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COMPENSATING TERRORISTS FOR TORTURE: AN ANOMALOUS OUTCOME UNDER INTERNATIONAL HUMANITARIAN LAW?

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> The U.S.'s story seems to be: there was a laudable beginning, and then we strayed for a little while, we are getting back on track now. However the fact remains that a number of breaches have occurred in between. In one form or another, for one reason or another, under one name or another, some overt and some covert.… However, how does [the] U.S. intend to live up to its international expectations now, especially correcting the historical and recent injustices?[1]

In the frenetic aftermath of September 11, 2001, the United States (U.S.) unleashed a program of secret detention and enhanced interrogation that would lead President Barack Obama to admit that "we tortured some folks."[2] Torture is a morally reprehensible act and has been prohibited in the law of armed conflict, or International Humanitarian Law (IHL), for decades.[3] International Human Rights Law (HRL) banned torture in 1966 through the International Covenant on Civil and Political Rights (ICCPR) article 7.[4] But the ICCPR ultimately was not effective enough. Thus, in order to "make more effective the struggle against torture and other cruel, inhuman or degrading treatment or punishment throughout the world" on 10 December 1984 the United Nations General Assembly adopted the Convention Against Torture (CAT) and opened it for signature by Member States.[5] In addition to defining and prohibiting torture the CAT, like many other human rights treaties, also includes a redress and compensation requirement. Article 14 of the CAT provides that "[e]ach State Party shall ensure in its legal system that the victim of an act of torture obtains redress and has an enforceable right to fair and adequate compensa-

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[1] Rapporteur Satyabhoosun Gupt Domah, *Full Transcript: U.S. Third Periodic Report to UN Committee Against Torture* 21 (Nov. 12-13, 2014) [hereinafter *Third Periodic Report*] (alteration in original), http://www.ushrnetwork.o rg/sites/ushrnetwork.org/files/cat_complete_transcript_from_just_security.pdf.

[2] President Obama famously stated during a press conference in August 2014 that the U.S. crossed a moral line during the war on terror and that "we tortured some folks." Josh Gerstein, *"Obama: We tortured some folks"*, Politico. com (Aug. 1, 2014, 3:38 PM), http://www.politico.com/story/2014/08/john-brennan-torture-cia-109654.html (last visited Nov. 21, 2014).

[3] Common Article 3 to all four Geneva Conventions of 1949 prohibits torture. Article 3, paragraph 1.a., of the Geneva Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field prohibits "at any time and in any place whatsoever…cruel treatment and torture." Geneva Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field art. 3, Aug. 12, 1949, 6 U.S.T. 3114, 75 U.N.T.S. 31.

[4] International Covenant on Civil and Political Rights, Dec. 16, 1966, 999 U.N.T.S. 171. Article 7 reads, "No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment. In particular, no one shall be subjected without his free consent to medical or scientific experimentation." *Id.*

[5] Convention against torture and other cruel, inhuman or degrading treatment or punishment, Dec. 10, 1984, 1465 U.N.T.S. 85, 113 [hereinafter United Nations Convention Against Torture]. The preamble to the convention also pays homage to Article 5 of the Universal Declaration of Human Rights which states that "No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment." As a UN General Assembly resolution it is not binding treaty law but it is recognized as setting out for the first time in 1948 fundamental human rights to be universally protected. Universal Declaration of Human Rights, G.A. Res. 217 (III) A, U.N. Doc. A/810 at 71 (Dec. 10, 1948), http://www.un.org/ga/search/view_doc.asp?symbol =A/RES/217(III).

tion, including the means for as full rehabilitation as possible."[6] The U.S. ratified the CAT on October 21, 1994, subject to certain reservations and understandings.[7] The important point is that to this day, no individual captured, detained, and tortured by the U.S. in the aftermath of September 11th has received any redress, compensation, or rehabilitation as contemplated by Article 14 of the CAT. Why?

On November 12 and 13 of 2014, a U.S. delegation testified before the Committee against Torture, an oversight committee created by the CAT.[8] During questioning the U.S. delegation was asked about the applicability of the CAT during armed conflict and specifically about Article 14's applicability to victims of torture detained at the U.S. Naval Station at Guantanamo Bay (GTMO).[9] In its response the U.S. maintained that while the CAT continues to apply during a time of war, IHL is the *lex specialis* during situations of armed conflict, and as *lex specialis*

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[6] United Nations Convention Against Torture, *supra* note 5, 1465 U.N.T.S. at 116.

[7] List of Convention Against Torture Participants, United Nations Treaty Collection [hereinafter U.N. Treaties–CAT] https://treaties.un.org/pages/ShowMTDSGDetails.aspx?src=UNTSONLINE&tabid=2&mtdsg_no=IV-9&chap ter=4&lang=en#Participants (last visited Feb. 28, 2015). There are two understandings filed by the U.S. that could be used to argue against the main thesis of this article that the U.S. is required by UNCAT to establish a compensation system for victims of the CIA enhanced interrogation program. The first is located at Section II, paragraph (1)(a) of the ratification and accession instruments filed by the U.S. with the United Nations on October 21, 1994. It provides the U.S. understanding of the definition of torture. I provide it here for completeness but will not analyze the potential legal impact because the President, Commander in Chief, has publically stated that the U.S. tortured some folks. The understanding reads as follows:

> That with reference to article 1, the United States understands that, in order to constitute torture, an act must be specifically intended to inflict severe physical or mental pain or suffering and that mental pain or suffering refers to prolonged mental harm caused by or resulting from: (1) the intentional infliction or threatened infliction of severe physical pain or suffering; (2) the administration or application, or threatened administration or application, of mind altering substances or other procedures calculated to disrupt profoundly the senses or the personality; (3) the threat of imminent death; or (4) the threat that another person will imminently be subjected to death, severe physical pain or suffering, or the administration or application of mind altering substances or other procedures calculated to disrupt profoundly the sense or personality.

Convention Against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment, Ratification and Accession (a) United States of America, 1830 U.N.T.S. 320 (Oct. 21, 1994) [hereinafter U.S. CAT Ratification], https://treaties.un.org/doc/Publication/UNTS/Volume%201830/v1830.pdf. The second U.S. understanding of relevance is located at Section II, paragraph (3) and it states that "it is the understanding of the United States that Article 14 requires a State Party to provide a private right of action for damages only for acts of torture committed in territory under the jurisdiction of that State Party." *Id.* at 322. It is beyond the scope of this article to examine whether CIA detention sites constitute territory under the jurisdiction of the U.S.

[8] Articles 17 through 24 of the UNCAT establish the Committee Against Torture and outline its responsibilities. United Nations Convention Against Torture, *supra* note 5, 1465 U.N.T.S. at 116-21.

[9] Jens Modvig, Country Rapporteur, asked the U.S., "[h]ow many victims of torture formerly detained in Guantanamo have received judicial remedy for their treatment?" *Third Periodic Report*, *supra* note 1, at 18.

it is the controlling body of law.[10] With regard to the specific question regarding application of Article 14 Acting Legal Advisor at the U.S. Department of State Mary McCleod said:

> Although Article 14 of the Convention contemplates an enforceable right to fair and adequate compensation for victims of torture, it would be anomalous under the law of war to provide individuals detained as enemy belligerents with a judicially enforceable individual right to a claim for monetary compensation against the detaining power for alleged unlawful conduct. The Geneva Conventions contemplate that claims related to the treatment of POWs and protected persons are to be resolved on a State-to-State level, and war reparations claims have traditionally been, and as a matter of customary international law are, the subject of government-to-government negotiations, as opposed to private lawsuits.[11]

Some of what the U.S. said is supported by international law. The idea that the CAT continues to apply during armed conflict is in line with International Court of Justice (ICJ) opinions on the issue.[12] As is the general notion that IHL can be the *lex specialis* as between two normative systems during an armed conflict.[13] But is the U.S. assertion correct in this case? In other words, as it relates specifically to the CAT's Article 14 requirement for a state system of compensation and redress, is IHL the *lex specialis* that applies? Would it indeed be "anomalous" under IHL to provide individuals detained as enemy belligerents with a judicially enforceable individual right to a claim for monetary compensation against the detaining power for alleged unlawful conduct? Does it matter that the victim of the torture is a non-state actor captured as part of an armed conflict not of an international character?

This article explores whether the U.S. is in violation of its obligations under the CAT. For purposes of my discussion I ignore issues regarding the extraterritorial application of the CAT and assume that all provisions of the CAT applied to U.S.

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[10] *Id.* at 27-28. Acting Legal Adviser Mary McCleod stated that "[i]n terms of our international law obligations during situations of armed conflict, the law of armed conflict is the *lex specialis* and as such is the controlling body of law with regard to the conduct of hostilities and the protection of war victims. Moreover, as the United States has already recognized, a time of war does not suspend the operation of the Convention against Torture, which continues to apply, even when a State is engaged in armed conflict." *Id.* (emphasis added).

[11] *Id.* at 28.

[12] Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226, 240 (July 8). In analyzing whether the protections of the ICCPR applied during times of armed conflict the court noted "The Court observes that the protection of the International Covenant of Civil and Political Rights does not cease in times of war, except by operation of Article 4 of the Covenant whereby certain provisions may be derogated from in a time of national emergency." *Id.* The ICJ reaffirmed this position in another advisory opinion: Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory, Advisory Opinion, 2004 I.C.J. 136, 178 (July 9).

[13] Legality of the Threat or Use of Nuclear Weapons, *supra* note 12, at 240.

actions during the alleged acts of torture.[14] I will focus on situations of "Non-International Armed Conflict" or NIACs.

Section I provides some background on recent allegations of U.S. state sponsored torture and the CAT to include Article 14's compensation requirement. To illuminate the conduct at issue, I introduce three cases of U.S. sponsored torture and show that the victims have a facially valid claim of torture in violation of the CAT. In section II, I explore the relevant provisions of the law of armed conflict (or IHL). In order to understand the rules that apply it is necessary to break down what constitutes an International Armed Conflict (IAC) and what constitutes a NIAC. Different rules exist in IHL for IAC and NIAC. I show that the three cases of torture I highlight are governed by the rules applicable to NIAC. I then look for IHL compensation requirements in the realm of NIACs to determine if there are any rules that conflict with the CAT compensation requirements. In section III, I discuss the theory of *lex specialis* and compare the theory with how the U.S. views the interaction of IHL with the CAT in times of armed conflict. With this background I discuss whether the U.S. position that it would be "anomalous" to allow for an individual, judicial, compensation mechanism for NIAC belligerents is well founded. Finally, in section IV I take a closer look at the requirements of CAT Article 14 and figure out what actions the U.S. needs to take in order to be compliant with this crucial area of international law.

I. BACKGROUND

A. State Sponsored Torture

On December 9, 2014, the U.S. Senate Select Committee on Intelligence (SSCI) released a 528 page executive summary of its much anticipated "Committee Study of the Central Intelligence Agency's [(CIA)] Detention and Interrogation Program."[15] While some of the conclusions drawn by the SSCI about the CIA's actions are debatable, the report is based on a thorough review of CIA files and provides the best publically available factual background for discussions about what U.S. officials actually did to detainees.[16] The report finds that during the course of the

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[14] In its recent testimony before the Committee Against Torture the U.S. asserted the position that where the UNCAT "provides that obligations apply to a State Party 'in any territory under its jurisdiction,' such obligations extend to all places that the State Party controls as a government authority." *Third Periodic Report*, *supra* note 1, at 26. This may leave open the argument that CIA black sites did not fall within the reach of UNCAT Article 2's obligations to prevent acts of torture. For a detailed discussion and legal analysis of the geographic scope of the Convention Against Torture, *see* Harold Hongju Koh, *Memorandum Opinion on the Geographic Scope of the Convention Against Torture and Its Application in Situations of Armed Conflict* (Jan. 21, 2013), http://www.nytimes.com/interac tive/2014/03/07/world/state-department-koh.html?_r=3.

[15] S. Rep. No. 113-288 (2014), https://www.congress.gov/113/crpt/srpt288/CRPT-113srpt288.pdf.

[16] The Committee's executive summary lists 20 findings and conclusions. *Id.* at 9. For some criticism of those conclusions, *see* Benjamin Wittes, *Thoughts on the SSCI Report, Part I: Introduction and Overview*, Lawfare Blog (Dec. 15, 2014, 4:00 PM), http://www.lawfareblog.

CIA detention and interrogation program the CIA detained at least 119 individuals, of which at least 39 were subjected to enhanced interrogation techniques. At least 26 of the 119 "were wrongfully held and did not meet the [CIA's own] detention standard" as defined in a September 2001 Memorandum of Notification.[17]

In this article I explore U.S. legal obligations to victims of state sponsored torture, specifically victims who were detained as part of a NIAC. As such, it is important to identify a small sample of victims for analysis. I focus on the cases of three individuals, Abu Zubaydah, Abd al-Rahim al-Nashiri, and Khalid Sheik Mohammad. Were they tortured?

1. Abu Zubaydah

Abu Zubaydah (AZ) is a suspected al-Qaeda facilitator who was captured in a joint CIA-Pakistani government raid in March 2002.[18] At the time, it was thought that AZ was a significant player in the al-Qaeda organization, but this information has since been described as "significantly overstated."[19] AZ was the CIA's first detainee.

> On the day that [AZ] was captured, CIA attorneys discussed interpretations of the criminal prohibition on torture that might permit CIA officers to engage in certain interrogation activities. An attorney in CTC [(Counterterrorism Center)] also sent an email with the subject line 'Torture Update' to [redacted] CTC Legal [redacted], listing, without commentary, the restrictions on interrogation in the Geneva Conventions, the Convention Against Torture, and the criminal prohibition on torture.[20]

Thereafter AZ was subjected to ten of the CIA's twelve "enhanced interrogation techniques."[21] During a 20-day period of "aggressive" interrogation, "[AZ] spent

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com/2014/12/thoughts-on-the-ssci-report-part-i-introduction-and -overview/; Christine O'Donnell, *The White House wants it both ways on torture report*, Washington Times (Dec. 14, 2014), http://www.washingtontimes.com/news/2014/dec/14/christine-odonnell-white -house-wants-it-both-ways-/?page=all.

[17] S. Rep. No. 113-288, at xxi. The standard for CIA capture and detention was set out in a covert action Memorandum of Notification (MON) dated September 17, 2001. It authorized the Director of Central Intelligence to "undertake operations designed to capture and detain persons who pose a continuing, serious threat of violence or death to U.S. persons and interests or who are planning terrorist activities." *Id.* at 11.

[18] S. Rep. No. 113-288, at 21.

[19] *Id.*

[20] *Id.* at 22 (internal footnotes omitted).

[21] *Id.* at xiv. There are 12 enhanced interrogation techniques derived from the U.S. military's Survival, Evasion, Resistance, and Escape (SERE) school. The 12 techniques are described as: "(1) the attention grasp, (2) walling, (3) facial hold, (4) facial slap, (5) cramped confinement, (6) wall standing, (7) stress positions, (8) sleep deprivation, (9) waterboard, (10) use of diapers, (11) use of insects, and (12) mock burial." *Id.* at 32.

a total of 266 hours (11 days, 2 hours) in the large (coffin size) confinement box and 29 hours in a small confinement box, which had a width of 21 inches, a depth of 2.5 feet, and a height of 2.5 feet."[22] Over the course of 17 consecutive days, he was waterboarded 2-4 times per day, "with multiple iterations of the watering cycle during each application."[23] AZ is currently being held in U.S. military custody as a high-value detainee at GTMO and has not been formally charged with any crimes.[24]

2. Abd al-Rahim al-Nashiri

Abd al-Rahim al-Nashiri (Nashiri) was "assessed by the CIA to be an [al-Qaeda] 'terrorist operations planner.' "[25] After being captured in the United Arab Emirates in October 2002 he was rendered to one of the CIA's overseas detention sites. He was subjected to enhanced interrogation techniques on at least four separate occasions.[26] At one point the enhanced techniques were stopped by the local detention site chief when he assessed that Nashiri was compliant.[27] However the site chief's assessment was soon overruled by CIA headquarters who then sent in an untrained interrogator.[28] This untrained interrogator used a series of unauthorized interrogation techniques such as placing Nashiri in a "standing stress position with his hands fixed over his head" for two and a half days, blindfolding him and placing a pistol near his head, operating a drill near his body, "slapping [him] multiple times on the back of the head during interrogations; implying that his mother would be brought before him and sexually abused; blowing cigar smoke in [his] face' giving [him] a forced bath using a stiff brush; and using improvised stress positions that caused cuts and bruises resulting in the intervention of a medical officer."[29] Nashiri is currently being detained as a High Value Detainee at GTMO and is being tried at a Military Commission on numerous charges including murder in violation of the law of war.[30]

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[22] S. Rep. No. 113-288, at 42.

[23] *Id.*

[24] The Guantánamo Docket, N.Y. Times, http://projects.nytimes.com/guantanamo/detainees/high-value (last visited May 1, 2015).

[25] S. Rep. No. 113-288, at 66.

[26] *Id.* at 66-67.

[27] *Id.* at 68.

[28] *Id.*

[29] *Id.* at 69-70 (internal quotations omitted).

[30] Charge Sheet, United States v. Abd Al Rahim Hussayn Muhammad Al Nashiri, MC Form 458 (Sep. 15, 2011), http://www.mc.mil/Portals/0/pdfs/alNashiri2/Al%20Nashiri%20II%20(Referred%20Charges).pdf.

3. Khalid Sheik Mohammad

Khalid Sheik Mohammad (KSM) was a top level planner with al-Qaeda and the proclaimed mastermind of the 9/11 plot.[31] After hiding in Pakistan following 9/11, KSM was captured on March 1, 2003, in Rawalpindi, Pakistan.[32] He was thereafter transported to his first CIA detention site where he was immediately subjected to enhanced interrogation techniques.[33] Those enhanced interrogation techniques included "facial and abdominal slaps, the facial grab, stress positions, standing sleep deprivation (with his hands at or above head level), nudity, and water dousing."[34] The Chief of Interrogations "also ordered the rectal rehydration of KSM without a determination of medical need, a procedure that the chief of interrogations would later characterize as illustrative of the interrogator's 'total control over the detainee.'"[35] KSM was then moved to CIA DETENTION SITE BLUE, where he was subjected to nudity, standing sleep deprivation (one period would last seven and a half days, or approximately 180 hours), the attention grab and insult slap, the facial grab, the abdominal slap, the kneeling stress position, walling, threats to his children, and being subjected to waterboarding at least 183 times.[36] KSM is currently being held as a High Value detainee at GTMO and has been charged by a Military Commission with numerous crimes including murder in violation of the law of war.[37]

B. The United Nations Convention Against Torture

1. What constitutes torture?

An in depth analysis of the entire Convention Against Torture is beyond the scope of this article. Instead I am focused on U.S. responsibility under Article 14 of the CAT during NIAC. However, it is necessary at the outset to consider whether the U.S. has engaged in any activity with regards to AZ, Nashiri, and KSM that activates the protections of the Convention. As mentioned in the introduction, the U.S. signed the Convention in 1988 and it was ratified by the Senate in 1994.[38] CAT Article 1 defines torture as,

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[31] S. Rep. No. 113-288, at 25 n. 90.

[32] Khalid Sheikh Mohammed Fast Facts, CNN.com (Dec. 9, 2014), http://www.cnn.com/2013/02/03/world/meast/kh alid-sheikh-mohammed-fast-facts/.

[33] S. Rep. No. 113-288, at 81-82.

[34] *Id.* at 82.

[35] *Id.*

[36] *Id.* at 84-85, 90.

[37] *See* Charge Sheet, United States v. Khalid Sheikh Mohammed, Walid Muhammad Salih Mubarak Bin 'Attash, Ramzi Binalshibh, Ali Abdul Aziz Ali, Mustafa Ahmed Adam al Hawsawi, MC Form 458 (May 31, 2011), http://w ww.mc.mil/Portals/0/pdfs/KSM2/KSM%20II%20(Sworn%20Charges).pdf.

[38] *See* U.N. Treaties – CAT, *supra* note 7.

> any act by which severe pain or suffering, whether physical or mental, is intentionally inflicted on a person for such purposes as obtaining from him or a third person information or a confession, punishing him for an act he or a third person has committed or is suspected of having committed, or intimidating or coercing him or a third person, or for any reason based on discrimination of any kind, when such pain or suffering is inflicted by or at the instigation of or with the consent or acquiescence of a public official or other person acting in an official capacity.[39]

IHL also prohibits all acts of torture, both in IAC and NIAC, but it does not explicitly define torture.[40] When the U.S. Senate ratified the CAT in 1994 they filed an understanding of the U.S. interpretation of the word "torture."[41] The Senate's understanding of torture introduces modifying phrases to the definition thereby potentially limiting its application. Specifically in order to constitute torture under the U.S. understanding the act must be "*specifically intended* to inflict severe physical or mental pain or suffering and that mental pain or suffering refers to *prolonged mental harm* caused by" the act.[42] The current official U.S. Department of State position is that torture, however defined, is prohibited by both HRL and IHL and applies to U.S. officials anywhere in the world.[43]

There are differences of opinion regarding whether the treatment of AZ, Nashiri, or KSM rises to the level of torture as defined by the CAT, IHL, or the U.S. Senate's understanding. But for the purposes of this discussion it is clear from the SSCI report that all three men were held by official agents of the U.S. government, and all three men were subjected by those agents to extended periods of intense physical and mental manipulation and abuse in an intentional attempt to gain information regarding al-Qaeda operations from them. Therefore, it is safe to presume, especially in light of the fact that President Obama has publically stated that we tortured some folks, that all three victims here have, at a minimum, a facially valid claim that they are victims of U.S. state sponsored torture in violation of the CAT.[44]

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[39] United Nations Convention Against Torture, *supra* note 5, 1465 U.N.T.S. at 113-14.

[40] Common Article 3 of all four of the Geneva Conventions of 1949 explicitly provides that in case of armed conflict not of an international character "violence to life and person, in particular murder of all kinds, mutilation, cruel treatment and torture…" are prohibited at any time and in any place whatsoever. Geneva Convention relative to the Treatment of Prisoners of War, Aug. 12, 1949, 75 U.N.T.S. 135, 137-38. This third Geneva Convention also contains an explicit prohibition on torture in Article 17. It states, "[n]o physical or mental torture, nor any other form of coercion, may be inflicted on prisoners of war to secure from them information of any kind whatever." *Id.* at 150.

[41] U.S. CAT Ratification, *supra* note 7, at 320.

[42] *Id.* at 321 (emphasis added).

[43] U.S. Third, Fourth, and Fifth Periodic Reports to UN Committee Against Torture, ¶¶ 13 & 14, http://www.state.gov/j/drl/rls/213055.htm (last visited Mar. 28, 2016).

[44] President Obama famously stated during a press conference in August 2014 that the U.S. crossed a moral line during the war on terror and that "we tortured some folks." Josh Gerstein, *"Obama: We*

2. CAT Article 14 Compensation Requirements

Article 14 of the CAT provides that:

> Each State Party shall ensure in its legal system that the victim of an act of torture obtains redress and has an enforceable right to fair and adequate compensation, including the means for as full rehabilitation as possible. In the event of the death of the victim as a result of an act of torture, his dependants shall be entitled to compensation…. Nothing in this article shall affect any right of the victim or other persons to compensation which may exist under national law.[45]

The obligation on a State Party to ensure victims receive redress requires legislation and a judicially enforceable right to compensation. The U.S. recognized this private right to compensation requirement when it ratified the treaty.[46] But the right to redress required by Article 14 goes beyond monetary compensation and includes restitution, compensation, rehabilitation, satisfaction and guarantees of non-repetition. The State Party must ensure that "access to justice and to mechanisms for seeking and obtaining redress are readily available" regardless of the reason for which the person is detained including persons accused of terrorist acts.[47] Importantly, the State Party must "also make readily available to the victims all evidence concerning acts of torture or ill-treatment upon the request of the victims, their legal counsel, or a judge."[48]

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tortured some folks", Politico.com, http://www.politico.com/story/2014/08/john-brennan-torture-cia-109654.html (last updated Aug. 2, 2014, 7:34 AM). Interestingly enough, when the CIA secret rendition program first came out of the shadows in 2006, President George W. Bush made a speech where he stated: "I want to be absolutely clear with our people and the world. The United States does not torture. It's against our laws, and it's against our values. I have not authorized it, and I will not authorize it." A transcript of President Bush's speech is available online. *Transcript of President Bush's remarks*, NPR, http://www.npr.org/templates/story/story.php?storyId=5777480 (last visited Nov. 22, 2014). The dichotomy between the two views highlights the politically charged nature of a nation admitting its conduct constitutes torture.

[45] United Nations Convention Against Torture, *supra* note 5, 1465 U.N.T.S. at 116.

[46] *See* U.S. reservations, declarations, and understandings, Convention Against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment, 136 Cong. Rec. S17486-01 (daily ed. Oct. 27, 1990) http://www1.umn.edu/hu manrts/usdocs/tortres.html. Among its reservations to the Convention the United States said "That it is the understanding of the United States that Article 14 requires a State Party to provide a private right of action for damages only for acts of torture committed in territory under the jurisdiction of that State Party" *Id.* ¶ II(3).

[47] General Comment No. 3 of the Committee against Torture, ¶ 32, U.N. Doc. CAT/C/GC/3 (Nov. 19, 2012) [hereinafter General Comment No. 3] http://www2.ohchr.org/english/bodies/cat/docs/GC/CAT-C-GC-3_en.pdf.

[48] *Id.* ¶ 30.

The U.S. has claimed that, with respect to enemy belligerents, these compensation provisions of the CAT are trumped by the *lex specialis*, IHL. In order to analyze the U.S. position it is first necessary to explore IHL and what rules regarding compensation exist and apply to our detainees.

II. INTERNATIONAL HUMANITARIAN LAW

A. The basics of IHL, IAC vs. NIAC

The backbone of IHL against which we must analyze the United States' conduct is contained in the four Geneva Conventions of 1949.[49] The Geneva Conventions are designed to minimize the impact of war by establishing the rules that apply to international armed conflict.[50] The four conventions have received universal acceptance and currently have 196 States Parties.[51] As such they are considered not only treaty law applicable to States Parties but also a part of customary international law and are applicable even to nations and armed groups that are not signatories.[52] In addition to the four Geneva Conventions there are also two Additional Protocols to the conventions that were adopted in 1977.[53] Additional Protocol I (API) is titled "Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I)" and it establishes additional rules relating to the protection of victims of International Armed Conflict, as well as additional limitations on the means and methods of warfare in IACs.[54] Additional Protocol II (APII) is much more limited than API

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[49] Geneva Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field, Aug. 12, 1949, 75 U.N.T.S. 31 [hereinafter Geneva Convention I]; Geneva Convention for the Amelioration of the Condition of the Wounded, Sick and Shipwrecked Members of Armed Forces at Sea, Aug. 12, 1949, 75 U.N.T.S. 85 [hereinafter Geneva Convention II]; Geneva Convention relative to the Treatment of Prisoners of War, Aug. 12, 1949, 75 U.N.T.S. 135 [hereinafter Geneva Convention III]; Geneva Convention relative to the Protection of Civilian Persons in Time of War, Aug. 12, 1949, 75 U.N.T.S. 287 [hereinafter Geneva Convention IV].

[50] *See* Marco Sassòli, Antoine A. Bouvier & Anne Quintin, *How Does Law Protect in War*?, International Committee of the Red Cross (2012), https://www.icrc.org/casebook/doc/book-chapter/fundamentals-ihl-book-cha pter.htm (last visited May 1, 2015).

[51] Treaties and States Parties to Such Treaties, International Committee of the Red Cross, https://www.icrc.or g/applic/ihl/ihl.nsf/States.xsp?xp_viewStates=XPages_NORMStatesParties&xp_treatySelected=365; *see also* Press Release, ICRC, Geneva Conventions of 1949 achieve universal acceptance (Aug. 21, 2006), https://www.icrc.org/en g/resources/documents/news-release/2009-and-earlier/geneva-conventions-news-210806.htm.

[52] Andrea Bianchi & Yasmin Naqvi, International Humanitarian Law and Terrorism 58 (Hart Publishing, 2011).

[53] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the protection of victims of international armed conflicts (Protocol I), 1125 U.N.T.S. 3 (1977) [hereinafter API], https://treaties.un.org/doc/Publi cation/UNTS/Volume%201125/v1125.pdf; Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the protection of victims of non-international armed conflicts (Protocol II), 1125 U.N.T.S. 609 (1977) [hereinafter APII], https://treaties.un.org/doc/Publication/UNTS/Volume%201125/v1125.pdf.

[54] API contains 102 Articles which according to Article 1(3) supplement the "Geneva Conventions

and it establishes some additional protections for victims of NIACs.[55] The U.S. is a signatory to both API and APII but the Senate has never ratified either.[56] Therefore the U.S. is not obligated to follow the provisions of API and APII as a matter of international treaty law.[57] However, according to the International Committee of the Red Cross (ICRC) some of the provisions of API and APII are considered to reflect customary international law and are applicable to the U.S. in that manner as I discuss later in this section.

There are a number of articles that are common to each of the four Geneva Conventions of 1949.[58] Common Article 2 and Common Article 3 help draw the line between what constitutes an IAC, and alternatively, what is a NIAC. The difference between IAC and NIAC is important because IHL draws a distinction in regards to the obligations of participants in the conflict based on these classifications.

