Killing in High Definition:
Combat Stress among Operators of Remotely Piloted Aircraft

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In what has been dubbed the "RPA Revolution," the United States Air Force (USAF) has greatly expanded its fleet of Remotely Piloted Aircraft (RPA) since 2002. Fielding only a few dozen RPA during that year, the force boasted 256 in 2012 and intends to have close to 400 by 2017.[1] Capable of conducting long-duration surveillance and airstrike missions, RPA have played an indispensible part in USAF operations in Afghanistan, Iraq, and Libya. These aircraft have also been used by the CIA to carry out controversial airstrikes against suspected terrorists in Pakistan, Somalia, and Yemen.

Alongside the USAF's growing RPA fleet, a new class of military personnel has emerged: RPA operators. Since 2009, the USAF has trained more operators than fighter and bomber pilots combined, but demand for operators currently exceeds supply.[2] Indeed, although the organization fielded over 2,300 pilots and sensor operators in 2012, it continued to rely on a steady stream of new recruits and retrained veterans of non-flying trades, including civil engineers and military police, to try to make up for a shortfall of over 600 personnel.[3] Given the USAF's clear commitment to RPA, it seems likely that these aircraft will make up a majority of the force's total fleet by 2025.[4]

Despite the growing importance of RPA operators, little attention has been paid to the risks associated with their work. Rather, most scholarship on the use of RPA has focused on the legality, morality, or effectiveness of their use, not the well-being of the people who operate them.[5] Overlooking the risks faced by RPA operators is unsurprising. Employing RPA for airstrikes is commonly assumed to be a "costless" way to fight a war because the operators control their aircraft from bases thousands of kilometers away from their targets.[6] Scholars ere, however, when they assume that the physical safety enjoyed by most RPA operators also affords them protection from psychological harm. Reflecting the sentiments of a number of scholars who are critical of the USAF's use of RPA, Laurie Calhoun assumes that, because operators tend to be located far from the battlefield, they remain

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[1] Under Secretary of Defense for Acquisition, Technology, and Logistics, "Department of Defense Report to Congress on Future Unmanned Aircraft Systems Training, Operations, and Sustainability," (Washington, DC: Department of Defense, April 2012), 2.

[2] The Subcommittee on National Security and Foreign Affairs of The Committee on Oversight and Government Reform, "Rise of the Drones: Unmanned Systems and the Future of War - Hearing before The Subcommittee on National Security and Foreign Affairs of The Committee on Oversight and Government Reform," (Washington, DC: House of Representatives, Congress of the United States, March 23, 2010), 2; T. Vanden Brook, "Air Force to Train More on Drones," *USA Today*, June 16, 2009.

[3] Under Secretary of Defense for Acquisition, "Department of Defense Report to Congress on Future Unmanned Aircraft Systems Training, Operations, and Sustainability," 3; David Zucchino, "Stress of Combat Reaches Drone Crews," *The Los Angelas Times*, March 18, 2012.

[4] Elisabeth Bumiller, "A Day Job Waiting for a Kill Shot a World Away," *The New York Times*, July 29, 2012.

[5] See, for example, Laurie Calhoun, "The End of Military Virtue," *Peace Review: A Journal of Social Justice* 23, no. 3 (2011); Chris Cole, "Drone Wars Briefing: Examining the Growing Threat of Unmanned Warfare," (London, UK: Drone Wars UK, January 2012); Linda Johansson, "Is it Morally Right to Use Unmanned Aerial Vehicles (UAVs) in War?," *Philosophy & Technology* 24 (2011); Frank Sauer and Niklas Schornig, "Killer Drones: The 'Silver Bullet' of Democratic Warfare?," *Security Dialogue* 43, no. 4 (2012).

[6] P. W. Singer, "Do Drones Undermine Democracy?," *The New York Times*, January 22, 2012; US Department of Defense, "Unmanned systems roadmap 2007-2032," (Washington, DC: Department of Defense, 2007), 19.

psychologically detached and unaffected when they kill human targets during their missions.[7] Framed in this manner, operators appear to be little more than "adept videogame players," who are entirely removed from the horrors of war.[8]

Although many scholars share these assumptions about the risks faced by RPA operators, they are incorrect. To be sure, RPA operators run a much lower risk of suffering physical harm, when compared to the pilots of manned aircraft; however, they experience combat stress levels on a par with those experienced by their highflying counterparts.[9] Two aspects of the USAF's RPA operations contribute to combat stress. First, RPA operators routinely see traumatic images, including the graphic deaths of the people they kill during their missions, via the real-time video feeds displayed on the high definition monitors that make up their "virtual cockpits." Like many ground troops who have killed enemy soldiers at close range, RPA operators may process the images they view into haunting visual memories. Second, the fact that most USAF RPA units are based in the United States means that most operators commute between their family homes and operating stations each day, forcing them to undergo traumatic, rapid shifts between war fighter and civilian mentalities. Returning home at the end of each work day, these operators also typically lack a supportive social environment where they can discuss and alleviate their pent up feelings of combat stress during off-duty hours.

This paper analyzes these aspects of USAF RPA operations in detail and proposes ways to mitigate their stress-inducing effects. Our empirical focus is on the operators of MQ-1 Predators and MQ-9 Reapers. These aircraft can carry air-to-surface missiles, usually AGM-114 Hellfires, and have been utilized in hundreds of airstrikes since 2002. Their operators, therefore, constitute a population that is not only more likely to experience combat stress than their counterparts who operate unarmed RPA, but are also more likely than other RPA operators to benefit from the changes to USAF RPA operations proposed in this paper. Insufficient publically available evidence exists to incorporate the Central Intelligence Agency's (CIA) RPA operations into this study. However, since the aspects of USAF RPA operations discussed in this paper are common to the CIA's RPA operations, the analysis and conclusions put forward in this paper should have relevance to both organizations as well as non-U.S. operators of combat RPA.

