Denver Journal of International Law & Policy

Volume 39
Number 4 *Fall*

Article 7

January 2011

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Keywords

Humanitarian Law, Aircraft, Communications Law, First Amendment, Regulation, Privacy, States, Technology

CURRENT U.S. AIR FORCE DRONE OPERATIONS AND THEIR CONDUCT IN COMPLIANCE WITH INTERNATIONAL HUMANITARIAN LAW—AN OVERVIEW

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I. INTRODUCTION

They are most commonly referred to as "drones." The United States Air Force (USAF) calls them "Remotely Piloted Aircraft" (RPAs) or "Unmanned Aircraft Systems" (UASs).[2] Pilots and operators might call them "Reapers" or "Preds." No matter the name or acronym, these remotely-controlled machines have risen dramatically during the last decade to the forefront of war fighting capabilities—and international law debate. However, the employment of drones on the battlefield is not new. During at least the last 50 years, the United States (U.S.) military has employed drones and RPAs principally as a platform for reconnaissance—allowing operators, far removed from danger, to safely observe the battlefield.[3] Over the last decade, however, RPAs have evolved into a comprehensive "combat support asset," being used for both reconnaissance operations and targeting operations, among other functions.[4]

Remotely Piloted Aircraft targeting operations, sometimes called strikes, have become a prominent feature of the U.S.'s worldwide battle against individual terrorists and terrorist organizations. One of the U.S.'s first notable strikes of this modern RPA era occurred in Yemen on November 3, 2002.[5] The U.S. and Yemeni Governments had been tracking several men who were allegedly involved in the bombing of the USS *Cole* in October 2000.[6] On several occasions, officials attempted to apprehend the men, but were unsuccessful.[7] The priority target among them, Ali Qaed Senyan al-Harithi, was believed to be the top al Qaeda operative in Yemen.[8] Wanted and pursued by both governments, Harithi had been hiding amongst and moving between armed tribal villages.[9] On at least one occasion, villagers had demonstrated their willingness and ability to forcefully

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2. In 2009, Secretary of the Air Force, Michael Donley, officially replaced the name Unmanned Aerial Vehicle, or UAV, with Remotely Piloted Aircraft, or RPA. The change was to emphasize the fact that UAV operations are anything but "unmanned." Bruce Rolfsen, *Unmanned a Misnomer When it Comes to UAVs*, AIR FORCE TIMES (June 11, 2010), http://www.airforcetimes.com/news/2010/06/airforce_uav_personnel_061110w/; *A Drone by Any Other Name...*, REUTERS SUMMIT NOTEBOOK (Dec. 14, 2009) http://blogs.reuters.com/summits/2009/12/14/a-drone-by-any-other-name/. Numerous acronyms exist to describe drones of varying sizes and capabilities. The most common among them are: Unmanned Aircraft System (UAS), Unmanned Combat Air Vehicle (UCAV), Micro Aerial Vehicle (MAV), Remotely Piloted Aircraft (RPA), Force Protection Aerial Surveillance System (FPASS), Small Unmanned Aircraft System (SUAS), and Lethal Miniature Aerial Munitions System (LMAMS).

3. U.S. AIR FORCE, THE U.S. AIR FORCE REMOTELY PILOTED AIRCRAFT AND UNMANNED AERIAL VEHICLE STRATEGIC VISION 1 (2005), [hereinafter STRATEGIC VISION], *available at* http://www.globalsecurity.org/ military/library/policy/usaf/afd-060322-009.pdf.

4. *Id.* at 2.

5. *Report of the Special Rapporteur,* U.N. Econ. & Soc. Council [ECOSOC], *Civil and Political Rights, Including the Questions of Disappearances and Summary Executions: Report of the Special Rapporteur,* ¶ 37, U.N. Doc. E/CN.4/2003/3 (Jan. 13, 2003) (prepared by Asma Jahangir).

6. *Id.* ¶ 38.

7. *Id.*

8. NILS MELZER, TARGETED KILLING IN INTERNATIONAL LAW 3, 41(2008); *CIA 'Killed Al-Qaeda Suspects' in Yemen*, BBC NEWS (Nov. 5, 2002), http://news.bbc.co.uk/2/hi/middle_east/2402479.stm.

9. *CIA 'Killed Al-Qaeda Suspects' in Yemen, supra* note 8.

repel Yemeni government security forces, turning back a raid and killing 18 Yemeni soldiers in the process.[10]

It was against this backdrop that the U.S., with cooperation from the Yemenis, tracked, targeted, and killed Harithi and five of his associates using a Predator drone armed with Hellfire missiles.[11] The strike took place in Yemen as the men traveled in a vehicle near a tribal stronghold.[12] The strike was notable because in conducting so-called "covert action,"[13] the U.S. took an unmanned reconnaissance aircraft, attached missiles to it, and used it to kill people in a country where arguably no armed conflict existed.[14] This was not the first time an RPA had been used to deliver a lethal strike in this manner and it certainly would not be the last. In December 2008, then-CIA Director Michael Hayden briefed President-elect Barack Obama on the numerous covert activities then underway at the CIA.[15] Reportedly, foremost among the activities discussed was the multitude of RPA strikes "on terrorists and terrorist camps worldwide."[16] "80 percent" of the CIA's worldwide RPA strikes, Director Hayden told the president-elect, were taking place in Pakistan.[17] A 2009 congressional report noted that

> [t]he accelerated drone campaign in western Pakistan that began in mid-2008 appears to have taken a significant toll on Al Qaeda operatives....According to Pakistani intelligence officials, who reportedly are now providing targeting information to the United States, drone attacks have eliminated more than half of the top 20 Al Qaeda "high-value targets" in western Pakistan since mid-2008.[18]

Even by al Qaeda members' own admissions, RPAs have been critical to knocking out top leaders in the Taliban and al Qaeda organizations.[19] In January

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10. *Id.*

11. *Id.*

12. *Id.*

13. Paragraph 3.5(b) of Executive Order 12333, defines "covert action" as "an activity or activities of the United States Government to influence political, economic, or military conditions abroad, where it is intended that the role of the United States Government will not be apparent or acknowledged publicly . . . ." Exec. Order No. 12,333, 46 Fed. Reg. 59,941 (Dec. 4, 1981), *amended by* Exec. Order No. 13, 470, 73 FR 45, 325 (Jul. 30, 2008), *available at* http://www.fas.org/irp/offdocs/eo/eo-12333-2008.pdf.

14. Anonymous U.S. officials who were cited attributed the Yemen strike to the U.S. Central Intelligence Agency (CIA), although the CIA did not comment publicly on the strike. *CIA 'Killed Al-Qaeda Suspects' in Yemen*, *supra* note 8.

15. BOB WOODWARD, OBAMA'S WARS 50-56 (2010).

16. *Id.* at 52.

17. *Id.*

18. K. ALAN KRONSTADT, CONG. RESEARCH SERV., RL 33498, PAKISTAN-U.S. RELATIONS 34 (2009), http://fpc.state.gov/documents/organization/127297.pdf; *but see* David Kilcullen & Andrew McDonald Exum, Op-Ed., *Death From Above, Outrage Down Below*, N.Y. TIMES, May 16, 2009, http://www.nytimes.com/2009/05/17/opinion/17exum.html (arguing that using the unseen, unheard RPAs often with collateral damage actually serves to further destabilize these regions and turn power to insurgents).

19. *Al-Qaida Leader Admits Facing Pressure from Drones*, FOXNEWS.COM (Jan. 27, 2011), http://www.foxnews.com/world/2011/01/27/al-qaida-leader-admits-facing-pressure-drones/.

2011, al Qaeda's chief of media and preaching in Pakistan admitted in a broadcast to his followers that its network is losing territory, people, and resources as "drones are flying in the sky."[20] The USAF has described RPAs and their effects as "one of the most 'in demand' capabilities the USAF provides...."[21] In the fall of 2010, the U.S. government revealed that RPAs had proven the key to success in Afghanistan against U.S. troops' formidable foe, the Improvised Explosive Device (IED).[22] In less than a two-week period, an RPA task force contributed to the killing of at least 26 individuals who were taking part in planting IEDs.[23] Among this and various other operational benefits that will be discussed in this article, RPAs also provide the USAF reduced operation and maintenance costs[24] and, of course, the ability to keep pilots and operators out of harm's way as they control their aircraft from remote locations.

Strikes like the Yemen strike described above, often referred to as "targeted killings,"[25] began largely under President George W. Bush and have increased significantly under President Barrack Obama.[26] These strikes now occur regularly

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20. *Id.*

21. U.S. AIR FORCE, UNITED STATES AIR FORCE UNMANNED AIRCRAFT SYSTEMS FLIGHT PLAN 2009-2047, 3 (2009), *available at* http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA 505168&Location =U2& doc=GetTRDoc.pdf [hereinafter FLIGHT PLAN].

22. Yochi J. Dreazen, *Using Drones to Counter IEDs*, NAT'L J. (Oct. 2, 2010), http://www.nationaljournal.com/njmagazine/id_20101002_1678.php; Terry McCarthy, *Afghanistan's Most Dangerous Job: Finding IEDs*, CBS NEWS (Aug. 19, 2010), http://www.cbsnews.com/stories/2010/08/19/eveningnews/main6788192.shtml (citing an exponential increase in US fatalities caused by IEDs, with as many as 60% of fatalities caused by IEDs in Afghanistan during 2010).

23. Dreazen, *supra* note 22.

24. STRATEGIC VISION, *supra* note 3, at 15.

25. MELZER, *supra* note 8, at 3. Melzer, a legal advisor to the International Committee of the Red Cross, has explained targeted killings as having five essential elements. Those are first, the "use of lethal force" against a person; second, that the targeting was done with "premeditation and deliberation to kill;" third, that the targeting is of "individually selected persons" as opposed to "collective, unspecified, or random targets;" fourth, that the actor lacked "physical custody" of the targeted person; and fifth, that the act is attributable to a "subject of international law," which refers to "primarily States," but also includes certain "non-State actors." *Id.* at 3-4. Various other definitions exist, although no definition seems to be widely agreed upon under IHL. One international law scholar suggests a more restrictive definition, describing a targeted killing as "the intentional killing of a specific civilian or unlawful combatant who cannot reasonably be apprehended, who is taking a direct part in hostilities, the targeting done at the direction of the state, in the context of an international or non-international armed conflict." GARY D. SOLIS, THE LAW OF ARMED CONFLICT, 538 (2010).

26. While exact numbers are elusive, as most of these attacks are not publicly acknowledged or discussed by the U.S. government, rough estimates indicate the attacks at a rate of just a few during 2007, steadily increasing to as many as twenty per month in 2010. *See* Ishtiaq Mahsud, *Al-Qaida Figure Believed Killed In US Drone Strike*, The WASH. TIMES (Feb. 21, 2011), http://www.washingtontimes.com/news/2011/feb/21/al-qaeda-figure-believed-killed-us-drone-strike/ (discussing strikes in Pakistan during 2011 occurring about once per week); Mark Mazzetti & Eric Schmitt, *C.I.A Steps Up Drone Attacks On Taliban In Pakistan*, N.Y. TIMES (Sept. 27, 2010), http://www.nytimes.com/2010/09/28/world/asia/28drones.html (citing seventy-four attacks year-to-date in September 2010); Interview by Ari Shapiro with Peter Bergen, Senior Fellow, New American Foundation (Sept. 28, 2010), *available at* http://www.npr.org/templates/story/story.php?storyId=130180992 (citing roughly twenty drone strikes along the Afghan border during September 2010); Eric Schmitt, *Pakistan's Failure to Hit Militant Sanctuary Has Positive Side for U.S.*, N.Y.

along and inside Pakistan's northwestern border with Afghanistan.[27] For reasons to be discussed in this article, some war fighters, politicians, and scholars praise the relatively new weapon system and its many capabilities—including targeted killings.[28] However, questions exist as to whether the U.S. has the legal right, domestic or international, to resort to the use of force outside the traditional battlefield, especially to the extent the CIA is involved.[29] Some have condemned targeted killings as "extrajudicial executions" and failing to comply with international human rights law,[30] as well as international humanitarian law (IHL).[31] The U.S., however, maintains that being in a state of "armed conflict with al-Qaeda, as well as the Taliban and associated forces" justifies using "force consistent with its inherent right to self-defense under international law."[32] The

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TIMES (Jan. 17, 2011), http://www.nytimes.com/2011/01/18/world/asia/18terror.html (explaining that number of strikes in North Waziristan was 104 in 2010, up from 22 in 2009); Craig Whitlock, *In Hunt for Bin Laden, a New Approach*, WASH. POST (Sept. 10, 2008), http://www.washingtonpost.com/wp-dyn/content/article/2008/09/09/AR2008090903404.html (discussing three strikes reported by Pakistani officials in 2007 and eleven strikes in 2008).