Article 2 establishes the scope of application of the conventions. It states in relevant part "the present Convention shall apply to all cases of declared war or of any other armed conflict which may arise between two or more of the High Contracting Parties, even if the state of war is not recognized by one of them."[59] Article 2 recognizes the historical paradigm that IAC is between two nation states

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of 12 August 1949 for the protection of war victims, [and] shall apply in the situations referred to in Article 2 common to those Conventions." API, *supra* note 53, 1125 U.N.T.S. at 7.

[55] APII contains 28 Articles regarding protections for victims of non-international armed conflict. *See* APII, *supra* note 53, 1125 U.N.T.S. 609.

[56] *See* Treaties, States Parties and Commentaries, United States of America, International Committee of the Red Cross, https://www.icrc.org/applic/ihl/ihl.nsf/vwTreatiesByCountrySelected.xsp?xp_countrySelected=US (last visited May 1, 2015).

[57] Although the U.S. is not a party to API, the Obama Administration has chosen "out of a sense of legal obligation to treat the principles set forth in Article 75," which establishes fundamental guarantees for persons detained by an opposing force, as applicable to individuals detained by the U.S. during international armed conflict. Press Release, The White House, Fact Sheet: New Actions on Guantanamo and Detainee Policy (Mar. 7, 2011), https://www.white house.gov/sites/default/files/Fact_Sheet_—_Guantanamo_and_Detainee_Policy.pdf.

[58] Among the "common" articles are Articles 1, 2, and 3 of each of the conventions, which are identical in language. Additionally, while each convention also contains a provision that addresses what constitutes a grave breach of the convention, the exact wording of the four are not identical and therefore not "common." *See* each of the four Geneva Conventions I-IV, *supra* note 49, 75 U.N.T.S. 31, 85, 135, 287.

[59] Geneva Convention I, *supra* note 49, 75 U.N.T.S. 31. The full text of Article 2 is reproduced here:

> In addition to the provisions which shall be implemented in peacetime, the present Convention shall apply to all cases of declared war or of any other armed conflict which may arise between two or more of the High Contracting Parties, even if the state of war is not recognized by one of them.
>
> The Convention shall also apply to all cases of partial or total occupation of the territory of a High Contracting Party, even if the said occupation meets with no armed resistance.

locked in war, even if the state of war is not recognized by one of them.[60] In IAC all of the privileges and obligations of all four conventions apply. This is important because the third and fourth Geneva Conventions establish the obligations of states with regard to the classification and treatment of Prisoners of War and Civilian Persons, respectively.[61] It is important to note that these obligations and privileges are based on international treaty law and while individuals are ultimately protected and benefit from the treaty and could be considered the beneficiaries, the Conventions themselves do not necessarily extend an enforceable individual cause of action over the States Parties.[62]

The four Geneva Conventions of 1949 contain 425 articles relating to IAC.[63] There is one Common Article 3, spanning less than one page in the United Nations Treaty series, regulating all of NIACs. Common Article 3 says in its entirety:

> In the case of armed conflict not of an international character occurring in the territory of one of the High Contracting Parties, each Party to the conflict shall be bound to apply, as a minimum, the following provisions:
>
> 1) Persons taking no active part in the hostilities, including members of armed forces who have laid down their arms and those placed hors de combat by sickness, wounds, detention, or any other cause, shall in all circumstances be treated humanely, without any adverse distinction founded on race, colour, religion or faith, sex, birth or wealth, or any other similar criteria.
>
> To this end, the following acts are and shall remain prohibited at any time and in any place whatsoever with respect to the above-mentioned persons:
>
> a) violence to life and person, in particular murder of all kinds, mutilation, cruel treatment and torture;

> Although one of the Powers in conflict may not be a party to the present Convention, the Powers who are parties thereto shall remain bound by it in their mutual relations. They shall furthermore be bound by the Convention in relation to the said Power, if the latter accepts and applies the provisions thereof.

Id.

[60] Bianchi & Naqvi, *supra* note 52, at 60.

[61] *See* Geneva Conventions III & IV, *supra* note 49, 75 U.N.T.S. 135, 287.

[62] Major Julie Long, *What Remedy for Abused Iraqi Detainees?*, 187 Mil. L. Rev. 43, 75-76 (2006).

[63] There are 429 total articles in the four conventions. I have subtracted the four occurrences of common Article 3 to arrive at 425 articles governing IAC. *See* Geneva Conventions I-IV, *supra* note 49, 75 U.N.T.S. 31, 85, 135, 287.

b) taking of hostages;

c) outrages upon personal dignity, in particular humiliating and degrading treatment;

d) the passing of sentences and the carrying out of executions without previous judgment pronounced by a regularly constituted court, affording all the judicial guarantees which are recognized as indispensable by civilized peoples.

2) The wounded and sick shall be collected and cared for.

An impartial humanitarian body, such as the International Committee of the Red Cross, may offer its services to the Parties to the conflict.

The Parties to the conflict should further endeavor to bring into force, by means of special agreements, all or part of the other provisions of the present Convention.

The application of the preceding provisions shall not affect the legal status of the Parties to the conflict.[64]

Common Article 3 is often referred to as a "convention within a convention" because it exists in all four Geneva Conventions as a set of minimum behavioral standards that apply in what were traditionally thought of as "internal wars."[65] Today these conflicts are known as NIACs. How to define a NIAC can be tricky. Article 3 does not specifically define a NIAC but rather applies "In the case of armed conflict *not* of an international character occurring in the territory of one of the High Contracting Parties…."[66] Analytically the first step in determining if the situation is a NIAC is to determine if the conflict in question rises to the level of an armed conflict, be it IAC or NIAC. Some clashes are merely considered "internal disturbances and tensions, riots, or acts of banditry."[67] In those cases IHL, and hence the Geneva Conventions, simply do not apply.[68]

Determining the existence of an IAC under Article 2 of the Conventions is straightforward and indeed the International Criminal Tribunal for the former

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[64] Article 3, Geneva Convention I, *supra* note 49, 75 U.N.T.S. at 32-33.

[65] Bianchi & Naqvi, *supra* note 52, at 103.

[66] Article 3, Geneva Convention I, *supra* note 49, 75 U.N.T.S. at 32.

[67] *See* ICRC, *How is the Term "Armed Conflict" Defined in International Humanitarian Law?*, International Committee of the Red Cross, Opinion Paper, 3 (Mar. 2008), https://www.icrc.org/eng/assets/files/other/opinion-pape r-armed-conflict.pdf.

[68] *See* APII, *supra* note 53, 1125 U.N.T.S. at 611.

Yugoslavia (ICTY), in the case of *Prosecutor v. Dusko Tadic*, established a very simple test stating that "an armed conflict exists whenever there is a resort to armed force between States…."[69] But outside of that bright line for IAC is a little more complicated. In the *Tadic* case the ICTY attempted to clarify what is meant by "armed conflict" in NIACs. The Court stated that an armed conflict also exists whenever there is "protracted armed violence between governmental authorities and organized armed groups or between such groups within a State."[70]

So it seems that the best test for a NIAC is to look first at who is acting in the conflict. If it is two States who are engaged in the use of armed force against one another then it is an IAC under Article 2 of the Conventions. If the conflict is between a State and an armed group or between armed groups within the territory of a State then one needs to determine if the groups have sufficient organization and if the use of force or "violence" is "protracted." If so, then the conflict can rightfully be classified as a NIAC and Geneva Conventions Common Article 3 will apply.[71] As mentioned previously, APII also establishes some rules for NIACs. However, because the U.S. is not a party those provisions are only binding on the U.S. to the extent they may represent customary international law.

This entire discussion thus far on IHL and the rules that apply to IACs and NIACs has been centered on the black letter treaty law of IHL known as the Geneva Conventions and Additional Protocols. In addition to those treaty rules it is important to note that there exists a large body of customary international law relating to IHL. Customary International Law is law derived from "a general practice accepted as law" among States.[72] In order to prove that any given rule is customary international law "one has to show that it is reflected in state practice and that the international community believes that such practice is required as a matter of law."[73]

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[69] Decision on the Defence Motion for Interlocutory Appeal on Jurisdiction, ¶ 70, 1995 I.C.T.Y. (Oct. 2), http://www.geneva-academy.ch/RULAC/pdf/Decision-on-the-Defence-Motion-for-Interlocutory-Appeal-on-Jurisdic tion.pdf.

[70] *Id.*

[71] Bianchi & Naqvi, *supra* note 52, at 103. The authors state that "the scope of application of common Article 3 must be read in conjunction with common Article 2, which sets out the scope of application of the remaining provisions of each respective convention. Armed conflicts not of an international character therefore do not involve declared wars, disputes between states, or occupation of a state. Thus the type of conflict to be covered by common Article 3 are those not involving two or more states and which take place on the territory of 'one High Contracting Party.' The negative formulation 'not of an international character' indicates that such a conflict does not involve more than one state and rather pertains to violent struggle within one state."

[72] Overview, *Customary international humanitarian law*, ICRC (Oct. 29, 2010), https://www.icrc.org/eng /war-and-law/treaties-customary-law/customary-law/overview-customary-law.htm.

[73] *Id.*

The ICRC conducted an intense study of customary international humanitarian law and published their findings in 2005.[74] The purpose of the study was two-fold. First to "determine which rules of international humanitarian law are part of customary international law and therefore applicable to all parties to a conflict, regardless of whether or not they have ratified the treaties containing the same or similar rules." [75] Second, "to determine whether customary international law regulates non-international armed conflict in more detail than does treaty law and if so, to what extent."[76] The study discerned 161 rules of customary international law relating to International Humanitarian Law.[77] Most important the study found a widespread practice of states to provide individual compensation in NIACs. [78]

The U.S. took issue with the ICRC customary international law study specifically citing concerns regarding the methodology used to determine if in fact both requirements, State Practice and the sense of a State's legal obligation to follow the rules, had been adequately developed and proven through factual evidence.[79] Nonetheless the point to be made here is that, in addition to treaty based obligations in NIACs the U.S. has specifically agreed to be bound by, there may exist customary international humanitarian law rules and obligations that apply even though the U.S. has explicitly denied their application.

B. Categorizing Detainees/Victims and Divining Rules

Therefore, in order to determine whether the obligations the U.S. owes to AZ, Nashiri, and KSM are based on the totality of the provisions of the Geneva Conventions, and corresponding customary international humanitarian law applicable to IACs, or if U.S. obligations only originate in common Article 3's protections afforded to NIACs, one must first require a determination of the nature of the

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[74] Jean-Marie Henckaerts, *Study on customary international humanitarian law: A contribution to the understanding and respect for the rule of law in armed conflict*, International Review of the Red Cross, vol. 87, no. 857, at 175 (Mar. 2005), https://www.icrc.org/eng/assets/files/other/icrc_002_0860.pdf.

[75] *Id.* at 177.

[76] *Id.* at 178.

[77] *See* Jean-Marie Henckaerts & Louise Doswald-Beck, Customary Int'l Humanitarian Law Volume I: Rules (Cambridge University Press 2005), https://www.icrc.org/eng/assets/files/other/customary-interna tional-humanitarian-law-i-icrc-eng.pdf.

[78] *Rule 150. Reparation*, Customary IHL, ICRC, https://www.icrc.org/customary-ihl/eng/docs/v1_rul_rule150 (last visited May 4, 2015) [hereinafter *Reparation*]. The ICRC commentary on Rule 150 contains numerous examples of State practice allowing for restitution, compensation, and satisfaction based on violations of international humanitarian law during non-international armed conflict. *Id.*

[79] John B. Bellinger, III & William J. Haynes II, *A U.S. government response to the International Committee of the Red Cross study Customary International Humanitarian Law*, Int'l Rev. of the Red Cross, vol. 89 No. 866, at 443, 444 (June 2007) https://www.icrc.org/eng/assets/files/other/irrc_866_bellinger.pdf.

conflict as IAC versus NIAC. Once this is resolved, one can apply the template of protections to the individuals.

The U.S. Supreme Court faced a similar classification of conflict/detainee problem in the case of *Hamdan v. Rumsfeld*.[80] Ultimately the Court did not answer the fundamental question regarding the classification of the petitioner, Hamdan, but nonetheless the Court gave us some valuable insight into how to begin the analytical process.[81] Petitioner, Hamdan, was a Yemeni national and a member of al-Qaeda who was captured during hostilities between the United States and the Taliban (which then governed Afghanistan).[82] Thereafter he was moved to GTMO where he was detained.[83] The U.S. intended to try Hamdan at a military commission. He filed a Habeas Corpus petition alleging that the trial by military commission, *inter alia*, violated the Geneva Conventions.[84] The U.S. government argued that Hamdan was not entitled to the full protections of the Geneva Conventions under Article 2 because al-Qaeda was not a "High Contracting Part[y]" as is required by Article 2.[85] The Supreme Court in response stated:

> We need not decide the merits of this argument because there is at least one provision of the Geneva Conventions that applies here even if the relevant conflict is not one between signatories. Article 3, often referred to as Common Article 3 because, like Article 2, it appears in all four Geneva Conventions, provides that in a "conflict not of an international character occurring in the territory of one of the High Contracting Parties, each Party to the conflict shall be bound to apply, as a minimum," certain provisions protecting "[p]ersons taking no active part in the hostilities, including members of armed forces who have laid down their arms and those placed *hors de combat* by … detention."[86]

The Government countered by arguing that even Common Article 3 did not apply to Hamdan because the conflict with al Qaeda was "international in scope" and did not qualify as a "conflict not of an international character."[87] The Court quickly dismissed this argument and found that the language "not of an international character" bears its literal meaning and Common Article 3 applies to protect individuals who are not associated with a signatory or a nonsignatory "Power."[88]

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[80] Hamdan v. Rumsfeld, 548 U.S. 557 (2006).

[81] *See id.*

[82] *Id.* at 566.

[83] *Id.*

[84] *Id.* at 567.

[85] *Hamdan*, 548 U.S. at 628-29.

[86] *Id.* at 629-30 (alteration in original).

[87] *Id.* at 630.

[88] *Id.* at 630-31. The relevant part of the opinion is as follows:

When we apply the facts of the case as it relates to AZ, Nishiri, and KSM we find that they are indeed being held as "enemy belligerents" as the result of a NIAC and therefore the only obligations, or protections, owed to them by the U.S. are those within the confines of Common Article 3.[89] All three were members of al-Qaeda which is not a party to the conventions nor a nonsignatory "Power." It is clear that they were not part of the Taliban and they were not picked up while fighting alongside those forces, which could have created confusion as to their status. The U.S. government has never extended POW status to them or indicated that the U.S. is bound by IHL to afford them the full protections of the Geneva Conventions. Therefore the U.S. has never recognized them as combatants in line with the Geneva Conventions. Thus in line with the Supreme Court's ruling in *Hamdan* they are individual "enemy belligerents" engaged in an armed conflict not of an international character and are due the limited protections of Common Article 3 of the Geneva Conventions of 1949.

> The term "conflict not of an international character" is used here in contradistinction to a conflict between nations. So much is demonstrated by the "fundamental logic [of] the Convention's provisions on its application." Common Article 2 provides that "the present Convention shall apply to all cases of declared war or of any other armed conflict which may arise between two or more of the High Contracting Parties." High Contracting Parties (signatories) also must abide by all terms of the Conventions vis-à-vis one another even if one party to the conflict is a nonsignatory "Power," and must so abide vis-à-vis the nonsignatory if "the latter accepts and applies" those terms. Common Article 3, by contrast, affords some minimal protection, falling short of full protection under the Conventions, to individuals associated with neither a signatory nor even a nonsignatory "Power" who are involved in a conflict "in the territory of" a signatory. The latter kind of conflict is distinguishable from the conflict described in Common Article 2, chiefly because it does not involve a clash between nations (whether signatories or not). In context, then, the phrase "not of an international character" bears its literal meaning….
>
> Common Article 3, then, is applicable here…."

Id. (alteration in original) (citations omitted).

[89] It should be noted here that I repeat the term "enemy belligerent." Enemy belligerent is a term used by the U.S. government but not used in International Humanitarian Law. IHL has "combatants" and "civilians." The important distinction is that combatants are recognized under IHL and receive the immunities associated with enemy forces in armed conflict (i.e. they can target and kill other combatants without facing trial for murder). Civilians cannot be targeted and correspondingly they cannot engage in hostilities. If civilians directly participate in hostilities they will lose their protection against targeting, but may still be tried for criminal actions. The U.S. has never given combatant status to captured members of al-Qaeda nor declared that they are civilians who are entitled to trial or release under IHL. Instead the U.S. refers to them as "enemy belligerents." For information on the distinction between combatants and civilians see *Direct participation in hostilities: questions & answers*, ICRC (Feb. 6, 2009), https://www.icr c.org/eng/resources/documents/faq/direct-participation-ihl-faq-020609.htm.

C. The NIAC legal void

The U.S. position that allowing for an individual right to compensation for torture would be anomalous under the law of armed conflict presumes that these detainees are entitled to something the U.S. has never afforded them, full protection under the Geneva Conventions as enemy combatants in an IAC.[90] Indeed, if the U.S. had given these detainees POW status as combatants under IAC and full protection of the conventions then Article 131 of the Third Geneva Convention relative to the treatment of prisoners of war would be applicable.[91] Article 131 provides that "No High Contracting Party shall be allowed to absolve itself or any other High Contracting Party of any liability incurred by itself or by another High Contracting Party in respect of breaches referred to in the preceding Article" (on grave breaches including torture).[92] As the U.S. correctly concludes in its presentation before the CAT, this provision contemplates a State to State mechanism for addressing complaints of violations of the convention.[93] Furthermore, as noted by the ICRC in its commentary on Article 131, it would be "inconceivable" as the law stands today that an individual "should be able to bring a direct action for damages against the State in whose service the person committing the breaches was working."[94] This would support the U.S. position in the strict context of POWs during an IAC.

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[90] AZ was captured in March 2002, Nashiri in October 2002, and KSM on March 1, 2003. S. Rep. No. 113-288 at 21, 66, & 81. On January 25, 2002, White House Counsel Alberto R. Gonzales wrote a memo for President George W. Bush titled "*Decision RE Application of the Geneva Convention on Prisoners of War to the Conflict with al Qaeda and the Taliban*." The memo was in response to a push from The Secretary of State for the President to reconsider his decision that the Geneva Convention III on the Treatment of Prisoners of War (GPW) did not apply to the conflict with al Qaeda. In his argument Gonzales finds, *inter alia*, that the war on terror "renders obsolete Geneva's strict limitations on questioning of enemy prisoners" and that "by concluding that GPW does not apply to al Qaeda and the Taliban, we avoid foreclosing options for the future, particularly against nonstate actors." Gonzales also expresses concern that if GPW status applies then U.S. officials may face prosecution for acts against the Taliban that may constitute "war crimes" under 18 U.S.C. § 2441. Memorandum from Alberto Gonzales on Decision Re Application of the Geneva Convention on Prisoners of War to the Conflict with Al Qaeda and the Taliban to the President, Jan. 25, 2002, http://nsarchive.gwu.edu/NSAEBB/NSAEBB127/02.01.25.pdf.

[91] Geneva Convention III, *supra* note 49, 75 U.N.T.S. at 238.

[92] *Id.*

[93] *See Commentary of 1960 – Art. 131. Penal Sanctions: III. Responsibilities of the Contracting Parties*, ICRC, https://www.icrc.org/applic/ihl/ihl.nsf/Comment.xsp?viewComments=LookUpCOMART&articleUNID=E4CE404B EB5A0424C12563CD0051B5FF (last visited May 4, 2015).

[94] *Id.* Commentary on the article is reproduced below:

> In our opinion, Article 131 is intended to prevent the vanquished from being compelled in an armistice agreement or a peace treaty to renounce all compensation due for breaches committed by persons in the service of the victor. As regards material compensation for breaches of the Convention, it is inconceivable, at least as the law stands today, that claimants should be able to bring a direct action for damages against the State in whose service the person committing the breaches was working. Only a State can make such claims on another State, and they form part, in general, of what is called "war reparations." It would seem unjust for

But as already explored and analyzed above, AZ, Nashiri and KSM are not enemy combatants detained as POWs as the result of an IAC. As evidenced by the circumstances of their capture and detention, the analysis of IHL by the U.S. Supreme Court, and the historical practice of the U.S. executive branch they are being detained as the result of a NIAC. As such the U.S. is not obligated under international law to apply any of the Geneva Convention rules specific to IAC mentioned above to them. The U.S. is only obligated to apply the provisions of Common Article 3, or customary international humanitarian law specific to NIACs, to their detention. Therefore, to survive scrutiny, the rules that the U.S. relies on to demonstrate a conflict between IHL and the CAT should be found in Common Article 3 or in the customary IHL of NIACs.

The complete language of Article 3, *supra* page 14, is completely silent regarding compensation or liability of the parties for violations, unlike the conventions applicable to IACs. It contains no clear provision that says that only States may claim violations or that individuals cannot make claims. It literally says nothing about the subject whatsoever. In fact, even if the U.S. were a party to APII, which provides another 28 Articles covering NIACs, it adds nothing to Common Article 3 about State liability for violations, about compensation for victims, or mechanisms for complaints.[95]

In the absence of black letter treaty law, one should look to the customary international humanitarian law mentioned earlier. The ICRC Customary International Humanitarian Law Study found that in both IAC and NIAC "a State is responsible for violations of international humanitarian law attributable to it and is required to make full reparation for the loss or injury caused by such violations."[96] In its commentary on the rule (Rule 150 of the study) the ICRC notes "widespread and representative practice in which States have made efforts to compensate victims of violations of international humanitarian law committed in non-international armed conflicts."[97] In fact, contrary to the U.S. position, the study also found some evidence of state practice allowing individual claims in IAC.[98]

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individuals to be punished while the State in whose name or on whose instructions they acted was released from all liability.

Id.

[95] *See* APII, *supra* note 53, 1125 U.N.T.S. 609.

[96] Henckaerts, *supra* note 74, at 196. The study listed 161 rules of customary international humanitarian law. Rule 150 states: "A State responsible for violations of international humanitarian law is required to make full reparation for the loss or injury caused." *Id.* at 211.

[97] *Reparation*, *supra* note 78. The ICRC commentary on Rule 150 contains numerous examples of State practice allowing for restitution, compensation, and satisfaction based on violations of international humanitarian law during non-international armed conflict. *Id.*

[98] The ICRC notes that in International Armed Conflicts "there is an increasing trend in favour of enabling individual victims of violations of international humanitarian law to seek reparation directly from the responsible State." The commentary goes on to list instances where reparations to

Furthermore, the Rome Statute for the International Criminal Court (ICC), which was established to prosecute war crimes among other serious crimes, also lends support to the argument that an individual right exists by alluding to a right of individuals to seek compensation from States in Article 75(6) where it says that "nothing in this article shall be interpreted as prejudicing the rights of victims under national or international law."[99] The Statute also establishes a Trust Fund at Article 79 for "the benefit of victims of crimes."[100] And the U.N.'s International Law Commission has also recognized the possibility that such an individual right may exist in its Articles on State Responsibility where it conditions the application of the rules as being "without prejudice to any right, arising from the international responsibility of a State, which may accrue directly to any person or entity other than a State."[101]

In fact, even the U.S. has acknowledged and at times advocated for direct compensation for victims as a result of armed conflict, such as when the U.S. Legislature approved of reparations for Japanese victims of internment by the U.S. during World War II.[102] Another example of U.S. acknowledgment of an individual right to compensation is the Department of Defense's use of solatia payments, condolence payments, and claims mechanisms to compensate victims.[103]

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individuals were provided: 1) on the basis of inter-State and other agreements; 2) on the basis of a unilateral State act; and 3) through national courts. *Id.*

[99] Rome Statute of the International Criminal Court, July 17, 1998, 2187 U.N.T.S. 90, 135 (entered into force July 1, 2002), https://treaties.un.org/doc/Publication/UNTS/Volume%202187/v2187.pdf.

[100] *Id.* at 136.

[101] Int'l Law Commission, *Draft articles on Responsibility of States for Internationally Wrongful Acts, with commentaries*, 94 (2001), http://legal.un.org/ilc/texts/instruments/english/commentaries/9_6_2001.pdf.

[102] *See* Irvin Molotsky, *Senate Votes to Compensate Japanese-American Internees*, N.Y. Times, Apr. 21, 1988, http://www.nytimes.com/1988/04/21/us/senate-votes-to-compensate-japanese-american-internees.html. The Civil Liberties Act:

> established a trust fund to provide a measure of monetary reparations to those that had been unjustly interned, and created a public education fund to ensure that the period of Japanese internment would not be forgotten or repeated.
>
> In 1990, the government distributed individual redress payments of $20,000… to an estimated 60,000 surviving Japanese Americans who were affected by the internment, along with its apology for the treatment of Japanese Americans during World War II.

Anti-Defamation League, *Understanding the Civil Liberties Act of 1988*, http://archive.adl.org/education/civil_libert ies/understanding_civil_liberties_act_1998.pdf (last visited May 4, 2015).

[103] Between 2003 and 2006 the Defense Department "paid $30.9 million to Iraqi and Afghan civilians who were killed, injured, or incurred property damage due to U.S. or coalition forces' actions during combat." Associated Press, *Abu Ghraib abuse victims never got compensated*, RepublicanAmerican.com, Sep. 27, 2010, http://rep-am. com/articles/2010/10/14/news/national/doc4ca00e5b0af27911634743.txt. Condolence payments are for the "expression of sympathy for death, injury, or property damage caused by…U.S. forces generally during combat." Whereas Solatia payments are "[t]oken or nominal payment[s] for death, injury, or property damage caused

III. LEX SPECIALIS

A. Introduction

It should be noted at the outset that IHL and HRL have completely different developmental histories.[104] IHL was largely developed through the enactment of treaties beginning in earnest in the nineteenth century and has as its goal the balancing of the "violence inherent in armed conflict with the dictates of humanity."[105] The development of IHL has occurred outside the U.N. system and has been championed by the ICRC.[106] IHL only applies during times of armed conflict between two or more competing factions (states and/or armed groups) and it allows for no derogations.[107] International HRL on the other hand is comparatively new. It blossomed within the United Nations system in the post WWII era.[108] HRL is fundamentally different from IHL in two respects. First, HRL is intended to regulate the relationship of the much stronger state with the weaker individual.[109] Therefore the focus of HRL is on state obligations owed to individuals. Second, HRL binds states at all times, during peace and armed conflict, in their interactions with individuals.[110] Because both IHL and HRL apply during armed conflict when provisions of HRL and IHL are directed at the same behavior and both are potentially applicable, we need a conceptual way to determine which rules apply to the situation at hand. The model of *Lex Specialis*, the basic principle being that a more specific rule in one of the bodies of law will take

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by U.S. forces during combat." Payment of solatia is "made in accordance with local custom as an expression of remorse or sympathy toward a victim or his/her family." Neither Condolence nor Solatia payments are considered an admission of legal liability or fault. Payment is completely discretionary on the part of the Commander authorized to make payment. Payment of both Condolence and Solatia was capped at a maximum of $2,500 for death of the victim. U.S. Gov't Accountability Off., GAO-07-699, Military Operations: The Department of Defense's Use of Solatia and Condolence Payments in Iraq and Afghanistan (May 23, 2007), http://www.gao.gov/assets/270/261104.pdf.

[104] International Human Rights Law 481-82 (Daniel Moeckli, Sangeeta Shah & Sandesh Sivakumaran eds., 2d ed. 2014) [hereinafter Sivakumaran].

[105] *Id.* at 480.

[106] *Id.* at 482.

[107] *Id.* at 481.

[108] The Charter of the United Nations was signed on June 26, 1945. One of the stated purposes of the United Nations under Article 1, paragraph 3, is "to achieve international cooperation … in promoting and encouraging respect for human rights and for fundamental freedoms for all without distinction as to race, sex, language, or religion…." U.N. Charter art. 1.

[109] Sivakumaran, *supra* note 104, at 482.

[110] *Id.* The general rule is that states are bound by their obligations under HRL treaties at all times, however some HRL treaties contain provisions that allow for derogation of some provisions during times of extreme emergency. Article 4 of the International Covenant on Civil and Political Rights, Dec. 19, 1966, 999 U.N.T.S. 171, 174. *But see* United Nations Convention Against Torture, *supra* note 5, 1465 U.N.T.S. at 114. UNCAT Article 2, paragraph 2, provides that "no exceptional circumstances whatsoever, whether a state of war or a threat of war, internal political instability or any other pubic emergency, may be invoked as a justification of torture." *Id.*

precedence over the more general, helps us with this determination.[111] *Lex Specialis* can be further broken down into three possible approaches to be taken by states.

B. Three approaches to Lex Specialis

A state could take the approach of complete displacement. In other words, whenever there is an armed conflict IHL, as the more specific body of law directly applicable to armed conflict, will completely displace HRL.[112] The benefit of this model is its simplicity and clarity. One only has to determine if an armed conflict under the terms of IHL exists. If so, then HRL essentially becomes irrelevant to the discussion of a state's obligations and we need not concern ourselves with how to sort out areas of conflict between the two bodies of law.[113] It should be noted here that this theory has not received extensive support from the international community.[114] It also has a rather negative side-effect of removing the ability of human rights treaties bodies to oversee a state's actions during armed conflict.[115] This may work to defeat the object and purpose of many human rights treaties.