Combat Stress among Predator and Reaper Operators

Possessing intelligence, surveillance, and reconnaissance (ISR) capabilities, as well as the capacity to undertake airstrikes, the versatile Predator and Reaper currently form the backbone of the USAF RPA fleet. Although the Predator was originally developed as a reconnaissance aircraft and equipped with multiple still and full-motion video cameras, its role was expanded in 2002 to include strikes against ground targets. Predators are equipped with a sophisticated targeting system, and up to two laser-guided AGM-114 missiles or six AGM-176 Griffin missiles for air-to-ground attacks, and four AIM-92 Stinger air-to-air missiles for defence against other aircraft.[10] The Reaper is larger and more lethal, with a

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[7] Calhoun, "The End of Military Virtue," 382; Sauer and Schornig, "Killer Drones," 370; Lamber Royakkers and Rinie van Est, "The Cubicle Warrior: The Marionette of Digitalized Warfare," *Ethics and Information Technology* 12 (2010): 289-292.

[8] Calhoun, "The End of Military Virtue," 379.

[9] Elizabeth Quintana, "The Ethics and Legal Implications of Military Unmanned Vehicles," (London, UK: Royal United Services Institute, 2008), 20; Mary Ellen O'Connell, "Flying Blind: U.S. Combat Drones Operate Outside International Law," *America* March 15, 2010, 13.

[10] Joseph A. Ouma, Wayne L. Chappelle, and Amber Salinas, "Facets of Occupational Burnout among U.S. Air Force Active Duty and National Guard/Reserve MQ-1 Predator and MQ-9 Reaper Operators," (Wright-Patterson AFB, OH: Air Force Research Laboratory. School of Aerospace Medicine, June 2011), 3.

heightened ability to locate and destroy targets.[11] Indeed, the Reaper flies higher and faster than the Predator and is equipped with Synthetic Aperture Radar, which allows it to more effectively observe and target points on the ground with up to up to 14 AGM-114s, two 500 pound GBU-12 Paveway II laser-guided bombs, or two BGU-38 Joint Direct Attack Munitions.[12]

Both aircraft are operated from ground control stations by teams consisting of a pilot, a sensor operator (SO), and a mission intelligence coordinator (MIC). Seated side-by-side in a trailer on any one of the eight USAF facilities on U.S. soil where combat RPA units are currently based, each of these individuals faces three monitors: one displaying live footage from the RPA's cameras, another displaying data pertaining to flying the aircraft, such as its altitude and fuel level, and another displaying an array of other data.[13] While the pilot is responsible for flying the aircraft and launching weapons, the SO conducts reconnaissance and, using the aircraft's laser targeting system, guides weapons into targets on the ground.[14] The MIC coordinates the flow of information between the aircrew (the pilot and the SO) and outside sources, such as any ground units the RPA is supporting in theatre.[15] Collectively, these individuals perform a number of valuable functions, including providing real-time surveillance to personnel around the globe; guiding and protecting ground forces from enemy attacks; locating and eliminating weapons caches and enemy combatants; and conducting damage assessments following airstrikes.[16]

Given that RPA operators control their aircraft with the aid of joysticks from the safety of trailers located in the United States, it unsurprising that they are perceived to be glorified video game players who remain unaffected by the horrors of war. However, data collected by USAF mental health specialists during the past decade have revealed that RPA operators actually experience considerable stress from performing their duties.[17] For example, a recent survey of Predator and Reaper operators in the USAF revealed that 46 percent of pilots, 41 percent of SOs, and 39 percent of MICs reported experiencing high levels of stress, at least some of which was due to their participation in combat operations.[18] Combat stress is marked by a range of physical, cognitive, behavioural, and emotional symptoms that can be detrimental to an individual's health and well-being. These include, but are not limited to, cardiovascular and respiratory problems, sleep disturbances, depression, an exaggerated or delayed reaction to stimuli, erratic behaviour, and strong feelings of apathy.[19] Moreover, although rates of Post-traumatic Stress Disorder (PTSD) among operators are currently low, reportedly affecting only about four percent of operators, the high levels of combat stress

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[11] Ibid.

[12] Wayne Chappelle, Kent McDonald, and Raymond E. King, "Psychological Attributes Critical to the Performance of MQ-1 Predator and MQ-9 Reaper U.S. Air Force Sensor Operators," (Wright-Patterson Air Force Base, OH: Air Force Research Laboratory, USAF School of Aerospace Medicine, June 2010), 2.

[13] Jefferson Morley, "Boredom, Terror, Deadly Mistakes: Secrets of the New Drone War," *Salon.com*, April 3, 2012.

[14] Chappelle, McDonald, and King, "Psychological Attributes Critical to the Performance of MQ-1 Predator and MQ-9 Reaper U.S. Air Force Sensor Operators," 2; Morley, "Boredom, Terror, Deadly Mistakes: Secrets of the New Drone War."

[15] Chappelle, McDonald, and King, "Psychological Attributes Critical to the Performance of MQ-1 Predator and MQ-9 Reaper U.S. Air Force Sensor Operators," 2.

[16] C. Drew, "Military is Awash in Data from Drones," *The New York Times*, January 11, 2010.

[17] Ouma, Chappelle, and Salinas, "Facets of Occupational Burnout among U.S. Air Force Active Duty and National Guard/Reserve MQ-1 Predator and MQ-9 Reaper Operators; Elisabeth Bumiller, "Air Force Drone Operators Report High Levels of Stress," *The New York Times*, December 18, 2011.

[18] Zucchino, "Stress of Combat Reaches Drone Crews."

[19] Rick L. Campise, Schuyler K. Geller, and Mary E. Campise, "Combat Stress," in *Military Psychology: Clinical and Operational Applications*, ed. Carrie H. Kennedy and Eric. A. Zillmer (New York, NY: The Guilford Press, 2006), 218-219.

being experienced by these individuals places them at high risk of eventually developing this debilitating long-term condition.[20]

Aspects of USAF RPA Operations that Contribute to Combat Stress

Although combat stress has been documented among USAF RPA operators, there is currently little understanding regarding the particular aspects of USAF RPA operations that may contribute to combat stress. This section redresses this gap in the scholarly literature by discussing how viewing traumatic images and operating from RPA bases located in the United States contribute to combat stress among RPA operators.

