommendations

UAVs have been seen by the Department of Defense as the ‘miracle cure all’ to the Global War on Terrorism. UAVs are currently used for ISR, CSAR, and combat operations. UAVs allow for long term loitering over an area with no need to pause operations for refueling or crew swap-out. UAVs allow 24-hours ISR and combat operations in an all-weather environment without the danger of loss of life. For the most part, UAVs have brought an amazing new tool to the war fighting tool kit of the operational commander. This new tool however is not without its own hazards. Operational commanders must look at all aspects of this emerging technology and identify these hazards and foresee their implications.

The first thing the operational commander must do is have a firm grasp of the LOAC implications in regards to semi-autonomous and autonomous uses of UAVs. Operational commanders must determine accountability for the various stages of UAV operations. For UAVs strictly using ground controllers, this is pretty straight forward. This should not be treated any different then normal manned flight operations. It becomes more difficult as semi-autonomous operations come into play. Standard takeoffs, landings, and combat operations are performed by ground controllers. However, if during the autonomous transit time the UAV crashes or misfires, the accountability should fall on the ground crew for accepting the associated risk for allowing the transit time to go autonomous. Because of the unique nature of performing combat operations in an autonomous mode, permission should first be granted by the operational commander. It is at this point that the operational commander then assumes full liability for the autonomous mission. He will dictate how and

on whom the autonomous mission will be carried out. Autonomous mode should be used sparingly.

Operational commanders should avoid using UAVs solely in autonomous mode. Operational commanders can easily provide ROE to his Airman and with some degree of confidence he can be assured that this ROE is understood and carried-out. This is not the case with UAVs in autonomous mode. In autonomous mode, operational commanders are betting that the civilian software programmer created a software program that can facilitate his ROE. Can this autonomous UAV interpret the ROE the same way as the operational commander? Based on current software limitations, the odds are it will not. The operational commander must ensure that there is a man-in-the-loop to interpret his ROE when physically engaging the enemy. Only during time of transit should autonomous UAV use be considered. By only using semi-autonomous mode, the operational commander is ensured his ROE is carried out and that no LOAC violations occur as a result of a software error.

Operational commanders need to ensure that only military pilots carry out combat missions involving UAVs. Operational commanders need to understand that UAV technology is an emerging technology that is constantly changing. New capabilities can be requested and delivered straight from the manufacturing line to the front line in a very short period. Although this is a very tempting proposition, it is fraught with danger from an LOAC perspective. The research and development phase of a product produces skilled contractor pilots but quite often does not provide sufficient time for the military to train up more than an initial cadre of pilots. Operational commanders should resist the temptation to field a weapon system prior to having enough military pilots to fly all of the UAV sorties. By doing so, he will avoid making non-combatant contractors into belligerents who could later be

prosecuted for war crimes as well as avoid potential retributions against all civilian non-combatants assigned to his command.

Operational commanders also need to ensure that their ROE provides enough specifics to enable them to claim the right of self-defense for UAVs. Operational commanders need to claim that UAVs are national properties that provide a strategic capability necessary for self-defense. Only in this venue can the operational commander then use the inherent right of self-defense under international law when fired upon.

Finally, operational commanders must keep in mind the global nature of UAVs. He must constantly remember that due to reachback, a large percentage of the UAV force actually resides in CONUS. They are combatants in the same way that the military pilots assigned in the AOR are combatants. The operational commander must ensure that these “legal targets” are provided sufficient security in the event the enemy decides to attack UAV operations. The blur between AOR operations and CONUS operations caused by reachback must be understood and observed.

The evolution of technology in the nature of warfare provides many challenges for operational commanders. The emerging technology of UAVs continually provides new combat capabilities for the operational commander. These combat capabilities often provide the answers to solutions needed to win the Global War on Terror. However, these new solutions often challenge our understanding of how we view the laws of war. Operational commanders who are eager to embrace the capabilities of UAVs must also be eager to embrace the legalities of UAV use. By realizing these issues in advance, incorporating them in their operational plans and planning for their consequences, operational commanders can avoid costly LOAC issues involving UAVs in their AOR.

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