A second approach that states can use to determine which rules apply is to look at both bodies of law as applicable and yet complimentary and try to harmonize the outcome.[116] This is the approach adopted by the International Court of Justice (ICJ) in its advisory opinion on the Legality of the Threat or Use of Nuclear Weapons.[117] In that opinion the court determined that while the protections of the International Covenant of Civil and Political Rights (ICCPR) continued to apply during times of war the only way to interpret the ICCPR's provisions was in reference to the law of armed conflict as the *lex specialis*.[118] This is also the approach

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[111] Sivakumaran, *supra* note 104, at 489.

[112] Oona A. Hathaway et al., *Which Law Governs During Armed Conflict? The Relationship Between International Humanitarian Law and Human Rights Law*, 96 Minn. L. Rev. 1883, 1894 (2012) [hereinafter Hathaway].

[113] *Id.* at 1897.

[114] *Id.* at 1896-97.

[115] *Id.* at 1897.

[116] *Id.* at 1897-98.

[117] Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, July 8, 1996, ICJ Rep. 1996, p. 226., http://www.icj-cij.org/docket/files/95/7495.pdf.

[118] The court deals with this issue in paragraph 25 where it states:

> The Court observes that the protection of the International Covenant of Civil and Political Rights does not cease in times of war, except by operation of Article 4 of the Covenant whereby certain provisions may be derogated from in a time of national emergency. Respect for the right to life is not, however, such a provision. In principle, the right not arbitrarily to be deprived of one's life applies also in hostilities. The test of what is an arbitrary deprivation of life, however, then falls to be determined by the applicable *lex specialis*, namely, the law applicable in armed conflict which is designed to regulate the conduct of hostilities. Thus whether a particular loss of life, through the use of a certain weapon in warfare, is to be

that seems to be favored by the United Nations International Law Commission which identified a principle of harmonization that exists in international law.[119] The Commission stated "it is a generally accepted principle that when several norms bear on a single issue they should, to the extent possible, be interpreted so as to give rise to a single set of compatible obligations."[120]

Lying somewhere between the first two approaches is another approach that may be used by states that we can refer to as conflict pre-emption. The idea of this approach is that the two bodies of law, IHL and HRL, can apply concurrently during armed conflict, but where there is actual conflict between norms of those bodies of law, and incompatible obligations are thrust onto states, the more specific rule will prevail as the norm to be followed by the state thereby pre-empting the more general rule with regards to the specific area of conflict only. [121]

C. The U.S. position on the interaction of IHL and CAT (HRL)

So which approach does the U.S. use with regard to the interaction between IHL and HRL, or more specifically between IHL and the CAT in times of armed conflict? The U.S. position has changed in recent years. When the CAT was being negotiated the U.S. representative stated that "the convention…was never intended to apply to armed conflicts…" and emphasized that if it were to apply to armed conflicts it "would result in an overlap of the different treaties which would undermine the objective of eradicating torture."[122] Although these remarks about applicability were made in 1984 when the treaty was being negotiated and never made it into the

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considered an arbitrary deprivation of life contrary to Article 6 of the Covenant, can only be decided by reference to the law applicable in armed conflict and not deduced from the terms of the Covenant itself.

Id. at 240.

[119] Int'l Law Commission, *Conclusions of the Work of the Study Group on the Fragmentation of International Law: Difficulties Arising from the Diversification and Expansion of International Law*, 58th Sess., U.N. Doc. A/61/10, at 408 (2006) [hereinafter ILC Report], http://legal.un.org/ilc/documentation/english/a_61_10.pdf.

[120] *Id.*

[121] *See generally* Hathaway, *supra* note 112, at 1894. The authors argue that within the Conflict Resolution Model as they term it there are three rules, event-specific displacement, reverse event-specific displacement, and specificity. *Id.* I focus my attention on what they define as their specificity rule of conflict resolution because that appears to most closely match the U.S. position that will be described later in this paper.

[122] John B. Bellinger, III, Legal Adviser, U.S. Dep't of State, *Opening Remarks at U.S. meeting with U.N. Committee Against Torture* (May 5, 2006), https://www.justsecurity.org/wp-content/uploads/2014/03/state-departme nt-cat-memo.pdf. The historical accuracy of Mr. Bellinger's assessment has been challenged by Harold Koh. When Mr. Koh was Legal Adviser at the U.S. Department of State, he wrote a memorandum on the geographical scope of the CAT. In that memo he undertakes an extensive review of the negotiating history of the CAT and finds that the statement by the U.S. representative regarding the negotiating history was contradicted by the actual record and that the statement was "in tension with other U.S. actions during the negotiations." Koh, *supra* note 14, at 78.

text of the final treaty, they were revived by the U.S. Department of State during its appearance before the Committee Against Torture in 2006 to articulate a new U.S. position of complete displacement.[123] Thus according to the U.S. in 2006, in the event of armed conflict, IHL was the *lex specialis* and the CAT provisions did not apply. The U.S. delegation was criticized for this position in the concluding observations of the Committee where the Committee recommended that "[t]he State party [U.S.] should recognize and ensure that the Convention applies at all times, whether in peace, war or armed conflict, in any territory under its jurisdiction and that the application of the Convention's provisions are without prejudice to the provisions of any other international instrument, pursuant to paragraph 2 of its articles 1 and 16."[124]

In the years between the U.S. appearance in 2006 and its most recent appearance in November 2014, the executive branch under President Barack Obama rejected many of the legal positions adopted by the previous administration between 2001 and 2006 as part of a U.S. program "to avoid legal constraint on U.S. counter-terrorism efforts against al Qaeda."[125] But "the Obama administration had never [squarely] articulated its position" with regard to the Convention's application in

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[123] Bellinger, *supra* note 122.

[124] Committee against Torture, Consideration of Reports Submitted by States Parties Under Article 19 of the Convention, *Conclusions and recommendations of the Committee against Torture, United States of America*, 4 (May 18, 2006), http://www.state.gov/documents/organization/133838.pdf. It should be noted that the U.S. was under an intense amount of scrutiny in 2006. At this time the Abu Ghraib prison scandal had been reported and there were rumors of U.S. involvement in extraordinary rendition which culminated in President Bush acknowledging the CIA rendition program in September 2006. *See* Seymour M. Hersh, *Torture at Abu Ghraib*, The New Yorker (May 10, 2004), http://www.newyorker.com/magazine/2004/05/10/torture-at-abu-ghraib; President George W. Bush, *Transcript of President Bush's Remarks*, NPR.org (Sep. 6, 2006), http://www.npr.org/templates/story/story.php?sto ryId=5777480.

[125] Koh, *supra* note 14, at 88. Harold Koh's Memo sums up the U.S. policies during the 2001-2006 years best when he says:

> The newfound *lex specialis* position the United States articulated in 2006 appears to have been part and parcel of a series of legal positions that were developed between 2001 and 2006 to avoid legal constraint on U.S. counter-terrorism efforts against al Qaeda. These included legal opinions asserting an extremely restrictive interpretation of the definition of torture, concluding that principles of necessity or self-defense could override U.S. CAT obligations as well as the domestic extraterritorial Torture Act, asserting that an order of the President could override U.S. CAT obligations, that U.S. domestic statutes purporting to prohibit the torture of detainees were unconstitutional, that the U.S. reservation to CAT Article 16 meant that the Article did not apply to non-citizens abroad, that the U.S. non-self-executing declaration meant that the U.S. was not bound to comply with the non-derogation principle of CAT Article 2, that neither the extraterritorial torture statute nor other U.S. domestic criminal law applied to detainee abuse on Guantánamo, that Common Article 3 of the Geneva Conventions did not apply to the U.S. conflict with al Qaeda and the Taliban, and that "customary international law does not bind the President or the U.S. Armed Forces in their decisions concerning the detention conditions of al Qaeda and Taliban prisoners, to name a few.

armed conflict.[126] When the U.S. appeared before the Committee in the fall of 2014 in conjunction with its third, fourth and fifth periodic reports, it adopted a new position that is more in line with a conflict pre-emption approach to *lex specialis*.[127] In her opening statement to the Committee, Acting Legal Adviser for the U.S. Department of State, Mary McLeod, stated "[a]lthough the law of armed conflict is the controlling body of law with respect to the conduct of hostilities and the protection of war victims, a time of war does not suspend operation of the Convention Against Torture, which continues to apply even when a State is engaged in armed conflict."[128] The White House released a statement on the same day, November 12, 2014, where it confirmed the Administration's position that a time of war does not suspend the Convention, but also went on to clarify that where IHL and HRL conflict, the more specialized laws of war take precedence over the Convention.[129] Ms. McLeod brought the U.S. position into focus when she discussed the apparent conflict between IHL and the compensation requirement under Article 14 of the CAT. According to McLeod war reparations are the subject of government-to-government negotiations under IHL, and it would "be anomalous under the law of war [IHL] to provide individuals detained as enemy belligerents with a judicially enforceable individual right to a claim for monetary compensation against the detaining power for alleged unlawful conduct."[130]

So the current U.S. position is one of conflict pre-emption. Both IHL and CAT protections apply during armed conflict, but where actual conflict between

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> Most, if not all, of these positions have now been rejected by this [Obama] Administration.

Id. at 88-89 (footnotes omitted).

[126] Sarah Cleveland, *The United States and the Torture Convention, Part II: Armed Conflict*, JustSecurity.org (Nov. 19, 2014, 9:30 AM), http://justsecurity.org/17581/united-states-torture-convention-armed-conflict/.

[127] *Id.*

[128] Mary E. McLeod, *Opening Statement Committee Against Torture*, Geneva.USMission.gov (Nov. 12-13, 2004), https://geneva.usmission.gov/2014/11/12/acting-legal-adviser-mcleod-u-s-affirms-torture-is-prohibited-at-all-times-in-all-places/.

[129] Press Release, The White House, Statement by NSC Spokesperson Bernadette Meehan on the U.S. Presentation to the Committee Against Torture (Nov. 12, 2014), https://geneva.usmission.gov/2014/11/12/statement-by-nsc-spokesperson-bernadette-meehan-on-the-u-s-presentation-to-the-committee-against-torture/. The White House also addressed two other changes to policy notably: "In contrast to positions previously taken by the U.S. government, the delegation will affirm that U.S. obligations under Article 16, which prohibits cruel, inhuman, or degrading treatment or punishment, do not apply exclusively inside the territorial United States." Also importantly the White House stated "the U.S. delegation will affirm the United States' obligation to abide by the exclusionary rule set forth in Article 15 of the Convention in the Periodic Review Board process for law of war detainees at Guantanamo, as well as in military commissions" which demonstrated that the Administration was willing to apply rules within the Convention that are more stringent than those found in IHL. *Id. See also* Cleveland, *supra* note 126.

[130] *Third Periodic Report*, *supra* note 1, at 28.

the provisions exists *the more specialized laws of war* (IHL) take precedence over the CAT provisions.

But what happens when there is no actual black letter conflict between IHL and the CAT but rather where IHL is silent on a particular issue, does IHL's silence on an issue constitute a conflict which would result in the preemption of a more specific CAT provision? On this point it is instructive to point out apparent U.S. practice. At the same appearance before the CAT Committee in November 2014, the U.S. affirmed its "obligation to abide by the exclusionary rule set forth in Article 15 of the Convention" at Periodic Review Boards and the military commissions.[131] Neither the Geneva Conventions, nor the Additional Protocols to the Geneva Conventions, address the issue of evidence suppression derived from torture.[132] Thus it would seem that in practice, where IHL is silent on an issue, and the CAT provides a more specialized rule, the U.S. would be obligated by CAT provisions. In other words, silence is not a conflict that would trigger the *lex specialis* pre-emption argument on the part of the U.S.

This brings us to the heart of the matter. If we take the rules we have explored under IHL and the CAT and subject them to a *lex specialis* analysis, do we come to the same answer as the U.S. that IHL conflicts with the CAT requirement for individual compensation, and that IHL is the *lex specialis* that must be applied?

D. Lex Specialis analysis

The consensus is clear that the CAT continues to apply during all armed conflicts, IAC and NIAC. The U.S. position is one of conflict pre-emption between the two norms of IHL and HRL. The U.S. has stated that applying Article 14 of the CAT, which requires that the U.S. ensure that individual victims of torture receive redress and compensation, would be anomalous under the *lex specialis*, IHL, therefore IHL prevails.

AZ, Nashiri, and KSM were all detained as the result of NIACs. Their treatment while in the exclusive control of agents of the U.S. government leads to facially valid claims that the U.S. has violated both IHL and CAT prohibitions on torture. The maxim of *lex specialis* is that "whenever two or more norms deal with the same subject matter, priority should be given to the norm that is more specific."[133] But the facts defy the existence of a conflict between the applicable rules of IHL and the CAT. If we look to the customary international law as mentioned previously we find an increasing international practice to allow individual claims against State's for violations of IHL in NIACs.[134] State practices are moving towards validating

[131] Meehan, *supra* note 129.

[132] Cleveland, *supra* note 126.

[133] ILC Report, *supra* note 119, at 408.

[134] *Reparation*, *supra* note 78.

individual rights to compensation, not only in NIACs but also in IACs. But there is no final arbiter of what is or is not customary international law, and the U.S. has taken issue with the ICRC study regarding customary IHL.

With this apparent contradiction in mind, if we take the argument from the U.S. perspective, then at best, IHL of NIACs appears to be silent on the issue of individual compensation or compensation/reparation systems in general. This best case scenario for the U.S. means there is a void of NIAC compensation rules. In this void the U.S. should follow its previous practice when reaffirming the CAT Article 15 exclusionary rule, where IHL is silent the U.S. should adhere to the CAT because there is no conflict for IHL to preempt.

But let us say for argument's sake that the U.S. can make some claim that there exists an unwritten rule in NIAC that individuals cannot make claims against states for compensation. Even if that is the case, then the CAT should still prevail under a pure *lex specialis* analysis as the more specialized rule. As noted by the International Law Commission "[t]he idea that special enjoys priority over general has a long pedigree in international jurisprudence."[135] The Commission found that the idea was even expressed by Grotius when he stated, "What rules ought to be observed in such cases [i.e. where parts of a document are in conflict]. Among agreements which are equal … that should be given preference which is most specific and approaches most nearly to the subject in hand, for special provisions are ordinarily more effective than those that are general."[136] There can be no doubt that, as between the detailed requirement of the CAT Article 14 and a general unwritten rule that prefers State to State negotiations, Article 14 is the more specific rule. In fact, Harold Koh, former Legal Advisor at the U.S. Department of State, concluded after "a thorough review of the object and purpose, text and context of the [U.N.] CAT, relevant subsequent State practice, the Convention's negotiating history… and the U.S. Executive Branch and Senate understandings at the time of ratification" that, where aspects of the CAT may differ from the preexisting law of armed conflict, as the latter in time convention of greater specificity the CAT controls, not the law of armed conflict.[137]

Therefore the U.S. position lacks support. First of all it is arguably an incorrect assertion that the law of IAC does not allow for individual rights to compensation as the ICRC has found evidence of state practice to refute this claim. Second, it is not anomalous under IHL to provide individuals detained as part of a NIAC with a judicially enforceable individual right to a claim for monetary compensation because there are no IHL rules in NIAC that conflict with the CAT Article 14. Again, if

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[135] Int'l Law Commission Study Group on Fragmentation, *Fragmentation of International Law: Difficulties Arising from the Diversification and Expansion of International Law*, A/CN.4/L.682, 36, ¶ 59 (Apr. 13, 2006), http://legal.un.org/ilc/documentation/english/a_cn4_1682.pdf.

[136] *Id.*

[137] Koh, *supra* note 14, at 90.

anything, there is actually evidence of state practice allowing for individual claims in NIACs. Furthermore, because the IHL rules for compensation in NIACs are not fully developed, the maxim of *lex specialis* actually supports the applicability of the later in time, more specific provisions of the CAT as it relates to redress and compensation for victims of torture in NIACs. Contrary to its position, the U.S. is obligated to ensure in its legal system that AZ, Nashiri, and KSM have a method to obtain redress and an enforceable right to fair and adequate compensation.[138]

IV. CAT ARTICLE 14 AS LEX SPECIALIS IN NIAC. WHAT NOW?

A. Is the U.S. violating the CAT?

As I have already discussed at length under the CAT, Article 14, all states parties agree to establish mechanisms that ensure victims receive compensation and redress for their torture. The U.S. routinely claims to have a system that complies with all requirements of Article 14 of the CAT to the Committee against Torture (Committee).[139] When questioned about the availability and adequacy of American legal systems to ensure fair and adequate compensation, the U.S. has consistently harkened back to a very broad statement that U.S. law already provides "various avenues for seeking redress in cases of torture and other violations of constitutional and statutory rights relevant to the Convention."[140] But the domestic law structures referenced by the U.S. are not designed to deal with the real world victims of CIA black sites and interrogation like AZ, Nashiri and KSM.[141] The victims in our scenarios of U.S. state sponsored torture, based on real world accounts, fall into a domestic legal black hole as far as remedy, and their assailants have largely gone unprosecuted.[142] This is contrary to U.S. obligations under the CAT.

The general rule is that absent consent an individual cannot sue the U.S. Government or an agency thereof in Federal Court.[143] There must therefore either be a waiver of this government immunity or a statutory cause of action in order for torture victims to be heard in a court of law. While, as the Administration has noted before the Committee, there are many statutes that operate in this field such

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[138] *See* United Nations Convention Against Torture, *supra* note 5, 1465 U.N.T.S. at 116.

[139] *See, e.g.*, *Third Periodic Report*, *supra* note 1, at 53-55.

[140] *Id.* at 53.

[141] *See* Richard Henry Seamon, *U.S. Torture As A Tort*, 37 Rutgers L. J. 715 (2006).

[142] *See* Terry Frieden, *Justice Department won't prosecute CIA interrogators in two prisoner deaths*, http://www.cnn .com/2012/08/30/justice/no-cia-prosecutions/index.html (last updated Aug. 30, 2012); Mary Bruce & Devin Dwyer, *Why CIA Interrogators Unlikely to Be Prosecuted For Torture*, ABCnews.com (Dec. 9, 2014), http://abcnews.go.co m/Politics/cia-interrogators-prosecuted-torture/story?id=27484378.

[143] FDIC v. Meyer, 510 U.S. 471, 475 (1994). "Absent a waiver, sovereign immunity shields the Federal Government and its agencies from suit." *Id.* (quoting Loeffler v. Frank, 486 U.S. 549, 554 (1988)).

as the Alien Tort Statute,[144] the Torture Victim Protection Act of 1991,[145] the Federal Tort Claims Act,[146] and 42 U.S.C. 1983, none provide a remedy because there are numerous procedural and substantive hurdles that no victim has ever been able to overcome in the U.S. legal system. This article will not go into detail on any of the existing statutory provisions that the United States relies on. Suffice it to say that scholars and courts alike have examined these provisions and found no remedy for victims of the United States enhanced interrogation program.[147] No victim of CIA sponsored torture has ever been successful in bringing a suit against the U.S. or any of its officials, nor has any victim otherwise received compensation for being tortured from the U.S.[148] In fact this result is so striking that the Committee has noted it and brought it into the discussion. During questioning at the November appearance, Country Rapporteur Jens Modvig asked a series of very pointed questions highlighting the difficulty that victims face finding a remedy in the U.S. legal system.[149]

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[144] 28 U.S.C. § 1350 (1948) ("The district courts shall have original jurisdiction of any civil action by an alien for a tort only, committed in violation of the law of nations or a treaty of the United States.").

[145] Pub. L. No. 102-256, 106 Stat. 73 (codified at 28 U.S.C. § 1350 note (1992)).

[146] 28 U.S.C. § 1346(b).

[147] *See* Arar v. Ashcroft, 585 F.3d 559, 564 (2d Cir. 2009). The court recognized the lack of a civil remedy in damages for victims of CIA rendition. "Our ruling does not preclude judicial review and oversight in this context. But if a civil remedy in damages is to be created for harms suffered in the context of extraordinary rendition, it must be created by Congress, which alone has the institutional competence to set parameters, delineate safe harbors, and specify relief. If Congress chooses to legislate on this subject, then judicial review of such legislation would be available." *Id. See also*, Seamon, *supra* note 141, at 91. The author notes that limits placed on liability under the FTCA and Bivens doctrine have led to a system whereby the U.S. can avoid liability for most torture claims. *Id.*

[148] Cleveland, *supra* note 126. In fact, even the victims of the torture scandal that centered around the abuses at Abu Ghraib prison in Iraq have never been compensated, despite statements from then Secretary of Defense Donald Rumsfeld that they would be compensated because it was the right thing to do. Associated Press, *Abu Ghraib abuse victims never got compensated*, RepublicanAmerican.com (Sep. 27, 2010), http://rep-am.com/articles/2010/10/14 /news/national/doc4ca00e5b0af27911634743.txt.

[149] During his initial questioning, Rapporteur Modvig asked among other things,

> Please also comment on reports that indicate that the State Party continues to invoke claims of immunity for Government officials and state secrecy laws to evade liability, and that any information relating to the detainees' time in secret detention apart from the date and place of their capture remains classified. Please provide updated information on the investigation and related prosecutions for the destruction of evidence, such as videotapes documenting torture, by CIA personnel…. The State Party informs that various avenues exist for obtaining redress, including rehabilitation for acts of torture. However, lawsuits brought by persons alleging torture while in U.S. custody are hindered by claims of immunity for government officials or state secrecy laws. Could the State Party please inform how many victims of torture have legally pursued and successfully obtained effective remedy for torture during U.S. custody within and outside U.S. territory, respectively, within the reporting period. How many victims of torture formerly detained in Guantanamo have received judicial remedy for their treatment?

The U.S. delegation provided no direct answer to any of his questions.[150] As it stands right now, the complete lack of a real judicially enforceable redress and compensation mechanism that is available to victims of torture places the U.S. in violation of its obligations under the CAT.

B. How can the U.S. meet its obligations under International Law to the victims of CIA torture?

This requires an interpretation of the requirements of Article 14 of the CAT. The Vienna Convention on the Law of Treaties Article 31 provides that "[a] treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose."[151] The text of Article 14 is relatively short and simple. "Each State Party shall *ensure in its legal system* that the victim of an act of torture *obtains redress* and *has an enforceable right to fair and adequate compensation*, including the means for as full rehabilitation as possible."[152] So what does this mean to the U.S. in light of the object and purpose of the CAT which is "to make more effective the struggle against torture and other cruel, inhuman or degrading treatment or punishment throughout the world"?[153]

Guidance on the international interpretation of Article 14 requirements can be found by the Committee. The Committee is established under Article 17 of the UNCAT. It is composed of "ten experts of high moral standing and recognized

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> As for Protective Order 1, high value detainees who are victims of torture are prevented from seeking remedy because of classification of the information surrounding their treatment. Could the State Party please explain why victims of torture are silenced this way, prevented from seeking remedy with reference to state security, even including remedies abroad?

Third Periodic Report, *supra* note 1, at 17 (alteration omitted).

[150] Brigadier General Rich Gross, Legal Counsel to the Chairman of the Joint Chiefs of Staff, Department of Defense, attempted to address one of Mr. Modvig's questions regarding Protective Order 1 by stating "[w]e must balance the need to comply with U.S. law and regulations regarding the protection of classified national security information with the United States' strong interest in ensuring the detainees meaningful access to counsel, including the ability of detainee counsel to access relevant classified information." *Id.* at 30 (alteration omitted). General Gross does not address the key issue which is that detainees and their counsel, even when they have access to the information are placed under a gag order and cannot complain of their treatment. *See* James G. Connell, III, *The United States' Compliance with the Convention Against Torture with Respect to the Classification of Information Regarding the Ill-Treatment of Detainees in Secret Detention*, http://tbinternet.ohchr.org/Treaties/CAT/Shared%20D ocuments/USA/INT_CAT_CSS_ USA_18485_E.pdf (last visited May 5, 2015).

[151] Vienna Convention on the Law of Treaties, 1155 U.N.T.S. 331, 340 (1969) (entered into force Jan. 27, 1980).

[152] United Nations Convention Against Torture, *supra* note 5, 1465 U.N.T.S. at 116 (emphasis added).

[153] *Id.* at 113.

competence in the field of human rights."[154] As part of its duties the Committee receives reports from States Parties, comments on those reports, and files its own annual Committee report to the General Assembly of the United Nations.[155] While the reports and commentary from the Committee are not binding law they are influential.[156]

With regard to the U.S., the Committee in its concluding observations after the 2006 appearance expressed concern "by the difficulties certain victims of abuses have faced in obtaining redress and adequate compensation, and that only a limited number of detainees have filed claims for compensation for alleged abuse and maltreatment, in particular under the Foreign Claims Act."[157] The Committee recommended that the U.S. "should ensure, in accordance with the Convention, that mechanisms to obtain full redress, compensation and rehabilitation are accessible to all victims of acts of torture or abuse, including sexual violence, perpetrated by its officials."[158]

After the recent U.S. appearance in November 2014 the Committee's concluding observations again cited several concerns centered on the provisions of Article 14.[159] First the Committee stated that it was "particularly disturbed at reports describing a draconian system of secrecy surrounding high-value detainees that keeps their torture claims out of the public domain. Furthermore, the regime

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[154] *Id.* at 116.

[155] *See id.* at 117-21.

[156] Kerstin Mechlem, *Treaty Bodies and the Interpretation of Human Rights*, 42 VAND. J. TRANSNAT'L L. 905, 924 (2009). The author states that:

> a closer look at the differences between formal legal processes before a court and the comparatively informal procedures before the treaty bodies reveals that concluding observations can operate to similar effect as judgments. Despite the facts that treaty body members are not judges, that their concluding observations are not binding, and that the committees rely to a great extent on the goodwill and cooperation of the states in front of them, it seems that governments and especially NGOs perceive these concluding observations as something akin to judgments, rendering the difference between formal adjudication and concluding observations less significant in practice.

Id.

[157] Committee against Torture, Consideration of Reports Submitted by States Parties under Article 19 of the Convention, *Conclusions and recommendations of the Committee against Torture, United States of America*, CAT/C/USA/CO/2, 8 (May 18, 2006), http://www.state.gov/documents/organization/133838.pdf.

[158] *Id.* It should also be noted here that this appearance before the Committee in 2006 was the first appearance by the U.S. after the Abu Ghraib scandal revealed potential sexual abuse of Iraqi prisoners. *See* Iraq Prison Abuse Scandal Fast Facts, CNN.COM, http://www.cnn.com/2013/10/30/world/meast/iraq-prison-abuse-scandal-fast-facts/ (last updated Mar. 27, 2015).

[159] Committee against Torture, *Concluding observations on the third to fifth periodic reports of United States of America*, 7 (Nov. 20, 2014)[hereinafter *Concluding Observations*], http://tbinternet.ohchr.org/Treaties/CAT/Shared %20Documents/USA/INT_CAT_COC _USA_18893_E.pdf (last visited May 5, 2015).

applied to these detainees prevents access to an effective remedy and reparations, and hinders investigations into human rights violations by other States."[160] AZ, Nashiri, and KSM are all considered high-value detainees and are subject to the concerning "draconian system of secrecy."[161] As a result of its concern the Committee called for the declassification of torture evidence, in particular GTMO detainees' accounts of torture. Further the Committee said the U.S. "should ensure that all victims of torture are able to access a remedy and obtain redress, wherever acts of torture occurred and regardless of the nationality of the perpetrator or the victim."[162]

Second, the Committee stated that it was concerned "about the situation of certain individuals and groups made vulnerable by discrimination or marginalization who face specific obstacles that impede the enjoyment of their right to redress."[163] This comment seems to be directed at the victims of torture held at GTMO who are discriminated against or marginalized due to their detention and association with terrorism. The Committee:

> urges the [U.S.] to take immediate legal and other measures to ensure that all victims of torture and ill-treatment obtain redress and have an enforceable right to fair and adequate compensation, including the means for as full rehabilitation as possible, in particular… terror suspects claiming abuse….
>
> The Committee draws the [U.S.'s] attention to its General Comment No. 3 (2012) on the implementation of article 14 by State parties (CAT/C/GC/3), in which it elaborates upon the nature and scope of State parties' obligations to provide full redress to victims of torture, in particular to paragraphs 3-4, 11-15, 19, 32 and 39.[164]

General Comment No. 3 referenced by the Committee in its concluding observations contains 46 paragraphs intended to explain and clarify to States parties the content and scope of the obligations under Article 14 of the CAT.[165] The Comment says that the obligations of States parties are two-fold: procedural and substantive. "To satisfy their procedural obligations, States parties shall enact legislation and establish complaints mechanisms, investigation bodies and institutions, including independent judicial bodies, capable of determining the right to and awarding redress

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[160] *Id.*

[161] *See* Int'l Committee of the Red Cross, *ICRC report on the treatment of fourteen "High Value Detainees" in CIA custody*, THERENDITIONPROJECT.ORG, 5 (Feb. 14, 2007), http://www.therenditionproject.org.uk/pdf/PDF%20 101%20%5bICRC,%20Feb%202007.%20Report%20on%20Treatment%20of%2014%20HVD%20in%20CIA%20Custody%5d.pdf.

[162] *Concluding Observations*, *supra* note 159, at 7.

[163] *Id.* at 14.