The Stress-Inducing Effects of Killing in High Definition

As mentioned earlier, certain scholars find it difficult to believe that RPA operators are susceptible to combat stress.[21] Referring to operators as people who, "kill in the manner of sociopaths with no feelings whatsoever for their victims," Calhoun argued that, "When soldiers do not directly risk death through wielding deadly weapons and come in contact with the consequences of their homicidal actions only through surreal video images, it is much easier for them to kill."[22] Calhoun went on to argue that, for RPA operators, "the visceral quality of warfare has been altogether removed from the experience of killing. The emotions associated with the activity of killing and risking death have been progressively muted with distance and now eliminated from the act altogether in summary executions effected by RPAs and managed by desktop warriors."[23] Linda Johansson argued, similarly, that RPA, "enable, more than any other weapon, a form of 'numbed killing'.... due to the fact that combatants are able to maintain an emotional distance by using this more or less autonomous technology."[24] Mary Ellen O'Connell, likewise, asserted that, "Killing with drones is made easy for operators," because, "The operators never see the persons they have killed.... [nor] experiences the place where the attack occurs."[25] Taken together, these commentators conclude that operators participate in warfare without any degree of self-sacrifice.

These claims do not, however, reflect the reality of RPA operations. Indeed, operators are at considerable risk of developing combat stress as a result of regularly seeing traumatic images while performing their duties.[26] Operators may be located far from the battlefields that their aircraft fly over, but they can see the consequences of their actions, including their victims being thrown about and torn apart by explosions, in real time high definition through the monitors that make up their virtual cockpits.[27] As one operator put it, "You are 18 inches

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[20] Zucchino, "Stress of Combat Reaches Drone Crews; Committee on the Assessment of Ongoing Efforts in the Treatment of Posttraumatic Stress Disorder, *Treatment for Posttraumatic Stress Disorder in the Military and Veteran Populations: Initial Assessment* (Washington, DC: National Academies Press, 2012), 39-41.

[21] Medea Benjamin, *Drone Warfare: Killing by Remote Control*, Kindle ed. (New York, NY: OR Books, 2012), Loc. 41-43.

[22] Laurie Calhoun, "The Silencing of Soldiers," *The Independent Review* 16, no. 2 (Fall 2011): 259; Calhoun, "The End of Military Virtue," 381.

[23] Calhoun, "The End of Military Virtue," 382.

[24] Johansson, "Is it Morally Right to Use Unmanned Aerial Vehicles (UAVs) in War?," 283.

[25] O'Connell, "Flying Blind," 12.

[26] Jeff Schogol and Markeshia Ricks, "Demand Grows for UAV Pilots, Sensor Operators," *Air Force Times*, April 21, 2012.

[27] P. W. Singer, *Wired for War: The Robotics Revolution and Conflict in the Twenty-First Century* (New York, NY: Penguin Press, 2009), Loc. 619; Derek Gregory, "From a View to a Kill: Drones and Late Modern War," *Theory Culture Society* 28, no. 7-8 (2011): 7-8; Morley, "Boredom, Terror, Deadly Mistakes: Secrets of the New Drone War; Aliya Robin Deri, "'Costless' War: American and Pakistani Reactions to the U.S. Drone War," *Intersect* 5 (2012): 4; Sauer and Schornig, "Killer Drones," 370; Ouma, Chappelle, and Salinas, "Facets of

away from 32-inch, high-definition combat.... You are there. You are there.... It's not detached. It's not a video game. And it's certainly not 8,000 miles away."[28] An operator described the experience of watching his missiles slam into human targets as "very vivid," and went on to state that the video feeds he and his fellow operators saw made the trauma unfolding before their eyes seem, "right there and personal."[29] Chris Chambliss, a commander of an RPA unit based in Nevada, similarly, recalled that as an operator, you "see the aftermath of what you did.... You have a pretty good optical picture of the individuals on the ground. The images can be pretty graphic, pretty vivid."[30] For example, USAF Major Shannon Rogers recalled seeing the "big smoking hole" produced when his missiles slammed into a truck being driven by a suspected terrorist and claimed that his, "heart was pumping as we were doing our business. It felt just as real to me, however many thousands of miles away, as if I were sitting right there in that cockpit."[31] From this it should be clear that, although RPA operators may be far away from the trauma they inflict, they are very close psychologically.

The psychological distance between RPA operators and their targets is further reduced by the fact that they frequently watch their targets undertaking a wide range of normal, human activities, including eating, defecating, smoking, and interacting with friends and family, before attempting to kill them.[32] The observation period preceding an RPA airstrike, which can last hours, days, or even weeks, causes many RPA operators to develop a strong sense of familiarity with the people they ultimately try to kill, making it difficult and emotionally traumatic to ultimately take their lives.[33] The difficulties associated with this sense of familiarity were well-illustrated by a member of the USAF when he recalled a multi-week RPA operation to observe and then kill a terrorist bomb-maker:

> We watched him wake up in the morning; we watched him leave for work in his vehicle; we tracked him to where he was building these weapons; we watched him eat lunch; we watched him go home and play soccer in his yard with his family — with his two little girls.... We watched him live with his wife; we watched him sleep; we watched him get up in the middle of the night, go to the back of his house and build weapons. We [had] been watching him for so long that we... [had] that part of the history with our operators, who are having the thought in their head of, 'I don't care what you think of this individual, he does have two daughters; I have seen him with his family'.[34]

In comparison to RPA operators, the pilots of manned aircraft sit in cockpits on top of their (usually high-flying) aircraft and are, consequently, not well-positioned to observe the harm they inflict when they attack targets on the ground. Most of the pilots of manned

Occupational Burnout among U.S. Air Force Active Duty and National Guard/Reserve MQ-1 Predator and MQ-9 Reaper Operators," 4-6; Chris Cole, Marry Dobbing, and Amy Hailwood, "Convenient Killing: Armed Drones and the 'Playstation' Mentality," (Oxford, UK: The Fellowship of Reconciliation, 2012), 8.

[28] Schogol and Ricks, "Demand Grows for UAV Pilots, Sensor Operators."

[29] Scot Lindlaw, "Predator Pilots' Stress far from Remote," *The Associated Press* (August 8, 2008).

[30] Ibid.

[31] Robert Sparrow, "Building a Better WarBot: Ethical Issues in the Design of Unmanned Systems for Military Applications," *Science and Engineering Ethics* 15, no. 2 (June 2009): 181.