27. Mahsud, *supra* note 26; Mazzetti & Schmitt, *supra* note 26; Shaprio, *supra* note 26; Schmitt, *supra* note 26; Whitlock, *supra* note 26.

28. Jordan J. Paust, *Self-Defense Targetings of Non-State Actors and Permissibility of U.S. Use of Drones in Pakistan*, 19 J. TRANSNAT'L L. & POL'Y 237, 276 (2010); Kenneth Anderson, *Predators Over Pakistan*, THE WEEKLY STANDARD, Mar. 2010, at 26, *available at* http://www.weekly standard.com/articles/ predators-over-pakistan; Noah Shachtman, *CIA Chief: Drones 'Only Game in Town' for Stopping Al Qaeda*, WIRED (May 19, 2009), http://www.wired.com/dangerroom/2009/05/cia-chief-drones-only-game-in-town-for-stopping-al-qaeda (CIA Director Leon Panetta describes UAV operations as "the only game in town in terms of confronting or trying to disrupt the al Qaeda leadership").

29. MARY ELLEN O'CONNELL, *Unlawful Killing with Combat Drones, A Case Study of Pakistan, 2004-2009*, *in* Shooting to Kill: The Law Governing Lethal Force in Context (forthcoming Simon Bronitt ed., Hart Publishing), *available at* http://www.ssrn.com/abstract=1501144; Noah Shachtman, *Call Off Drone War, Influential U.S. Adviser Says*, WIRED.COM (Feb. 10, 2009), http://www.wired.com/dangerroom/2009/02/kilcullen-says/; *but see* Barton Gellman, *CIA Weighs "Targeted Killing" Missions*, WASH. POST (Oct. 28, 2001), http://www.washingtonpost.com/ac2/wp-dyn/A63203-2001Oct27 (Apparently based on certain classified documents, "the Bush administration has concluded that executive orders banning assassination do not prevent the president from lawfully singling out a terrorist for death by covert action.").

30. In situations where no armed conflict exists and where a state may not lawfully use lethal force in self-defense, international human rights law, including the International Covenant on Civil and Political Rights (ICCPR), prohibits the arbitrary taking of life. Article 6 of that covenant states: "Every human being has the inherent right to life. This right shall be protected by law. No one shall be arbitrarily deprived of his life." International Covenant on Civil and Political Rights art. 6, Mar. 23, 1976, 999 U.N.T.S. 171, *available at* http://www2.ohchr.org/english/law/ccpr.htm#part3.

31. *Report of the Special Rapporteur*, *supra* note 5, at 37-39 (Special Rapporteur concluding that the Yemen strike was a "clear case of extrajudicial killing."); Gary Solis, *Targeted Killing and the Law of Armed Conflict*, 60 NAVAL WAR C. REV. 127, 134-35 (2007) (stating that targeted killing only takes place "in the context of an international or non-international armed conflict").

32. Harold H. Koh, Legal Adviser, U.S. Dep't of State, Keynote Address at the Annual Meeting of the American Society of International Law (Mar. 25, 2010), *available at* http://www.state.gov/s/l/releases/remarks/139119.htm. Long recognized in customary international law, a State's right to self-defense is also provided for in Article 51 of the Charter of the United Nations. U.N. Charter art. 51, *available at* http://www.un.org/en/documents/charter/chapter7.shtml. However, the U.S. position seems to be at odds with certain aspects of the following decisions reached by the

U.S. further maintains that even lethal force is justified inasmuch as it is used in compliance with the IHL principles of distinction and proportionality.[33]

This article does not further address the U.S.'s legal basis for use of force in current conflicts,[34] nor does it address RPA operations conducted by the CIA.[35] Rather, this article focuses specifically on U.S. Air Force (USAF) RPA operations. The first section gives an overview of a typical USAF RPA operation in terms of command and control. The first section also addresses compliance with IHL principles which govern the use of force—particularly distinction and proportionality. The next section addresses the evolution of semi or fully autonomous drones and their implications for command and control on the battlefield. The final section identifies command responsibility as the principle under IHL that holds accountable those commanders and military members who might fail to comply with IHL during RPA operations.

II. COMMAND AND CONTROL DURING USAF RPA OPERATIONS

"Command and control" is a term of art in the military.[36] The military is trained to understand that uncontrolled force or indiscriminate application of force is nothing more than violence. The U.S. Marine Corps teaches that "[w]ithout command and control, campaigns, battles, and organized engagements are impossible, military units degenerate into mobs, and the subordination of military force to policy is replaced by random violence."[37]

International Court of Justice; *but see, e.g.*, *Military and Paramilitary Activities in and Against Nicaragua* (Nicar. v. U.S.), 1986 I.C.J. 14, at ¶¶ 191-96 (June 27), *available at* http://www.icj-cij.org/docket/files/70/6503.pdf; *see, e.g.*, *Armed Activities on the Territory of the Congo* (Dem. Rep. Congo v. Uganda), 2005 I.C.J. 168 at ¶ 301, *available at* http://www.icj-cij.org/docket/files/116/10455.pdf; *see, e.g.*, *Oil Platforms* (Iran v. U.S.), 2003 I.C.J. 161 at ¶ 51, *available at*: http://www.icj-cij.org/docket/files/90/9715.pdf.

33. *See* Koh, *supra* note 32.

34. ADAM ROBERTS & RICHARD GUELFF, DOCUMENTS ON THE LAWS OF WAR 1 (2000) ("The reason for this lies in the cardinal principle that *jus in bello* applies in cases of armed conflict whether or not the inception of the conflict is lawful under *jus ad bellum*").

35. This article discusses USAF RPA operations specifically, as opposed to CIA RPA operations. However, conclusions drawn here regarding RPA weapon systems are not necessarily specific to the operator who employs those systems. The author has no personal knowledge of CIA RPA operations other than that information which is found in open or publicly available sources. According to those sources, the CIA uses the same RPA systems as the USAF—namely MQ-1 Predator and MQ-9 Reaper RPAs. Thus, conclusions drawn as to these particular weapons systems could apply equally to the USAF and to the CIA.

36. The U.S. Department of Defense defines command and control as:
"The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission."
U.S. DEP'T OF DEF., DEP'T OF DEF. DICTIONARY OF MILITARY AND ASSOCIATED TERMS 65 (2010) [hereinafter *Terms*].

37. DEP'T OF THE NAVY, U.S. MARINE CORPS, COMMAND AND CONTROL 35 (1996), http://www.dtic.mil/doctrine/jel/service_pubs/mcdp6.pdf.

The U.S. Air Force defines command and control as "the exercise of authority and direction by a properly designated commander over assigned and attached forces...performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed...in the accomplishment of the mission."[38] Accordingly, command and control is required at all times and over all aspects of the military mission. This is no less true when it comes to RPA operations. As a former RPA pilot for a small research team at the U.S. Air Force Academy, this author can provide a personal account of the requirement for continuous command and control, even during small-scale RPA research flights. The next several paragraphs will detail the command and control experience.

With final ground safety checks complete, an operator inside the ground control station (GCS)[39] gives control of the aircraft to me, the "aircraft commander."[40] During takeoffs and landings, I stand outside the GCS and fly the RPAs by sight, using a hand-held controller. I add power to the RPA, direct it down the runway and lift off. Once airborne, I ensure the RPA is functioning properly, fly the RPA to a specific altitude, and say, "Passing off RPA 1." When the operator inside the GCS verifies that he (via the autopilot software on his computer) has control of the aircraft, command and control goes to this operator in the GCS, who is accountable for the remainder of that portion of the mission. We follow the same process for each aircraft until all aircraft are airborne and controlled by the GCS (usually two or three at a time for each research mission). Once the flying objective or experiment is complete, we follow a similar process in landing the aircraft. The GCS directs the RPA to a designated point in the airspace and I say, "Taking RPA 1." I take control of the aircraft and land them in the same order I took them off.

Current USAF RPA operations on the battlefield are similar in that commanders at various levels exercise command and control during their corresponding mission segment. At no time during the operation is there a command and control void, where the RPA might command itself. The following overview of current USAF RPA operations illustrates this point.

38. U.S. AIR FORCE, COMMAND AND CONTROL: AIR FORCE DOCTRINE DOCUMENT 2 (2007).

39. The GCS here (specific to the U.S. Air Force Academy research team and as opposed to that of a larger-scale RPA) is a small enclosed trailer with several computers, several very smart computer scientists, and a collection of communications equipment such as antennas, receivers, and transmitters.

40. The "aircraft commander" in any USAF air operation, manned or unmanned, is personally responsible for the aircraft commanded by that person. They cannot delegate or otherwise abrogate that responsibility—similar to the way the driver of a car cannot abrogate responsibility for the car he or she is operating. The U.S. Department of Defense defines "aircraft commander" as "[t]he aircrew member designated by competent authority as being in command of an aircraft and responsible for its safe operation and accomplishment of the assigned mission." U.S. DEP'T OF DEF., DEP'T OF DEF. DICTIONARY OF MILITARY AND ASSOCIATED TERMS (2011), http://www.dtic.mil/doctrine/dod_dictionary/data/a/2309.html (follow "aircraft commander" hyperlink).

A. Overview of Current USAF RPA Operations

During the summer of 2010, the USAF operated as many as 40 RPA combat air patrols (CAPs) at any given time in Iraq and Afghanistan.[41] As of March 2011, the worldwide total for the USAF was 48.[42] A CAP signifies one aircraft—and more specifically, one aircraft fulfilling a flying mission, or patrol, usually dedicated to monitoring or protecting an assigned battle pace, whether overland, oversea, or in the air.[43] These CAPs can consist of various RPAs, including the MQ-1 Predator, the MQ-9 Reaper, and in a much more limited and specialized reconnaissance role, the RQ-4 Global Hawk.[44] Smaller scale hand-launched or catapult-launched Small Unmanned Aircraft Systems, such as the RQ-11B Raven and the Scan Eagle are not included in these CAPs but instead are dedicated almost exclusively to providing commanders "situational awareness" in a smaller battle space.[45]

Predators and Reapers are similar in that they are both "multi-role" aircraft.[46] The principal strength of both these RPAs is their ability to perform various intelligence, surveillance, and reconnaissance (ISR) tasks.[47] The U.S. Department of Defense defines ISR as "[a]n activity that synchronizes and integrates the planning and operation of sensors, assets, and processing, exploitation, and

41. Bruce Rolfsen, *Unmanned a Misnomer when it Comes to UAVs*, AIR FORCE TIMES, June 11, 2010, http://www.airforcetimes.com/news/2010/06/airforce_uav_personnel_061110w.

42. Robert M. Gates, Secretary of Defense, U.S. Air Force Acad. (Mar. 4, 2011), http://www.defense.gov/speeches/speech.aspx?speechid=1543 ("The Air Force now has forty-eight Predator and Reaper combat air patrols currently flying—compared to eighteen CAPs in 2007").