[164] *Id.*

[165] *See* General Comment No. 3, *supra* note 47.

for a victim … and ensure that such mechanisms and bodies are effective and accessible to all victims … [s]uch legislation must allow for individuals to exercise this right and ensure their access to a judicial remedy."[166] And while "collective reparation and administrative reparation programmes may be acceptable as a form of redress, such programmes may not render ineffective the individual right to a remedy and to obtain redress."[167] Finally, the State party shall ensure that impartial and effective complaints mechanisms are established and that such mechanisms shall be made known and accessible to the public, including to persons deprived of their liberty.[168]

On the substantive level the requirements of the State are to ensure "that victims … obtain full and effective redress and reparation, including compensation and the means for as full rehabilitation as possible."[169] The right to "monetary compensation alone may not be sufficient redress for victims" and the "provision of only monetary compensation is inadequate for a State party to comply with its obligations under Article 14."[170] The obligation to provide redress includes "restitution, compensation, rehabilitation, satisfaction and guarantees of non-repetition."[171] The ultimate objective in the provision of redress is the "restoration of the dignity of the victim."[172]

So it is clear from the text of Article 14, the purpose and object of the CAT, U.S. interactions with the Committee, the subsequent concluding observations of the Committee, and General Comment No. 3 that there are certain minimum requirements for the U.S. to meet its obligations under Article 14. First, the U.S. must enact legislation which establishes an exercisable right for victims to obtain a judicial remedy. The U.S. acknowledged this requirement in its *lex specialis* argument before the Committee when it declared that it would be anomalous "to provide individuals detained as enemy belligerents *with a judicially enforceable individual right* to a claim for monetary compensation against the detaining power for alleged unlawful conduct."[173] Second, any system developed must contemplate restitution, compensation, rehabilitation, satisfaction and guarantees of non-repetition.[174]

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[166] *Id.* ¶¶ 5 & 20.

[167] *Id.* ¶ 20

[168] *Id.* ¶ 23.

[169] *Id.* ¶ 5.

[170] *Id.* ¶ 9.

[171] General Comment No. 3, *supra* note 47, ¶ 6. General Comment 3 goes into detail as to the requirements of each form of redress. For the purposes of this article it is sufficient enough to generally list the types of redress that a State system must incorporate. *See Id.* ¶¶ 8-18.

[172] *Id*. ¶ 4.

[173] McLeod, *supra* note 128, at 28.

[174] Individual cases may require one or more of the forms of reparation. General Comment 3 notes that "Reparation must be adequate, effective and comprehensive. States parties are reminded that in the determination of redress and reparative measures provided or awarded to a victim of torture or ill-treatment, the specificities and circumstances of each case must be taken into consideration and redress should be tailored to the particular needs of the victim and be proportionate in relation to

Monetary compensation alone is not enough.[175] Third, any system must provide rehabilitative services that include medical and psychological care as well as legal and social services.[176] Fourth, it must be transparent and allow for victims of even the most secret state programs of interrogation and torture to come forward and request and receive evidence of their torture. Fifth, along this same line it must provide a complaint system that is made known, even to those detained as a result of acts of terrorism. And finally, it must not create obstacles or discriminate based on the status or alleged misconduct of the victim. Quite simply, there are six keys to fulfilling our international CAT obligations to victims of torture they are: judicially enforceable, full reparations, rehabilitation, transparent, open complaint system, and zero discrimination.

C. Accomplishing the six minimum requirements of Article 14

The real key to the U.S.'s successful implementation of the six minimum requirements of the CAT Article 14 is the U.S. Congress. No matter how creative the Executive Branch is, legislation will be required to establish the judicially enforceable right to a claim against the U.S. government, to waive U.S. sovereign immunity, and to provide for the funding required to pay potential awards of "full reparations" and establish and fund systems for rehabilitation. The U.S. cannot meet its obligations under Article 14 through executive action alone. This is a critical recognition because there is very little, if any, political will in the U.S. to provide compensation to those accused of terrorism, especially for KSM who is considered a key organizer of the attacks on 9/11.[177] But if we acknowledge this fact at the outset, perhaps we can frame the issue in a more appealing way for the U.S. Congress. The reality is that the choice Congress would make is between compensating alleged terrorists that we tortured and continuing to violate our international law obligations in the sensitive area of torture. As we have already seen by the reversal of almost all of the controversial positions taken by the U.S. administration after 9/11, as a country we appear to be "looking 'forward, as opposed to looking backward.' "[178] Additionally, it may not be in the U.S.'s best interests to position itself as a country that engages in torture and then washes its hands when it comes to providing compensation under Article 14. It would be a dangerous precedent that the U.S. may regret when attempting to confront other State Parties in the future.

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gravity of the violations committed against them. General Comment No. 3, *supra* note 47, ¶ 6.

[175] *Id.* ¶ 9.

[176] *Id.* ¶ 11.

[177] *See* Bret Stephens, Opinion, *I Am Not Sorry the CIA Waterboarded, Dick Cheney says he would "do it again in a minute." He's right*. Wall St. J., Dec. 15, 2014, http://www.wsj.com/articles/bret-stephens-i-am-not-sorry-the-cia-waterboarded-1418687576.

[178] Nathalie Weizmann, *State Responsibility and Reparation for Torture as a Violation of IHL*, JustSecurity.org, (Dec. 10, 2014, 9:06 AM), http://justsecurity.org/18232/state-responsibility-reparation-torture-violation-ihl/ (quoting U.S. President Barack Obama).

If Congress could be convinced to act, then the best solution in my mind is to implement an independent judicial cause of action with a series of procedural protections and remedies for victims in the event of guilt on the part of the U.S. government or its agents. The procedural protections I envision would also have to include provisions compelling discovery of classified information, increasing transparency, and allowing claims to be filed while undergoing detention or criminal or law of war prosecution. Obviously the legislation would have to meet each of the six requirements set out in the previous section.

While I am convinced that the best method is through comprehensive legislation, it remains a legally viable alternative to establish an administrative procedure. In other words, the Committee has not per se prohibited this methodology so long as the administrative procedure doesn't extinguish the right to seek enforcement of a remedy. The idea would be to create some type of claim mechanism or commission to review claims and determine liability and compensation, perhaps something like the Federal Tort Claims Act system, which also has a judicial remedy in the event a claim is denied or ignored. In my mind though it seems problematic to put this process into the hands of the executive branch when they are the ones who fought so hard to justify acts of torture in the first place. We should strive to avoid even the appearance of tampering or coercion in this process.

V. CONCLUSION

In 1994 the U.S. ratified the United Nations Convention Against Torture in an effort to make more effective the struggle against torture and other cruel, inhuman or degrading treatment or punishment throughout the world. In addition to prohibiting torture the Convention, under Article 14, requires the U.S. to ensure in its legal system that victims of torture obtain redress and have an enforceable right to fair and adequate compensation, including the means for as full rehabilitation as possible. After 9/11 the U.S. engaged in behavior that has been publically characterized by the President as torture. The U.S. captured alleged terrorists and subjected them to enhanced interrogation techniques to elicit information from them. Among those who received the most severe treatment were Abu Zubaydah, Abd al-Rahim al-Nashiri, and Khalid Sheik Mohammad. Yet even though all three were subjected to extreme treatment by U.S. officials in a state sponsored hunt for information, none of them has ever been able to file a claim, lodge a complaint, or receive any compensation for their treatment.

When questioned by the Committee against Torture in November 2014 about the U.S.'s apparent lack of compliance with the obligations of the CAT Article 14, the U.S. responded that although the CAT continued to apply during armed conflict, IHL was the *lex specialis* and where Article 14 conflicted with IHL, IHL prevailed. The U.S. intimated that a conflict existed between IHL and the redress and compensation requirements of Article 14, therefore the compensation provisions of Article 14 didn't apply to detainees like AZ, Nashiri, and KSM.

But the U.S. missed a subtle point. The IHL that they appear to rely on is based on International Armed Conflicts. The U.S. said that IHL contemplates a State to State negotiation and solution to complaints of torture. Arguably the U.S. position on IAC does not reflect the current state of the law with regard to individual compensation rights. But more to the heart of the matter, AZ, Nashiri, and KSM are being detained in relation to a Non-International Armed Conflict or NIAC. The IHL rules for NIACs are very limited and as it relates to complaints and compensation for violations there are no rules. The U.S. position is wrong. There is no conflict between IHL in a NIAC situation and Article 14 of the UNCAT. Furthermore, because AZ, Nashiri, and KSM have not been given redress or compensation, nor been given a mechanism to complain, but rather have been shut out through U.S. government systems that require them to remain silent due to classification of their torture evidence, the U.S. stands in violation of its obligations under Article 14.

In order for the U.S. to meet its obligations under Article 14 it must enact a complaint, redress, and compensation system that meets six minimum requirements. The remedy under the system must: be judicially enforceable, provide for full reparations, establish a comprehensive rehabilitation system, be transparent, have an open complaint system, and provide zero discrimination. While it will be politically difficult if not impossible to accomplish this goal, the alternative is worse. The alternative is that the U.S. remains a violator of a fundamental premise of international law, both IHL and HRL, and denies compensation to its victims. This is not a precedent that the U.S. wants to establish. The U.S. must do the right thing and compensate those it has subjected to torture, regardless of their alleged involvement in terrorism. What message do we want to send? In armed conflict there may be nothing wrong with capturing people, detaining people, questioning people, but putting someone in a tiny box naked for days on end, or waterboarding someone 183 times over a month may be torture and a violation of IHL and HRL. And if it is, then we should honor our commitments that we acknowledged and agreed to in 1994 under the CAT, and provide an appropriate complaint, redress and compensation mechanism.

SPACE SITUATIONAL AWARENESS DATA SHARING: SAFETY TOOL OR SECURITY THREAT?

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I. DEFINING THE PROBLEM

> *If the purpose of astronomy is to describe the relationship of every object in the heavens to every other object in order to make sense of it all, then the utmost care has to be taken in establishing their relative positions.*[1]

A. Introduction

Space situational awareness (SSA), defined by the United States Department of Defense as "the requisite current and predictive knowledge of the space environment and the [operational environment] upon which space operations depend,"[2] has skyrocketed in importance as the portion of outer space where man-made Earth satellites operate has grown more crowded, complicated, and, some suggest, contested.[3] The more objects that are present in Earth orbit, the greater the risks of destructive collisions and harmful electromagnetic interference (EMI) between them. Proliferation of space, missile, and other advanced technologies among states with adverse interests has also increased satellites' vulnerability to intentional interference or attack. To preserve the vital capabilities that satellites bring, it is critical to know what natural and man-made hazards might endanger them, and how best to reduce, mitigate, or eliminate those hazards. SSA is a fundamental prerequisite to protecting space capabilities.

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[1] William Burrows, This New Ocean: The Story of the First Space Age 12 (1998) [hereinafter This New Ocean].

[2] U.S. Dep't of Def., Joint Publication 3-14, Space Operations II-1 ¶ 2 (2013) [hereinafter JP 3-14]. JP 3-14 elaborates that SSA involves characterizing space capabilities as completely as necessary via space surveillance, environmental monitoring, status checks of friendly space systems, and analysis of the space domain, to include intelligence insight into adversary capabilities, threats, and intent. Other definitions exist. The Secure World Foundation, a non-profit organization dedicated to space sustainability, describes SSA as, "the ability to accurately characterize the space environment and activities in space," and distinguishes "civil SSA" (space weather and positional information on objects' orbital trajectories) from military and national security SSA applications that have the additional duty of "characterizing objects in space, their capabilities and limitations, and potential threats." Brian Weeden, *Space Situational Awareness Fact Sheet*, Secure World Found. (Sept. 2014), http://swfound.org/media/1800/swf_ssa_fact_sheet_sept2014.pdf. The European Space Agency (ESA) SSA Programme explains SSA as the ability to "detect, predict and assess the risk to life and property due to man-made space debris objects, reentries, in-orbit explosions and release events, in-orbit collisions, disruption of missions and satellite-based service capabilities, potential impacts of Near-Earth Objects (NEOs), and the effects of space weather phenomena on space- and ground-based infrastructure." ESA, *Space Situational Awareness* (Apr. 1, 2013), http://www.esa.int/Our_Activities/Operations/Space_Situational_Awareness/About_SSA.

[3] U.S. Dep't of Def. & Office of the Dir. of Nat'l Intelligence, Nat'l Security Space Strategy: Unclassified Summary 1 (2011), https://www.dni.gov/index.php/newsroom/reports-and-publications/94-reports-publications-2011/620-national-security-space-strategy [hereinafter U.S. Nat'l Security Space Strategy].

In turn, achieving and maintaining SSA requires the continual collection, fusion, and analysis of information about Earth's orbital environment and the objects in it. The information takes a variety of forms, including but not limited to imagery generated from optical sensors and ranging data derived from radar systems; numeric values quantifying an object's orbital position; scientific measurements of space weather effects such as solar wind; and other information about a space object's design, shape, capabilities, and intended purpose. This article uses the term "SSA data" to refer to such information.

Given the number of objects orbiting the Earth,[4] the hyper-velocities at which they travel, and the complexity of integrating geographically dispersed networks of sophisticated sensors to identify and track them, most states and non-state satellite operators lack the internal resources to make their SSA as robust as they might like.[5] Therefore, many states and other satellite owners and operators turn outward to share the data they possess, in the hope of reciprocal sharing that will improve their own SSA, and ultimately, their prospects of space mission assurance.[6]

Sharing SSA data more widely can help assure spacecraft mission success, as it can reduce the likelihood that maneuverable satellites will suffer accidental collisions and EMI. On the other hand, in an era when satellites have become indispensable tools of modern warfare and several nations have demonstrated the ability to target, strike, and disable satellites in orbit, sharing SSA data too broadly could also increase a country's vulnerability to intentional anti-satellite (ASAT) attack.

It thus becomes imperative to seek to answer key questions: (1) To what extent does a space-faring state's sharing of its SSA data advance that state's national

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[4] There are over 23,000 objects large enough to track, including active and defunct satellites, spent upper rocket stages, and other debris. Marc Schanz, *Fifth Generation Space Begins with Situational Awareness*, Air Force Mag.: Daily Rep., Nov. 22, 2013, http://www.airforcemag.com/DRArchive/Pages/2013/November%202013/November%2022%202013/Fifth-Generation-Space-Begins-with-Situational-Awareness.aspx. The U.S. National Aeronautics and Space Administration (NASA) estimates there are also about 500,000 pieces of space debris measuring between 1-10 cm in diameter, and over 100 million less than 1 cm in diameter. *See* NASA, *NASA Orbital Debris FAQs* (Mar. 12, 2012), http://orbitaldebris.jsc.nasa.gov/faqs.html.

[5] Even the United States, which has the most comprehensive SSA network in the world, acknowledges the limitations of its system. While it is able to track around 23,000 objects in orbit today, it is planning a new "Space Fence" system that is expected to grow the catalog to include over 200,000 tracked objects. *See Fiscal Year 2017 Budget Request for National Security Space: Hearing Before the Strategic Forces Subcomm. of the H. Armed Services Comm.*, 114th Cong. 5-6 (2016) (Lieutenant General David J. Buck Commander, Joint Functional Component Command for Space), http://docs.house.gov/meetings/AS/AS29/20160315/104620/HHRG-114-AS29-Wstate-BuckD-20160315.pdf [hereinafter, Lt Gen Buck Statement].

[6] *See, e.g.*, *id.* at 7-9; Tim Turk, *Inside the Commercial Integration Cell Project*, INTELSAT: SatCom Frontier (Feb. 11, 2016), http://www.intelsatgeneral.com/blog/inside-the-commercial-integration-cell-project/; Space Data Association, *SDA Overview* (2015), http://www.space-data.org/sda/about/sda-overview/.

interests; and (2) Within what legal and strategic framework should SSA data sharing occur? The answer to the first question will shape the answer to the second.

This article will comprise five sections. Section I will define key terms, explain the major types of SSA data that can be collected, and introduce the challenges associated with SSA data sharing. Section II will recount the history of ASAT threats and discuss how emerging ASAT weapons and dual-use technologies may affect incentives for SSA data sharing. Section III will examine the history of SSA data collection and sharing, both during and after the Cold War. Section IV will analyze the major existing sources of international law that relate to SSA data sharing. Section V will review proposals for improving international SSA data sharing and advocate for the expansion of SSA data sharing via bilateral and small-group multilateral agreements along the lines of the U.S. statutory model.

B. The SSA Data-Sharing Dilemma

As outer space has grown more congested with both useful satellites and debris, SSA has become increasingly important.[7] To avoid destructive collisions between satellites and other space objects, states and other entities that launch and operate satellites need to be aware of man-made and natural hazards that exist in the space environment, and be able to predict how they might interact with existing or planned space activities. To this end, the development and dissemination of SSA data has fostered safer space operations for all.[8]

But what if a malicious actor *wants* to target another nation's space object for destruction? Although the United States and the Soviet Union halted kinetic anti-satellite testing by the mid-1980s, and for many years no other state had demonstrated the means to threaten a satellite in orbit, the safety and security of satellites in the 21st Century has once again fallen into doubt. On March 15, 2016, Lieutenant General David J. Buck, Commander, Joint Functional Component for Space (CDR JFCC SPACE), testified before Congress, "Our ability to deliver space effects is challenged by the unprecedented development of counter-space programs… resources invested and systems designed to deny or degrade our freedom of action…. [W] e can no longer take for granted the strategic, operational and tactical advantages we've come to depend on from space."[9]

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[7] U.S. Nat'l Security Space Strategy, *supra* note 3, at 6, 9-10; Nat'l Space Pol'y of the United States of America 7 (2010) [hereinafter U.S. Nat'l Space Pol'y 2010].

[8] For example, during 2015, the U.S. Joint Space Operations Center (JSpOC) made notifications to U.S., commercial, and foreign satellite owner operators that informed 148 successful collision avoidance maneuvers, including four maneuvers and one shelter-in-place action by the International Space Station and its crew. Lt Gen Buck Statement, *supra* note 5, at 6; NASA, *Two More Collision Avoidance Maneuvers for the International Space Station*, 19 Orbital Debris Q. News 4, 1 (2015), http://orbitaldebris.jsc.nasa.gov/newsletter/pdfs/ODQNv19i4.pdf.

[9] Lt Gen Buck Statement, *supra* note 5, at 2-3. In his testimony, Lt Gen Buck went on to detail the growing counter-space threats posed by Russia and China, as well as by space debris.

China's launch of an ASAT missile to destroy a Chinese weather satellite in orbit in January 2007 reignited the ASAT debate.[10] It raised the specter that providing too much SSA data could enable a State to identify another State's strategically important satellites and use that information to disable or destroy them—not only inflicting harm on the satellite's owner or users, but potentially causing a cascade of destruction throughout the extraterrestrial commons as other satellites collided with its scattered remains.[11] Recent Russian and Chinese deployments of highly maneuverable satellites,[12] including one with a movable arm,[13] as well as Chinese jammers, lasers, and cyber weapons,[14] have caused some to worry about the application of new technologies to disable or co-opt a satellite without exploding it into a globe-encircling debris field—thus minimizing the risks to the attacker and third parties. On the other hand, such technologies could be used for benign applications such as on-orbit satellite repair and refueling, space debris cleanup, or as a precursor to a manned orbital rendezvous.[15]

Furthermore, because any country that possesses space launch capability, or even medium-to-long-range ballistic missiles, could potentially adapt its missiles or launch vehicles as ASAT weapons,[16] the advances in missile technology by hostile regimes such as Iran and North Korea should make some countries reluctant to share detailed SSA data too broadly. If precise and timely information about a satellite, such as its purpose, location, direction, and telemetry data, are made available to its owner's enemies, then an enemy that has space object detection and tracking capabilities, and missile launch capabilities that can reach the satellite's orbit,

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[10] Michael Gordon & David Cloud, *U.S. Knew of China's Missile Test, but Kept Silent*, N.Y. Times, Apr. 23, 2007, http://www.nytimes.com/2007/04/23/washington/23satellite.html?pagewanted=print.

[11] NASA has noted, for instance, that China's destruction of its Fengyun 1C weather satellite produced nearly 3,400 trackable pieces of debris, ranging in altitude from 200 km to over 4,000 km, along with many more pieces too small to track. NASA, *Fengyun-1C Debris Cloud Remains Hazardous*, 18 Orbital Debris Q. News 1, 2 (2014), http://orbitaldebris.jsc.nasa.gov/newsletter/pdfs/ODQNv18i1.pdf [hereinafter *Fengyun-1C Debris Cloud*]. In the seven years since the test, the International Space Station and several unmanned satellites have had to change positions to avoid being hit by debris from the Fengyun 1C. *Id*.

[12] Sam Jones, *Object 2014-28E – Space Junk or Russian Satellite Killer?*, Fin. Times, Nov. 17, 2014, http://www.ft.com/cms/s/2/cdd0bdb6-6c27-11e4-990f-00144feabdc0.html.

[13] Bill Gertz, *China Testing New Space Weapons*, Wash. Free Beacon, Oct. 2, 2013, http://www.freebeacon.com/china-testing-new-space-weapons/.

[14] Lt Gen Buck Statement, *supra* note 5, at 8.

[15] Mike Wall, *Is Russian Mystery Object a Space Weapon?*, Space.com, Nov. 19, 2014, http://www.space.com/27806-russia-mystery-object-space-weapon.html.

[16] Ballistic missiles, ballistic missile interceptors, and space launch vehicles are all designed to travel outside the Earth's atmosphere for a portion of their flights, at extremely high velocities. Thus, they have intrinsic, if latent, potential ASAT applications, even if their usual intended targets (points on the Earth, other missiles, or empty parts of outer space) are not satellites in orbit. Use of these capabilities to hit a satellite in orbit would, however, require changes to their targeting procedures and technologies. Laura Grego, *The Anti-Satellite Capability of the Phased Adaptive Approach Missile Defense System*, Fed'n of Am. Scientists Pub. Int. Rep. (Winter 2011), http://www.ucsusa.org/assets/documents/nwgs/2011-winter-anti-satellite.pdf.

may be able to use that data to detect, track, and destroy the satellite. The enemy could also use less destructive means to interfere with the targeted satellite, such as jamming its signal or using lasers to blind its optical sensors, when it knows the satellite is passing overhead.

SSA data sharing is therefore a critically important geostrategic issue, ripe for extended discussion.

C. Methodology

This article will employ a doctrinal methodology to examine the risks and benefits of SSA data sharing. Having defined SSA, it will describe the legal and practical means of acquiring, using, and sharing it. It will survey the literature concerning space situational awareness and analyze it critically. Sources will include academic, think-tank, and journalistic writings; unclassified U.S. space law, policy, and doctrine; and international resolutions, treaties, and agreements. The article will also examine other defense and deterrent practices that could reduce the perceived risk that SSA sharing would increase a nation's vulnerability to an ASAT attack.

The doctrinal approach will be buttressed by historical and comparative techniques as the article examines the past actions, current practices, and stated policies of major and rising space powers with regard first to ASAT threats, and second to SSA and its implications for space safety and security. The survey will review how SSA data sharing has been conducted during the Cold War space race and into the present day, with particular attention to the policies and practices of the United States, Russia, and China. It will also discuss the implications of other nations' space activities, which have rapidly proliferated in recent decades.

Where black-letter law exists in this field, the article will interpret and apply it as well. In this regard, U.S. federal law, particularly 10 U.S.C. § 2274, the United Nations (U.N.) treaties on outer space, and International Telecommunication Union (ITU) governing documents will be primary sources. The article will describe the present legal frameworks for SSA sharing within the United States and internationally, and how they operate.

Once the historical and legal background is established, the article will evaluate different types of SSA sharing practices in light of national security concerns. It will consider the arguments for broader versus narrower SSA data sharing, and encourage the wider adoption of legal and policy frameworks similar and complementary to those of the United States. The U.S. framework consists of providing a publicly available online database of most tracked space objects (excluding classified satellites that are tracked, but not publicized), the ability for space operators to obtain more detailed information by special agreement, and unsolicited warnings of potential collisions so that space operators can take the necessary steps to avoid them.

The goal of the article is to develop an understanding of space situational awareness, and the sharing thereof, that will promote the continued peaceful use of space by all nations. It will argue that broad SSA data sharing is generally in space-faring states' national interests, as well as beneficial for the world at large; that SSA data sharing should continue in the absence of credible threats to a nation's space assets; and that each state should take measures to ensure broad SSA data sharing in peacetime, subject to appropriate limitations for national security.

Broad SSA sharing will benefit both the nations that provide it and the entire global spacefaring community because it will help states and private space actors to plan satellite launches and operations so as to minimize the likelihood of a destructive on-orbit collision. This benefit will continue to apply throughout peacetime and even in wartime, so long as space objects themselves do not become targets of warfare. To reduce this latter possibility, broad SSA sharing will promote the development of a customary international legal norm against attacks on space objects in orbit. However, to the extent that states nevertheless do threaten each other's space assets, states must have the ability to protect information about their vital satellites that may be so threatened. Therefore, states should establish criteria and mechanisms for reducing the risk that certain critical SSA data could fall into unfriendly hands, while continuing to provide it to the broadest extent possible to the rest of the space-faring community.

D. Situational Awareness in Outer Space

1. Characteristics of the Near-Earth Outer Space Environment

The space environment differs markedly from the environment on Earth. Just getting to space and back is fraught with risks, given the immense amounts of fuel that must be burned for liftoff[17] and the heat generated by atmospheric friction upon re-entry.[18] In space, Earth's gravitational pull is attenuated to the point that astronauts feel weightless. To maintain Earth orbit, satellites travel at speeds of up to seven to eight kilometers per second in Low Earth Orbit (LEO),[19] fast enough

[17] For example, the space shuttle's external fuel tank carried 385,000 gallons of liquid hydrogen and 140,000 gallons of liquid oxygen for the orbiter, in addition to the two solid booster rockets. This New Ocean, *supra* note 1, at 519.

[18] The space shuttle Orbiter, for example, reached up to 3,000 degrees Fahrenheit on portions of its external surface during reentry, requiring advanced engineering of its tile and insulation system to ablate the heat. NASA, Wings in Orbit: Scientific and Engineering Legacies of the Space Shuttle 184 (Wayne Hale & Gail Chapline eds., 2010), http://www.nasa.gov/centers/johnson/pdf/584728main_Wings-ch4b-pgs182-199.pdf. Tragically, on 1 February 2003, the heat of reentry incinerated the space shuttle *Columbia* orbiter, killing all its crew, after a piece of insulation foam broke off from the external fuel tank during launch and damaged the *Columbia*'s protective thermal tiles. *Id.*; Columbia Accident Investigation Board Report, Vol. 1, 9 (2003), http://www.nasa.gov/columbia/home/CAIB_Vol1.html [hereinafter Columbia Report].

[19] *NASA Orbital Debris FAQs*, *supra* note 4.

to circle the Earth completely every 90 minutes, or roughly 16 times a day.[20] Solar radiation flows unimpeded by the Earth's atmosphere,[21] which dissipates almost completely above 100 kilometers from the Earth's surface.[22] Over 23,000 objects in orbit are large enough to track,[23] and hundreds of thousands more are too small to track but just as lethal if they strike a satellite traveling in a different direction.[24] An object 10 centimeters in width, no bigger than a softball, can destroy a satellite instantly if encountering it at orbital velocity, and collisions between larger objects can produce debris fields consisting of tens of thousands of lethal fragments.[25] Even tiny pieces of debris such as paint chips have damaged U.S. Space Shuttles so severely that their windshields needed to be replaced.[26]

2. Orbital Regimes

Earth's artificial satellites operate primarily in three different orbital regimes, or levels of orbit defined by their distance from the Earth's surface. Low Earth Orbit (LEO) and Geostationary Earth Orbit (GEO) are the most heavily populated, while Medium Earth Orbit (MEO) between them is less so.[27] There are also Highly Elliptical Orbits (HEO), which take the shape of an elongated ellipse that may have its perigee and apogee in different orbital regimes.[28] One specialized type of HEO

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[20] NASA, *STS-111 International Space Station* (Nov. 22, 2007), http://www.nasa.gov/missions/highlights/webcasts/shuttle/sts111/iss-qa.html.

[21] Yochanan Kushnir, *Solar Radiation and the Earth's Energy Balance* (2000), http://eesc.columbia.edu/courses/ees/climate/lectures/radiation/.

[22] University of California, Santa Barbara ScienceLine, *Why Does Space Have Thin Air?*, http://scienceline.ucsb.edu/getkey.php?key=1076 (last visited May 4, 2016). *Cf.* Eric R. Christian, Cosmicopia, *Space Physics: Matter in Space*, http://helios.gsfc.nasa.gov/qa_sp_ms.html (last visited May 4, 2016) (explaining that the average density of the Milky Way galaxy "is about one atom per cubic centimeter").

[23] Schanz, *supra* note 4.

[24] Nicholas Johnson, NASA chief scientist for orbital debris, has stated, "The greatest risk to space missions comes from non-trackable debris." Mark Garcia, *Space Debris and Human Spacecraft*, NASA (last updated July 30, 2015), http://www.nasa.gov/mission_pages/station/news/orbital_debris.html.

[25] Kevin Whitelaw, *The Problem of Space Debris*, U.S. News & World Rep., Dec. 4, 2007, http://www.usnews.com/news/articles/2007/12/04/the-problem-of-space-debris. *See also* Darren McKnight, *Pay Me Now or Pay Me More Later: Start the Development of Active Orbital Debris Removal Now* 6, Amos 8 (Sept. 16, 2010), http://www.amostech.com/TechnicalPapers/2010/Posters/McKnight.pdf (characterizing orbital debris objects of five millimeters to 10 centimeters in size as "lethal" yet not catalogued or easily trackable).