[32] Robert Sparrow, "Building a Better WarBot: Ethical Issues in the Design of Unmanned Systems for Military Applications," *Science and Engineering Ethics* 15, no. 2 (June 2009): 179-180; Benjamin, *Drone Warfare*, Loc. 274; Bumiller, "A Day Job Waiting for a Kill Shot a World Away; Morley, "Boredom, Terror, Deadly Mistakes: Secrets of the New Drone War."

[33] Greg Miller, "Drone Wars," *Science* 336, no. 6083 (May 18, 2012); Megan McCloskey, "Two Worlds of a Drone Pilot," *Stars and Stripes*, October 27, 2009.

[34] Schogol and Ricks, "Demand Grows for UAV Pilots, Sensor Operators."

combat aircraft that took part in one or more of the USAF's sustained aerial bombing campaigns during the twentieth century probably inflicted considerably more deaths than any RPA operator has; however, these pilots were able to avoid an important cause of combat stress because they could not easily observe the trauma they inflicted upon their victims.[35] To be sure, the pilots who dropped bombs over Germany, Japan, Vietnam, and Iraq could often see the burning structures, forests, and vehicles wrought by their weapons, but they could not readily observe the human lives they snuffed out. J. Douglas Harvey, who piloted American bomber aircraft during strikes on German cities during the Second World War, captured the psychological experience of launching weapons from a manned combat aircraft quite well when he recalled that he "could not visualize the horrible deaths my bombs… had caused.... I had no feeling of guilt."[36] Albert Aimar, a veteran of multiple ground attack missions in jet aircraft, likewise, argued that, "When you come in (to the target area) at 500 to 600 miles per hour, drop a 5,000 pound bomb, and then fly away, you don't see what happens."[37] Dave Grossman, a U.S. Army psychologist, rightly argued that, although pilots of manned aircraft understand they are killing other human beings, they do not internalize this fact, allowing them to avoid developing haunting visual memories of the act of taking human lives.[38]

The literature on military psychology is categorical about the notion that witnessing deaths and serious injuries, especially those that result from one's own actions, is the leading cause of combat stress.[39] Since RPA operators observe the casualties they inflict in real-time high definition video, this circumvents the psychological buffer normally associated with killing from a great physical distance, when a combatant cannot normally see the consequences of his or her actions.[40] Few studies have focussed directly on the relationship between witnessing traumatic images and the development of combat stress among RPA operators. However, the existing empirical literature suggests that, "precision targeting and destroying enemy combatants and assets," and "exposure to live video feed and images of destruction to ensure combatants have been effectively destroyed or neutralized," has contributed to combat stress among RPA operators.[41] Reflecting on this literature, Colonel

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[35] Singer, *Wired for War*, Loc. 7458; Dave Grossman, *On Killing: The Psychological Cost of Learning to Kill in War and Society*, Kindle ed. (Boston, MA: Little, Brown, 2001), Loc. 1401-1421.

[36] Grossman, *On Killing*, Loc. 2115.

[37] Lindlaw, "Predator Pilots' Stress far from Remote."

[38] Grossman, *On Killing*, Loc. 1401-1421.

[39] N. Breslau et al., "Previous Exposure to Trauma and PTSD Effects of Subsequent Trauma: Results from the Detroit Area Survey of Trauma," *American Journal of Psychiatry* 156, no. 6 (1999); J.D. Ford, "Disorders of Extreme Stress Following War-zone Military Trauma: Associated Features of Posttraumatic Stress Disorder or Comorbid but Distinct Syndromes?," *Journal of Consulting & Clinical Psychology* 67, no. 1 (1999); L. A. King et al., "Deployment Risk and Resilience Inventory: A Collection of Measures for Studying Deployment Related Experiences of Military Personnel and Veterans," *Military Psychology* 18 (2006); C. W. Hoge et al., "Combat Duty in Iraq and Afghanistan, Mental Health Problems, and Barriers to Care," *New England Journal of Medicine* 351 (2004); C. R. Brewin, B. Andrews, and J. D. Valentine, "Meta-Analysis of Risk Factors for Posttraumatic Stress Disorder in Trauma-exposed Adults," *Journal of Consulting and Clinical Psychology* 68 (2000); J. C. Beckham, M. E. Feldman, and A. C. Kirby, "Atrocities Exposure in Vietnam Combat Veterans with Chronic Posttraumatic Stress Disorder: Relationship to Combat Exposure, Symptom Severity, Guilt, and Interpersonal Violence," *Journal of Traumatic Stress* 11 (1998); Sharon Morgillo Freeman, Bret A. Moore, and Arthur Freeman, *Living and Surviving in Harm's Way: A Psychological Treament Handbook for Pre- and Post-Deployment of Military Personnel* (New York, NY: Routledge, 2009), 93; B. L. Green et al., "Risk Factors for PTSD and Other Diagnoses in a General Sample of Vietnam Veterans," *American Journal of Psychiatry* 147, no. 6 (1990); Peter A. Hancock and Gerald P. Krueger, "Hours of Boredom, Moments of Terror: Temporal Desynchrony in Military and Security Force Operations," (Washington, DC: Center for Technology and National Security Policy, National Defense University, October 2010), 13.

[40] Grossman, *On Killing*, Loc. 2227; Campise, Geller, and Campise, "Combat Stress," 227-228.

[41] Ouma, Chappelle, and Salinas, "Facets of Occupational Burnout among U.S. Air Force Active Duty and National Guard/Reserve MQ-1 Predator and MQ-9 Reaper Operators," 7; Wayne Chappelle, Amber Salinas, and Kent McDonald, "Psychological Health Screening of Remotely Piloted Aircraft (RPA) Operators and

Hernando Ortega, a USAF flight surgeon, concluded that, when RPA operators witness traumatic events during a combat operation, they may experience an "existential conflict," and a "guilt feeling," and may be left wondering, "Did I make the right decision? .... Was it a good outcome? Was it a bad outcome? Could I have done it better?"[42] Similarly, Colonel Kent McDonald, a USAF neuropsychiatrist who has co-authored studies focussing on the psychological well-being of operators, concluded that witnessing "collateral damage" from RPA airstrikes, including the deaths of women and children, is particularly, "unnerving and unsettling to these guys."[43]