43. UNITED STATES DEPARTMENT OF DEFENSE, *supra* note 36, at 60.

44. The Global Hawk is a high-altitude, long-endurance RPA dedicated entirely to specialized ISR missions. It has a ceiling of 60,000 feet and can remain aloft for as many as thirty-six hours. *See* U.S. AIR FORCE, RQ-4 GLOBAL HAWK (2009), http://www.af.mil/information/factsheets/factsheet.asp?id=13225.

45. *See* U.S. AIR FORCE, RQ-11B RAVEN (2010), http://www.af.mil/information/factsheets/factsheet.asp?id=10446; *See* U.S. AIR FORCE, SCAN EAGLE (2009), http://www.af.mil/information/factsheets/factsheet.asp?id=10468.

46. The "M" designator in MQ-1 Predator and MQ-9 Reaper signifies "multi-role." *See* U.S. AIR FORCE, MQ-1B PREDATOR FACT SHEET (2010), http://www.af.mil/information/factsheets/actsheet.asp?id=122; *See* U.S. AIR FORCE, MQ-9 REAPER (2010), http://www.af.mil/information/factsheets/factsheet.asp?id=6405.

47. For an argument that the Obama administration, based on political expediency, prefers to kill targets as opposed to track and capture them, see Kenneth Anderson's Blog. Kenneth Anderson, *Why Targeted Killing? And Why is Robotic So Crucial an Issue in Targeted Killing?*, KENNETH ANDERSON'S L. OF WAR AND JUST WAR THEORY BLOG (Mar. 27, 2009, 12:36 PM) ("Moreover, the political costs for any U.S. administration taking and holding detainees are now enormous. Once you hold them, over time they will likely be accorded quasi-Constitutional protections by the courts, at least some version of habeas corpus. Politically, the most powerful institutional incentive today is to kill rather than capture them. The intelligence losses of killing rather than capturing in order to interrogate them are great. But since the U.S. political and legal situation has made interrogation a questionable activity anyway, there is little reason to seek to capture rather than kill. And if one intends to kill, the incentive is to do so from a standoff position, because it removes messy questions of surrender."), http://kennethandersonlawofwar.blogspot.com /2009/03/why-targeted-killing-and-why-is.html; *See* Tara McKelvey, *Inside the Killing Machine*, NEWSWEEK, Feb. 13, 2011, *available at* http://www.newsweek.com/2011/02/13/inside-the-killing-machine.html.

dissemination systems in direct support of current and future operations."[48] The USAF describes ISR as the means of providing "accurate, relevant, and timely intelligence to decision makers...the life blood of effective decision making."[49] In addition to ISR capabilities, both aircraft are capable of carrying munitions and delivering those munitions on a selected target.[50]

RPAs are successful in their multiple roles largely because they fly as high as 50,000 feet (well out of sight or earshot of those on the ground) and loiter over an objective for as many as 22 hours at a time—or less, depending on payload weight.[51] This kind of "persistent surveillance," as it is called, gives operators the ability to watch points of interest almost indefinitely, considering multiple RPAs can rotate in an out of airspace to hand off surveillance tasks.[52] Increased time aloft also means fewer sorties (a take-off, flight, and landing), which minimizes strain on operators, ground crew, and the aircraft.[53]

However important prolonged loiter time might be, the key enabler of RPAs is the "suite of sensors" or "targeting system" included onboard each RPA.[54] These sensors allow operators from miles away to zoom in on unsuspecting subjects.[55] The high-definition images provide operators a detailed picture of the battlefield and more importantly, of specific individuals on the battlefield. Included in a typical sensor package on a Reaper, for example, are an "infrared sensor [to provide night vision], a color/monochrome daylight TV camera, an image-intensified TV camera, a laser designator and a laser illuminator..."[56] Regardless of primary mission, RPAs might also carry sensors for weather data collection or other communications purposes—all designed to enhance commanders' situational awareness on the battlefield.[57]

Deployed in early 2011, and carried by Reaper RPAs, is the U.S. Air Force's newest and most powerful sensor system—the "Gorgon Stare."[58] This 1,100

48. UNITED STATES DEP'T OF DEF., *supra* note 36, at 183.

49. U.S. AIR FORCE, INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE OPERATIONS: AIR FORCE DOCTRINE DOCUMENT 1 (2007).

50. *Compare* MQ-1B Predator, U.S. Air Force (July 20, 2010), http://www.af.mil/information/factsheets/factsheet.asp?id=122 (explaining that the Predator will carry no more than two AGM-114 Hellfire missiles—which is a payload capacity of 450 pounds), *with* MQ-9 Reaper, U.S. Air Force (Aug. 18, 2010), http://www.af.mil/information/factsheets/factsheet.asp?id=6405 (explaining that the Reaper's payload capacity rivals that of the more traditional fighter aircraft, the F-16. The Reaper has a payload capacity of almost 4,000 pounds. With this capacity, the Reaper can be armed with various combinations of AGM-114 Hellfire missiles, GBU-12 Paveway II laser guided munitions, and GBU-38 Joint Direct Attack Munitions).

51. FLIGHT PLAN, *supra* note 21, at 26-27.

52. STRATEGIC VISION, *supra* note 3, at 5.

53. *Id.*

54. MQ-9 Reaper, *supra* note 50.

55. Lara Logan, *Drones: America's New Air Force*, CBS NEWS: 60 MINUTES (Aug. 14, 2009), http://www.cbsnews.com/stories/2009/05/08/60minutes/main5001439.shtml.

56. MQ-9 Reaper, *supra* note 50.

57. STRATEGIC VISION, *supra* note 3, at 9.

58. Ellen Nakashima & Craig Whitlock, *With Air Force's Gorgon Drone 'We Can See Everything'*, WASH. POST, Jan. 2, 2011, http://www.washingtonpost.com/wp-dyn/content/article/2011/

pound 15 million dollar system is capable of viewing a five-mile diameter area at one time, as opposed to the "soda-straw" perspective offered by some previous sensor systems.[59] It accomplishes this by stitching together images from multiple cameras aimed at various points within the viewing area. This one sensor system can also simultaneously broadcast one viewpoint to one user—perhaps a ground commander on the battlefield; another view point to another user—perhaps an intelligence analyst at a base in the United States; a third viewpoint to another user—perhaps a decision maker at the Pentagon or the White House; and so on. This is critically important during USAF RPA operations because a successful mission may involve a team composed of multiple individuals, each with their own specialties, perspectives, roles, and geographic locations. Furthermore, one can imagine greater control of the battlefield, as well as situational awareness, given multiple sets of eyes focusing on multiple points.

1. A Typical USAF RPA Combat Air Patrol[60]

A USAF RPA Combat Air Patrol (CAP) might be responsible for any number of tasks including monitoring and covering (providing close air support for) friendly forces' movements or positions, tracking and observing enemy forces' movements or positions, protecting a defended target, observing and defending a boundary or border, searching for missing, downed, or captured friendly forces, or finding, tracking, and targeting an enemy combatant or objective.[61]

These missions typically begin at an overseas location where a ground crew readies the RPA for flight. The ground crew fuels, arms, and otherwise prepares the RPA for its mission. While at or near the launch base, the RPA is controlled by a crew of operators working from a ground control station (GCS) located at the launch base. That aircrew is responsible for getting the RPA airborne and preparing it for handoff to the crew of operators (working from a base other than the launch base—often located in the U.S.) who will complete the operational mission.

At the designated time, the remotely-located aircrew takes control of the RPA and proceeds with the mission, which could last upwards of 22 hours.[62] At this point, the mission is considered a "remote split operation."[63] The aircrew now in control of the RPA is comprised of several operators, including at a minimum, a

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01/01/AR2011010102690. html?sid=ST2011012204147.

59. Michael Hoffman, *New Reaper Sensors Offer a Bigger Picture*, AIR FORCE TIMES, Feb. 16, 2009, http://www.airforcetimes.com/news/2009/02/airforce_WAAS_021609/.

60. Information used in the following section, unless otherwise noted, was taken from interviews with two U.S. Air Force RPA pilots (including one RPA Squadron Commander) who, while working from bases in the continental U.S., have spent considerable time conducting RPA operations in the Middle East and Southwest Asia. In addition to piloting RPAs, these pilots also fly, respectively, the F-16 multirole fighter and the KC-135 tanker. Interview notes are on file with the author.

61. FLIGHT PLAN, *supra* note 21, at 26-27.

62. Given the long duration of RPA flights, multiple crews in shifts will work the GCS for any given CAP. At shift change, command of the RPA and of the CAP is passed from the outgoing pilot to the incoming pilot.

63. FLIGHT PLAN, *supra* note 21, at 26.

pilot, a sensor operator, and a mission intelligence coordinator.[64] The pilot serves as the aircraft commander and at all times controls the RPA—even if the RPA happens to be flying with an "auto-pilot" function.[65] The pilot is solely responsible for the safe operation of the RPA and for the appropriate and legal use of force during operations. The sensor operator is responsible for operating the suite of sensors aboard the RPA. The mission intelligence coordinator, or MIC, who is trained as an imagery analyst, oversees the immediate analysis, collection, and flow of intelligence gathered and used during the mission. The mission intelligence coordinator also assists with airspace coordination, compliance with rules of engagement during use of force, and mission reporting.

In addition to the aircrew working the GCS, any number of intelligence analysts and military decision makers might also take part in the mission. Available at all times in the GCS are at least three voice lines—one to military forces on the battlefield and two lines linking headquarter elements overseas and command centers at various places around the world—whether airborne or land-based. In addition to the voice lines, individuals at all levels of military operations, including in the GCS, have access to "chat rooms," as they are called, where "secure" networks are used to discuss, share, compare, and further analyze intelligence data.

The various types of intelligence used and discussed might include human intelligence (information gained directly from human sources),[66] communications intelligence (information gained from intercepted communications),[67] or electronic intelligence (information gained from exploitation of an adversary's electronic systems),[68] to name a few. All of this information, or intelligence, is in addition to that gained by the RPA operators during the particular mission.

By comparison, an F-16 pilot relies almost entirely on instinct and training in analyzing a given situation. This is due to significant time constraints during battlefield engagements. The pilot takes into account whatever can be observed through the canopy with the naked eye, whatever can be observed in the cockpit on a small screen displaying images obtained with the targeting pod system attached to the aircraft, and any additional information the pilot might learn from a controller at an operations center. An F-16's array of sensors often includes an infrared detector, a CCD-TV camera, a laser rangefinder and a laser designator.[69] Notably, however, an F-16 pilot is alone in operating all flight controls, sensors, communications equipment, and munitions. The pilot's job is further complicated

64. *Id.* at 28-29.

65. Currently, the pilot is restricted to operating a single aircraft although immediate USAF plans call for a single pilot to control four aircraft simultaneously during "benign operations." FLIGHT PLAN, *supra* note 21, at 55.

66. *Terms*, *supra* note 36, at 167.

67. *Id.* at 70.

68. *Id.* at 120.

69. *See* U.S. Air Force, *Fact Sheet*, http://www.af.mil/information/factsheets/factsheet_print.asp?fsID=114&page=1.

by the fact that the F-16 will likely have only enough fuel to loiter over a target for 60-90 minutes.[70]

Due to these limitations, F-16 pilots might find themselves in situations where choosing not to engage a target and returning for fuel will discontinue observation of the target—meaning the target will likely be lost. In discussing the many people with many perspectives and specialties collaborating during USAF RPA operations, a former F-16 pilot with considerable combat experience in the F-16—now also an RPA pilot—spoke of RPA operations saying, "You get better answers at every turn with all these people in the room." With "better answers at every turn," RPA pilots are uniquely able to comply with core IHL principles that govern the use of force—particularly the principles of distinction and proportionality.[71]

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70. *See* U.S. Air Force, *Fact Sheet F-16 Fighting Falcon* (Oct. 30, 2009), http://www.af.mil/information/factsheets/factsheet.asp?id=103.