[26] *See* Garcia, *supra* note 24 (explaining that "space shuttle windows have been replaced because of damage caused by material that was analyzed and shown to be paint flecks").

[27] As of January 1, 2016, the Union of Concerned Scientists reported that there were 759 satellites in LEO, 493 in GEO, 92 in MEO, and 37 in elliptical orbits. Union of Concerned Scientists (UCS), *UCS Satellite Database* (Jan. 1, 2016), http://www.ucsusa.org/nuclear-weapons/space-weapons/satellite-database.

[28] HEO satellites orbit at many different ranges. The UCS database, *id.*, reports three HEO satellites in "Molniya" orbits as having perigees below 1,000 kilometers and apogees out beyond GEO, as

is the Geosynchronous Transfer Orbit (GTO), which can be used to move a satellite from an orbit in LEO out to the geosynchronous region.[29] All these orbits are well inside the orbit of the Moon, which circles the Earth from an average distance of 384,400 kilometers.[30]

(a) *Low Earth Orbit*

LEO begins around 100 kilometers from the Earth's surface, where orbit is first possible to sustain,[31] and extends outward to 2,000 kilometers in altitude.[32] It is the easiest to access because it is closest to Earth and requires the least propellant to reach. It is also the most crowded orbital region.[33] LEO is valuable for hosting activities that benefit from proximity to Earth, such as most manned spaceflight[34] and remote sensing of the Earth's surface and weather.[35]

(b) *Medium Earth Orbit*

MEO extends from 2,000 kilometers above Earth to the inner shell of the Geosynchronous Region at 35,586 kilometers above Earth.[36] Its best-known tenants are positioning, navigation, and timing (PNT) satellite systems such as the Russian Federation's Global Navigation Satellite System (GLONASS) at an

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well as several "deep highly eccentric" satellites with perigees above 6,000 kilometers and apogees well over 100,000 kilometers.

[29] Jet Propulsion Laboratory, *Planetary Orbits*, https://solarsystem.nasa.gov/basics/bsf5-1.php (last visited May 4, 2016).

[30] NASA, *Earth's Moon: Facts & Figures* (Dec. 20, 2013), http://solarsystem.nasa.gov/planets/profile.cfm?Display=Facts&Object=Moon.

[31] Paul Dempsey, Address at the Conference on Commercialisation of Space at King's College London: The Intersection of Air Law and Space Law 11 (Jan. 24, 2013) (on file with McGill University Institute of Air and Space Law).

[32] Inter-Agency Space Debris Coordination Committee (IADC), IADC Space Debris Mitigation Guidelines, IADC-02-01 Rev 1 § 5.3 (2007), http://www.unoosa.org/documents/pdf/spacelaw/sd/IADC-2002-01-IADC-Space_Debris-Guidelines-Revision1.pdf.

[33] *UCS Satellite Database*, *supra* note 27.

[34] Apart from NASA's *Apollo* program to send men to the Moon and back, all manned space missions to date have taken place within LEO. The International Space Station maintains an orbit between about 415-420 kilometers above sea level. NASA, *Large Space Object Population near the International Space Station*, *in* 18 Orbital Debris Q. News 1, *supra* note 11, at 2.

[35] *UCS Satellite Database*, *supra* note 27. Broadly speaking, "Remote sensing is the perception of external objects and features at an indeterminate distance from the sensor." Legal Implications of Remote Sensing from Outer Space XI (Nicolas Matte & Hamilton Desaussure eds., 1976). Proximity is beneficial for Earth observation remote sensing satellites because, as between two satellites with image sensors of equal resolution, the one closer to Earth will be able to take the more detailed "close-up" pictures. However, if a wider field of view is desired (e.g., nearly a whole side of the Earth rather than a single region), a higher altitude may be appropriate.

[36] Holli Riebeek, *Catalog of Earth Satellite Objects* (Sept. 4, 2009), http://earthobservatory.nasa.gov/Features/OrbitsCatalog; *cf.* IADC Space Debris Mitigation Guidelines § 3.3.2(2), *supra* note 32.

altitude of about 19,100 kilometers;[37] the U.S. NavStar Global Positioning System (GPS) constellation at 20,200 kilometers;[38] the new generation of China's Beidou satellite system at 21,500 kilometers;[39] and the European Space Agency's (ESA's) Galileo system at 23,222 kilometers.[40] The GPS constellation, while foremost a military tool for the national security of the United States,[41] is also made available "for peaceful civil, commercial, and scientific uses on a continuous worldwide basis free of direct user fees."[42]

(c) *Geosynchronous and Geostationary Earth Orbits*

Satellites that orbit within 200 kilometers of geostationary altitude and within 15 degrees of inclination above or below the Equator are considered to be in Geosynchronous Orbit (GSO).[43] Within GSO, GEO is a unique circular, equatorial orbit about 35,786 km away from Earth, with an orbital period of exactly one Earth day.[44] In this orbit, satellites can be maneuvered so that they appear to be nearly stationary relative to the point directly below them on the Earth, when their movement is synchronized with the Earth's own rotation.[45] This makes them valuable for any user who wants to be in constant contact with a satellite from the same ground station, or who wants to maintain constant coverage of a single region of the Earth.[46] For these reasons, GEO is used overwhelmingly for communications purposes,[47] but also has applications such as missile launch early warning, earth science, meteorology, and navigation.[48]

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[37] *GLONASS Space Segment*, Navipedia (Sept. 18, 2014), http://www.navipedia.net/index.php/GLONASS_Space_Segment.

[38] U.S. Dep't of Def., Global Positioning System Standard Positioning Service Performance Standard 1 (4th ed., 2008).

[39] China Satellite Navigation Project Center, Address at the International Committee on GNSS: COMPASS/BeiDou Navigation Satellite System (July 14, 2008), http://www.unoosa.org/pdf/icg/2008/expert/2-1a.pdf.

[40] *Galileo Space Segment*, Navipedia (Nov. 3, 2014), http://www.navipedia.net/index.php/GALILEO_Space_Segment.

[41] 10 U.S.C. § 2281(a).

[42] 10 U.S.C. § 2281(b).

[43] IADC Space Debris Mitigation Guidelines, *supra* note 32, § 3.3.2(2).

[44] *Id.* at § 3.3.3.

[45] T.S. Kelso, *Basics of the Geostationary Orbit*, Celestrak (May 17, 2014), https://celestrak.com/columns/v04n07/.

[46] *Id*.

[47] *UCS Satellite Database*, *supra* note 27, reports that 433 of 493, or about 88 percent, of satellites in GEO were for "[c]ommunications" purposes.

[48] *Id.*; *cf. U.S. Air Force Fact Sheet: Space Based Infrared Systems*, Air Force Space Command (Aug. 2015), http://www.afspc.af.mil/library/factsheets/factsheet_print.asp?fsID=3675 [hereinafter, SBIRS Fact Sheet].

GEO is a limited natural resource that can only accommodate a certain number of satellites before their signals (if in overlapping frequency bands) begin to cause harmful interference with each other, or they present too great a risk of colliding with one another.[49] The ITU has promulgated rules for allotting space within the GSO in order to assure sufficient separation between satellites and equitable access to GEO by all countries that desire it.[50] Among these are rules intended to prevent radio-frequency interference, which require, in part, ensuring that satellites in GSO maintain their agreed-to nominal position within certain parameters.[51]

3. Civilian and Military Uses of Space

Now that mankind has learned how to exploit Earth's orbital environment through the launching and stationing of artificial Earth satellites, that environment has become exceedingly useful. The satellite industry is one of the fastest-growing global industries today, with a market value estimated at $330 billion and an annual growth rate of nine percent, with commercial activity exceeding government activity by a ratio of over three to one.[52] Among their applications in the civilian sector, satellites are useful for global telecommunications, mapping the Earth, searching for water and mineral deposits, study of terrestrial and space weather, natural disaster response and recovery,[53] media broadcasting, and scientific research.[54] With satellite signal receivers and mapping programs in their cars and mobile phones, millions of consumers can now use satellite-aided navigation to plan anything from a walk to the nearest restaurant to a cross-country vacation—and may listen to music or news on a satellite radio station during the trip.[55]

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[49] Radio Regulations of the International Telecommunication Union, Preamble § 0.3 (2012) [hereinafter ITU-RR].

[50] *Id.* at art. 22

[51] *Id.* at art. 22 § III. However, this requirement does not guarantee success. For example, an anomaly that severed ground control capabilities from Intelsat's Galaxy 15 satellite for several months in 2010 resulted in the satellite's drifting out of place and threatening to cause EMI with other nearby satellites in GSO before control was finally restored. Jonathan Amos, *"Zombie-sat" Rises Like a Phoenix*, BBC News (Jan. 14, 2011), http://www.bbc.co.uk/news/science-environment-12187603.

[52] Space Foundation, Space Rep. 4 (2015), http://www.spacefoundation.org/sites/default/files/downloads/The_Space_Report_2015_Overview_TOC_Exhibits.pdf.

[53] For instance, remote sensing satellites that provide advance warning of cyclones have helped to reduce cyclone fatalities in India from tens of thousands to the single digits. Saritha Rai, *From India, Proof that a Trip to Mars Doesn't Have to Break the Bank*, N.Y. Times, Feb. 17, 2014, http://www.nytimes.com/2014/02/18/business/international/from-india-proof-that-a-trip-to-mars-doesnt-have-to-break-the-bank.html?_r=0.

[54] *UCS Satellite Database*, *supra* note 27.

[55] *See, e.g.*, Jamie Lendino, *The History of Car GPS Navigation*, PC Mag., Apr. 16, 2012, http://www.pcmag.com/article2/0,2817,2402755,00.asp; Joseph DeBenedetti, *Satellite Radio Industry Analysis*, Hous. Chron., http://smallbusiness.chron.com/satellite-radio-industry-analysis-79281.html (last visited May 4, 2016).

Space power has also revolutionized modern warfare, enhancing and enabling capabilities such as intelligence, surveillance and reconnaissance (ISR);[56] command, control and communications;[57] meteorology; battlespace awareness; precision targeting of munitions[58] and supply airdrops;[59] and ballistic missile defense (BMD) early warning and tracking systems.[60]

In 1991's Operation DESERT STORM, commonly (if inaccurately) known as the "first space war,"[61] satellites were used to plan the air campaign, carry over 80 percent of U.S. Central Command's communications, locate enemies, and provide precision navigation and timing for U.S. troops,[62] for example, enabling helicopters to simultaneously strike Saddam Hussein's radar sites for maximum effect.[63]

Precision-guided munitions, many of them directed to their targets by GPS satellite signals, rose from 8 percent of U.S. munitions dropped in DESERT STORM to 30 percent in Operation ALLIED FORCE (Kosovo, 1999), 60 percent in Operation ENDURING FREEDOM (OEF) (Afghanistan, 2001), and 68 percent in Operation IRAQI FREEDOM (OIF) (Iraq, 2003).[64] The use of precision weapons aids both

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[56] With multi-spectral sensors (to include those that can observe light in the infrared or ultraviolet ranges beyond the visible spectrum), or radar, remote sensing satellites can produce imagery of what lies beneath cloud cover, foliage, and even some manmade structures, distinguish camouflaged objects based on their heat signatures, and determine where enemy military vehicles had moved across a piece of ground. James Lee, *Counterspace Operations for Information Dominance*, *in* Beyond the Paths of Heaven: The Emergence of Space Power Thought 249, 268-270 (Colonel Bruce deBlois ed., 1999), http://aupress.maxwell.af.mil/digital/pdf/book/b_0070_deblois_beyond_paths_heaven.pdf.

[57] The United States first used a satellite to relay military communications in late August 1964, during the Vietnam War. Thomas Rienzi, Vietnam Studies: Communications-Electronics 1962-1970 18 (1972), http://www.history.army.mil/books/Vietnam/Comm-El.

[58] U.S. Air Force, *Joint Direct Attack Munition GBU-31/32/38* (June 18, 2003), http://www.af.mil/AboutUs/FactSheets/Display/tabid/224/Article/104572/joint-direct-attack-munition-gbu-313238.aspx.

[59] GlobalSecurity.org, *Joint Precision Airdrop System (JPADS)* (July 7, 2011), http://www.globalsecurity.org/military/systems/aircraft/systems/jpads.htm.

[60] SBIRS Fact Sheet, *supra* note 48.

[61] *See, e.g.*, Jackson Maogoto & Steven Freeland, *Space Weaponization and the United Nations Charter Regime on Force: A Thick Legal Fog or a Receding Mist?*, 41 Int'l L. 1091, 1107 (2007); *cf.* This New Ocean, *supra* note 1, at 611. However, space capabilities had been used extensively even as early as the Cuban Missile Crisis and the Vietnam War, and continued to prove useful in various military operations in the 1980s. P.K. Menon, The United Nations' Efforts to Outlaw the Arms Race in Outer Space 15 (1988); Rienzi, *supra* note 57; NOVA, *Spies That Fly: Master of the Surveillance Image* (Nov. 2002), http://www.pbs.org/wgbh/nova/spiesfly/brugioni.html.

[62] Frank Gallegos, *After the Gulf War: Balancing Space Power's Development*, *in* Beyond the Paths of Heaven, *supra* note 56, at 64.

[63] Richard Easton, *The Origins and Consequences of GPS Technology*, *on* The Milt Rosenberg Show, 18:46-19:13 (June 2, 2014), *available at* http://www.podtrac.com/pts/redirect.mp3/cdn.ricochet.com/wp-content/uploads/2014/06/RichardEaston.mp3.

[64] U.S. Gov't Accountability Off., GAO-04-547, Recent Campaigns Benefited from Improved Communications & Technology, but Barriers to Continued Progress Remain 9, 17 (2004)

military effectiveness and compliance with humanitarian law by increasing the chances that a desired target will be hit while reducing the risk of collateral damage to persons, objects, and structures whose destruction serves no lawful military purpose.[65]

Satellites are indispensable to modern military communications, as they can bring troops together over greater distances than terrestrial radio signals could, without the need to string out expensive and vulnerable cables in an austere and rapidly changing environment.[66] They enable precision maneuver even under darkness and adverse weather conditions. For example, GPS allowed U.S. troops to attack and annihilate Iraqi Republican Guard tank formations during a sandstorm,[67] and empowered Navy SEAL Team Six to travel undetected through Pakistani airspace on the raid that killed Osama Bin Laden.[68] Satellites, and the information dominance they provide, have often been critical tools for cutting through the Clausewitzian "fog of war."[69]

Thus, satellites have in many ways contributed to humanity's unprecedented situational awareness about happenings on Earth. But what about situational awareness in the space environment itself? How do we ensure that we know what is going on where the satellites themselves operate? How do we know where satellites are at any given time, and when there might be a chance of a dangerous encounter with another space object or environmental condition? And how do we identify and distinguish the causes of space system anomalies?

4. Obtaining Space Situational Awareness

To understand and predict space events, we need SSA. To have SSA, one must be able to sense what is going on in outer space and interpret it accurately and rapidly, so as to apply it to enhance the safety and efficacy of space activities. We derive SSA in part by obtaining raw data about where space objects are at any

(explaining that the use of GPS-guided bombs relative to laser-guided bombs increased significantly for OEF, but this trend was somewhat reversed for OIF).

[65] *Explosive Weapons in Populated Areas: Humanitarian, Legal, Technical and Military Aspects* 6, Int'l Comm. Red Cross (Feb. 24-25, 2015), http://www.icrc.org/en/download/file/10297/icrc-explosive-wepons-report.pdf.

[66] Rienzi, *supra* note 57; Encyclopedia of Military Science 376-379 (G. Kurt Piehler ed., 2013).

[67] John Gresham, *Gulf War 20th: The Battle of 73 Easting and the Road to the Synthetic Battlefield* (Feb. 22, 2011), http://www.defensemedianetwork.com/stories/gulf-war-20th-the-battle-of-73-easting-and-the-road-to-the-synthetic-battlefield/.

[68] Easton, *supra* note 63, at 20:15-21:09.

[69] Karl von Clausewitz, On War, at 140 (Anatol Rapoport ed., J.J. Graham trans., Penguin Books 1982). Clausewitz, a Prussian officer during the Napoleonic wars, was a preeminent military theorist of the nineteenth century. While the cited translation uses "clouds," the term "fog" is more widely recognized. It refers to how uncertainty, chance, and the rapid and disjointed flow of information can challenge a military leader's ability to make immediate decisions soundly.

given moment and what environmental conditions are affecting them, and combining these data with a predictive analysis of how and where the space objects will continue to move and how their paths may cross at any given moment. Another crucial component of SSA involves knowing what the operators of maneuverable space objects are doing or intend to do with them.

(a) *Satellite Owner and Launching State Information*

In many cases, the first information concerning a man-made space object will be available before it is even launched. Satellite operators and launching entities will have information such as the size, function, intended orbital characteristics, and intended launch date of their own satellites, and may report it to a separate organization with established SSA data fusion and analytical capabilities, such as the U.S. military's Joint Space Operations Center (JSpOC)[70] or the private Space Data Association (SDA).[71] In such cases, the organization that receives the information can integrate it with other SSA data to help schedule an optimal launch date and minimize the probability of conflict with existing space activities.[72] In the absence of advance coordination with the satellite owner, operator, or launch services provider, an organization such as the JSpOC may still glean pre-launch SSA information from intelligence sources,[73] or from publicly available information about a planned launch. During and after launch, SSA sensors and analysts can be tasked to track the satellite to verify whether it reaches its intended orbit, and to identify and resolve any problems that might arise.[74]

Other sources of information about satellites include the launching states' registration statements under U.N. General Assembly Resolution 1721 B (XVI)[75] and the Registration Convention.[76] The Registration Convention, which presently has 62 States Parties in addition to four States Signatories and two international

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[70] The JSpOC is an operations center within the Joint Functional Component Command for Space (JFCC SPACE), itself a component of U.S. Strategic Command (USSTRATCOM). Located at Vandenberg Air Force Base, California, the JSpOC "provides operational employment of worldwide joint space forces and enables the JFCC Space commander to integrate space power into global military operations." USSTRATCOM, *Joint Functional Component Command for Space (JFCC Space)* (Dec. 2011), http://www.stratcom.mil/factsheets/7/JFCC_Space [hereinafter JFCC SPACE Fact Sheet].

[71] Space Data Association (SDA), *SDA Overview* (2015), http://www.space-data.org/sda/.

[72] Duane Bird, *Sharing Space Situational Awareness Data*, AMOS (Sept. 16, 2010), http://www.amostech.com/TechnicalPapers/2010/Integrating_Diverse_Data/Bird.pdf.

[73] Lt Gen Buck Statement, *supra* note 5, at 6-7, 9.

[74] *Id*.

[75] G.A. Res. 1721 B, U.N. GAOR, 16th Sess., U.N. Doc. A/Res/1721 (1961). The resolution does not specify what information is to be provided.

[76] Convention on Registration of Objects Launched into Outer Space, *opened for signature* Nov. 12, 1974, 28 U.S.T. 695, 1023 U.N.T.S. 15 [hereinafter Registration Convention].

organizations that have accepted,[77] requires each launching state that has registered a space object on its own registry to furnish to the U.N. Secretary-General:

> as soon as practicable, the following information concerning each space object carried on its registry:
>
> (*a*) Name of launching State or States;
>
> (*b*) An appropriate designator of the space object or its registration number;
>
> (*c*) Date and territory or location of launch;
>
> (*d*) Basic orbital parameters, including:
>
> (i) Nodal period;
>
> (ii) Inclination;
>
> (iii) Apogee;
>
> (iv) Perigee;
>
> (*e*) General function of the space object.[78]

The Registration Convention permits (but does not require) states of registry to provide additional information about their space objects,[79] which can prove especially important if a space object has deviated from its original intended course, or if it has been sold to a new owner; and it requires states to tell the U.N. when their registered space objects have departed Earth orbit.[80]

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[77] *Status of International Agreements Relating to Activities in Outer Space as at 1 January 2015*, U.N. LSC COPUOS, 54th Sess., U.N. Doc. A/AC.105/C.2/2015/CRP.8 (Apr.13-24, 2015), http://www.unoosa.org/pdf/limited/c2/AC105_C2_2015_CRP08E.pdf [hereinafter, Status of Space Agreements].

[78] Registration Convention art. IV(1). The "nodal period" of a satellite means the time between two successive northbound crossings of the equator, usually in minutes (i.e., the time the satellite takes to circle the Earth once); the "inclination" refers to the angle of the orbital plane relative to the Earth's equator, with the polar orbit being 90° and an equatorial orbit being 0°; the "apogee" is the space object's highest altitude above the Earth's surface (in kilometers); and the "perigee" is the lowest altitude above the Earth's surface (also in kilometers). UNOOSA, *Registration of Objects Launched into Outer Space* (2014), http://www.unoosa.org/oosa/en/SORegister/index.html.

[79] Registration Convention art. IV(2).

[80] *Id.* at art. IV(3).

The Registration Convention and other instruments for registering information about satellites will be discussed in more detail in Section IV below.

(b) *The Need for SSA Sensors*

Many space objects also enter Earth orbit without having been registered or reported in advance.[81] Between the growth of the private space industry, the complexities of multinational consortia involved in launches, and inattention or purposeful omission by launching states, hundreds of satellites have been launched into orbit without having been registered.[82] In addition to unregistered and unreported new satellites, other objects can appear in orbit as well. These include naturally occurring meteoroids as well as space debris such as upper rocket stages,[83] solid fuel residue, and fragments resulting from accidental explosions or collisions between other space objects, whether the "parent" space objects were registered or not.[84] To identify and track such objects, one must first be able to perceive them.

Even when a space object is launched into what is intended to be a stable orbit, it is necessary to take observations of its position and periodically recalculate its trajectory, and not assume it will continue indefinitely according to a preset mathematical model. Over time, atmospheric friction gradually slows a satellite, and with the effect of gravity, causes a steady orbital decay that is most pronounced for satellites in the lower altitudes of LEO.[85] Moreover, some spacecraft are meant to be maneuvered.[86] They may maneuver to stay in an agreed-to position in the orbital plane ("station-keeping"), to rendezvous with another space object, or to reach their final orbit. Not every launch or maneuver goes exactly according to plan.[87] Some

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[81] For example, according to one study in 2006, half of all Globalstar satellites, 20 percent of Iridium satellites, and 25 percent of the 247 satellites launched by Arianespace over the previous 20 years had not been registered with the UN. Yoon Lee, *Registration of Space Objects: ESA Member States' Practice*, 22 Space Pol'y 42, 44-45 (2006).

[82] *Id*.

[83] To economize on fuel, missiles that launch satellites are built in multiple stages, which successively drop off as their fuel is expended so that the remaining stages do not have to carry their dead weight into orbit. While the lower rocket stages may fall into the sea or burn up reentering the atmosphere, upper stages often remain in orbit after separating from their payloads.

[84] *See* Aerospace.org, *Space Debris Basics*, http://www.aerospace.org/cords/space-debris-basics/ (last visited May 4, 2016).

[85] Carl Gazley, Jr., L.N. Rowell & G.F. Schilling, *On the Prediction of Satellite Orbit Decay and Impact* 1-3 Rand Corp., Research Memo. 4619-PR (Oct. 1965), https://www.rand.org/content/dam/rand/pubs/research_memoranda/2008/RM4619.pdf.

[86] Examples include most manned spacecraft, such as the U.S. space shuttle and Russian Soyuz capsules, and remotely piloted craft such as the experimental U.S. X-37B space plane. Many large modern satellites are also equipped with "station-keeping" thrusters intended to minimize the effects of orbital perturbations.

[87] For example, on 22 August 2014, two Galileo navigation satellites deployed to lower and more eccentric orbits than intended. Alan Cameron, *Galileo's Two Giant Steps Back* (Sept. 24, 2014), http://gpsworld.com/galileos-two-giant-steps-back/.

spacecraft are sent into deep space, so specialized systems are needed to track and monitor their health and safety.[88] Under the voluntary Inter-Agency Space Debris Coordination Committee (IADC) Space Debris Mitigation Guidelines, satellites approaching the end of their lives should also be retrieved, caused to re-enter the Earth's atmosphere, or moved to a higher "graveyard orbit" where they will not interfere with active satellites.[89] Because of the need to discover previously unknown objects and account for perturbations in the orbits of known objects, sensors that provide accurate, timely data are essential to maintaining SSA.

(c) *Types of SSA Sensors*

Sensors that contribute to SSA can be Earth-based or space-based, and primarily perceive space objects either through optical or radar technologies.[90] USSTRATCOM categorizes its sensors into four classes: conventional radars, phased-array radars, electro-optical sensors, and space-based sensors.[91] There are also the direct communication links by which owner-operators maintain telemetry, tracking, and command of their satellites.[92] Some sensors are greatly enhanced by technology that enables them not only to perceive space objects but to automatically track them over time as well.[93] Sensors are necessary both to identify new space objects and to continue tracking known ones. Because there are many more potentially hazardous objects in orbit than can presently be sensed and tracked, there will be an ongoing need to develop more advanced and geospatially dispersed sensors.[94]

(1) *Radar Sensors*

Radar technology is a way of repeatedly bouncing radar energy beams off objects and receiving the energy back to identify their location and direction of

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[88] Examples are NASA's *Viking* and *Curiosity* Mars landers, the NASA-ESA *Cassini-Huygens* missions, Japan's Hayabusa asteroid lander, and the ESA's Rosetta comet lander.

[89] IADC Space Debris Mitigation Guidelines, *supra* note 32, at § 5.3.

[90] Other types of sensors include radiation and thermal sensors.

[91] JFCC SPACE Fact Sheet, *supra* note 70.

[92] A. Winton et al., *The Transponder–A Key Element in ESA Spacecraft TTC Systems*, Eur. Space Agency (May 1996), http://www.esa.int/esapub/bulletin/bullet86/wint86.htm.

[93] NASA's new Meter Class Autonomous Telescope on Ascension Island in the southern Atlantic Ocean is one prime example. It boasts a unique "double horseshoe" mount that enables it to track deep space objects quickly and automatically across the full field of sky. David Dickinson, *Unique Scope Searches for Space Junk*, Sky & Telescope (Nov. 17, 2015), http://www.skyandtelescope.com/astronomy-news/unique-scope-searches-for-space-junk-111723/.

[94] For example, the United States and Australia recently concluded an agreement to move the U.S. Space Surveillance Telescope (SST) from the New Mexico to Western Australia. DARPA, *SST Australia: Signed, Sealed and Ready for Delivery* (Dec. 6, 2013), http://www.darpa.mil/NewsEvents/Releases/2013/12/06.aspx. In addition, the U.S. launched two new geosynchronous SSA satellites in July 2014. James Dean, *Delta IV Rocket Vaults Off Launch Pad to Orbit*, USA Today, July 29, 2014, http://www.usatoday.com/story/news/nation/2014/07/29/delta-iv-rocket-vaults-off-launch-pad-to-orbit/13307305/.

movement.[95] Two major categories of radar used in space surveillance are conventional radars and phased-array radars.[96]

Conventional radars can track individual near-Earth objects with great precision, as they repeatedly send a single beam of radar energy to the target, receive it back, and reorient their antennae toward the object as it moves.[97] Their use of a focused single beam of energy makes it more challenging to employ conventional radars to search for targets across a broad field, although techniques exist to enable "search" functions for some conventional radars.[98] The most powerful conventional radars, such as the Massachusetts Institute of Technology's Haystack Observatory[99] and the Jet Propulsion Laboratory's Goldstone radio telescope,[100] can, with sufficient energy and planning, track objects as small as two[101] to five[102] millimeters in LEO, or larger objects far out in deep space.[103]

Phased-array radars, a more advanced technology, contain thousands of transmit/receive antennae that are electronically steered in coordination to generate multiple tracking beams and track multiple objects simultaneously.[104] They can track many satellites or ballistic missiles at once, and provide detailed information on the characteristics of each.[105]

(2) *Electro-Optical Sensors*

Electro-optical sensors, such as those used in the U.S. Air Force's Ground-Based Electro-Optical Deep Space Surveillance (GEODSS) System, generate images from light waves reflected off an object and record them to magnetic tape—essen-

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[95] Edward Chatters IV & Brian Crothers, *Space Surveillance Network*, *in* AU-18 Space Primer 249 (1999) [hereinafter Chatters & Crothers].

[96] JFCC SPACE Fact Sheet, *supra* note 70.

[97] Chatters & Crothers, *supra* note 95.

[98] *Id*.

[99] *See History*, MIT Haystack Observatory, http://www.haystack.mit.edu/hay/history.html (last visited May 4, 2016).

[100] *See* NASA Jet Propulsion Lab., *70-meter Antenna – Deep Space Network*, http://deepspace.jpl.nasa.gov/about/DSNComplexes/70meter/ (last visited May 4, 2016).

[101] NASA, *West Ford Needles: Where Are They Now?*, 17 Orbital Debris Q. News 4, 3-4 (2013), http://orbitaldebris.jsc.nasa.gov/newsletter/pdfs/ODQNv17i4.pdf; *see also* Patrick Schwomeyer, *The U.S. Outer Space Situational Awareness Sharing Law: Sharing Information About SSA and the Need for Global Cooperation* 26-27 (2011) (unpublished LL.M. thesis, McGill University) (on file with the McGill University Library).