Despite the causal relationship between witnessing collateral damage and combat stress, two survey-bases studies have found that respondents are more likely to attribute their feelings of stress - though not combat stress specifically - to shift work and long hours than to combat-related factors.[44] The authors of these studies, however, cautioned that these results should be taken with a grain of salt and may not accurately reflect the causes of operators' stress. Respondents likely focussed on the stressful aspects of their job that they encountered every day over those that happen less frequently; viewing traumatic images – particularly those produced as a result of conducting an airstrike – may be highly stressful but this is not a daily occurrence.[45] It is also probable that, as in many survey-based studies of combat stress, respondents chose to underreport combat-related sources of stress out of concern that this might disqualify them from their current position, make them the brunt of jokes or more serious social sanctions for "not being tough enough," or even harm their long-term career prospects.[46]

Accounts provided by USAF personnel clearly indicate that viewing traumatic images contributes to combat stress among RPA operators. This stress does not quickly dissipate, but is, instead, perpetuated by the operators' own memories of the original trauma.[47] An operator who has killed multiple people in airstrikes recalled that, "There was good reason for killing the people that I did, and I go through it in my head over and over and over. But you never forget about it. It never just fades away, I don't think… not for me."[48] Another operator, who has taken part in combat operations that resulted in the deaths of human targets, admitted that the traumatic images he and his fellow operators viewed on their monitors, "stay in people's

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Supporting Units," (Wright-Patterson Air Force Base, OH: Department of Neuropsychiatry, USAF School of Aerospace Medicine, 2012).

[42] Glenda Kwek, "Combat Commuters: Dishing Out Death with Drones," *Sydney Morning Herald*, June 26, 2012, 31-32; P.W. Singer, "Combat Stress in Remotely Piloted/UAS Operations," (Washington, DC: The Brookings Institution, February 3, 2012).

[43] Bumiller, "Air Force Drone Operators Report High Levels of Stress."

[44] Chappelle, Salinas, and McDonald, "Psychological Health Screening of Remotely Piloted Aircraft (RPA) Operators and Supporting Units," 24; Ouma, Chappelle, and Salinas, "Facets of Occupational Burnout among U.S. Air Force Active Duty and National Guard/Reserve MQ-1 Predator and MQ-9 Reaper Operators," 12; Singer, "Combat Stress in Remotely Piloted/UAS Operations."

[45] Chappelle, Salinas, and McDonald, "Psychological Health Screening of Remotely Piloted Aircraft (RPA) Operators and Supporting Units," 24; Ouma, Chappelle, and Salinas, "Facets of Occupational Burnout among U.S. Air Force Active Duty and National Guard/Reserve MQ-1 Predator and MQ-9 Reaper Operators," 12; Singer, "Combat Stress in Remotely Piloted/UAS Operations."

[46] Terri L. Tanielian and Lisa Jaycox, *Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery* (Santa Monica, CA: The RAND Corporation, 2008), xxii, xxv, 88, 93, 101, 104, and 112; Elspeth Cameron Ritchie, "Psychological Issues of War: Valuable Information Learned from Army Surveillance and Research," (Falls Church, VA: Office of the Army Surgeon General, US Army), 20 and 28-29; Committee on the Assessment of Ongoing Efforts in the Treatment of Posttraumatic Stress Disorder, *Treatment for Posttraumatic Stress Disorder in the Military and Veteran Populations*, 46; Hoge et al., "Combat Duty in Iraq and Afghanistan, Mental Health Problems, and Barriers to Care."

[47] Gleen Greenwald, "Bravery and Drone Pilots," *Salon.com*, July 10, 2012; McCloskey, "Two Worlds of a Drone Pilot."

[48] Bumiller, "A Day Job Waiting for a Kill Shot a World Away."

minds for a long time."[49] Speaking in more general terms, an RPA unit commander argued that, "You see a lot of detail…. [W]e feel it… it effects us. When you let a missile go, you know that's a real life. There's no reset button."[50]

The Stress-Aggravating Effects of Commuting to Combat

The USAF's policy of controlling RPA from bases located inside the United States, such as the Nellis and Creech Air Force Bases in Nevada, aggravates the trauma-induced combat stress experienced by some operators.[51] Since the personnel assigned to RPA units usually serve for multiple years at the same facility, their families often relocate with them, and the operators commute between their homes and workplaces six days a week. This situation is fairly unique in the U.S. Armed Forces, since most combat personnel deploy outside the country for multi-month tours before returning home. This means that most combat personnel in the U.S. Armed Forces must only mentally transition between a warzone and the home front a relatively small number of times during their career – likely fewer than 10 times and almost certainly fewer than 20. U.S.-based RPA operators, in contrast, exceed these totals within two weeks of joining their unit.[52]

Although each RPA operator's home life is certainly unique, all of these personnel must frequently transition back-and-forth from taking part in combat operations in Iraq, Afghanistan, Pakistan, and elsewhere to taking part in such mundane civilian activities as shopping for groceries, attending church, and taking their children to dentist appointments and little league games.[53] As one RPA unit commander put it, "You are at war, but at the same time you have mom at home saying the toilet needs to be fixed. You need to be ready to execute combat missions, where lives are at stake, but still have church activities to go to, kids that need to be taken to the hospital, soccer practices, etc."[54] Some commentators have derided this aspect of the USAF's RPA operations by labelling operators "combat commuters," who can leave the horrors of war behind at the end of their shift.[55] Many soldiers and pilots on lengthy overseas tours are, likewise, probably envious of combat personnel who get to spend time with their families every day. However, these views are misguided, for this aspect of RPA operations contributes to combat stress in at least two ways.

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[49] Lindlaw, "Predator Pilots' Stress far from Remote."

[50] Gregory, "From a View to a Kill," 198; David Zucchino, "Drone Pilots Have a Front-row Seat on War from Half a World Away," *The Los Angelas Times*, February 21, 2010; L. Logan, "Drones: America's New Air Force," *60 Minutes*, August 14, 2009.

[51] Singer, *Wired for War*, Loc. 625; Ouma, Chappelle, and Salinas, "Facets of Occupational Burnout among U.S. Air Force Active Duty and National Guard/Reserve MQ-1 Predator and MQ-9 Reaper Operators," 7; Sally B. Donnelly, "Long-distance Warriors," *Time Magazine* December 4, 2005; Chappelle, Salinas, and McDonald, "Psychological Health Screening of Remotely Piloted Aircraft (RPA) Operators and Supporting Units," 8.