71. This is not to say that USAF RPA operations do not allow for compliance with other core IHL principles of military necessity and humanity. A U.S. Navy handbook for commanders explains that the goal of military necessity is "to limit suffering and destruction to that which is necessary to achieve a valid military objective." U.S. DEP'T OF HOMELAND SEC., THE COMMANDER'S HANDBOOK ON THE LAW OF NAVAL OPERATIONS (2007), http://www.usnwc.edu/getattachment/a9b8e92d-2c8d-4779-9925-0defea93325c/1-14M_%28Jul_2007%29_% 28NWP%29. The weapon system itself has little relevancy in the analysis of what comprises a valid military objective. The weapon system becomes relevant only to the extent it causes more suffering and destruction than is necessary to achieve a valid military objective. This is similar to the analysis under the IHL principle of humanity, or human suffering. Humanity, as addressed in Article 35(2) of AP I, prohibits employing "weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering." Protocol Additional to the Geneva Conventions of 12 August 1949 and Relating to the Protection of Victims of International Armed Conflicts (Protocol I) art. 35 ¶ 2, Dec. 7, 1978, 1125 U.N.T.S. 3, *available at* http://www.icrc.org/IHL.NSF/COM/470-750113?OpenDocument [hereinafter Protocol I]. This limitation is similarly stated as a principle of customary international humanitarian law: "The use of means and methods of warfare which are of a nature to cause superfluous injury or unnecessary suffering" is prohibited. JEAN-MARIE HENCKAERTS & LOUISE DOSWALD-BECK, CUSTOMARY INTERNATIONAL HUMANITARIAN LAW VOLUME 1: RULES 237 (2005); *see also* Michael J. Matheson, *The United States Position on the Relation of Customary International Law to the 1977 Protocols Additional to the 1949 Geneva Conventions*, 2 AM. U. J. INT'L L. & POL'Y 419, 424 (1987). USAF RPAs currently employ the same precision-guided munitions that have been employed for years by other conventional manned aircraft. The MQ-9 Reaper, for example, employs the GBU-12 Paveway II bomb, the GBU-38 Joint Direct Attack Munition bomb, and the AGM-114 Hellfire missile. *See* U.S. Air Force, *Joint Direct Attack Munition GBU 31/32/38* (Nov. 21, 2007), http://www.af.mil/information/factsheets/ factsheet.asp?id=108. The weapon platform from which these munitions are employed does not change the nature of the injury of suffering caused by the munitions. Therefore, any analysis as to military necessity or humanity does not change relative to the platform from which the munitions are deployed—in this case, an RPA.

2. USAF RPA Operations in Compliance with Distinction and Proportionality[72]

Regardless of the classification of any particular armed conflict, certain fundamental principles of IHL govern the use of force.[73] The principles of distinction and proportionality are memorialized in treaty, long accepted as customary international humanitarian law, and applicable during targeting operations.[74] These principles apply whether targeting is conducted with manned aircraft, long-range cruise missiles, small arms, or RPAs.

In the International Committee of the Red Cross (ICRC) study on customary international humanitarian law, distinction is literally "Rule 1."[75] It states: "The parties to the conflict must at all times distinguish between civilians and combatants. Attacks may only be directed against combatants. Attacks must not be directed against civilians."[76] Article 57 of Additional Protocol I to the Geneva Conventions of 1949,[77] as well as customary international humanitarian law,

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72. Similar to a previous footnote regarding the previous section, the information used in the following section, unless otherwise noted, was taken from interviews with two U.S. Air Force RPA pilots (including one RPA Squadron Commander) who, while working from bases in the continental U.S., have spent considerable time conducting RPA operations in the Middle East and Southwest Asia. In addition to piloting RPAs, these pilots also fly, respectively, the F-16 multirole fighter and the KC-135 tanker. Interview notes are on file with the author. *See supra* note 60.

73. This statement recognizes an understanding in IHL that certain laws and types of law apply in certain contexts depending upon classifications of armed conflict. For example, during an international armed conflict, as described by common article two of the Geneva Conventions of 1949, Additional Protocol I to the Geneva Conventions of 1949 (AP I) would be applicable. Geneva Convention Relative to the Protection of Civilian Persons in Time of War art. 2, Aug. 12, 1949, 6 U.S.T. 3516, 75 U.N.T.S. 287; Protocol I, *supra* note 71. Similarly, in a non-international armed conflict, as described by common article three of the Geneva Conventions of 1949, Additional Protocol II to the Geneva Conventions of 1949 (AP II) would be applicable. Protocol Additional to the Geneva Conventions of 12 August 1949 and Relating to the Protection of Non-International Armed Conflicts, June 8, 1977, 6 U.S.T. 3516, 1125 U.N.T.S. 609 [hereinafter Protocol II]. In addition to various provisions of treaty law, another body of international law applies during both types of armed conflict described by the Geneva Conventions of 1949. Int'l Comm. of the Red Cross, *Treaties and Customary Law: Overview* (Oct. 29, 2010), http://www.icrc.org/eng/war-and-law/treaties-customary-law/overview-treaties-and-customary-law.htm. This law is known as customary international humanitarian law. Thus, certain treaty provisions are referred to in remaining sections of this article with the understanding that although they may not apply in one type of armed conflict or another, unless otherwise stated they are nonetheless customary international humanitarian law and binding upon nation States employing RPAs in armed conflict.

74. *See* Protocol I, *supra* note 71, at arts. 35, 51.

75. HENCKAERTS & DOSWALD-BECK, *supra* note 71, at 3.

76. At the heart of the principle of distinction is the protection of civilians and civilian objects. Distinction has been described as "the foundation on which the codification of the laws and customs of war rests." *Id.* at 427. According to the principle of distinction, attack may be directed against a person who is a "combatant" or against "civilians...for such time as they take a direct part in hostilities." *Id.* at 3, 19. These same core concepts are codified in several articles of AP I, including 48, 51(2), 51(3) and 52(1) and Article 13 of Additional Protocol II to the Geneva Conventions of 1949 (AP II). Protocol I, *supra* note 71, at arts. 48, 51 ¶¶ 2-3, 52 ¶ 1; Protocol II, *supra* note 73, at art. 13.

77. Although the U.S. has not ratified AP I, it apparently recognizes a majority of its articles as customary international law. In 1987, a U.S. Department of State Deputy Legal Advisor, Michael Matheson, gave a speech in which he outlined very specifically the many articles and principles of AP I

prescribes "precautionary measures" that one must take in planning or deciding upon an attack.[78] Prior to launching any attack, one who plans or decides upon an attack must "do everything feasible to verify that the objectives to be attacked are neither civilians nor civilian objects...."[79] It seems, therefore, that IHL would favor a weapon system that enhances an operator's ability to verify that an objective to be attacked is a combatant, as opposed to a civilian.

One criticism levied against RPAs, however, is that operators, finding themselves far from the battlefield, must rely on what they see via the RPA's sensors and that perhaps the decision to use lethal force has become "too easy."[80] Commentary on AP I states that "those who plan or decide upon...an attack will base their decision on information given them, and they cannot be expected to have personal knowledge of the objective to be attacked and of its exact nature."[81]

Although perhaps not possessing first-hand "in-person" knowledge of their targets, RPA pilots are often better able to distinguish between civilians and combatants on the battlefield—more so than pilots of other manned aircraft—due to an RPAs' capabilities. As previously discussed, RPAs can observe a potential target from altitudes as high as 50,000 feet, where the RPAs are neither seen nor heard. This unedited, uninterrupted observation of the unaware subject takes place during day or night and can go on for hours and even days at a time, as RPAs rotate in and out of airspace, handing off observation of a particular target if necessary to allow for more deliberate consideration of a decision to use force.

When analyzing a potential attack, an RPA pilot has at his or her fingertips a collection of intelligence data and information regarding the target, including the live video feed of events in progress. The pilot is also able to rely on the assistance of fellow crew members, intelligence analysts, ground forces, and other operators that are all linked to the operation. Most importantly, at all times during RPA operations the aircrew's conduct is governed by rules of engagement. Rules of engagement (ROE) are a set of internal rules governing the use of force in compliance with IHL.[82] Remotely Piloted Aircraft operators rely on ROE in

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that the U.S. considered customary international law. *See* Michael J. Matheson, *The United States Position on the Relation of Customary International Law to the 1977 Protocols Additional to the 1949 Geneva Conventions*, 2 AM. U. J. INT'L L. & POL'Y 419, 422-29 (1987). Since that time, the U.S. has not repeated, refined, or otherwise retracted Mr. Matheson's statements. With the exception of Articles 36 and 48, all of the AP I articles referenced or relied on by the author in this current article were included in Mr. Matheson's comments as having been accepted by the U.S. as customary international law. *Id.*

78. HENCKAERTS & DOSWALD-BECK, *supra* note 71, at 336-44.

79. Protocol I, *supra* note 71, at art. 57 ¶ 2(a)(i).

80. Chris Cole, *Growing Concern over Drone Attacks*, THE GUARDIAN (Jun. 9, 2010), http://www.guardian.co.uk/world/2010/jun/09/growing-concern-over-drone-attacks; Eric Hagerman, *Point. Click. Kill: Inside The Air Force's Frantic Unmanned Reinvention*, POPULAR SCIENCE (Aug. 18, 2009, 1:43 PM), http://www.popsci.com/drones.

81. HENCKAERTS & DOSWALD-BECK, *supra* note 71, at 680.

82. The U.S. Department of Defense defines "rules of engagement" as: "Directives issued by competent military authority that delineate the circumstances and limitations under which United States forces will initiate and/or continue combat engagement with other forces encountered." *Terms*, *supra* note 36, at 393. ROE are specific to a particular fighting force engaged in a particular armed conflict in

making decisions that might ultimately lead to the decision to use force. Current USAF ROE for RPA operations requires a person, as opposed to artificial intelligence, to authorize the use of force.[83]

In the event that operators believe use of force against a particular target is necessary, the resort to force is never instantaneous or automatic. Occasionally, the use of force might be rushed in order to meet an emerging target or emergency situation on the battlefield but even in these situations operators are bound to fully comply with ROE. More often than not, operators have considerable time to monitor and track a target while ensuring full compliance with ROE prior to a strike because of an RPA's ability to observe a target undetected over a long period of time.

In preparation for a strike, the pilot positions the RPA for optimal observation of the target and deployment of weapons. The sensor operator might switch to a different sensor or adjust the viewing angle on a sensor to enhance images of the target and surrounding area. The mission intelligence coordinator analyzes the images, looking to verify the identity of the target and gauge possible collateral damage. At all times, all members of the aircrew, as per their ROE, are looking for civilians, civilian objects, and other protected objects, such as religious or medical facilities. Depending on the ROE, a less-than-favorable collateral damage estimate might require the pilot to seek approval to carry out a particular strike.

At issue in procuring approval for these airstrikes is the IHL principle of proportionality, which seeks to minimize or eliminate collateral damage during armed conflict. This principle, recognized in treaty as well as customary international humanitarian law, prohibits "an attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated...."[84] Although relevant portions of current ROE are classified and cannot be discussed here, it appears that ROE take into account that operators at lower levels, including RPA operators, might not be in a position to determine the excessiveness of collateral damage relative to the direct

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a particular theatre of war and often to a particular mission. Currently, U.S. fighting forces in Afghanistan operate under ROE promulgated by a unified geographic commander who commands the International Security Assistance Force. Although ROE is not itself IHL, the "competent military authority" who promulgates ROE is responsible for ensuring that force used in accordance with ROE is also necessarily used in accordance with IHL. Thus, proposed ROE undergo several levels of review by commanders, operators, legal advisors and senior politicians before they become effectual. ROE may be more restrictive on the use of force than IHL otherwise would be. A subordinate's violation of ROE might result in military discipline administered by a commander.