[102] NASA, *NASA Resumes Haystack Data Collection*, 18 Orbital Debris Q. News 2, 1 (2014), http://orbitaldebris.jsc.nasa.gov/newsletter/pdfs/ODQNv18i2.pdf.

[103] JPL, *70-meter Antenna – Deep Space Network*, *supra* note 100.

[104] Chatters & Crothers, *supra* note 95, 249-250.

[105] *PAVE PAWS Radar System*, U.S. Air Force Space Command (Mar. 2013), http://www.afspc.af.mil/library/factsheets/factsheet_print.asp?fsID=3656.

tially acting as high-powered video cameras with powerful telescopic lenses, which track the movement of space objects reflecting or producing visible light at night.[106] Electro-optical sensors are essential for tracking objects in GSO, beyond the range of radar, but can be blocked by clouds and rain and overwhelmed by daylight.[107] In addition, if space objects do not reflect light well, they may not be identified by optical sensors.[108]

(3) *Space-Based Sensors*

Space-based sensors include any type of sensor mounted on a satellite in orbit.[109] Because of their location, they can detect and track space objects and environmental phenomena without the weather-, atmosphere-, and sunlight-induced limitations of Earth-based sensors.[110] Examples include the U.S. Space-Based Space Surveillance (SBSS) satellite,[111] Geosynchronous Space Situational Awareness Program (GSSAP) satellites,[112] Canada's Sapphire space surveillance satellite,[113] and the National Oceanic and Atmospheric Administration (NOAA)'s Deep Space Climate Observatory space weather monitoring satellite.[114]

(d) *The Need for Greater International SSA Data Integration*

Whatever SSA capabilities a single country or organization has, they will never be fully comprehensive. For example, until recently the United States had few

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[106] Chatters & Crothers, *supra* note 95, 250; *see also* Walter Faccenda, *GEODSS: Past and Future Improvements*, MITRE Corp. (2000), https://www.mitre.org/sites/default/files/pdf/geodss_faccenda.pdf.

[107] JFCC SPACE Fact Sheet, *supra* note 70.

[108] For example, NASA and U.S. Air Force researchers observed that debris from the U.S. ASAT test in 1985 were "so dark as to be almost undetectable" with optical telescopes, most likely because the metal pieces were covered with soot generated by the explosion. However, their heat allowed them to be detected easily with infrared telescopes. David Portree & Joseph Loftus, Jr., NASA Tech. Paper 1999-208856, Orbital Debris: A Chronology (1999), http://ston.jsc.nasa.gov/collections/trs/_techrep/TP-1999-208856.pdf.

[109] Space-based sensors include any type of sensor mounted on a satellite in orbit, such as electro-optical and radar sensors. USSTRATCOM, *USSTRATCOM Space Control and Space Surveillance* (Jan. 2014), https://www.stratcom.mil/factsheets/11/Space_Control_and_Space_Surveillance/.

[110] JFCC SPACE Fact Sheet, *supra* note 70.

[111] AFSPC, *Space Based Space Surveillance* (Mar. 2013), http://www.afspc.af.mil/library/factsheets/factsheet_print.asp?fsID=20523&page=1.

[112] Stephen Clark, *Air Force General Reveals New Space Surveillance Program*, SpaceFlight Now, Feb. 25, 2014, http://spaceflightnow.com/news/n1402/25gssap/#.U1F17152Q08; Dean, *supra* note 94.

[113] Chris Gainor, *Sapphire – Canada's First Military Satellite*, SpaceRef Canada (Mar. 6, 2012), http://spaceref.ca/military-space/sapphire-canadas-first-military-satellite.html.

[114] *NOAA's New Deep Space Solar Monitoring Satellite Launches*, NOAA (Feb. 11, 2010), http://www.noaanews.noaa.gov/stories2015/20150211-NOAA-new-deep-space-solar-monitoring-satellite-launches.html.

SSA sensors in the Southern Hemisphere, leaving most satellites out of Earth-based sensor range for significant segments of each orbit.[115] While staying focused on outer space above the Northern Hemisphere made the most sense during the Cold War, when Soviet inter-continental ballistic missiles (ICBMs) could most quickly strike the United States from the north, today's broader SSA mission requires surveillance of the outer space surrounding Earth in all directions.

Thus, in recent years, calls have risen for increased international cooperation in the production and sharing of SSA data. The more that space operators and observers can share, coordinate, and pool their SSA data, the fuller SSA all will have, and the more effective contribution they will make to the space activities that rely on their data. However, for a variety of historical, political, technological, and strategic reasons, widespread SSA data sharing has been a difficult task to achieve. The next section will examine one of the most obdurate obstacles to expanding SSA data sharing: namely, ASAT threats.

II. ASAT THREATS

> *Failure to provide a non-nuclear capability to counter Soviet targeting satellites that directly support hostile forces against our land, sea, and air forces undercuts stability and our ability to deter both conventional and nuclear conflicts…. I am personally committed to developing an operational U.S. ASAT which will help preserve the security of the nation and our men and women in uniform.*
>
> —President Ronald Reagan, 11 May 1987[116]

> *[The space battlefield] will be a major component of future conflict.*
>
> —Supplement to People's Liberation Army Encyclopedia, 2002[117]

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[115] Turner Brinton, U.S. and Australia Join Forces to Track Space Junk, Space.com (Nov. 16, 2010), http://www.space.com/9539-australia-join-forces-track-space-junk.html; NASA, The NASA Meter Class Autonomous Telescope's New Destination Is Ascension Island, 18 Orbital Debris Q. News 2, 4-6 (2014).

[116] *The U.S. Anti-Satellite (ASAT) Program: A Key Element in the National Strategy of Deterrence* (May 1987), Fed'n of Am. Scientists http://www.fas.org/spp/military/program/asat/reag87.html [hereinafter *U.S. ASAT Program*].

[117] Dean Cheng, *Prospects for China's Military Space Efforts*, *in* Beyond the Strait: PLA Missions Other Than Taiwan 211, 213 (Roy Kamphausen, David Lai & Andrew Scobell eds., 2009).

The Secretary of Defense shall:…

> *Develop capabilities, plans, and options to deter, defend against, and, if necessary, defeat efforts to interfere with or attack U.S. or allied space systems;*
>
> *Maintain the capabilities to execute the space support, force enhancement, space control, and force application missions….*

—U.S. National Space Policy, 28 June 2010

A. Introduction

Because states have demonstrated the ability to use anti-satellite (ASAT) weapons in the past, and the general consensus against them is still insufficiently strong to rule out their use in the future, the risk of an ASAT attack must factor into states' present space situational awareness (SSA) data-sharing policies. What does the history of ASAT testing suggest about how states should shape their SSA data-sharing policies? How serious is the threat of an ASAT attack? This section will first examine humanity's history of ASAT tests to see what lessons they provide, and will then evaluate factors that could make a future ASAT attack more or less likely. States' perceptions of their vulnerability to ASAT attack are likely to affect their willingness to share SSA data abroad.

B. ASAT Threats During the Cold War

1. Early ASAT Theory

Many space power theorists contemplated anti-satellite warfare before the first artificial satellite ever entered orbit, and many considered it to be an important element of future military space strategy.[118] The advent of aircraft had transformed the skies into "the ultimate high ground" of war mere decades before, enabling attacks to proceed with unsurpassed speed, force, and maneuverability free from the limits of terrain—and requiring robust counter-air capabilities for anyone coming under aerial attack. In the same way, Space-Age Americans and Soviets alike

[118] For example, Professor Myres McDougall argued at the 1956 Annual Meeting of the American Society of International Law, "If it is felt by an underlying state that the passing space-craft endangers its security, it is going to shoot it down if it can…." 50 Proc. Am. Soc'y Int'l L. 109 (quoted in Stephen Gorove, *On the Threshold of Space: Toward a Cosmic Law* 4 N.Y. L. Forum 305, 326 (1958). *See also* Myres McDougall, Harold Lasswell & Ivan Vlasic, Law and Public Order in Space 390, n.79 (1963) (citing Thomas Schelling & Morton Halperin, Strategy and Arms Control 33 (1961), for the proposition that countries could engage in covert warfare including the destruction of each other's satellites).

feared what space and missile technology portended for the future of warfare.[119] If an enemy was plotting to launch nuclear weapons on one's major cities from or through outer space, who would not earnestly desire the capability to destroy the weapons' delivery systems?[120] And if even an enemy's spy satellites or communications satellites provided a distinct military advantage in case of a conflict, would it not be justified to target them under the laws of war?[121]

Thus, both Cold War powers developed highly secretive programs to be able to attack enemy satellites.[122] The U.S. and Soviet programs paralleled each other in some ways, but differed in others, with Soviet testing of co-orbital ASATs being answered for a time by a U.S. direct-ascent ASAT program.[123] This article will now define these and other types of ASAT weapons.

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[119] *See* Alan Boyle, *Sputnik Started Space Race, Anxiety* (Oct. 4, 1997), http://www.nbcnews.com/id/3077890/ns/technology_and_science-space/t/sputnik-started-space-race-anxiety/.

[120] Because of these fears, the Outer Space Treaty forbids States Parties to "place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner." Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, Jan. 27, 1967, art. IV, 18 U.S.T. 2410, 610 U.N.T.S. 205 (hereinafter Outer Space Treaty or OST). This provision alleviated some of the motivation for developing ASAT weapons, but does not prevent the use of space for non-nuclear bombardment by satellites, or fractional-orbital bombardment (FOB), wherein a high-altitude nuclear missile briefly enters Earth orbit but makes less than one revolution before it strikes its target. The USSR had contemplated using FOB to attack the United States from the south, in order to avoid the U.S.-Canadian Ballistic Missile Early Warning System that would detect launches over the northern polar region. Braxton Eisel, *The FOBs of War*, Air Force Mag., June 2005, http://www.airforcemag.com/MagazineArchive/Documents/2005/June%202005/0605fobs.pdf.

[121] President Reagan argued that ASAT capability was necessary not only to deter and defeat Soviet ASAT capabilities, but to neutralize Soviet spy satellites that "although not weapons themselves, are designed to provide radar and electronically derived targeting data to Soviet weapon platforms." *U.S. ASAT Program*, *supra* note 116. For a discussion of the application of law of armed conflict (LOAC) principles to anti-satellite warfare, explaining how satellites may be treated as valid military targets if doing so complies with LOAC principles such as military necessity, proportionality, and distinction, see, e.g., Michel Bourbonnière, *Law of Armed Conflict (LOAC) and the Neutralisation of Satellites or Jus in Bello Satellitis*, 9(1) J. Conflict & Sec. L. 43 (2004); James Rendleman, *Lawful Responses to Attacks on Space Systems*, 4(1) Space & Def. 3 (2010); P.J. Blount, *Targeting in Outer Space: Legal Aspects of Operational Military Actions in Space*, Harv. Nat'l Sec. J. (2012).

[122] Early U.S. national security space policies allowed for the possibility of ASAT development, but withheld approval authority for publicity about ASAT development, as well as for the performance of any ASAT tests, at the Presidential level. The U.S. did not want to appear to legitimize attacks on U.S. space-based reconnaissance assets, which themselves remained a closely guarded secret. *See* R. Cargill Hall, *The Evolution of U.S. National Security Space Policy and its Legal Foundations in the 20th* Century, 33 J. Space L. 1, 19-21 (2007) (discussing and excerpting elements of ASAT polices from the Eisenhower and Kennedy administrations). Only after the Soviet Union began conducting ASAT tests in orbit did a U.S. President affirmatively declare that the U.S. needed to acquire a non-nuclear capability to nullify or destroy satellites in orbit. Hall, *id.*, at 30-32 (discussing President Gerald R. Ford's National Security Decision Memoranda 333 and 345).

[123] David Zeigler, *Safe Heavens: Military Strategy and Space Sanctuary*, *in* Beyond the Paths of

2. Types of ASAT Weapons

(a) *Direct-Ascent ASATs*

Direct-ascent anti-satellite weapons are ballistic missiles launched on a trajectory to intercept a satellite in orbit without entering orbit themselves.[124] Direct-ascent ASATs are most commonly designed to destroy the target with the sheer kinetic force of impact.[125] Although they can be planned in advance, direct-ascent ASAT strikes must be targeted and conducted in the brief window of time when a satellite on a known path passes over a certain distance from the launch site.[126] The launch site must therefore also be in a region beneath the satellite's orbital path.[127]

(b) *Co-orbital ASATs*

Co-orbital ASATs, in contrast, are those that first enter orbit themselves, maneuver towards the target satellite, and then destroy it by ramming it, shooting it, exploding nearby it, or other means.[128] A co-orbital ASAT could be launched with a fairly immediate mission of homing in on and destroying its target, or it could be deposited in orbit for use at some later time as a "space mine."[129] Co-orbital ASATs, in theory, could be manned or unmanned,[130] and techniques designed for on-orbit satellite maintenance and upgrades could in theory be modified to permit a wide number of ways to creatively interfere with a satellite's operations.[131]

Heaven, *supra* note 56, at 198-201, *c.f.* Sven Grahn, *Simulated War in Space: Soviet ASAT Tests*, http://www.svengrahn.pp.se/histind/ASAT/ASAT.htm (last visited May 4, 2016).

[124] Brian Weeden, *Anti-satellite Tests in Space – The Case of China* 1, Sec. World Found., Aug. 16, 2013, http://swfound.org/media/115643/china_asat_testing_fact_sheet_aug_2013.pdf [hereinafter, *Chinese ASAT Tests*].

[125] *Id*.

[126] *Id*.

[127] *Id*.

[128] Brian Weeden, *Through a Glass, Darkly: Chinese, American, and Russian Anti-satellite Testing in Space* 28-29 Secure World Found. (Mar. 17, 2014), http://swfound.org/media/167224/Through_a_Glass_Darkly_March2014.pdf. In the 1980s, the Soviet Union attempted to field an orbiting laser weapon system to neutralize potential U.S. space-based missile defenses, but it was plagued with technical difficulties and never succeeded. Dwayne A. Day & Robert G. Kennedy III, *Soviet Star Wars: The launch that saved the world from orbiting battle stations*, Air & Space Mag., Jan. 2010, http://www.airspacemag.com/space/soviet-star-wars-8758185/?all.

[129] Bhupendra Jasani, Space Weapons and International Security 344 (1987).

[130] The high costs and risks of manned spaceflight, supplemented by international legal norms that astronauts in outer space are "envoys of mankind" (OST art. V) make it unlikely that a state would risk trying to send a manned mission to attack an enemy satellite, unless perhaps the target satellite was itself designed to attack targets on Earth.

[131] For example, the Hubble Space Telescope once had to have its lens replaced in orbit, requiring that it be grabbed with the Space Shuttle's "Canadarm" remote manipulator system, partly disassembled, and reassembled with the new lens installed. In theory, satellites could also be seized and modified to diminish instead of improve their functionality, to redirect their transmissions to a

(c) *Laser and Directed Energy Weapons*

Although no satellite is known to have been destroyed in orbit by a laser or directed energy weapon, high-powered lasers have long been recognized as a potential threat to satellites, especially remote sensing satellites with sensitive optical equipment that could be "dazzled" temporarily or even "blinded" permanently.[132] President Reagan cited Soviet laser ASAT development at Sary Shagan as one justification for the Strategic Defense Initiative.[133] Lasers can be used to track and measure the distance of satellites, as well as for new applications such as satellite communications.[134]

(d) *Jamming and Cyber Attacks*

Satellites' capabilities also can be interfered with through less-destructive means, such as having their uplink, downlink, or crosslink transmissions jammed.[135] Space systems could also be vulnerable to cyber-attacks, in which malicious software code could be introduced to cause an anomaly in the space system's operations with effects that could theoretically range anywhere from a brief interruption in service to a de-orbiting or other permanent neutralization of a satellite, or the diversion of the data it produces or transmits to someone other than its owner/operator or intended audience.[136]

This article will next discuss the major historical incidents of ASAT testing.

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different source, to "throw" them down into a decaying orbit, or to attach a time-delayed explosive charge to destroy the target satellite after the attacking satellite has moved a safe distance away.

[132] When asked by a *60 Minutes* reporter whether China and Russia have lasers that could blind American satellites, Secretary of the Air Force Deborah James responded, "They are testing and investing. And that is worrisome to the United States." *60 Minutes: The Battle Above* (CBS television broadcast Apr. 26, 2015) (transcript available at http://www.cbsnews.com/news/rare-look-at-space-command-satellite-defense-60-minutes/) [hereinafter, *The Battle Above*].

[133] *U.S. ASAT Program*, *supra* note 116; *but see* The National Security Archive, *The Glasnost Tours: Breaking Down Soviet Military Secrecy* (Apr. 29, 2010), http://nsarchive.gwu.edu/NSAEBB/NSAEBB314/ (arguing that Soviet laser systems were ineffective even at conducting laser ranging of satellites, let alone damaging them).

[134] Peter de Selding, *Airbus Negotiating SpaceX Launch for ESA-supported Laser Relay Satellite*, SpaceNews, Dec. 1, 2014, http://www.spacenews.com/article/launch-report/42682airbus-negotiating-spacex-launch-for-esa-supported-laser-relay-satellite.

[135] "Jamming" is a colloquial term for intentional electromagnetic or radiofrequency interference. *See, e.g.*, Lt Gen Buck Statement, *supra* note 5, at 5 (describing threat from Chinese terrestrial communications jammers). General John Hyten, Commander, Air Force Space Command, also stated, "Space Command is making its new satellites more maneuverable to evade attack, and also more resistant to jamming." *The Battle Above*, *supra* note 132.

[136] Ram Levi & Tal Dekel, *Vulnerable in Space*, Israel Def., Apr. 15, 2012, http://www.israeldefense.com/?CategoryID=512&ArticleID=1165&print=1.

3. Cold War ASAT Tests

(a) *High-Altitude Nuclear Explosions*

The United States began fielding and testing experimental nuclear ASAT devices within a year of Sputnik 1's launch.[137] The earliest satellite "kills" occurred as byproducts of such high-altitude nuclear explosion (HANE) testing, as experiments in Program 437, Operation HARDTACK TEAK, Project Argus, and Operation STARFISH PRIME proved that nuclear detonations in outer space or the upper atmosphere could seriously disrupt radio communications and electrical circuits for hundreds of miles.[138] The STARFISH PRIME test, which detonated a 1.4-megaton nuclear device on 9 July 1962 at 400 kilometers' altitude, dispersed radiation in orbit that degraded and disabled several satellites in the months following the explosion, including Telstar-1, the world's first communications satellite.[139]

Soviet HANE tests, while not publicly documented to have caused satellite failures, demonstrated powerful wide-ranging electromagnetic pulse (EMP) effects on Earth, such as destructive power surges along the full length of a shielded 500-kilometer-long aerial communication line and a shielded underground power line 600 kilometers away from ground zero.[140] Similar effects in space would also endanger nearby satellites.

After the initial series of tests revealed the dangers of high-altitude and exoatmospheric nuclear explosions, to satellites as well as ground electrical systems, the United States, United Kingdom, and Soviet Union moved to ban the use of detonation of nuclear weapons in outer space in the Limited Test Ban Treaty of 1963.[141] This treaty provides, "Each of the Parties to this Treaty undertakes to prohibit, to prevent, and not to carry out any nuclear weapon test explosion, or any other nuclear

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[137] On 1 August 1958, the U.S. Army launched and detonated a 3.8-megaton nuclear device for the Nike-Zeus ASAT program from Johnston Island in the North Pacific Ocean. Air Force Space and Missile Museum, *Johnston Island Launch Complexes and Facilities* (2015), http://afspacemuseum.org/johnston/.

[138] Nuclear Explosions in Space: Hearing Before the House Comm. on Science & Astronautics, 86th Cong. 1 (1959); Edward Conrad et al., Defense Threat Reduction Agency, Collateral Damage to Satellites from an EMP Attack, DTRA-IR-10-22, 11-14 (2010).

[139] Conrad, *id.*

[140] Vasiliy Greetsai et al., *Response of Long Lines to Nuclear High-altitude Electromagnetic Pulse (HEMP)*, 40 IEEE Transactions on Electromagnetic Compatibility 4, 1 (1998); Howard Seguine, Address at the Workshop on Atmospheric Nuclear Test Experience: US-Russian Meeting – HEMP Effects on National Power Grid & Telecommunications (Feb. 14-15, 1995), *available at* http://nuclearweaponarchive.org/News/Loborev.txt; William Radasky, Address to IEEE EMC Society & IEEE Fox Valley Section: High-Powered Electromagnetic (HPEM) Threats and the Electric Power System 10 (Oct. 20, 2010).

[141] *See* Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water, Aug. 5, 1963, U.S.T. 1313, 480 U.N.T.S. 43, *available at* http://www.state.gov/t/isn/4797.htm [hereinafter, LTBT] (especially the accompanying narrative).

explosion, at any place under its jurisdiction or control … in the atmosphere [or] beyond its limits, including outer space…."[142] This prohibition was later buttressed by the Outer Space Treaty (OST) itself, which provides, "States Parties to the Treaty undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner."[143]

Although the term "weapons of mass destruction" (WMD) is not defined in the OST, it has generally been understood to include chemical, biological, radiological, or nuclear weapons as types of weapons capable of causing widespread, indiscriminate death and destruction.[144] Based on the minimal human presence in space at the time of the OST's drafting, the lack of full comprehension of the future space debris problem, and states' subsequent practice in developing ASAT capabilities, it appears that Article IV was not intended to ban the use of any non-nuclear ASAT weapon, or indeed, any form of "conventional" weapon stationed in orbit, *per se*.[145] Whether a non-nuclear weapon used in outer space would be forbidden as a WMD would likely depend on the reasonably expected scale of the damage it would cause to human life, property, and infrastructure.[146]

Another provision of the OST that could limit ASAT activity is the obligation of States Parties to act with due regard for the corresponding interests of other

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[142] LTBT art. I, § 1, 14.

[143] OST art. IV.

[144] Ivan Vlasic, *The Legal Aspects of Peaceful and Non-Peaceful Uses of Outer Space*, *in* Peaceful and Non-Peaceful Uses of Space: Problems of Definition for the Prevention of an Arms Race 42 (Bhupendra Jasani ed., 1991); *cf.* 50 U.S.C. § 2302 (2013) (defining WMD for nonproliferation purposes as "any weapon or device that is intended, or has the capability, to cause death or serious bodily injury to a significant number of people through the release, dissemination, or impact of—(A) toxic or poisonous chemicals or their precursors; (B) a disease organism; or (C) radiation or radioactivity"). *But see* 18 U.S.C. § 2332a(c)(2)(A), "Use of weapons of mass destruction" (2013) (expanding the definition, for the purposes of criminal prosecution, to include any explosive or incendiary device). The UN uses WMD as shorthand for nuclear, chemical, or biological weapons, and their means of delivery. United Nations Office for Disarmament Affairs (UNODA), *UNODA Support of the 1540 Committee (2004)*, http://www.un.org/disarmament/WMD/1540 (last visited May 4, 2016); *cf.* U.N. SCOR 1540, 4956th mtg., U.N. Doc. S/Res/1540, at 1 (2004).

[145] For example, some have conceptualized space-based bombardment of deeply buried terrestrial targets with inert tungsten rods that achieve powerful explosive-like effects using only the kinetic energy of their impact. *See, e.g.*, Bob Preston et al., Space Weapons Earth Wars 40-45 (2002), http://www.rand.org/content/dam/rand/pubs/monograph_reports/2011/RAND_MR1209. sum.pdf. In addition, one project considered as part of the Strategic Defense Initiative, known as "Brilliant Pebbles," would have employed a swarm of miniature satellites to sense, track, and crash into enemy ballistic missiles as they passed through outer space, thus destroying them. William Broad, *What's Next for "Star Wars"? "Brilliant Pebbles*," N.Y. Times, Apr. 25, 1989, http://www.nytimes.com/1989/04/25/science/what-s-next-for-star-wars-brilliant-pebbles.html?pagewanted=all&pagewanted=print.

[146] *See, e.g.*, Mike Fey, *Results- vs. Device-Centric Threats: Why Cyber-Attacks Should Be in the WMD Conversation* (July 23, 2014), http://blogs.mcafee.com/executive-perspectives/results-vs-device-centric-threats-cyber-attacks-wmd-conversation.

States Parties, and to engage in consultations if they have reason to believe their space activity could cause harmful interference with the space objects of another State Party.[147] Given the current state of awareness of the space debris problem, one could argue that destructive ASAT testing violates the duty of due regard. However, both the United States and Soviet Union conducted a series of ASAT tests during the Cold War. These tests may have indicated that they did not perceive a significant risk of harmful interference from the tests,[148] that they viewed national security interests as paramount to treaty obligations,[149] or both. Of course, the standard of care may have evolved in a more restrictive direction since the Cold War's end.[150]

(b) *Soviet ASAT Efforts*

The Soviet Union was the first state to test a dedicated non-nuclear ASAT kinetic kill vehicle, which it called *Istrebitel Sputnikov* ("satellite destroyer").[151] It conducted numerous co-orbital ASAT tests between 1963 and 1982,[152] some of which resulted in the destruction of the target satellite and more of which resulted in the destruction of the attacking satellite only.[153] While the attacking satellites approached their targets from different directions, it appears all successful "kills" resulted from the attacking satellite maneuvering near to the target satellite and then detonating an explosive charge that destroyed it.[154] The Soviet Union also equipped its early Almaz space station with a defensive cannon.[155] Finally, beginning in the 1970s, Russia developed high-powered ground-based lasers and anti-ballistic missile systems, which could have been used to track and target U.S. spy satellites in LEO.[156] Knowledge of these efforts led President Reagan to advocate the development of dedicated U.S. ASAT capabilities in addition to the ballistic missile defense

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[147] OST art. IX.

[148] Although space debris was created by the tests, there are no known instances of debris from any ASAT test prior to 2007 causing damage to satellites that were not targets of the tests.

[149] There was a precedent to this in the short-lived U.S. program of U-2 reconnaissance plane overflights of the USSR, which ended after pilot Francis Gary Powers was shot down and captured in 1960. Under the Chicago Convention, "No state aircraft of a contracting State shall fly over the territory of another State or land thereon without authorization by special agreement or otherwise, and in accordance with the terms thereof." Convention on International Civil Aviation, art. 3(c), Dec. 7, 1944, 61 Stat. 1180, 15 U.N.T.S. 295 (entered into force Apr. 4, 1947) [hereinafter Chicago Convention].

[150] *See* James Rendleman & Sarah Mountin, Address at the 7th International Space Safety Conference: Evolving Spacecraft Operator Duty of Care and Implications for Space Traffic Management (Oct. 20, 2014).

[151] This New Ocean, *supra* note 1, at 547.

[152] *See, e.g.*, *id.*; Grahn, *supra* note 123; Weeden, *supra* note 128, at 35-36.

[153] Grahn, *supra* note 123.

[154] *Id*.

[155] This New Ocean, *supra* note 1, at 508.

[156] *U.S. ASAT Program*, *supra* note 116; Christina Lindborg, *Lasers*, Fed'n Am. of Scientists (1997), http://www.fas.org/spp/guide/russia/military/asat/lasers.htm.

(BMD) capabilities of his Strategic Defense Initiative (SDI), popularly known as "Star Wars."[157]

(c) *U.S. ASAT Efforts*

(1) *X-20 Dyna-Soar*

ASAT research in the United States actually began long before the Reagan presidency, stretching back to the beginning of the Space Age. One major early U.S. ASAT concept was the X-20 Dyna-Soar, a rocket-launched reusable space-plane that was envisioned at various times to be capable of orbital bombardment, high-altitude reconnaissance of Earth, or inspecting and attacking suspicious satellites.[158] However, the U.S. government could not settle on a viable military mission for it, and it was too expensive for a research vehicle.[159] A high-speed prototype aircraft was built, but it was never armed, and the project was canceled in 1963.[160] The United States would trail behind the Soviet Union in ASAT development until the mid-1980s, preferring to focus its space efforts on manned spaceflight such as the Apollo moon landing program and NASA's reusable Space Transportation System (STS), known more popularly as the Space Shuttle.[161]

(2) *Air-Launched Miniature Vehicle*

With Soviet ASAT testing continuing into his first term and U.S. ASAT efforts having been suspended, President Ronald Reagan sought for the United States to gain its own ASAT capability as a means of deterrence, to protect U.S. forces, and to enable retaliation in kind in response to a Soviet ASAT attack.[162] He therefore directed the Air Force to develop and test an ASAT weapon. The project came to fruition when on 13 September 1985, USAF Major Wilbert D. "Doug" Pearson flew his F-15 fighter jet up to 38,100 feet, where its Air-Launched Miniature Vehicle (ALMV) launched itself at the targeted obsolete U.S. satellite, the P78-1 Solwind, and shattered it.[163] Congress then banned further such kinetic intercepts by

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[157] *U.S. ASAT Program*, *supra* note 116; Broad, *supra* note 145.

[158] This New Ocean, *supra* note 1, at 251-255.

[159] Boeing Corporation, *X-20 Dyna-Soar Space Vehicle* (2015), http://www.boeing.com/boeing/history/boeing/dynasoar.page.

[160] *Id*.