[52] Jeff Schogol, "AF Told to Study Rate of UAV Pilots' Promotions," *Air Force Times*, December 29, 2012; Lindlaw, "Predator Pilots' Stress far from Remote."

[53] Kwek, "Combat Commuters: Dishing Out Death with Drones; Spiegel Online, "Interview with a Drone Pilot: 'It is Not a Video Game'," *Spiegel Online*, March 12, 2010; McCloskey, "Two Worlds of a Drone Pilot; Aaron R. Duggan, "Nex Ex Machina, or Bringing it All Back Home: The Fallacy and Fantasy of Sacrificeless Warfare and Why it Will Never Work," *Mythological Studies Journal* 1, no. 1 (2010): 4 and 8; The Subcommittee on National Security and Foreign Affairs of The Committee on Oversight and Government Reform, "Rise of the Drones," 3.

[54] Singer, *Wired for War*, Loc. 6521.

[55] Gregory, "From a View to a Kill," 192; Kwek, "Combat Commuters: Dishing Out Death with Drones; Rob Blackhurst, "Drone Pilots say their Job is Not Like a Video Game," *Business Insider*, September 24, 2012; O'Connell, "Flying Blind," 13.

First, RPA operators who commute to and from bases in the United States have very little time - between five minutes and an hour according to an operator who works at Creech Air Force base - to mentally shift from being active participants in a war to leading ordinary, civilian lives at home.[56] As discussed earlier, when operating their aircraft, these personnel may be required to kill other human beings - both enemy combatants and civilians - and witness the harm wrought by their actions. When commuting to work, these operators must force themselves to shed the mentality of a civilian and adopt the mentality of a war fighter so that they can fulfil their duties. In the words of Captain Steven Rolenc, who has served with a Predator unit stationed at Nellis Air Force Base, [When] "you put your hands on the controls and your eyes on the screens, you feel as though you're flying over Iraq or flying over Afghanistan. You get yourself into that reality. It's not a video game. It's the real deal."[57] However, when their shift ends, operators must force themselves to quickly readopt the mentality of a civilian so that they can interact with friends and family in a healthy, normal manner.[58] As Gary Fabricius, commander of a Predator squadron based in the United States, put it:

> You are going to war for twelve hours, shooting weapons at targets, directing kills on enemy combatants, and then you get in the car, drive home, and within twenty minutes you are sitting at the dinner table talking to your kids about their homework.[59]

Specialists in combat stress recognize that adjusting from a war fighter to a civilian mentality is difficult and should ideally be allowed to occur gradually over time because rapid transitions tend to be incomplete and mentally jarring.[60] Grossman, for example, emphasized the need for military personnel that take part in combat or witness traumatic events to go through a "cool down period" as they return home from a warzone.[61] He and other specialists in combat stress conclude that the period of time that combat veterans spent travelling from battlefields to port facilities and on "long, slow sea voyage[s]," which could last weeks, provided many veterans of the World Wars and the Falkland Islands War with sufficient time to readopt a civilian mentality that let them lead normal peacetime lives once they returned home.[62] The pilots of contemporary American combat aircraft fly between the United States and overseas warzones, and could, therefore, return to the United States from anywhere on Earth within a day. However, these personnel are usually required to spend a few days at a stopover point for the specific purpose of providing them with time to readopt a civilian mentality before returning to their normal lives.[63]

Michael Lenahan, a Predator pilot and unit operations director, characterized the comparatively rapid mental transitions experienced by RPA operators as "quite different" from those experienced by the pilots of the USAF's manned combat aircraft since the latter

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[56] Royakkers and Est, "The Cubicle Warrior," 293; Singer, "Combat Stress in Remotely Piloted/UAS Operations," 49-50; Duggan, "Nex Ex Machina, or Bringing it All Back Home," 4 and 8; David Zucchino, "Troops who 'Telecommute' to War Zone Feel its Effects," *Nanaimo Daily News*, March 21, 2012.

[57] Sparrow, "Building a Better WarBot," 174-175.

[58] N. Shachtman, "Attack of the Drones," *Wired* 2005; Robert D. Kaplan, "Hunting the Taliban in Las Vegas," *The Atlantic Monthly* (September 2006); Donnelly, "Long-distance Warriors; Steven Groetken, "Military Operations Half a World Away: The 24 Hour Use of Unmanned Vehicles Controlled From Remote Locations," (Unpublished Work, 2010).

[59] Singer, *Wired for War*, Loc. 6521.

[60] Grossman, *On Killing*, Loc. 4742-4743 and 4858.

[61] Grossman, *On Killing*, Loc. 4858.

[62] Ibid; Groetken, "Military Operations Half a World Away."

[63] Singer, "Combat Stress in Remotely Piloted/UAS Operations," 36-37.

will rarely, if ever, be required to experience, "shooting a missile, then going to your kid's soccer game."[64] Colonel Scott Brenton, who has controlled RPA in combat operations, similarly, alluded to the "strange feeling" he experienced on his brief commute home along civilian streets, where, "No one in my immediate environment is aware of anything that occurred."[65] Dave Lara, a Predator instructor pilot, likewise, stated that constantly commuting between their homes and combat stations left operators feeling that "There was no point at which we were ever in peacetime. We were just permanently somewhere between war and peace."[66]

Moreover, RPA units made up of operators who commute to bases in the United States have little opportunity to develop the strong degree of unit cohesion that traditionally helps combat personnel deal with the stress produced by witnessing and participating in traumatic events because their personnel simply do not spent enough time socializing with each other during their off duty hours, when their families and civilian friends are rightly competing for their attention.[67] Commenting on this aspect of U.S.-based RPA units, Colonel Eric Mathewson, an RPA unit commander, concluded that, "It's hard to forge that esprit de corps, that tribe mentality when you can't all go to the bar after work and decompress together."[68]

The role of unit cohesion in combat stress is straightforward but vital: combat personnel are better able to cope with combat stress when they are immersed in a social environment made up of people who have experienced similar traumatic events and are willing and able to talk about them.[69] As Grossman put it, the American combat personnel in the Second World War, who not only served together but also lived and travelled together as a unit, had ample opportunities to spend time, "joking, laughing, gambling, and telling tall tales as they cooled down and depressurized in what psychologists would call a very supportive group-therapy environment... And if they had doubts about what they'd done, or fears about the future, they had a sympathetic group to talk to."[70] Ortega, likewise, argued that the, "ability to decompress the stressful events of the day with your peers in a relatively secure environment was really important to the [manned] aviation world."[71] The relative lack of unit cohesion among U.S.-based RPA units means that their personnel lack a social support system that could allow them to regularly relieve pent up combat stress. RPA operators cannot legally discuss details of their missions, especially whether they killed someone, with their civilian friends or family members because, unlike most military

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[64] Lindlaw, "Predator Pilots' Stress far from Remote."