83. USAF Colonel Eric Mathewson is quoted in a February 2010 Popular Mechanics article as saying, "If you look at the way we employ unmanned aircraft in the current fights, the rules of engagement require that someone [in charge at the rear] has to approve it, to say, 'Yes, indeed, you're cleared hot' for every single case." Joe Pappalardo, *The Future For UAVs in the U.S. Air Force*, POPULAR MECHANICS, Feb. 26, 2010, http://www.popularmechanics.com/technology/aviation/military/4347306.

84. HENCKAERTS & DOSWALD-BECK, *supra* note 71, at 46, 621-22.

military advantage anticipated from a strike.[85] In other words, such a determination likely entails more than simply a tactical assessment of the battlefield; compliance with proportionality typically entails larger operational, strategic, and policy considerations.

For example, during the initial invasion of Iraq in 2003 and for some time after, ROE required Secretary of Defense, Donald Rumsfeld, to personally authorize any strike that had the potential to result in more than 30 civilian casualties.[86] In the current conflict in Afghanistan, it appears, based on statements from the top U.S. commander in Afghanistan, that at least some form of approval could be required for a strike that might cause any collateral damage at all.[87]

Obtaining this approval, regardless of the source of the approval, is almost seamless during USAF RPA operations. If such an approval is required, the mission intelligence coordinator instantly shares the video feed and other known intelligence with the approval authority. This real-time sharing of information can take place whether the approval authority happens to be on the ground in the battle, at an operations center, at a command headquarters, or at the White House or Pentagon.[88] Furthermore, operators, analysts, and approvers alike have access to chat rooms where data, intelligence, analysis, and observations can be shared. The advantage of the chat rooms, of course, is that all participants in the chat rooms have equal access to the flow of information.

Once in compliance with ROE, the RPA pilot is authorized to use force. An RPA provides several options for striking targets and ultimately, the RPA pilot decides on the specific application of force. Depending on availability of weapons

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85. For some commentators, compliance with the principle of proportionality seems to come down to numbers alone. Occasionally, "numerous civilian casualties" can be seen as "excessive civilian casualties" without the relative comparison of the direct military advantage anticipated through the strike. *See* David Kilcullen & Andrew McDonald Exum, *Death From Above, Outrage Down Below*, N.Y. TIMES, Mar. 17, 2009, http://www.nytimes.com/2009/05/17/opinion/17exum.html ("Press reports suggest that over the last three years drone strikes have killed about fourteen terrorist leaders. But, according to Pakistani sources, they have also killed some 700 civilians. This is fifty civilians for every militant killed...."); *but see* YORAM DINSTEIN, THE CONDUCT OF HOSTILITIES UNDER THE LAW OF INTERNATIONAL ARMED CONFLICT 131 (2004) (Dinstein states that the principle of proportionality applies even where a belligerent uses a civilian objective to shield its military forces or weapons from attack. "However," he adds, "even if that is the case, the actual test of excessive injury to civilians must be relaxed. That is to say, the appraisal whether civilian casualties are excessive in relation to the military advantage anticipated must make allowances for the fact that -- if an attempt is made to shield military objectives with civilians -- civilian casualties will be higher than usual.")

86. HUMAN RIGHTS WATCH, OFF TARGET: THE CONDUCT OF THE AIR WAR 19 (2003), http://www.hrw.org/en/node/12207/section/.1.

87. Jason Motlagh, *Petraeus Toughens Afghan Rules of Engagement*, TIME, Aug. 6, 2010, http://www.time.com/time/world/article/0,8599,2008863,00.html ("General Petraeus has reportedly expanded the ban on air strikes and artillery fire to all types of buildings, tree-lined areas and hillsides where it is difficult to distinguish who is on the ground.")

88. David Zucchino, *U.S. report faults drone crew, command posts in Afghan civilian deaths*, L.A. TIMES, May 29, 2010, http://articles.latimes.com/2010/may/29/world/la-fg-predator-20100530 (Although this seamless sharing of information clearly did not happen in the situation referred to in this news article, it supports the premise that such sharing of information is not only possible during RPA operations but *vital*.).

and desired effects, a pilot might use laser-guided missiles, or laser-guided or gps-guided bombs.[89] RPAs also provide the ability to "buddy-laze" a target, which occurs when the pilot uses the RPA's laser designator to guide a weapon fired from a separate platform, such as an attack helicopter.[90] In all cases, RPA systems are capable of striking targets with high accuracy using precision-guided munitions, thereby reducing collateral damage.

Current USAF RPA operations are such that, absent operator error, operator misconduct, or malfunction of equipment, it is difficult to launch a strike without first distinguishing between civilians and combatants—assuming intelligence provided to RPA operators by other sources is accurate.[91] Due to RPAs' enhanced capabilities, the USAF actually has an increased burden in doing "everything feasible" to avoid targeting civilians and civilian objects.[92] Certainly, "everything feasible" is a much higher burden now than it was even just a decade ago.[93]

B. USAF RPA Systems' Vulnerabilities

The U.S. Department of Defense defines "vulnerability" as "[t]he characteristics of a system that cause it to suffer a definite degradation (incapability to perform the designated mission) as a result of having been subjected to a certain level of effects in an unnatural (man-made) hostile environment."[94] Military planners and war fighters assess and mitigate vulnerabilities on a regular basis due to the dramatic effects that systems' vulnerabilities can have on military outcomes. In a related vein, the assessment of a system's vulnerabilities becomes relevant here to the extent that a system's "degradation" or "incapability to perform the designated mission" might cause noncompliance with IHL. More specifically, an RPA system's vulnerabilities are

89. USAF REAPER FACT SHEET, http://www.af.mil/information/factsheets/factsheet_print.asp?fsID=6405&page=1 (last visited April 22, 2011).

90. FLIGHT PLAN, *supra* note 21, at 26.

91. The International Criminal Tribunal for the former Yugoslavia addressed the issue of mistake, or negligence, as opposed to intentional or reckless abandon in the context of distinction. The Tribunal stated: "The parties to the conflict are obliged to attempt to distinguish between military targets and civilian persons or property.... Such an attack must have been conducted intentionally in the knowledge, or when it was impossible not to know, that civilians or civilian property were being targeted not through military necessity." Prosecutor v. Blaskic, Case No. IT-95-14-T, Judgment, ¶ 180 (Int'l Crim. Trib. For the Former Yugoslavia Mar. 3, 2000).

92. In commentary on AP I, it was recognized that "the identification of objectives depended to a large extent on the technical means of detection available to the belligerents." An example was given that "some belligerents might have information owing to a modern reconnaissance device, while other belligerents might not have this type of equipment." HENCKAERTS & DOSWALD-BECK, *supra* note 71.

93. It seems that given the requirements of "precautionary measures" and the increased capabilities provided by RPAs, that the USAF might be obliged to use this technology (i.e., track a target for hours, confirm the identity of the target with multiple analysts, view the target with an enhanced image, etc.) in every targeting scenario. However, there is no basis in law to suggest that once a capability is possible that it must be used in every scenario. In other words, "everything feasible" does not necessarily mean "everything possible." *See generally*, Danielle L. Infeld, *Precision-Guided Munitions Demonstrated Their Pinpoint Accuracy in Desert Storm; but is a Country Obligated to Use Precision Technology to Minimize Collateral Civilian Injury and Damage*, 26 GEO. WASH. J. INT'L L. & ECON. 109 (1992).

94. *Terms*, *supra* note 36, at 393.

relevant in that like other medium and larger sized manned aircraft, an RPA has the potential to significantly harm civilians and civilian objects—especially when in a degraded state.[95] In May 2009, the USAF released its most comprehensive written guidance to date on RPA policy and technology—the *United States Air Force Unmanned Aircraft Systems Flight Plan 2009-2047*.[96] However, the version of the report released to the public says nothing of RPA systems' vulnerabilities. Rather, in place of the page that would otherwise address vulnerabilities is the word "Classified."[97] Even with little public acknowledgment or discussion of existing vulnerabilities by the USAF, something can be learned of these vulnerabilities through inference, assumption, and history.

For example, the USAF recently published a document soliciting vendor participation in test flights for vehicles that would meet the USAF's needs for a small hand-launched aircraft capable of delivering lethal force—the Lethal Miniature Aerial Munitions System.[98] Included in the solicitation is a list of questions that must be answered before a vendor may conduct test flights for the Air Force.[99] Of the 45 questions asked, 26 of them directly address the "command link" for controlling the vehicle.[100] Among the questions are: "What frequency will you use?" "What happens when the command link is lost?" "How does the vehicle recognize that loss of command link has occurred?" "Is there a backup command transmitter and receiver?" "Does this vehicle have an automatic "return home" (also called "reversion mode") in the event of loss of link?"[101] By inference, it seems that losing control of the vehicle is foremost among the USAF's concerns.

The command link has historically been the "Achilles heel of unmanned systems," as the Air Force has previously put it.[102] Think back to the "remote control" toy car you got for your sixth birthday—where the car was literally tethered to the controller by a wire. Yes, you could control the car "remotely" but the fun only lasted about five minutes: the amount of time it took for you to realize no surprise attacks on little brother, no chasing the cat, and certainly no racing. The problem was you were never truly "remote." Such was the case when, during World War II, Germany deployed remote controlled mini tanks laden with

95. In addition to lethal munitions carried as payload, "these platforms have significant kinetic energy based on their weight and speed, [and] they can cause significant damage." FLIGHT PLAN, *supra* note 21, at 36.

96. *Id.* at 21.

97. Among the topics in the document that are listed as classified are "threats," "vulnerabilities," and "application of gaps and shortfalls." FLIGHT PLAN, *supra* note 21, at 21, 23. This classification is not only understandable but expected, given military members' desire to mitigate known threats, vulnerabilities, and shortfalls. To publicize these in detail would be to invite exploitation by adversaries.

98. Dep't of the Air Force, Lethal Miniature Aerial Munitions System (Sept. 10, 2010), *available at* https://www.fbo.gov/?s=opportunity&mode=form&id=50e5c113e29c09b2d7c3c8d5f5dd3 b01&tab=core&_cview=0 [hereinafter BAA].

99. *Id.* at § D.

100. *Id.*

101. *Id.*

102. STRATEGIC VISION, *supra* note 3, at 5.

explosives. The "Achilles heel," of course, was the fact that to disable the tanks, Allied forces simply had to cut (or otherwise sever) anywhere along the 2,000 feet of cable connecting the vehicle to the controller![103]

While command link technology has evolved exponentially since World War II, the inherent weakness remains. Cut the "virtual wire" and the drone could be lost. Or at least direct control of the drone is lost. In the event the command link is lost, most RPAs are pre-programmed to try to reconnect the lost link, return to base autonomously, or complete the mission autonomously.[104] Understandably, flying autonomously or completing the mission autonomously—especially where use of force is involved—only enhances concerns relating to the vehicle's loss of control.[105]

This vulnerability was dramatically exposed when a U.S. Navy drone helicopter flew "autonomously" through restricted airspace near Washington D.C. During a 2010 demonstration flight, a U.S. Navy "Fire Scout" unmanned helicopter lost contact with controllers at Naval Air Station Patuxent River in southern Maryland.[106] In what the U.S. Navy described as a "software issue," the helicopter flew its own course for approximately 30 minutes during which it traveled 23 miles, flew within 40 miles of Washington D.C., and entered restricted airspace.[107]

Another example, while not of a command link loss, illustrates a similar vulnerability in the context of current U.S. RPA operations. Using $26 dollar (USD) off-the-shelf software, militants were able to intercept live video feed from U.S. RPAs in Iraq in 2009.[108] U.S. officials maintained the intercept never affected control of the RPAs or otherwise affected their mission.[109] Nonetheless, the breach of the RPA system exposed the vulnerability for what it was.