[161] The Soviet Union wrongly accused the space shuttle itself of being developed as an ASAT weapon because of its ability to grab satellites for repairs. Zeigler, *supra* note 123, at 192. Unpersuaded by U.S. assurances that the space shuttle was for peaceful purposes, the Soviets thought it necessary to build their own version, dubbed the *Buran*, in order to maintain parity with the United States. *See* John Walker, *Saturday Night Science:* Energiya-Buran, Ricochet, https://ricochet.com/saturday-night-science-energiya-buran/ (Mar. 12, 2016) (reviewing Bart Hendrickx & Bert Vis, Energiya-Buran: The Soviet Space Shuttle (2007)).

[162] *U.S. ASAT Program*, *supra* note 116.

[163] Gregory Karambelas & Sven Grahn, *The F-15 ASAT Story*, Space Hist. Notes, http://www.

denying funding for the "Miniature Homing Vehicle."[164] President Reagan continued to press for ASAT research despite the congressional moratorium on field-testing such weapons.[165] It took 17 years before the last trackable piece of debris from the test disappeared from orbit, long after the Cold War itself had ended.[166]

(3) *BMD Capabilities as Latent ASAT Weapons*

The ground- and space-based BMD capabilities sought under the Strategic Defense Initiative also contained the potential for dual use as ASAT weapons. Although the purpose of BMD research was to defend the United States and its allies from missile attacks, systems that could target and destroy an incoming intercontinental ballistic missile (ICBM) in outer space could, in theory, be modified to attack satellites in orbit.[167] Although BMD systems were never tested as ASAT weapons during the Cold War, one proved capable of destroying a satellite years later, in 2008.[168]

C. Post-Cold War

1. The End of History?

Once the Cold War ended, with both the United States and the Soviet Union no longer attempting to deploy ASAT weapons, the idea of space as sanctuary became in some ways easier to accept. International bodies focused on figuring out how to reduce and eliminate debris from space activities, the United States scaled back its work on BMD systems, and ASAT worries generally receded into the background.[169]

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svengrahn.pp.se/histind/ASAT/F15ASAT.html (last visited May 4, 2016).

[164] Nat'l Def. Auth. Act for Fiscal Year 1987, Pub. L. No. 99-661, § 204(c), 100 Stat. 3839 (1986), *available at* http://www.gpo.gov/fdsys/pkg/STATUTE-100/pdf/STATUTE-100-Pg3816.pdf.

[165] National Security Decision Directive (NSDD) 258, Anti-Satellite (ASAT) Program (Feb. 6, 1987), *available at* http://research.archives.gov/description/6879837.

[166] William Broad & David Sanger, *China Tests Anti-Satellite Weapon, Unnerving U.S.*, N.Y. Times, Jan. 18, 2007, http://www.nytimes.com/2007/01/18/world/asia/18cnd-china.html?pagewanted=print.

[167] Weeden, *supra* note 128, at 20. One recent successful U.S. BMD test intercepted its target in outer space. U.S. Missile Defense Agency (MDA), *Target Missile Intercepted over Pacific Ocean During Missile Defense Exercise* (June 22, 2014), http://www.mda.mil/news/14news0005.html.

[168] Anna Mulrine, *The Satellite Shootdown: Behind the Scenes*, U.S. News & World Rep., Feb. 25, 2008, http://www.usnews.com/news/world/articles/2008/02/25/the-satellite-shootdown-behind-the-scenes.

[169] Under President Clinton, for example, the U.S. National Space Policy dropped any mention of ASAT capabilities as U.S. goals and demoted the goal of strengthening national security below the goal of enhancing knowledge. It did, however, preserve requirements to counter hostile space systems and services, execute mission areas of space control and force application, deny freedom of action to adversaries if directed, and research missile defense systems to include space-based lasers. Hall, *supra* note 122, at 87-91 (discussing Presidential Decision Directive /NSC-49/NSTC-8, Nat'l Space Pol'y, Sept. 14, 1996).

Yet military use of space increased at a rapid rate. After proving their value in the 1991 Persian Gulf War, military space assets were called to action in the Balkans, where they provided much of the battlespace awareness, communications, and precision targeting that ultimately helped NATO to oust Slobodan Milosevic as President of Serbia and stop the ethnic cleansing of Kosovars.[170] At the time, the security of those satellites was almost taken for granted. No country had intentionally destroyed a satellite in orbit since 1985, and some hoped that a new international norm against ASATs could be taking hold.[171]

2. The United States Re-Evaluates Its Security Posture

However, many doubted that space conflict was truly a thing of the past. In 1999, the U.S. Congress established a special commission to examine the state of space security.[172] The commission, headed by former and future Secretary of Defense Donald Rumsfeld, released its report in early 2001.[173] The report identified vulnerabilities in U.S. space infrastructure and warned of the possibility of a "Space Pearl Harbor" in which an enemy sought to strike first at U.S. space assets as a prelude to a terrestrial military campaign.[174] The Rumsfeld Commission Report's recommendations set the groundwork for a new National Space Policy and National Security Space Strategy that emphasized preserving full freedom of action for the United States in space, whether in offense or defense.[175]

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[170] Satellite-aided targeting did not prevent all errors, however, as the U.S. discovered after it accidentally bombed the Chinese embassy in Belgrade, killing three people and provoking outrage from China. Brent Sadler et al., *Chinese, Russians Condemn Embassy Attack, Call for Bombing Halt*, CNN, May 8, 1999, http://www.cnn.com/WORLD/europe/9905/08/kosovo.01/.

[171] Zeigler, *supra* note 123, at 222-223.

[172] Nat'l Def. Auth. Act for Fiscal Year 2000, Pub. L. No. 106-65, §§ 1621-1630, 113 Stat. 512, 813-817 (1999), *available at* http://www.gpo.gov/fdsys/pkg/PLAW-106publ65/pdf/PLAW-106publ65.pdf.

[173] Donald Rumsfeld et al., *Report of the Commission to Assess U.S National Security Space Management and Organization* 22-25 (Jan. 11, 2001), *available at* http://www.dod.gov/pubs/space20010111.pdf [hereinafter, Rumsfeld Commission Report]. The report concluded, "we know from history that every medium—air, land and sea—has seen conflict. Reality indicates that space will be no different. Given this virtual certainty, the U.S. must develop the means both to deter and to defend against hostile acts in and from space."

[174] *Id.* at 100.

[175] For example, President George W. Bush's National Space Policy stated "the United States will… deny, if necessary, adversaries the use of space capabilities hostile to U.S. national interests." U.S. Nat'l Space Pol'y, Aug. 31, 2006, at 1-2, *available at* https://fas.org/irp/offdocs/nspd/space.pdf. The policy it superseded had only stated that the United States would counter hostile space activities, but not that it would deny them. *Id.*; *cf.* Hall, *supra* note 122, at 89. Moreover, unlike the 1996 policy, the 2006 space policy asserted U.S. opposition to arms control agreements and any legal restrictions that would prohibit or limit U.S. access to or use of space, or impair the rights of the U.S. to research, develop, test, operate, and act in space. *See* U.S. Nat'l Space Pol'y, Aug. 31, 2006, at 2.

Another consequence of the review was President Bush's decision to withdraw from the Anti-Ballistic Missile (ABM) Treaty, which he believed unduly constrained the United States from defending itself against foreign missile attacks.[176] While a BMD system may not have protected the United States from a massive Soviet attack of hundreds or thousands of ICBMs, technological advances had made it more feasible that BMD systems could neutralize a single missile or small volley of missiles launched from the likes of Iran or North Korea.[177] However, some in Russia and China, as well as Western arms control advocates, attacked the new U.S. position, claiming as they did during the Reagan administration that renewed BMD efforts were likely to reinvigorate an arms race in outer space.[178]

3. Chinese ASAT Tests: The Fengyun 1C and Other Mysteries

As if to justify the United States' concerns, China began testing a direct-ascent ASAT weapon system, shooting missiles into space on 7 July 2005 and 6 February 2006.[179] The second tested missile came close to a satellite but did not strike it.[180] In late 2006, China again fired a high-powered ground-based laser to illuminate a U.S. satellite, possibly in an attempt to "blind" it or target it as practice for a kinetic ASAT attack.[181] Then, on 11 January 2007, without warning[182] (although it appears that the launch preparations were scrutinized by U.S. intelligence),[183] China's People's Liberation Army (PLA) launched an SC-19 missile from a mobile

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[176] U.S. Dep't of Def., *Announcement of Withdrawal from the ABM Treaty* (Dec. 13, 2001), http://www.acq.osd.mil/tc/treaties/abm/ABMwithdrawal.htm; *cf.* Treaty on the Limitation of Anti-Ballistic Missile Systems, May 26, 1972, U.S.-U.S.S.R., 23 U.S.T. 3435, 944 U.N.T.S. 13 (entered into force Oct. 3, 1972; U.S. withdrew effective June 13, 2002)[hereinafter ABM Treaty].

[177] Bruce Klingner, *South Korea Needs THAAD Missile Defense*, Heritage: Backgrounder (June 12, 2015), http://www.heritage.org/research/reports/2015/06/south-korea-needs-thaad-missile-defense. *See also* U.S. Gov't Accountability Off., GAO-16-254R, Missile Defense: Assessment of DoD's Reports on Status of Efforts and Options for Improving Homeland Missile Defense (2016), http://www.gao.gov/assets/680/675263.pdf.

[178] Daryl Kimball et al., *ABM Treaty Withdrawal: Neither Necessary Nor Prudent*, Arms Control Ass'n (Dec. 13, 2001), http://www.armscontrol.org/print/985.

[179] Weeden, *supra* note 128, at 23.

[180] Gordon & Cloud, *supra* note 10.

[181] Shirley Kan, Cong. Research Serv., RS22652, *China's Anti-Satellite Weapon Test* 5 (2007); GlobalSecurity.org, *Chinese Anti-Satellite [ASAT] Capabilities* (Dec. 23, 2013), http://www.globalsecurity.org/space/world/china/asat.htm; Warren Ferster & Colin Clark, *NRO Confirms Chinese Laser Test Illuminated U.S. Spacecraft*, SpaceNews, Oct. 3, 2006, http://www.spacenews.com/article/nro-confirms-chinese-laser-test-illuminated-us-spacecraft (also noting that the U.S. had tested an advanced chemical laser on an experimental USAF multi-sensor satellite on Oct. 17, 1997).

[182] Broad & Sanger, *supra* note 166; David Sanger & Joseph Kahn, *U.S. Tries to Interpret Chinese Silence Over Test*, N.Y. Times, Jan. 22, 2007, http://www.nytimes.com/2007/01/22/world/asia/22missile.html?pagewanted=print.

[183] Gordon & Cloud, *supra* note 10.

launcher at the aging Chinese Fengyun 1C weather satellite, which was then in a polar orbit.[184]

Streaking toward its target 860 kilometers above the Earth, the SC-19 missile struck the Fengyun 1C and pulverized it into a cloud of thousands of pieces of trackable debris that would eventually spread out to envelop the globe, at altitudes spanning the entirety of LEO.[185] The United States, Japan, and other countries were quick to criticize the test, which soon became recognized as the worst space debris-producing incident in history.[186]

Nine years after the test, most of its debris remains in orbit, with 2,880 of the originally cataloged 3,428 pieces still being tracked.[187] The test was estimated to have created over 150,000 fragments greater than one centimeter in size,[188] likely to be lethal to any operational satellite they encounter even though most of them are too small to track.[189] Even the 2009 Iridium-Cosmos crash did not produce as much debris.[190] Much of the Fengyun 1C debris will continue to present a danger to nearby satellites for decades to come.[191] It is believed that debris from the Fengyun 1C explosion already struck and disabled the experimental Russian BLITS 35871 nano-satellite in January 2013, breaking the 17-centimeter-wide spherical satellite into at least two separately trackable pieces.[192] Additionally, the International Space Station maneuvered to avoid a piece of Fengyun 1C debris on 28 January 2012.[193]

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[184] *Id*.

[185] NASA, *Chinese Anti-satellite Test Creates Most Severe Orbital Debris Cloud in History*, 11 Orbital Debris Q. News 2, 2-3 (2007), http://orbitaldebris.jsc.nasa.gov/newsletter/pdfs/ODQNv11i2.pdf (describing the debris cloud as extending from 200 kilometers to 4,000 kilometers in altitude).

[186] *Id*.

[187] *Id.*; *see also Fengyun-1C Debris Cloud*, *supra* note 11, at 2-3. More than nine years later, the Fengyun-1C intercept remains the largest single source of debris in orbit. NASA, *Top Ten Satellite Breakups Reevaluated*, 20 Orbital Debris Q. News 1-2, 5-6 (2016), http://www.orbitaldebris.jsc.nasa.gov/newsletter/pdfs/ODQNv20i1-2.pdf.

[188] Richard H. Buenneke, Remarks at the European Space Policy Institute/George Washington University Space Policy Institute Joint Workshop: Space and Security – Transatlantic Issues and Perspectives 7 (Nov. 17, 2009), *available at* https://www.gwu.edu/~spi/assets/docs/111709Buenneke.pdf.

[189] McKnight, *supra* note 25, at 6.

[190] NASA, *Update on Three Major Debris Clouds*, 14 Orbital Debris Q. News 2, 4 (2010), http://orbitaldebris.jsc.nasa.gov/newsletter/pdfs/ODQNv14i2.pdf.

[191] *Fengyun-1C Debris Cloud*, *supra* note 11, at 2.

[192] T.S. Kelso, *Chinese Space Debris May Have Hit Russian Satellite*, AGI (Mar. 8, 2013), http://blogs.agi.com/agi/2013/03/08/chinese-space-debris-hits-russian-satellite; Merry Azriel, *Fengyun 1C Debris Collided with BLITS Satellite*, Space Safety Mag. (Mar. 9, 2013), http://www.spacesafetymagazine.com/2013/03/09/fengyun-1c-debris-collided-blits-satellite/.

[193] NASA, *Increase in ISS Debris Avoidance Maneuvers*, 16 Orbital Debris Q. News 2, 1-2 (2012), http://orbitaldebris.jsc.nasa.gov/newsletter/pdfs/ODQNv16i2.pdf.

While China has not destroyed another satellite since the Fengyun 1C, it launched a missile in May 2013 that demonstrates the potential to strike targets in the geostationary region,[194] and has deployed and maneuvered other satellites since then in a way that suggest it possesses at least a latent co-orbital ASAT capability.[195] It launched three satellites together on 20 July 2013.[196] Beginning in early August 2013, space observers detected the largest satellite changing its orbit and moving in close proximity to the smallest satellite.[197] The largest satellite is believed to have grappled with the smaller satellite using a robotic arm, then moved into a different orbit to follow a satellite that had been launched in 2005.[198]

China has not explained how it intends to use these satellites.[199] It is possible that the highly maneuverable satellites could be used in support of China's manned space program, such as the Shenzhou space laboratory it intends to build; that they could be used for on-orbit refueling and servicing of existing satellites, for space debris removal; or as a co-orbital ASAT weapon.[200] The U.S. Defense and State Departments assess China as continuing to pursue ASAT and counter-space technologies to counteract the space capabilities of potential adversaries.[201] These pursuits are consistent with Chinese military policy since at least 2002, when then-President Jiang Zemin's Military Strategic Guidance stressed the need to prepare for a local war "under conditions of informatization,"[202] in which information provided through and by satellites plays a major role.

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[194] Bill Gertz, *China Conducts Test of New Anti-Satellite Missile*, Wash. Free Beacon, May 14, 2013, http://freebeacon.com/national-security/china-conducts-test-of-new-anti-satellite-missile/.

[195] Kevin Pollpeter, *China's Space Robotic Arm Programs* 1 (Oct. 2013), http://escholarship.org/uc/item/2js0c5r8.pdf.

[196] *Id.*

[197] *Id*.

[198] *Id*.

[199] Leonard David, *Mysterious Actions of Chinese Satellites Have Experts Guessing* (Sept. 9, 2013), http://www.space.com/22707-china-satellite-activities-perplex-experts.html.

[200] *Id*.

[201] U.S. Dep't of Defense, Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 22-23 (2015) [hereinafter, DoD China Report 2015]; Marcia Smith, *U.S. Accuses China of Conducting Another ASAT Test,* Space Pol'y Online, July 25, 2014, http://www.spacepolicyonline.com/news/u-s-accuses-china-of-conducting-another-asat-test. On a more sanguine note, a senior U.S. diplomat once reported, "a senior Chinese Ministry of Foreign Affairs official provided assurances [in 2008] to the United States that China will not conduct future ASAT tests in space." Buenneke, *supra* note 188, at 7. Nevertheless, the U.S. assesses that China continues to develop ASAT capabilities. Frank Rose, Remarks at the International Institute for Strategic Studies: Promoting Space Security and Sustainability (Nov. 21, 2014), *available at* http://www.state.gov/t/avc/rls/2014/234392.htm.

[202] Paul Oh, *Assessing Chinese Intentions for Military Use of the Space Domain*, 64 Joint Forces Q. 91, 93 (2012); *see also* Cheng, *supra* note 117, at 211.

4. U.S. Destruction of NROL-21

On 21 February 2008, the United States demonstrated that it, too, still possessed effective direct-ascent ASAT capabilities. When NROL-21 (also known as USA-193), a malfunctioning National Reconnaissance Office satellite with 1,000 pounds of toxic hydrazine fuel aboard, began experiencing rapid orbital decay, it was assessed to be a threat to people or property on the Earth in the event of an uncontrolled re-entry.[203] Thus, the *USS Lake Erie*, an Aegis cruiser equipped for ballistic missile defense, was dispatched to fire the modified SM-3 missile that destroyed the errant satellite before it could stage an American version of the Cosmos 954 disaster.[204] While the purpose of the satellite's destruction was to protect people on Earth from the hydrazine fuel, its timing barely a year after the Fengyun 1C ASAT test undoubtedly reminded the world that the United States had not abdicated the field of counter-space operations to its rising competitor across the Pacific.[205]

Three significant factors distinguished the 2008 U.S. satellite interception from the 2007 Chinese test. First, there was a valid safety justification for the satellite's destruction.[206] At the time of the Chinese ASAT test, the Fengyun 1C presented no immediate safety hazard, unlike the thousands of shards of orbital debris created by its destruction.[207] However, NROL-21 was not working and was expected to reenter the Earth's atmosphere soon.[208] Although it most likely would have crashed into an ocean, reentry prediction was and remains an inexact science that cannot effectively predict where a descending satellite will land.[209] The risk of damage to life, property, and the environment if the hydrazine fuel tank survived reentry and smashed across the ground was great enough to justify obliterating the satellite in time to ensure that Earth's gravity and the heat of reentry would soon take care of any remaining debris.[210] Indeed, destroying the satellite was consistent with, though not mandated by, OST Article IX's provision to adopt appropriate measures to avoid adverse changes in Earth's environment resulting from the introduction of extraterrestrial matter. In contrast, China's only motives in conducting the 2007 ASAT test seem to have been to demonstrate its ability to hold others' space assets

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[203] Mulrine, *supra* note 168

[204] *Id.*; Jamie McIntyre, Suzanne Malveaux & Miles O'Brien, *Navy Missile Hits Dying Satellite, Says Pentagon*, CNN, Feb. 21, 2008, http://www.cnn.com/2008/TECH/space/02/20/satellite.shootdown/index.html.

[205] McIntyre, Malveaux & O'Brien, *supra* note 204.

[206] *Id*.

[207] *Fengyun-1C Debris Cloud*, *supra* note 11.

[208] McIntyre, Malveaux & O'Brien, *supra* note 204

[209] Matthew Horsley, *Satellite Re-entry Modeling and Uncertainty Quantification*, AMOS (Sept. 14, 2012), http://www.amostech.com/TechnicalPapers/2012/Astrodynamics/HORSLEY.pdf.

[210] Recall that the Cosmos 954 crash spread debris across 600 km of Canadian soil, and the space shuttle *Columbia* disaster spread more than 84,000 pieces of debris across over 2,000 square miles of Texas and Louisiana. Columbia Report, *supra* note 18, at 44-45, 47.

at risk, show that China is a "great power" in space comparable to the United States and Russia, and deter other spacefaring nations from acting against China.[211]

Second, the United States provided notice to other nations well before the 2008 intercept. Other countries were notified about NROL-21's malfunction and descent in late January 2008, and some even helped the United States to track it.[212] Once President Bush had decided to destroy the satellite, a Defense Department press conference and diplomatic notifications were conducted a week before the event to allay the potential fears of other nations that the missile launch that brought down the U.S. satellite could be hostile or injurious to them.[213]

Finally, the satellite was struck at a low enough altitude to prevent a long-term debris problem. No debris "much larger than a football" could be detected within hours after the strike,[214] and all debris from the impact was expected to re-enter the atmosphere within the next few months.[215] This contrasts with the 860-kilometer altitude at which the Fengyun 1C was struck,[216] a highly populated part of LEO that is likely to remain filled with the debris for decades.[217] The U.S. test, in contrast, demonstrated that kinetic satellite kills could be conducted in a responsible manner without necessarily exacerbating the feared Kessler syndrome.[218]

That said, the destruction of NROL-21 was possible without a long-term debris problem because its orbit was decaying so rapidly. If an ASAT weapon is someday used to destroy an operational enemy satellite, it is likely to be at a higher altitude and present a longer-term debris risk that will need to be analyzed in terms

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[211] Hearings Before the U.S.-China Economic and Security Review Commission: China's Space and Counterspace Programs (Feb. 18, 2015) (testimony of Kevin Pollpeter, University of California Institute on Global Conflict and Cooperation), *available at* http://www.uscc.gov/sites/default/files/Pollpeter_Testimony.pdf.

[212] NASA Office of Public Affairs, *Media Briefing: "Reentry of U.S. Satellite," with Ambassador James Jeffrey, General James Cartwright, and NASA Administrator Michael Griffin* (Feb. 14, 2008), http://www.nasa.gov/pdf/212253main_pentagon_brief_200820214.pdf.

[213] *Id*.

[214] Mulrine, *supra* note 168.

[215] NASA, *Satellite Breakups During First Quarter of 2008*, 12 Orbital Debris Q. News 2, 1-2 (2008), *http*://orbitaldebris.jsc.nasa.gov/newsletter/pdfs/ODQNv12i2.pdf. However, according to one knowledgeable observer, the last tracked piece did not re-enter the atmosphere until 28 October 2009, over 18 months after the interception. Weeden, *supra* note 128, at 26. Still, this was a far faster rate of debris decay than for any previous ASAT test, thanks to the low altitude of the interception.

[216] J.-C. Liou & N.L. Johnson, NASA, *Physical Properties of the Large Fengyun-1C Breakup Fragments*, 12 Orbital Debris Q. News 2, 4 (2014).

[217] C. Stokely & M. Matney, NASA, *Haystack Radar Observations of Debris from the Fengyun-1C Antisatellite Test*, 12 Orbital Debris Q. News 3, 7 (2008), http://orbitaldebris.jsc.nasa.gov/newsletter/pdfs/ODQNv12i3.pdf.

[218] *See supra* note 215.

of law of armed conflict (LOAC) principles such as proportionality and distinction, even if destruction of the satellite is determined to be a justified act of self-defense.[219]

5. An Indian ASAT?

In addition to the three states that have already intentionally destroyed satellites in orbit, India, the world's largest democracy and second most populous state after China, claims to be ready to do so. In April 2012, Vijay Saraswat, scientific adviser to India's Defence Minister and Defence Research and Development Organisation (DRDO), stated, "Today, we have developed all the building blocks for an anti-satellite (ASAT) capability."[220] He added that India would only test this capability via electronic simulation, so as not to produce a harmful debris cloud.[221] India is also developing a BMD system, the Prithvi Defence Vehicle, which has successfully tracked a target missile and came close enough to destroy the target if it had been detonated.[222]

6. Future ASAT Possibilities

While no more satellites have been intentionally destroyed since 2008, the United States and China have also continued to test and improve their ballistic missile defense system technologies. Although the United States has scrapped the Airborne Laser program, and President Obama cut back the intended deployments of missile interceptors in Poland and the Czech Republic in 2009,[223] the United States renewed BMD efforts after North Korea's early-2013 nuclear tests and missile firings.[224] Additionally, non-kinetic means such as laser blinding, signal jamming,[225]

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[219] *See generally* Bourbonnière, *supra* note 121; Rendleman, *supra* note 121; Blount, *supra* note 121.

[220] Sandeep Unnithan, *India Attains the Capability to Target, Destroy Space Satellites in Orbit*, India Today, Apr. 28, 2012, http://indiatoday.intoday.in/story/agni-v-launch-india-takes-on-china-drdo-vijay-saraswat/1/186367.html.

[221] *Id*.

[222] T.S. Subramanian, *Interceptor Spot on, Though Without Blast: DRDO*, The Hindu, Apr. 28, 2014, http://m.thehindu.com/news/national/interceptor-spot-on-though-without-blast-drdo/article5953934.ece/.

[223] Ken Dilanian, *Obama Scraps Bush Missile-Defense Plan*, USA Today, *available at* http://abcnews.go.com/Politics/obama-scraps-bush-missile-defense-plan/story?id=8604357.

[224] Karen DeYoung, *U.S. to Deploy Anti-missile System to Guam*, Wash. Post, Apr. 3, 2013, https://www.washingtonpost.com/world/national-security/us-to-deploy-anti-missile-system-to-guam/2013/04/03/b939ecfc-9c89-11e2-a941-a19bce7af755_story.html. *See also* Bill Gertz, *Pentagon, South Korea to Deploy Advanced Missile Defenses*, Wash. Free Beacon, Feb. 9, 2016, http://freebeacon.com/national-security/pentagon-south-korea-to-deploy-advanced-missile-defenses/.

[225] Sarah M. Mountin, The Legality and Implications of Intentional Interference with Commercial Communication Satellite Signals, 90 Int'l L. Stud. 101, 104 (2014).

and cyber warfare against satellites[226] will likely be attractive anti-satellite techniques for the foreseeable future.

D. ASAT Implications for SSA Data Sharing

Given humanity's history of ASAT weapons tests, how should SSA data-sharing policies be shaped today? Does the fact that ASAT weapons have been developed and successfully tested mean that they will inevitably be used in war, or are there reasons to discount that risk? Do the safety gains from broader and more timely sharing of SSA data outweigh the risks that some of those data could be used to target an ASAT attack? Or might expanded SSA about enemy capabilities and intentions provide a strong enough foundation to exercise deterrent options that would otherwise be unavailable? This article will now evaluate arguments that minimize the likelihood of an ASAT attack and explain why the ASAT threat remains real.

1. Factors Discouraging ASAT Use

If an ASAT weapon is ever used as an act of war, its use is likely to be significantly more difficult than any of the ASAT tests conducted to date. In the tests, states have targeted their own assets only, and in many cases have launched the ASAT weapon and its target together in close proximity.[227] Belligerents will not always have those luxuries, especially as satellite operators improve the encryption of their signals and their own SSA capabilities, and employ strategies such as disaggregating satellite functions and using civilian commercial satellites, sometimes from neutral or friendly countries, for military purposes.[228]

In addition, there are the moral, legal, political, and practical considerations that weigh against using at least a kinetic ASAT. Most countries with space programs advanced enough to field an ASAT weapon will not want to set a precedent that legitimizes a retaliatory ASAT attack on their own satellites, and they will also have

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[226] Mary Pat Flaherty, Jason Samenow & Lisa Rein, *Chinese Hack U.S. Weather Systems, Satellite Network*, Wash. Post, Nov. 14, 2014, http://www.washingtonpost.com/local/chinese-hack-us-weather-systems-satellite-network/2014/11/12/bef1206a-68e9-11e4-b053-65cea7903f2e_story.html.

[227] This was the case with most of the Soviet co-orbital ASAT tests. Grahn, *supra* note 123.

[228] For example, the U.S. National Space Policy states the U.S. will "Augment U.S. capabilities by leveraging existing and planned space capabilities of allies and space partners," and to "Purchase and use commercial space capabilities and services to the maximum practical extent when such capabilities and services are available in the marketplace and meet United States Government requirements." U.S. Nat'l Space Pol'y 2010, *supra* note 7, at 7, 10. U.S. military leaders have spoken of the need to defend space capabilities by strengthening relationships with commercial space operators. Lt Gen Buck Statement, *supra* note 5, at 2, 8; *Fiscal Year 2017 Budget Request for National Security Space: Hearing Before the Strategic Forces Subcomm. of the H. Armed Services Comm.* 14, 114th Cong. (2015) (statement of General John E. Hyten, Commander, Air Force Space Command) [hereinafter General Hyten Statement].

to consider the likely effects of debris from their attack against their own and their allies' space assets in the future. For an advanced space power, threatening to destroy satellites in order to deter ASAT attacks by a less-developed space power would be the strategic equivalent of "threatening a chess opponent's knight in hopes of deterring him from taking your queen."[229] Another analogy might be that of using a hand grenade to defend one's home from a burglar: self-defense may well be justified, but the defensive weapon would cause so much collateral damage and even self-harm that it would not make sense to use it in most circumstances. Moreover, some of the most sensitive military satellites are located in GSO, where the costs of sending an ASAT missile are much higher and the costs of international censure much higher given the GSO's distance and importance as a limited natural resource.[230]

In an effort to reduce the expected utility of an ASAT attack (as well as damages from an accidental collision or space weather event), the United States is seeking to spread out and distribute its space-based capabilities so as to ensure resiliency and continued service even if an individual satellite or set of satellites is knocked out.[231] Just as Iridium kept a spare satellite in orbit that it moved to fill the void left by the Iridium-33 in February 2009, the GPS constellation includes a number of spares, and the U.S. military is reportedly examining concepts to launch as many as 3,000 small "cubesats" over the next few years to improve the resiliency of its satellite capabilities.[232] Other countries could also implement similar "hedging" strategies.