[65] Bumiller, "A Day Job Waiting for a Kill Shot a World Away."

[66] Singer, "Combat Stress in Remotely Piloted/UAS Operations," 73-74.

[67] Sparrow, "Building a Better WarBot," 175; Committee on the Assessment of Ongoing Efforts in the Treatment of Posttraumatic Stress Disorder, *Treatment for Posttraumatic Stress Disorder in the Military and Veteran Populations*, 38-39; T.C. Helmus and R. W. Glenn, "Steeling the Mind: Combat Stress REactionsand their Implications for Urban Warfare," (Santa Monica, CA: RAND Corporation, 2004); Campise, Geller, and Campise, "Combat Stress," 229; Canadian Army Lessons Learned Centre, "Stress Injury and Operational Deployments," *Dispatches: Lessons Learned for Soldiers* 10 (February 2004); G. L. Belenky, "Varieties of Reaction and Adaptation to Combat Experience," in *Military Psychiatry: Learning from Experience*, ed. W. W. Menninger (Topeka, KS: Menninger Foundation, 1987); M. Steiner and M. Neuman, "Traumatic Neurosis and Social Support in the Yom Kippur War Returnees," *Military Medicine* 143 (1978); O'Connell, "Flying Blind," 13.

[68] McCloskey, "Two Worlds of a Drone Pilot."

[69] Groetken, "Military Operations Half a World Away; Dale B. Flora, "Battlefield Stress: Causes, Cures and Countermeasures," (Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1985), 30 and 39-40.

[70] Grossman, *On Killing*, Loc. 4742-4743.

[71] Singer, "Combat Stress in Remotely Piloted/UAS Operations," 40.

operations, RPA missions tend to be classified.[72] Consequently, operators must maintain perpetual "silence at the breakfast table" regarding their duties and keep combat stress bottled up inside their own mind.[73]

Ways Forward

This section proposes two ways of altering USAF RPA operations to help mitigate their stress-inducing effects: modifying RPA sensor displays to mask traumatic imagery and deploying RPA units on standardized combat tours away from their homes and families.

Mask Traumatic Imagery

To reduce RPA operators' exposure to the stress-inducing traumatic imagery associated with conducting airstrikes against human targets, the USAF should integrate graphical overlays into the visual sensor displays in the operators' virtual cockpits. These overlays would, in real-time, mask the on-screen human victims of RPA airstrikes from the operators who carry them out with sprites or other simple graphics designed to dehumanize the victims' appearance and, therefore, prevent the operators from seeing and developing haunting visual memories of the effects of their weapons.[74] As envisioned, these overlays would automatically appear on the operators' video monitors when they launch a weapon at a target on the ground so as not to interfere with the operators' other vital mission tasks, such as tracking possible targets and conducting general reconnaissance. The operators' commanding officers would have access to the unmasked live feed on a separate monitor not visible to the operators, and the unmasked feed would also be recorded and archived for later review, as necessary, by people who did not play any direct role in the airstrike.

To be clear, these overlays are not intended to make it easier for operators to kill. The publically available statistics on RPA operations indicate that operators are already quite willing to take human lives. Rather, these overlays are intended to make it easier for RPA operators to cope with the fact that they have taken lives while doing their duty. As discussed earlier, combatants who see the people they kill are at heightened greater risk of developing combat stress.[75] USAF bomber crews certainly understood that they killed hundreds or even thousands of people during their missions over Germany and Japan during the Second World War, but most crews were at low risk of developing combat stress because they could not easily see their victims. As envisioned, these overlays would, likewise, not shield RPA operators from the knowledge that they had taken human lives; rather, they would merely help operators experience the psychological distance, disconnection, and desensitization that has traditionally allowed the pilots of manned attack aircraft avoid trauma-induced combat stress.[76]

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[72] Groetken, "Military Operations Half a World Away; Lindlaw, "Predator Pilots' Stress far from Remote."

[73] Lindlaw, "Predator Pilots' Stress far from Remote; Groetken, "Military Operations Half a World Away; McCloskey, "Two Worlds of a Drone Pilot."

[74] Singer, *Wired for War*, Loc. 7444-7487; Sparrow, "Building a Better WarBot," 175; Royakkers and Est, "The Cubicle Warrior," 292.

[75] Grossman, *On Killing*, Loc. 1401-1421 and 2115; Lindlaw, "Predator Pilots' Stress far from Remote; Hoge et al., "Combat Duty in Iraq and Afghanistan, Mental Health Problems, and Barriers to Care; Beckham, Feldman, and Kirby, "Atrocities Exposure in Vietnam Combat Veterans with Chronic Posttraumatic Stress Disorder; Green et al., "Risk Factors for PTSD and Other Diagnoses in a General Sample of Vietnam Veterans; Hancock and Krueger, "Hours of Boredom, Moments of Terror: Temporal Desynchrony in Military and Security Force Operations," 13.

[76] Singer, *Wired for War*, Loc. 7444-7487; Royakkers and Est, "The Cubicle Warrior," 292.