In addition to intercepting data transmission from RPAs, adversaries may seek to otherwise jam, hack, interfere with or interrupt the communications link, including by physical attack of the communication nodes (e.g., antennae, receiver, satellite, or other hardware node).[110] Furthermore, current USAF RPA operations rely for their communications "almost exclusively" on leased bandwidth from commercial satellites, which is an "open commodity."[111] This leased bandwidth is subject to interference and attack; but this also means that the USAF must compete

103. The vehicle was called the "Goliath" and was of limited effect during the war—due significantly to the fact that they were relatively easily disabled and captured by the Allies. U.S. WAR DEP'T, HANDBOOK ON GERMAN MILITARY FORCES 411-13 (1945).

104. STRATEGIC VISION, *supra* note 3, at 17.

105. This also brings with it a host of legal and ethical issues. These issues are briefly discussed in the next two sections of this article.

106. Elisabeth Bumiller, *Navy Drone Violated Washington Airspace*, N.Y. TIMES (Aug. 25, 2010), http://www.nytimes.com/2010/08/26/us/26drone.html.

107. *Id.*

108. Siobhan Gorman et al., *Insurgents Hack U.S. Drones*, WALL ST. J. (Dec. 17, 2009), http://online.wsj.com/article/SB126102247889095011.html.

109. *Id.*

110. FLIGHT PLAN, *supra* note 21, at 45; *see also*, STRATEGIC VISION *supra* note 3, at 17.

111. FLIGHT PLAN, *supra* note 21, at 43.

for bandwidth with a number of other communications users, including TV, phone, and data users.[112] This reliance on commercial satellites appears to be of significant concern for the USAF, as it recognizes that in "using remote split operations, it is critical that communications be as robust and assured as possible."[113]

RPAs also suffer some of the same vulnerabilities and limitations as manned aircraft, such as effects of extreme weather, kinetic and non-kinetic weapon threats, and "reliability" issues.[114] During the last four years, dozens of RPAs have crashed due to pilot error, mechanical failure, and/or electrical failure.[115] The USAF refers to these "human and material factors" as the "root causes leading to mishaps."[116] Also like other manned aircraft, RPA crashes occur most often during the takeoff and landing sequences of the flight.[117] Not surprisingly then, the USAF's short-term projections for RPAs include the ability to take off and land autonomously.[118] The USAF has also projected other advances in RPA technology to address or overcome current vulnerabilities or limitations. Many of these advancements will include, at least to some degree, increasing levels of vehicle autonomy.

III. ADDRESSING VULNERABILITIES WHILE ADVANCING TOWARD AUTONOMY

In a 2009 address, the Chief of Staff of the Air Force said, "[T]oday, the evolution of the machine is beginning to outpace the capability of the people we put in them. We now must reconsider the relationship of man and woman, machine, and air."[119] In reconsidering that relationship, the USAF finds the value of RPAs particularly "compelling where human physiology limits mission execution (e.g. persistence, speed of reaction, contaminated environment)."[120] Given the evolving nature of the relationship between humans and machines, it seems the thrust of advancing RPA technology is a move toward fully autonomous drones. While relative autonomy is certainly important, there is much more to the evolution of drone warfare than automation.

At least for now, U.S. RPAs have their place in airspace over rugged battlefields in underdeveloped countries like Afghanistan and Pakistan, where air superiority[121] is virtually guaranteed. However, in more advanced battlefields where air superiority is anything but certain, RPA systems must continually evolve

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112. *Id.*

113. *Id.* at 44.

114. STRATEGIC VISION, *supra* note 3, at 11-12.

115. *Drone Crash Database*, DRONE WARS UK, http://dronewarsuk.wordpress.com/drone-crash-database/ (compilation of reports on RPA crashes since 2007).

116. FLIGHT PLAN, *supra* note 21, at 81.

117. *Id.* at 58.

118. *Id.* at 17-18.

119. General Norton Schwartz, Chief of Staff, Air Force Ass'n Convention (Sept. 15, 2009), *available at* http://www.af.mil/shared/media/document/AFD-090915-240.pdf.

120. FLIGHT PLAN, *supra* note 21, at 14.

121. Air superiority, as defined by the U.S. Department of Defense, is "[t]hat degree of dominance in the air battle of one force over another that permits the conduct of operations by the former and its related land, maritime, and air forces at a given time and place without prohibitive interference by the opposing force." *Terms*, *supra* note 36, at 17.

to meet the many mission demands of a modern military. A few of the key capabilities of future USAF RPA systems include secure, proprietary communications links, radar avoidance or jamming, increased sensor capabilities, interoperability between drones, extended loiter time, and of course, increased autonomy.

To reduce dependence on leased commercial satellite bandwidth, the USAF has already begun transitioning RPA system communications to a military constellation of satellites—the Wideband Global SATCOM (WGS) constellation.[122] By 2016, almost half of Predator and Reaper CAPs will count on WGS for secure communications.[123] The USAF is also exploring a "surrogate satellite" system.[124] This high altitude lighter-than-air system (also known as a blimp) would function essentially as a satellite, relaying voice, video and data over a secure network—although not in a space orbit and functioning at a fraction of the cost of commercial or proprietary satellites.[125]

Three RPAs—the Global Observer, the X-47B, and the Phantom Ray—are in testing phase in early 2011 and already promise to fulfill many USAF projections for enhanced RPA capabilities.[126] The Global Observer flies as high as 65,000 feet for several days at a time and can survey an area of 280,000 square miles in an instant.[127] Obviously, this constitutes an ISR capability entirely unrivaled by aircraft in use today. The X-47B and the Phantom Ray are both jet-powered and built to evade enemy radar using stealth technologies.[128] Both will perform precision attacks behind enemy lines, including attacks of enemy air defenses.[129] To meet geographical mission demands, the X-47B is designed to take off from and land on an aircraft carrier.[130]

The U.S. has also participated in development of nanotechnology. Among recent advances is a six-inch flying vehicle called the Nano Hummingbird, which is capable of hovering in small spaces for as long as eight minutes.[131] Additionally, the USAF in March 2011 launched its X-37B unmanned spacecraft on only its second acknowledged space flight.[132] The first flight began in April

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122. FLIGHT PLAN, *supra* note 21, at 43-44.

123. *Id.* at 44.

124. *Id.*

125. *Id.*

126. W.J. Hennigan, *Drones Becoming Speedier, Deadlier*, L.A. TIMES (Jan. 11, 2011, 12:57 PM), http://www.standard.net/topics/business/2011/01/11/drones-becoming-speedier-deadlier.

127. *Id.*

128. *Id.*

129. *Id.*

130. Nathan Hodge, *Drone Will Call Aircraft Carriers Home*, WALL ST. J. (Feb. 8, 2011), http://online.wsj.com/article/SB10001424052748703507804576130493035362556.html.

131. W.J. Hennigan, *It's a Bird! It's a Spy! It's Both*, L.A. TIMES (Feb. 17, 2011), http://articles.latimes.com/2011/feb/17/business/la-fi-hummingbird-drone-20110217.

132. W.J. Hennigan, *Air Force X-37B Space Plane Launched into Orbit*, L.A. TIMES (Mar. 6, 2011), http://www.latimes.com/news/nationworld/nation/la-na-space-plane-launch-20110306,0,7354977 .story [hereinafter *Air Force X-37B*].

2010 and lasted 224 days—concluding with a fully autonomous landing. [133] According to the USAF, the X-37B is capable of orbiting earth for 270 days and is said to be a platform for testing new technologies in space.[134]

As for autonomy, the USAF plans to include autonomous capabilities in RPA systems "where it increases overall effectiveness...."[135] The immediate future will include RPAs with the ability to autonomously takeoff and land, as well as "swarm," which is to fly autonomously in a group while "sensing" each other to avoid collisions.[136] "Medium-sized" RPAs, such as the Reaper, are expected by 2020 to be able to employ air-to-air weapons.[137] By 2030, RPAs would be able to conduct air refueling of other RPAs.[138] Larger RPAs of the future are expected to incorporate autonomous takeoff and landing, cargo transport, air refueling, humanitarian assistance airlift, strategic attack, global strike, and even ground operations such as pallet loading and ground refueling.[139] The role of humans in these future ground operations would be that of "monitoring of autonomous actions."[140]

The concern, however, is that as drone technology evolves, commander involvement will become marginalized—not just during ground operations but during all aspects of RPA operations. Most disconcerting, of course, is the marginalized human (or commander) involvement during RPA operations that entail the use of force. As drone technology advances toward increasing autonomy, especially in the context of armed conflict, the single most important military function is and will always be command and control.

A. Command and Control during Deployment of Fully Autonomous Vehicles

Much has been made of the danger of including semiautonomous, autonomous, and other robotic weapons in military arsenals. One recent publication asserted that "[e]very time you hear about a 'drone attack'... that's an unmanned robot dropping bombs.... Push a button and it flies away, kills, and comes home."[141] Another author concludes that "if contact is lost with the drones, they begin making their own decisions."[142] Yet another author asserts that a fully

133. *Id.*

134. Leonard David, *Secretive Air Force X37-B Robotic Space Plane May Be Nearing Mission's End*, SPACE.COM (Nov. 22, 2010, 2:45 PM), http://www.space.com/9575-secretive-air-force-37b-robotic-space-plane-nearing-mission.html.

135. FLIGHT PLAN, *supra* note 21, at 33.

136. *Id.* at 33-34; *see also* William Matthews, *Project Would Empower UAVs to Fly Themselves*, A.F. TIMES (Oct. 10, 2010, 2:05 PM), http://www.airforcetimes.com/news/2010/10/air-force-uavs-to-fly-themselves-101010/.

137. FLIGHT PLAN, *supra* note 21, at 38.

138. *Id.*

139. *Id.* at 40.

140. *Id.*

141. Johann Hari, *The Age of the Killer Robot is no Longer a Sci-Fi Fantasy*, THE INDEPENDENT (Jan. 22, 2010), http://www.independent.co.uk/opinion/commentators/johann-hari/johann-hari-the-age-of-the-killer-robot-is-no-longer-a-scifi-fantasy-1875220.html.

142. Jane Mayer, *The Predator War: What are the Risks of the C.I.A.'s Covert Drone Program?*, THE NEW YORKER (Oct. 26, 2009), http://www.newyorker.com/ reporting/2009/

autonomous robot is a "weapon[]... so abhorrent", its use should be discontinued immediately.[143] And finally, another author suggests that current RPA systems are becoming de facto autonomous as human pilots tend to "defer" to conclusions reached by a computer, even over their own judgment, given the many decisions pilots are required to make in "split seconds."[144]

A former USAF RPA squadron commander laughed when asked about "fully autonomous" drones and the idea, in particular, that an operator could push a button as if to "unleash" a drone to go hunt and kill a target. "I'm ok with my vacuum being fully autonomous," he replied, flippantly.[145] He clarified that he knows of no RPA or drone that autonomously and unilaterally selects, tracks, and kills targets. When asked why such a weapon was not employed, he stated simply, "The ROE wouldn't allow it—nothing in the ROE would allow for those decisions to be automated." Pressed further on his understanding of the Rules of Engagement (ROE), he described them as very specific rules for using force that he and his operators were obligated to follow. Of note, he did not cite a lack of technology as a barrier to employing a fully autonomous capability—only a concern that it would violate the ROE.[146]

The USAF has planned for the potential use of force using autonomous weapons systems, recognizing that "advances in [artificial intelligence] will enable systems to make combat decisions and act within legal policy constraints without necessarily requiring human input."[147] Assuming political and military leaders resolve ethical, legal, and policy issues in favor of allowing varying degrees of autonomy in RPA operations, the USAF believes that

> commanders must retain the ability to refine the level of autonomy the systems will be granted by mission type, and in some cases by mission phase, just as they set rules of engagement for the personnel under their command today. The trust required for increased autonomy of systems will be developed incrementally. The systems' programming will be based on human intent, with humans monitoring the execution of operations and retaining the ability to override the system or change the level of autonomy instantaneously during the mission."[148]

In other words, the USAF is committed to retaining command and control of all RPA operations, regardless of the relative autonomy of the vehicles. This concept is not new. Several weapons already in use by the U.S. military are

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10/26/091026fa_fact_mayer.

143. The Editors, *Terminate the Terminators*, SCI. AM. (June 29, 2010), http://www.scientificamerican.com/article.cfm?id=terminate-the-terminators.

144. O'Connell, *supra* note 29, at 6. (suggesting that this tendency to rely on conclusions reached by a computer will increase as RPA pilots are required to command multiple aircraft—stating that "while the computer is not technically 'autonomous' in deciding to strike, that is becoming the reality.").

145. Neither offense to nor endorsement of any robotic carpet cleaning system is intended.

146. *See supra* note 80 and accompanying text on ROE.

147. FLIGHT PLAN, *supra* note 21, at 41.

148. *Id.*

capable of operating, essentially, in fully autonomous modes. However, the specific methods in which they are employed by commanders ensure their compliance with IHL.

The U.S. Navy's Phalanx Close-In Weapons System, for example, is a 20-mm Gatling Gun mounted on the deck of U.S. Navy ships that autonomously performs "search, detect, evaluation, track, engage and kill assessment functions."[149] The Phalanx is employed to confront "Anti Ship Missiles (ASM), aircraft, and littoral warfare threats that have penetrated other fleet defenses."[150] It accomplishes this mission by autonomously identifying a target as it moves toward the defended ship, tracking the target with radar, and eliminating the target by firing hundreds of rounds of armor piercing ammunition at the incoming target.[151] This entire process requires mere seconds to accomplish, obviously exceeding human abilities. Use of this autonomous weapon system complies with IHL because commanders utilize the system only after having already analyzed its employment in terms of compliance with IHL. Commanders can be certain that any object speeding toward and threatening their ship is indeed a valid military objective. Furthermore, given that U.S. Navy battles are fought over open water, commanders are certain that the Phalanx's armor piercing rounds will cause little or no collateral damage as they fall to the ocean. Of course, while in littoral waters or in port, a commander would need to further assess the implications of employing this weapon.

During the last six years, the U.S. Army has employed a variant of the Phalanx—the Counter Rocket, Artillery, and Mortar (C-RAM). The C-RAM is essentially the same system but is employed on land as a defense against incoming rocket and mortar rounds.[152] The C-RAM was introduced in 2005 at U.S. bases in Iraq and was shown in tests to have a 60-70% shoot-down capability.[153] As the C-RAM is employed on land, collateral damage is a concern. To address that concern and thereby comply with IHL, the C-RAM fires self-destructing (exploding) munitions, as opposed to hardened, armor piercing munitions.[154] Consequently, the danger to civilians on the ground is that of falling fragments from the exploding rounds or from a detonated mortar or rocket—which can be deemed by commanders to not be excessive in relation to the anticipated military advantage of taking out an incoming threat. Thus, these "autonomous" weapon systems comply with IHL principles of distinction and proportionality.

The essence of complying with IHL in employing autonomous weapons is the retention of command and control by commanders. A fully autonomous drone

149. MK 15 Phalanx Close-In Weapons System (CIWS), United States Navy Fact File (Nov. 5, 2010), http://www.navy.mil/navydata/fact_display.asp?cid=2100&tid=800&ct=2.

150. *Id.*

151. Phalanx Close-In Weapon System, Raytheon (Mar. 2008), http://www.raytheon.com/capabilities/products/stellent/groups/public/documents/content/cms04_019379.pdf.

152. Counter Rocket, Artillery, and Mortar (C-RAM), GlobalSecurity.org (Feb. 10, 2006), http://www.globalsecurity.org/military/systems/ground/cram.htm.

153. *Id.*

154. *Id.*

could be programmed to complete a battlefield mission and yet still be controlled by commanders. However, in the event an autonomous weapon takes an action not intended by its commander, command and control is lost and that commander who has lost control risks violating IHL if his or her weapon system becomes indiscriminate. This same risk is true for a commander who loses control of his or her troops. The bottom line is that a commander's duty is to command, whether the movement and action of troops or the employment of weapon systems on the battlefield.

Apart from losing control of a weapon system, a commander or operator can also misuse a fully autonomous drone or weapon. In case of misuse, commanders and operators risk violating IHL. The potential for misuse of a weapon, however, does not necessarily render that weapon system incompatible with IHL. Commentary on Article 36 of Additional Protocol I confirms this, providing that "[a] State is not required to foresee or analyze all possible misuses of a weapon, for almost any weapon can be misused in ways that would be prohibited."[155] Thus, the risk of misuse exists for RPAs just as it does for any weapon.

Notwithstanding the ability to employ autonomous weapons in compliance with IHL, drafters of Additional Protocol I provide the following warning on the subject of automated warfare:

> The use of long distance, remote control weapons, or weapons connected to sensors positioned in the field, leads to the automation of the battlefield in which the soldier plays an increasingly less important role. The counter-measures developed as a result of this evolution...exacerbates the indiscriminate character of combat. In short, all predictions agree that if man does not master technology, but allows it to master him, he will be destroyed by technology."[156]

In other words, even though advanced technology may allow autonomous weapons to be used in compliance with IHL, commanders or operators must nonetheless retain command and control.

B. Indiscriminate Weapons and Attacks

So as to not violate the principle of distinction, "indiscriminate attacks" and "indiscriminate weapons" are prohibited under IHL. Article 51(4) of Additional Protocol I prohibits indiscriminate attacks, describing such an attack as one "not directed at a specific military objective," or one which employs "a method or means of combat which cannot be directed at a specific military objective," or one that employs a "method or means of combat the effects of which cannot be limited as required by the Protocol."[157] The rationale for these prohibitions is that these described attacks are "of a nature to strike military objectives and civilians or civilian objectives without distinction."[158] The ICRC study on customary

155. Protocol I, *supra* note 71, at art. 36, ¶ 1469.
156. *Id.* at art. 36 ¶ 1476.
157. *Id.* at art. 51 ¶ 4 (a, b, c).
158. *Id.* at art.51 ¶ 4 (c).

international humanitarian law states that "[t]he use of weapons which are by nature indiscriminate is prohibited."[159] Such a weapon is described as one that "cannot be directed at a military objective or whose effects cannot be limited as required by international humanitarian law."[160]

Some have argued that RPAs are inherently indiscriminate weapons and a per se violation of IHL, based apparently in part on multiple civilian casualties (collateral damage) in the vicinity of targeted individuals.[161] One author even claims that "[m]issiles from errant drones have already killed as many as 1,000 civilians in Iraq, Afghanistan and Pakistan."[162] On the contrary, it is precisely because of these advanced RPA systems that it is difficult for RPA operators to say after an ill-advised attack that it was a "case of mistaken identity," assuming intelligence provided to RPA operators by other sources is accurate.[163]

Indeed, certain weapons are by their very nature indiscriminate (e.g., chemical, biological, and nuclear weapons). The United Nations General Assembly described chemical and biological weapons as "inherently reprehensible because their effects are often uncontrollable and unpredictable."[164] RPAs, as currently employed by the USAF, do not in any way fit this profile.

The U.N. Special Rapporteur on extrajudicial, summary or arbitrary executions agreed, stating that "a missile fired from a drone is no different from any other commonly used weapon, including a gun fired by a soldier or a helicopter or gunship that fires missiles."[165] "The critical legal question...," he added, is "whether its specific use complies with IHL."[166] In the event an operator employs an RPA in an uncontrollable or unpredictable manner, such that civilians or civilian objects are indiscriminately attacked, that operator, or even the superior commander of that operator, can be held accountable under the IHL principle of command responsibility.

IV. COMMAND RESPONSIBILITY: ACCOUNTABILITY FOR COMPLIANCE WITH IHL

The primary duty of a military commander is to exercise command. Inherent in exercising command, a commander creates within an armed force a hierarchical regime through which the commander ensures internal discipline.[167] Military

159. HENCKAERTS & DOSWALD-BECK, *supra* note 71, at 244.

160. *Id.*

161. Murray Wardrop, *Unmanned Drones Could be Banned, Says Senior Judge*, THE TELEGRAPH, July 6, 2009, http://www.telegraph.co.uk/news/uknews/defence/5755446/Unmanned-drones-could-be-banned-says-senior-judge.html.

162. The Editors, *Terminate the Terminators*, SCIENTIFIC AMERICAN (June 29, 2010), http://www.scientificamerican.com/article.cfm?id=terminate-the-terminators.

163. Michael N. Schmitt, *Precision Attack and International Humanitarian Law*, INT'L COMM. OF THE RED CROSS, 455 (Sept. 2005), http://www.icrc.org/eng/assets/files/other/irrc_859_schmitt.pdf.

164. G.A. Res. 2603 (XXIV), U.N. GAOR, 24th Sess., Supp. No. 30, U.N. Doc. A/7630, at 16 (Dec. 16, 1969).

165. Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions, *Study on Targeted Killings*, Human Rights Comm'n, ¶ 79, U.N. Doc. A/HRC/14/24/Add.6 (May 28, 2010) (by Philip Alston).

166. *Id.*

167. Protocol I, *supra* note 71, art. 87.

members know this hierarchy as the chain of command. Using this chain of command, commanders properly have command and control of subordinates and are thereby empowered to ensure compliance with IHL during armed conflict. A commander is of course held accountable for his or her own actions that violate IHL—the same as all other individuals on the battlefield.[168] However, pursuant to the principle of command responsibility, a commander might also be accountable for a subordinate's violation of IHL.[169]

Article 87(1) of Additional Protocol I provides that High Contracting Parties must "require military commanders...to prevent and, where necessary, to suppress and report" breaches of IHL. Commanders must also "ensure that members of the armed forces under their command are aware of their obligations" under IHL.[170] And finally, commanders must "initiate disciplinary or penal action against violators" of IHL.[171] These duties are also recognized as customary international humanitarian law, which certainly pre-dates Additional Protocol I , as evidenced by the trial of Japanese General Tomoyuki Yamashita.[172]

A. The "Yamashita" Standard for Command Responsibility

On December 7, 1945, a military commission sentenced Japanese General Tomoyuki Yamashita to death by hanging[173] in what has been described as "the first time a military commander had been found guilty of war crimes committed by his soldiers because of his failure to adequately supervise them."[174] The findings and decisions by the military commission were subsequently reviewed by the Supreme Court of the United States, which upheld the Commission.[175] The original charge during the military commission was that Yamashita,

> while commander of armed forces of Japan at war with the United States of America and its allies, unlawfully disregarded and failed to discharge his duty as commander to control the operations of the

168. HENCKAERTS & DOSWALD-BECK, *supra* note 71, at 551.

169. *See generally* Major William H. Parks, *Command Responsibility For War Crimes*, 62 MIL. L. REV. 1 (1973) (discussing war crimes involving command responsibility and including in his "examination a view of the criminal responsibility of the combat commander, possible offenses, and the degree of intent required under both domestic and international law").

170. Protocol I, *supra* note 71, at art. 87(2).

171. *Id.* at art. 87(3).

172. HENCKAERTS & DOSWALD-BECK, *supra* note 71, at 556-63; *see* In re Yamashita, 327 U.S. 1 (1946) (holding it is a violation of the laws of war when a commander fails to control the operations of members of his command who commit atrocities).

173. *Yamashita*, 327 U.S. at 5.