Opponents of this proposal could argue that shielding RPA operators from the traumatic imagery produced through their own use of deadly force could allow them to develop a "PlayStation mentality" that would lead them to stop caring at all about the people they see in their sensor feeds and, in turn, kill with reckless abandon.[77] P.W. Singer, for example, has argued that any functional means of reducing the combat stress felt by RPA operations could leave them "too unaffected by killing" and, therefore, more likely to launch deadly attacks during their missions.[78] Similarly, D. Keith Shurtleff, a U.S. Army Chaplain with the Soldier Support Institute at Fort Jackson, South Carolina, argued that, "as soldiers are removed from the horrors of war and see the enemy not as humans but as blips on a screen, there is a very real danger of losing the deterrent that such horrors provide."[79] The British Ministry of Defence raised the even more alarming prospect that, "by removing some of the horror, or at least keeping it at a distance... we... risk losing our controlling humanity and make war more likely."[80] Finally, in perhaps the most pessimistic assessment of the possible negative effectives of shielding operators from traumatic imagery, Lambert Royakkers and Rinie van Est predicted that masking traumatic images with graphics could depersonalize operators' experience of war to such as an extent that, "the cubicle warrior no longer would be aware of the fact that he is actually involved in a real war," and would, instead, think that he is merely playing a video game.[81]

These concerns are, fortunately, unfounded. No publically available evidence suggests that the traumatic images currently confronting RPA operators through their unmasked sensor feeds discourages them from launching airstrikes against human targets. Indeed, RPA operators have killed thousands of people in Afghanistan, Pakistan, Libya, and Iraq in hundreds of airstrikes since 2002. Moreover, it is important to recognize that RPA operators do not decide if and when to launch hunter-killer missions. Rather, they conduct the missions and fire weapons at the targets that their commanding officers order and authorize them to engage with. Therefore, masking the visual interface seen by individual RPA operators should not affect the frequency with which they launch weapons at human targets. As a further check against the possibility that masking operators' sensor feeds would make certain operators more trigger happy, the unmasked sensor feeds would, in a continuation of current practice, be recorded and routinely reviewed by USAF lawyers and senior officers. This should make it difficult for operators to get away with launching unauthorized airstrikes, let alone starting new wars.

Deploy RPA Units on Overseas Combat Tours

To help shield RPA operators from the stress-aggravating effects of having to frequently transition between a war fighter and civilian mentality, RPA units should be deployed on standardized combat tours in locations far from their homes and families.[82] Ideally, units should be deployed outside of the United States to, for instance, the territory of another NATO member state, the conflict zone where their aircraft are being used, or a ship at sea, in order to make it difficult and costly for the members of the unit to travel to and from their homes on a regular basis. As discussed earlier, units made up of operators who commute

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[77] Philip Alston and Hina Shamsi, "A Killer Above the Law," (August 2, 2010), 16; Cole, Dobbing, and Hailwood, "Convenient Killing: Armed Drones and the 'Playstation' Mentality."
[78] Singer, *Wired for War*, Loc. 7444-7487.
[79] Ibid.
[80] Ministry of Defence, "The UK Approach to Unmanned Aircraft Systems," (London, UK: Ministry of Defence, March 2013), 5-9.
[81] Royakkers and Est, "The Cubicle Warrior," 292.
[82] Sparrow, "Building a Better WarBot," 182.

to work must not only undergo psychologically jarring twice-daily transitions between war fighter and civilian mentalities, but must also refrain from discussing any aspects of their classified combat operations with their civilian friends or families. Deploying RPA units overseas would motivate their members to interact with each other during their off-duty hours, which should help bolster unit cohesion and, in turn, transform the unit into what Grossman referred to a, "supportive group-therapy environment."[83] Fostering a strong sense of cohesion within a combat unit has been hailed as "the single most effective protective measure against combat stress," because socially supportive units provide their members with an opportunity to unburden their minds of the trauma-induced stress they would otherwise have to internalize.[84] Thus, deploying RPA units outside the United States should help their members relieve some of their trauma-induced combat stress by providing them with abundant opportunities to discuss their thoughts and emotions with colleagues who not only share similar life experiences but also possess the security clearance to discuss them. Alternative means of isolating operators from their civilian lives, such as banning them from making or receiving personal phone calls while on duty, or sequestering a unit in a hotel or barracks near their U.S. base, are likely doomed to failure because they are simply too easy and tempting to circumvent.[85]

Deploying RPA units overseas would not, of course, alleviate all sources of stress. On the contrary, sending operators on six, twelve, or eighteen month tours of duty outside the United States would place strain on familiar relationships as operators are forced to miss birthday, anniversaries, and a host of other important events at home and their families are required to cope without them.[86] This stress would not, however, be combat stress and should not, therefore, be as psychologically debilitating or place operators at heightened risk of developing PTSD. Another potential objection to this solution is that deploying RPA units closer to active combat zones could expose them to greater risk of physical harm.[87] However, as long as RPA units are deployed to a well-defended facility, whether on land or at sea, the risk to their physical safety should be minimal.

Conclusion

RPA operators are clearly much more than glorified videogame players who remain unaffected by the horrors of war. Due to their routine exposure to traumatic images and the need to constantly shift between war fighter and civilian mentalities, USAF RPA operators currently experience levels of combat stress comparable to those experienced by the pilots manned combat aircraft. This paper has proposed two viable ways in which USAF RPA operations could be altered to reduce their stress-inducing effects: modifying RPA sensor displays to mask traumatic imagery and deploying RPA units on standardized combat tours away from their homes and families.

As stated at the outset of this paper, the number of RPA in the USAF's fleet has grown significantly in recent years, resulting in escalating demand for RPA operators that is unlikely to abate for at least a decade. The United States is not the only country fielding RPA. According to a 2012 report produced by the United States Government Accountability

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[83] Grossman, *On Killing*, Loc. 4742-4769; Flora, "Battlefield Stress," 118 and 121-122.
[84] Flora, "Battlefield Stress," 121.
[85] Royakkers and Est, "The Cubicle Warrior," 293.
[86] Cole, "Drone Wars Briefing," 9.
[87] Sparrow, "Building a Better WarBot," 182.

Office, at least 76 countries currently possess these assets.[88] As of March 2013, only the United States, the United Kingdom, and Israel are known to have employed armed RPA against human targets, but several other countries, including Germany, Russia, China, and India, are currently developing their own fleets of armed RPA. As these aircraft proliferate among the world's air forces, the problems with combat stress currently being experienced in the USAF likely will as well. With this in mind, it is vital that current and future users of armed RPA strive to minimize the risks posed to their personnel so as to avoid producing generations of psychiatric casualties.

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[88] United States Government Accountability Office, "Agencies Could Improve Information Sharing and End-Use Monitoring on Unmanned Aerial Vehicle Exports," (Washington, DC: United States Government Accountability Office, July 2012), 10.

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