174. Major Michael L. Smidt, *Yamashita, Medina, and Beyond: Command Responsibility in Contemporary Military Operations*, 164 MIL. L. REV. 155, 177 (2000); *see also* U.N. WAR CRIMES COMM'N, LAW REPORTS OF TRIALS OF WAR CRIMINALS VOLUME IV 4 (1948), *available at* http://www.loc.gov/rr/frd/Military_Law/pdf/Law-Reports_Vol-4.pdf [hereinafter LAW REPORTS]; *see generally Yamashita*, 327 U.S. 1 (1946) (holding it is a violation of the laws of war when a commander fails to control the operations of members of his command who commit atrocities).

175. *Yamashita*, 327 U.S. at 25-26.

> members of his command, permitting them to commit brutal atrocities and other high crimes... thereby violat[ing] the laws of war.[176]

A bill of particulars filed by the prosecution alleged 123 specific acts committed by General Yamashita's subordinates.[177] Among the acts alleged was the carrying out of "a deliberate plan and purpose to massacre and exterminate a large part of the civilian population... and to devastate and destroy public, private and religious property therein, as a result of which more than 25,000 men, women and children, all unarmed noncombatant civilians, were brutally mistreated and killed...."[178] Other acts alleged included "beating, wounding, torturing, mutilating, maiming, raping, attempting to rape, killing, attempting to kill, executing, burning alive, massacring and exterminating."[179]

Yamashita argued that the charge against him did not constitute a violation of the law of war because it neither alleged that he committed nor alleged that he directed the specific acts described in the bill of particulars.[180] Notably, the charge did not even allege that Yamashita had knowledge of the commission of the acts alleged.[181] In considering this issue, the Supreme Court found that "the law of war presupposes that its violation is to be avoided through the control of the operations of war by commanders who are to some extent responsible for their subordinates."[182] Referencing several provisions of international law regarding duties of commanders, the Supreme Court further found that Yamashita had "an affirmative duty to take such measures as were within his power and appropriate in the circumstances to protect prisoners of war and the civilian population."[183] In essence, the Commission held Yamashita accountable for his subordinates' violations of IHL based on the fact that he must have known of those violations and failed to prevent or repress them.[184]

This standard for command responsibility has since been reiterated and further refined in multiple instances under IHL.[185] Each instance reflects, with

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176. *Id.* at 13-14; LAW REPORTS, *supra* note 174, at 3-4.

177. *Yamashita*, 327 U.S. at 14; LAW REPORTS, *supra* note 174, at 4.

178. *Yamashita*, 327 U.S. at 14; LAW REPORTS, *supra* note 174, at 5.

179. U.N. COMM'N, *supra* note 174, at 5.

180. *Yamashita*, 327 U.S. at 14.

181. *Id.* at 28. Justice Murphy, in a vigorous dissent, noted perceived insufficiencies in the charge. He wrote: "[Yamashita] was not charged with personally participating in the acts of atrocity or with ordering or condoning their commission. Not even knowledge of these crimes was attributed to him...The recorded annals of warfare and the established principles of international law afford not the slightest precedent for such a charge." *Id.*

182. *Id.* at 15.

183. *Id.* at 16.

184. U.N. COMM'N, *supra* note 174, at 35. The Commission's judgment read as follows: "General Yamashita: The Commission concludes: (1) That a series of atrocities and other high crimes have been committed by members of the Japanese armed forces under your command...that they were not sporadic in nature but in many cases were methodically supervised by Japanese officers and noncommissioned officers; (2) That during the period in question you failed to provide effective control of your troops as was required by the circumstances." *Id.*

185. The standard for command responsibility has been codified in numerous instances, to include: Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of

slight variation, the standard set out and recognized as customary international humanitarian law—which is:

> Commanders and other superiors are criminally responsible for war crimes committed by their subordinates if they knew, or had reason to know, that the subordinates were about to commit or were committing such crimes and did not take all necessary and reasonable measures in their power to prevent their commission, or if such crimes had been committed, to punish persons responsible.[186]

Generally speaking, as summarized in a 1994 United Nations Security Council letter, responsibility for a subordinate's conduct attaches 1) where the commander knew of a subordinate's criminal behavior and failed to take steps to prevent it, 2) where the commander showed "serious personal dereliction" such as to "constitute a willful and wanton disregard of the possible consequences" of a subordinate's criminal behavior, or 3) where "despite pleas to the contrary, the commander, under the facts and circumstances of the particular case, must have known of the offences charged and acquiesced therein."[187]

B. Command Responsibility during USAF RPA Operations

We assume the requirements of command responsibility apply at the highest levels of command, but might they also apply to a commander of an RPA squadron? To the aircraft commander (pilot) of an RPA? To the ground commander of a special forces team calling in strikes by an RPA? Absolutely! Commentary on article 87 of Additional Protocol I explains:

> There is no member of the armed forces exercising command who is not obliged to ensure the proper application of the Conventions and the Protocol. As there is no part of the army which is not subordinated to a military commander at whatever level, this responsibility applies from the highest to the lowest level of the hierarchy, from the Commander-in-Chief down to the common soldier who takes over as head of the platoon to which he belongs at the moment his commanding officer has fallen and is no longer capable of fulfilling his task.[188]

Commanders then, at all levels of command, are accountable for the weapons they employ, the method in which they employ them, and the consequences resulting from such employment.

This is the case during RPA and other drone operations as a drone, at most, is a weapon or part of a weapon system employed on the battlefield either by

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Victims of International Armed Conflicts (Protocol I), art. 86; Updated Statute of the International Criminal Tribunal for the Former Yugoslavia, art. 7(3); Statute of the International Tribunal for Rwanda, U.N. SCOR, 49th Sess., art. 6(3), U.N. Doc. S/Res/955 (1994); and finally, Rome Statute of the International Criminal Court, art. 28, U.N. Doc. A/CONF.183/9 (Jan. 16, 2002).

186. HENCKAERTS & DOSWALD-BECK, *supra* note 71, at 558.

187. Letter, United Nations Security Council, Letter dated 24 May 1994 from the Secretary-General to the President of the Security Council, U.N. Doc. S/1994/674, ¶ 58 (May 27, 1994).

188. HENCKAERTS & DOSWALD-BECK, *supra* note 71.

commanders or at the direction of commanders. [189] Regardless of the mission or weapon system employed, every member of an armed force who commands, at whatever level, must be held accountable under the principle of command responsibility. No legal or military regime exists to place accountability on machines, drones, androids, or RPAs—nor should it exist.

For example, if a soldier used a pistol to kill a surrendering adversary, no one would suggest that the pistol committed a war crime. Clearly, the soldier committed the war crime. Further, if the crime was ordered by, acquiesced in or ignored by a commander, that commander also committed the war crime. A drone, no matter how technologically advanced, is similar to the pistol. Someone must use it before it can take any effect. If during the course of its use a war crime is committed, responsibility for the results will be on the person who employed it—and certainly not on the machine itself. IHL, by design, properly holds individuals and commanders accountable for their behavior during armed conflict. A recent case from the U.S. military demonstrates this principle.

In February 2010, a failed U.S. RPA operation took the lives of as many as 23 civilians in Afghanistan.[190] A report found that a Nevada-based Predator crew gave incomplete and inaccurate reports to a ground commander in Afghanistan.[191] The Predator crew ignored numerous indications that the people they were tracking during three and a half hours were, at least in part, civilians.[192] They also failed to acknowledge or forward messages from their intelligence analysts noting that children were visible among the individuals being tracked.[193] Based on the faulty reports (and lack of reports), the ground commander authorized and assisted in a missile strike by a nearby attack helicopter.[194] The missile strike took the lives of the Afghan civilians.[195] Upon completion of a thorough investigation, General Stanley McChrystal "issued formal letters of reprimand to four high-ranking officers, including brigade and battalion commanders, and letters of admonishment to two junior officers," almost certainly career-ending administrative actions, especially for the commanders.[196]

Two aspects of this case are noteworthy in demonstrating the principles of command responsibility. First, commanders even at lower levels who failed to comply with IHL were punished for their dereliction. Second, a commander at nearly the highest level, General McChrystal, complied with his obligations under

189. ZACHARY TUMIN ET AL., UNMANNED AND ROBOTIC WARFARE: ISSUES, OPTIONS, AND FUTURES 10 (President and Fellows of Harvard 2008), http://www.boozallen.com/media/file/Unmanned_and_Robotic_Warfare.pdf. This Harvard study pointed out that "unmanned warfare is now, and has always been, in fact a *hybrid system* comprising many individual actors and platforms." *Id.*

190. Dexter Filkins, *Operators of Drones Are Faulted in Afghan Deaths*, N.Y. TIMES, May 29, 2010, *available at* http://www.nytimes.com/2010/05/30/world/asia/30drone.html.

191. Zucchino, *supra* note 88.

192. *Id.*

193. *Id.*

194. Filkins, *supra* note 190.

195. Zucchino, *supra* note 88.

196. *Id.*

command responsibility in holding his subordinates accountable for their noncompliance with IHL. Given that he knew nothing of the violations before they happened or as they happened, his obligation was to "punish the persons responsible," as required under IHL.[197]

V. CONCLUSION

Drones and other automated war-fighting capabilities have existed for at least the last 50 years.[198] It is therefore appropriate to refer to this past decade as a "modern" era of robotic warfare. However, "modern" has already given way to the newest advances, as we are only at the beginning of this technological revolution. The USAF admits to being in the "early stages" of drone warfare and technology, adding that "[a]rming the RQ-1 Predator with Hellfire missiles can be compared to the mounting of guns on biplanes early in the last century."[199] Already, the USAF "is training more pilots for advanced UAVs than for any other single weapons system."[200]

Without a doubt, technology will someday exist which would allow a Soldier, Sailor, Airman, or Marine to completely automate the dirty business of fighting wars. In preparation for that coming evolution, it has been suggested that IHL should appropriately evolve. It is true that with evolution of warfare often comes the need for evolution in IHL. The Additional Protocols to the four 1949 Geneva Conventions have been attributed to the fact that "developments in the character of warfare led to the growing realization that the laws of war required further adaptation to the conditions of contemporary hostilities."[201]

However, given the fact that RPA technology is developmentally comparable to mounting guns on biplanes in the early 20th century, an adjustment to IHL at this point would likely be incomplete, uninformed, and shortsighted. Notwithstanding best efforts at predicting future drone technologies, the rapid evolution of these technologies suggests that we cannot accurately predict the various implications of such advancements. IHL drafted specifically to address concerns related to drone warfare would likely be outdated even before it is promulgated.

For the moment, current IHL, especially long-standing customary international humanitarian law concepts, seem well-poised to address foreseeable issues relating to employment by military members of drone technology on the battlefield. At all times, commanders must exercise command and control over their troops and weapon systems. Furthermore, force under a commander's control must be used in compliance with core IHL principles—including distinction and

197. HENCKAERTS & DOSWALD-BECK, *supra* note 71, at 58.

198. THOMAS P. EHRHARD, AIR FORCE UAVS: THE SECRET HISTORY 4 (2010), http://www.afa.org/mitchell/reports/MS_UAV_0710.pdf.

199. STRATEGIC VISION, *supra* note 3, at 6.

200. Robert M. Gates, Secretary of Defense, Speech delivered at the United States Air Force Academy (Mar. 4, 2011), http://www.defense.gov/speeches/speech.aspx?speechid=1543.

201. DOCUMENTS ON THE LAW OF WAR 419 (ADAM ROBERTS & RICHARD GUELFF eds., 3d ed. 2000).

proportionality.[202] And finally, in the event a commander fails to comply with these principles, that commander should be held accountable under the IHL principle of command responsibility.

202. Undoubtedly, RPAs comprise a highly-advanced, highly-effective weapon system for military commanders. Furthermore, USAF RPA operations as described in this article (RPA's unique capabilities coupled with the USAF's internal policies and ROE) enable operators to conduct a broad spectrum of military missions in full compliance with IHL. (As mentioned previously throughout the article, compliance with IHL using RPAs assumes accurate intelligence provided to RPA operators by outside sources.)