2. Reasons to Worry about ASATs

(a) *Rogue States*

However, some of the factors that would deter most countries from using a kinetic ASAT would not necessarily deter "rogue" regimes such as Iran and North Korea from using one. Such regimes are notorious for their belligerent statements and behavior, repeatedly engaging in overtly hostile acts against other states yet suffering minimal consequences.[233] While their space programs are still in an early

[229] Lee, *supra* note 56, at 275.

[230] *See supra* notes 49-51 and accompanying text.

[231] Lt Gen Buck Statement, *supra* note 5, at 2-5.

[232] Zachary Eytalis, Address to Manfred Lachs Conference on Space Governance: Disaggregation of Military Space Applications: Law and Policy Considerations (May 29, 2014).

[233] For example, since the Korean War armistice of 1953, North Korea has engaged in provocations including murdering two U.S. military officers in the demilitarized zone with axes; torpedoing a South Korean naval destroyer, killing 47; capturing and keeping an American naval ship; abducting and imprisoning South Korean nationals; shelling an inhabited South Korean island, killing four people; and developing, testing, and proliferating nuclear weapons technology; as well as perennially issuing threats and propaganda against its perceived enemies. *See* Michael Rubin, Dancing with the Devil: The Perils of Engaging Rogue Regimes ch. 3, *passim* (2014). While it has been diplomatically and economically isolated in many ways, the Kim family regime has not

stage, North Korea has nuclear weapons and Iran has at least the near-term potential to make them.[234] Therefore, they may perceive they can inflict damage to one or more space powers that greatly outweighs their own injury, if any, from the space debris caused by an ASAT attack—while also holding a nuclear deterrent to prevent armed retaliation against them on Earth. This same deterrent may also provide them with the time needed to develop and refine an ASAT weapon and tracking systems. Such regimes should not be provided sufficient data about foreign satellites to enable them to track, target, and attack those satellites.

(b) *Major Space Powers*

The concern over a possible ASAT attack is not limited to the so-called "rogue states," which in any case have not yet demonstrated an ASAT capability.[235] Even the great powers miscalculate from time to time. The Chinese foreign ministry may have been caught off guard by both the PLA's 2007 ASAT test and the international backlash against it.[236] The United States and Soviet Union conducted multiple high-altitude nuclear explosion tests before concluding that they were too destructive to continue.[237] Just because a course of action seems unnecessary or dangerous—at least in hindsight—does not mean that a government will not do it.[238] There remains a real possibility that, particularly if terrestrial conflicts between great powers heat up to the point where national survival or other core national interests are at stake, space will become as much of a battlefield as the air, land, and seas.

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been dislodged, and its military (and now nuclear) deterrent has precluded any attempts at regime change. Similarly, the Iranian regime in place since the 1979 revolution seized the U.S. Embassy and made hostages of its staff for 444 days, yet suffered no significant reprisal apart from the failed "Desert One" raid that left eight Americans dead. *Id.*, *supra* note 63; Mark Bowden, *The Desert One Debacle*, The Atlantic Monthly, May 1, 2006, http://www.theatlantic.com/magazine/archive/2006/05/the-desert-one-debacle/304803/?single_page=true. It likewise suffered no military consequences for its supplying of Iraqi insurgents with weaponry, including rocket-propelled grenades, rockets, mortars, and explosively formed penetrators that were used to deadly effect against the U.S.-led multinational forces in OIF. Lionel Beehner & Greg Bruno, *Iran's Involvement in Iraq*, Council on Foreign Relations (Mar. 3, 2008), http://www.cfr.org/iran/irans-involvement-iraq/p12521.

[234] R. James Woolsey et al., *Underestimating Nuclear Missile Threats from North Korea and Iran*, Nat'l Rev. Online (Feb. 12, 2016, 4:00 AM), http://www.nationalreview.com/article/431206/iran-north-korea-nuclear.

[235] While North Korean and Iranian missiles can reach LEO and perhaps beyond, they have not yet demonstrated the ability to target a satellite for destruction. For a summary of their missile ranges, see Charles Vick, Shahab-4, Fed'n of Am. Scientists, *Shahab-4* (May 12, 2014), http://fas.org/nuke/guide/iran/missile/shahab-4.htm.

[236] Sanger & Kahn, *supra* note 182.

[237] *See supra* notes 141-143 and accompanying text.

[238] *See* Joe Hanson, *The Forgotten Cold War Plan That Put a Ring of Copper Around the Earth*, Wired, Aug. 13, 2013, http://www.wired.com/2013/08/project-west-ford/.

(c) *New Technologies*

Another factor that could make attacks on satellites in warfare more conceivable is the development of ASAT technologies that minimize collateral damage such as space debris fields. If a belligerent can use directed energy, electronic warfare, or cyber weapons to neutralize an enemy satellite without fragmenting it, or selectively neutralize an enemy military-leased transponder hosted on a commercial satellite bus, the international opprobrium will be muted and states may be more likely to use it.[239]

(d) *Types of SSA Data to Protect*

Basic information is required to be made internationally available under the Registration Convention and ITU Radio Regulations, and the United States is content to publish unclassified satellite data based on general perturbations theory as discussed in Section II above.[240] However, there is no need to share data with one's adversaries on sensitive military and intelligence satellites and maneuvers, especially when a country has a conjunction assessment and warning program such as the United States does.[241] Additional types of information that would be likely to diminish security or strategic advantage without providing a corresponding safety improvement include the sensor resolution of the most advanced remote sensing satellites, vulnerabilities and maneuver capabilities of national security satellites, and technical specifications that could enable the reverse-engineering of a satellite or reveal information about classified satellite components.[242]

Countries with SSA capabilities would not need to reveal those types of critical information to provide warnings when a collision appears imminent, and thus could provide such warnings even for the benefit of a hostile country.[243] Moreover, if the United States or an ally was in control of a satellite that was in danger of colliding, it could also perform or recommend a collision avoidance maneuver on

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[239] President Ford's National Security Decision Memorandum 345, for example, advocated the acquisition of non-nuclear capabilities to electronically nullify Soviet space systems "in a reversible, less provocative way at lower crisis thresholds." Hall, *supra* note 122, at 31-32.

[240] As will be discussed in Part III.B.4, *infra*, the United States even makes access to its unclassified catalog available for free through the website Space-Track.org.

[241] As the U.S. Deputy Assistant Secretary of Defense for Space Policy has testified, a key element of resiliency in military space architecture is "operational ambiguity." *Hearing Before the Strategic Forces Subcomm. of the S. Armed Services Comm*., 113th Cong. 6-7 (2014) (statement of Mr. Douglas L. Loverro, Deputy Assistant Secretary of Defense for Space Pol'y), *available at* http://www.armed-services.senate.gov/imo/media/doc/Loverro_03-12-14.pdf.

[242] Joint Dep't of State and Dep't of Def. Final Report to Congress, Risk Assessment of United States Space Export Control Policy: Review of Section 1248 of the National Defense Authorization Act for Fiscal Year 2010 (Mar. 15, 2012), *available at* http://www.defense.gov/home/features/2011/0111_nsss/docs/1248_Report_Space_Export_Control.pdf; Robert Ryals & James Rendleman, Address at SSA Sharing Architecture Options: AIAA Space 2010 Conference & Exposition 8 (2010) [hereinafter Ryals & Rendleman].

[243] Bird, *supra* note 72, at 2.

its own. In neither case would collision avoidance procedures require a country to provide potentially sensitive details such as a satellite's current mission tasking, sensor resolution, or design blueprints. However, they could both avert a space debris-producing accident and show good faith in a way that could keep international tensions from escalating.

The importance of prudence in revealing the extent of one's assets has been known since ancient times. The Bible recounts how King Hezekiah of Judah took Babylonian envoys on a tour of all his treasures, including his armory, believing the emissaries to be friendly and so distant as not to pose a threat.[244] Yet this ostentatious display contributed to his country's downfall, as Babylon conquered Judah and captured or destroyed all the treasures just a few generations later.[245] To keep a similar fate from befalling its most precious national security satellites, a state should maintain the secrecy of those assets insofar as it is possible, supplying information about them only in general terms for international registration, to trustworthy allies who agree not to re-disclose the information, and to avoid collisions when a conjunction appears imminent.

3. Conclusion

It is fortunate that destructive anti-satellite warfare has not yet occurred in the course of armed conflict. Yet ASAT technology exists, and the seeds of it are present in any ballistic missile, mid-course ballistic missile defense system, or satellite launch vehicle—all of which are technologies that continue to proliferate,[246] and which are found in the hands of states that are or may conceivably become belligerents against each other. Having precise, current SSA data and tracking capabilities is what enables a missile or satellite to be targeted and steered as an ASAT kill vehicle.[247] Therefore, states will not want to provide such accurate and detailed data on their own sensitive satellites to unfriendly states to the extent that the data could be used to help target an ASAT attack against them or their allies. This legitimate concern will have to be factored into any national or international SSA data-sharing regime.

The next section examines how these concerns have influenced states' decisions whether to share SSA data during and after the Cold War, with a particular focus on recent developments in U.S. law.

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[244] *See 2 Kings* 20:12-19; *Isaiah* 39.

[245] *See 2 Kings* 25:1-21; *2 Chronicles* 36:6-7, 10, 17-21; *Jeremiah* 52:4-30.

[246] *See, e.g.*, Grego, *supra* note 16, at 4-5.

[247] *See* Mulrine, *supra* note 168; McIntyre, Malveaux & O'Brien, *supra* note 204; Grahn, *supra* note 123.

III. HISTORY OF SSA DATA SHARING

"We will not cackle until we have laid our egg."[248]

A. Why History Matters

Any recommendations about space situational awareness (SSA) data-sharing policy for today must be founded upon an understanding of how SSA data sharing has worked in the past. When and how has it been done, and to what effect? What arguments have been raised for and against it? This section will discuss the evolution of SSA data sharing in two eras: the first, from the beginning of the space race to the end of the Cold War, and the second, from the end of the Cold War to today. It will explore the dynamics of the former international rivalry and cooperation between the United States and the Soviet Union in particular, and assess how national attitudes and laws about SSA data sharing have shifted in the wake of the 2009 Iridium 33-Cosmos 2251 satellite collision. By understanding the situations where SSA data sharing has proven useful (or its absence detrimental), and the contexts where withholding SSA data makes more sense to national leaders, we can arrive at a better-informed conclusion about the extent and manner in which SSA data should be shared today.

B. Cold War Era, 1957-1991

1. The Primacy of National Security Interests

Early in the space age, the major powers' approach to SSA data sharing was characterized by mutual suspicion, mistrust, and deliberate obfuscation.[249] Both the United States and the Soviet Union saw space as the ultimate high ground, an

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[248] This New Ocean, *supra* note 1, at 181-182. This was the response of a Russian scientist to his American counterparts at the National Academy of Sciences for an International Geophysical Year event in the early fall of 1957, when asked about the status of the Soviet space program. Unbeknownst to the Americans, the USSR was less than a week away from launching Sputnik 1 into orbit.

[249] For example, in an unsuccessful attempt to deceive the Americans, the USSR called its primary space launch facility the Baikonur Cosmodrome, even though the launch complex was actually located by the town of Tyuratam and Baikonur was much farther away. This New Ocean, *supra* note 1, at 164-165, 448-449. And while Soviet propaganda stated that Laika, the first dog to travel to outer space aboard Sputnik 2 in November 1957, had died of a painless injection after about a week in orbit, it was revealed more than 40 years after her death that she had died of overheating and panic mere hours after her historic mission began. David Whitehouse, *First Dog in Space Died Within Hours*, BBC News, Oct. 28, 2002, http://news.bbc.co.uk/2/hi/sci/tech/2367681.stm. The United States also published disinformation, such as a 1960 report that the Samos reconnaissance satellite was growing artificial human cells and vegetation. This New Ocean, *supra* note 1, at 239. Later, after a reportedly successful BMD system test was exposed to have been aided by the placement of a homing device on the target missile, former Defense Secretary Caspar Weinberger stated, "You're always trying to practice deception. You are obviously trying to mislead your opponents and to make sure they don't know the actual facts." *Id.* at 542-543.

arena where technological superiority and record-breaking feats of exploration would translate into victories in the political and military realm down on Earth. As U.S. Air Force Chief of Staff Thomas D. White commented after the launch of Sputnik II, "Whoever has the capability to control space will likewise possess the capability to exert control of the surface of earth"[250]—a belief to be echoed by U.S. Presidents John F. Kennedy and Lyndon B. Johnson.[251] Likewise, Soviet premier Nikita Khrushchev proclaimed that the Soviet Union's mass production of missiles such as the one that launched Sputnik 1 signified that "socialism has triumphed not only fully, but irreversibly."[252] Because the stakes were so high, each side sought to learn as much as it could about the other's space activities, while only revealing information on its own programs that it thought would serve its own interests.[253]

National security and national prestige were both at stake. The missiles that launched satellites into orbit could also, if pointed a little lower, deliver nuclear weapons to obliterate cities thousands of miles away. Spy satellites were unveiling national secrets inaccessible to aerial reconnaissance.[254] Moreover, who knew what advantages could accrue to the nation that first possessed the capacity for orbital bombardment, or a military base on the Moon?[255] For a variety of political, military, security, and economic reasons, in the highly competitive "space race" between the United States and the Soviet Union, both countries often found it advantageous to conceal or reveal the relative strengths and weaknesses of their respective space programs. They often concealed weaknesses more readily than strengths;[256] successes could be leveraged for propaganda effects.

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[250] Roger Launius, Remarks at the 49th Harmon Memorial Lecture in Military History National Security at the United States Air Force Academy: Space and the Course of Recent U.S. History 4 (2006), *available at* http://www.usafa.edu/df/dfh/docs/Harmon49.pdf. Stephen Gorove has stated this concept more extravagantly, "He who controls the Cosmic Space,/ Rules not only the Earth/ But the whole Universe." Gorove, *supra* note 118, at 305.

[251] Launius, *supra* note 250, at 6-7.

[252] This New Ocean, *supra* note 1, at 195.

[253] *See, e.g.*, *id.* at 327 (contrasting the U.S. decision to televise Alan Shepard's first spaceflight in *Freedom 7* with the Soviets' more cautious decision not to broadcast live video from Yuri Gagarin's earlier foray into space).

[254] Remote sensing satellites proved a particularly useful tool for the United States once its U-2 spy plane overflights of the Soviet Union ended. *Id. at* 233.

[255] Preposterously, the U.S. Army once endorsed establishing a lunar outpost, citing its perceived utility for improved space surveillance, as a launching pad for weapons systems that could be used against Earth or space targets, and as a deterrent. U.S. Army, *Project Horizon*, Vol. 1, 1-2 (1959), http://www.history.army.mil/faq/horizon/Horizon_V1.pdf.

[256] For example, after the widely publicized Vanguard satellite launch failure of 6 December 1958, dubbed "Kaputnik" by the media, the U.S. imposed tight security restrictions on its next efforts to join the USSR in space. This New Ocean, *supra* note 1, at 204-205, 208. The USSR, for its part, long concealed and lied about a disastrous launch failure on 22 October 1962 that killed 92 people, including Mitrofan Ivanovich Nedelin, the commander in chief of the Strategic Rocket Forces. *Id.* at 309.

It was less simple, and less desirable, to conceal information collected about the space environment itself. After all, the first man-made satellites were launched in observance of the International Geophysical Year, a concerted international effort aimed to learn more about the Earth and the celestial environment surrounding it, arguably for the benefit of all mankind.[257] There was little strategic value in concealing basic scientific measurements of cosmic radiation or upper atmospheric density, largely because one's competitor would likely soon discover these things independently anyway.

Even if countries wanted to conceal their space activities from their competitors, they could not do so for long. When Sputnik 1 went up, it passed over the United States twice before Americans knew about it.[258] However, once satisfied that they had successfully "laid their egg," the Soviets then informed Americans of Sputnik 1's radio frequencies so that governmental and amateur space-watchers alike could help to track it.[259] Before long, the Americans and the Soviets established robust programs and facilities for gathering intelligence on their rivals' space programs, with or without the other side's cooperation.[260] The two sides did not routinely disclose detailed tracking information on their satellites to each other, as they both feared that such knowledge could be used for military purposes such as targeting an ASAT attack or concealing assets from a remote sensing satellite when it passed over.[261]

2. Big Sky Theory

Early in the space age, it was easy for national security concerns to trump worries about unintentional collisions. The vast expanse of empty space into which the Cold War powers launched their first satellites rendered the risk of accidental collisions infinitesimal. While the possibility of such collisions was considered,[262] the space powers often subordinated this concern to their goals of seeking scientific knowledge or strategic military advantage. For example, in Project West Ford in the

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[257] *Id.* at 180-181.

[258] *Id.* at 183.

[259] Walter Sullivan, *Course Recorded: Navy Picks Up Radio Signals—4 Report Sighting Device*, N.Y. Times, Oct. 5, 1957, *available at* http://query.nytimes.com/mem/archive/pdf?res=F70A15F73B5A177B93C7A9178BD95F438585F9 [hereinafter Sullivan].

[260] This New Ocean, *supra* note 1, at 225, 244 (describing geographic diversity of U.S. stations monitoring Soviet space and missile activities and comparing NORAD catalogue's descriptions of Soviet satellites in 1967 with an equally detailed 1972 Soviet report on U.S. space assets).

[261] In the wake of the 1960 Soviet shootdown of the U-2 reconnaissance plane, in light of Soviet resistance to President Eisenhower's "open skies" overtures, and with the very existence of the U.S. National Reconnaissance Office (NRO) being a classified secret, it is not surprising that the United States and the Soviet Union did not exchange such information. *Id.* at 236-239; *cf.* U.S. Dep't of State, Office of the Historian, *U-2 Overflights and the Capture of Francis Gary Powers, 1960*, https://history.state.gov/milestones/1953-1960/u2-incident (last visited May 4, 2016).

[262] *See* McDougall, Lasswell & Vlasic, *supra* note 118, at 592-595 (discussing legal commentaries and COPUOS findings concerning the risks of collisions among space vehicles and between spacecraft and aircraft).

early 1960s, the United States launched hundreds of millions of copper filaments into orbit to attempt to preserve long-distance communications capabilities against potential solar and belligerent disruptions.[263] Both the United States and the Soviet Union conducted multiple high-altitude nuclear detonations[264] and other ASAT tests discussed previously in Section II. Even for years after the end of the Cold War, some satellite owners trusted in this "Big Sky" theory of space to their own detriment.[265]

3. SSA Data-Sharing Authority at NASA's Birth: The Space Act of 1958

Nevertheless, recognizing the importance of avoiding interference between its own various space operations, as well as those that private entities and allied governments might plan in the future, the U.S. government began sharing SSA data between the Department of Defense and the National Aeronautics and Space Administration (NASA) from the beginning of NASA's existence.[266] The Space Act of 1958, which created NASA, provided for, *inter alia*, the exchange between NASA and military agencies of discoveries that have value or significance to the other;[267] cooperation with other nations in "work done pursuant to this Act and in the peaceful application of the results";[268] effective utilization of U.S. resources to avoid unnecessary duplication of effort;[269] and the "widest practicable and appropriate dissemination of information" concerning NASA's activities and their results.[270] Under the authority of the Space Act, NASA was then able to mail SSA data to

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[263] Hanson, *supra* note 238; *West Ford Needles*, *supra* note 101, at 3. The test precipitated a firestorm of protest, as a number of scientists and the Soviet Union complained about the threat the needles posed to spacecraft and personnel on orbit. The protest helped motivate the adoption of OST art. IX's provision seeking to limit harmful contamination of the space environment.

[264] Robert Pfeffer & D. Lynn Shaeffer, *A Russian Assessment of Several U.S.S.R. and U.S. HEMP Tests*, 3 Combating WMD J. 33 (2009); *see also* David Portree, *Starfish and Apollo (1962)*, Wired, Mar. 21, 2012, http://www.wired.com/2012/03/starfishandapollo-1962; *Nuclear Explosions in Space*, *supra* note 138.

[265] At a forum in July 2007, John Campbell, Iridium's vice president for governmental affairs, questioned the utility of the JSpOC's close-approach warnings and stated, "this isn't aviation; the Big Sky theory works." Brian Weeden, *Billiards in Space*, Space Rev., Feb. 23, 2009, http://www.thespacereview.com/article/1314/2/. Yet when Mr. Campbell made this statement, several known or suspected space object collisions had already occurred. David Wright, *Colliding Satellites: Consequences and Implications* 7 Union of Concerned Scientists (Feb. 26, 2009), http://www.ucsusa.org/assets/documents/nwgs/SatelliteCollision-2-12-09.pdf. A mere 19 months later, an active Iridium communications satellite was destroyed in an unexpected collision with a defunct Russian satellite, demonstrating that the "Big Sky theory" was inadequate insurance against space accidents. This incident will be discussed in further detail in section III.B.2 of this section.

[266] Charles Spillar & Mike Pirtle, *Commercial and Foreign Entities (CFE) Pilot Program Status Update and Way Ahead*, AMOS 2 (Sept. 3, 2009), http://www.amostech.com/TechnicalPapers/2009/Space_Situational_Awareness/Spillar.pdf.

[267] *National Aeronautics and Space Act of 1958*, Pub. L. No. 85-568, § 102(c)(6), 72 Stat. 426 (1958) [hereinafter, Space Act].

[268] *Id.* at § 102(c)(7).

[269] *Id.* at § 102(c)(8).

[270] *Id.* at § 203(a)(3).

approved commercial and foreign entities (CFEs).[271] However, nothing in the law permitted the disclosure or dissemination of classified information,[272] and many aspects of SSA data were kept on a "need-to-know" basis even within and among U.S. government agencies.[273]

4. The Soviet Approach to SSA Data

The Soviet Union also erected walls between the different components of its space program, and between its space program and the outside world. Unlike NASA, the Soviet Union's space program was exclusively under military control, though at times it would be presented as civilian in nature.[274] The Kremlin used secrecy to maintain political control, foster intramural competition among its major space engineering divisions, and cover over embarrassing accidents.[275] It lagged behind the United States in registering its space launches with the United Nations.[276] In general, it did not openly share its SSA data abroad,[277] although U.S. analysts were often able to monitor the telemetry and communications of Soviet missiles and spacecraft via their own technical capabilities.[278]

5. SSA Data Sharing Enables the Apollo-Soyuz Test Project

Following an early-1962 exchange of letters between President John F. Kennedy and Soviet Premier Nikita Khrushchev discussing ways to improve cooperation

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[271] Spillar & Pirtle, *supra* note 266, at 1. In the early 1990s, NASA's Goddard Space Flight Center developed the Orbital Information Group website, which permitted registered commercial and foreign mission partners to download SSA data, improving the timeliness of information from the postal-based system. *Id.* at 2.

[272] Space Act §§ 206(d), 303(b).

[273] For example, imaging reconnaissance satellite designers at the Central Intelligence Agency's Directorate of Science and Technology were not permitted to know operational details, including locations, of the satellites they made, nor were they allowed to see the imagery those satellites produced. This New Ocean, *supra* note 1, at 528.

[274] Roald Sagdeev & Susan Eisenhower, *United States-Soviet Space Cooperation during the Cold War*, NASA (May 28, 2008), *http*://www.nasa.gov/50th/50th_magazine/coldWarCoOp.html. Dr. Sagdeev, who worked as a space scientist in the USSR for decades before moving to the United States, recounts how, whenever Americans visited the Baikonur Cosmodrome or Kaliningrad control center, the Soviet military members working there changed their uniforms for civilian clothes and told their guests that the facility was controlled by "the Institute of Space Research and academician Sagdeev."

[275] This New Ocean, *supra* note 1, at 277-279.

[276] Thomas Hamilton, *Soviet Promises Space Data to U.N.*, N.Y. Times, Mar. 21, 1962, http://query.nytimes.com/mem/archive/pdf?res=F30A1FF83C5F107B93C3AB1788D85F468685F9.

[277] There were exceptions. After Sputnik 1 was placed in orbit, in one of the earliest examples of international SSA data sharing, Soviet scientists informed American scientists of the frequencies on which it was broadcasting, which enabled Americans to track its path. Sullivan, *supra* note 259.

[278] This New Ocean, *supra* note 1, at 225, 312, 338-339.

in outer space activities,[279] the Soviet Union and United States began to open up to each other in selected areas.[280] This cooperation culminated in the United Nations (U.N.) space treaties, a formal bilateral agreement,[281] and the "handshake in space" of 17 July 1975, in which U.S. astronauts and Russian cosmonauts met each other in orbit after successfully docking the *Apollo* and *Soyuz* capsules together.[282] The Apollo-Soyuz Test Project that led to that handshake necessitated the sharing of significant amounts of information on the space vehicles and support systems, as well as coordinated re-engineering of parts of the capsules themselves, to ensure a safe rendezvous.[283] However, it did not result in a comprehensive sharing of SSA data between the United States and Soviet Union, as enough rivalry and mistrust remained to keep certain assets off-limits.[284]

6. The Kessler Cascade

By 1978 scientists had begun to quantify the likelihood of accidental in-orbit space object collisions, as well as their accelerating propagation in a way that could, if left unchecked, render the most widely used Earth orbits unsustainable for centuries. In a seminal paper, NASA scientists Donald J. Kessler and Burton G. Cour-Palais developed a model that predicted, "Collisional breakup of satellites will become a new source for additional satellite debris in the near future, possibly well before the year 2000,"[285] and "Over a longer time period the debris flux will increase exponentially with time, even though a zero net input rate may be maintained."[286]

In layman's terms, this meant that satellites would soon begin crashing into other space objects, generating debris that would in turn lead to even more collisions, and that this would occur with exponentially increasing frequency even if no new satellites were launched into orbit. This theory came to be known as the "Kessler

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[279] The Cuban Missile Crisis forced the suspension of space cooperation talks later in 1962, but they eventually resumed.

[280] This New Ocean, *supra* note 1, at 446; Edward Ezell & Linda Ezell, *The Partnership: A History of the Apollo-Soyuz Test Project*, NASA Special Publication-4209, 38-41 (1978), http://www.hq.nasa.gov/office/pao/History/SP-4209/ch2-2.htm. The chief areas of cooperation were in fields such as deep space exploration, space medicine, and space environmental science.

[281] Agreement Concerning Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes, U.S.-U.S.S.R., May 24, 1972, 846 U.N.T.S. 118, No. 12115.

[282] This New Ocean, *supra* note 1, at 449-450.

[283] *Id.* at 448.

[284] For instance, the very existence of the NRO, to say nothing of the satellites it operated, remained a tightly guarded secret from its inception in 1961 until its declassification in 1992. NRO, *NRO Fact Sheet*, http://www.nro.mil/about/nro/NRO_Fact_Sheet.pdf (last visited May 4, 2016).

[285] Donald Kessler & Burton Cour-Palais, *Collision Frequency of Artificial Satellites: The Creation of a Debris Belt*, 83 J. Geophys. Res. A6, 2645 (1978).

[286] *Id.* For a contrary view that space debris population will *not* grow exponentially, see David Finkleman, *Space Debris as an Epidemic* (Apr. 2013), http://aero.tamu.edu/sites/default/files/faculty/alfriend/CTI2P/CT2013%2520S6.2%2520Finkleman.pdf.

cascade" and proved to be prescient as accidental space object collisions were first identified as occurring in the 1990s.[287]

7. The Cosmos 954 Incident

The year Kessler's article was published, a significant SSA data-sharing event took place between the United States and the Soviet Union. Shortly after the Soviet Union's launch of the nuclear-powered Cosmos 954 reconnaissance satellite in late 1977, U.S. space surveillance analysts began to notice that the satellite's orbit was becoming increasingly erratic.[288] When they contacted Soviet satellite controllers, the Soviets confirmed that they had lost control of the satellite, that the satellite was nuclear-powered, and that they expected the satellite to break up in the atmosphere without a nuclear explosion and only an insignificant risk of ground contamination.[289] However, Cosmos 954 crashed near the Great Slave Lake in northern Canada on 24 January 1978, leaving a swath of radioactive debris that stretched 600 kilometers from the Northwest Territories, across Alberta, to Saskatchewan.[290]

In this instance, the United States shared SSA data with the Soviet Union and received SSA data in return. However, the Soviet Union did not notify any countries that could potentially be affected by the impending destruction of Cosmos 954 until the United States prompted it to do so.[291] Even then, the information it provided tended inaccurately to minimize the expected damage.[292] The United States, though uncertain where the satellite would land, notified "our allies and some other countries with which we share such special relationships as tracking facilities"[293] of the potential for the crash, and immediately offered assistance to Canada as soon as it determined Canada would be the impact site.[294] Eventually, the Soviet Union paid Canada three million Canadian dollars to settle Canada's claim.[295]

The Cosmos 954 incident illustrates the importance of sharing accurate and timely SSA data with other nations responsible for or potentially affected by an

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[287] Wright, *supra* note 265, at 7. The first known collision occurred in 1991, when the inactive Cosmos 1934 satellite was struck by catalogued debris from the Cosmos 296 satellite. *Id.*

[288] Gus Weiss, *The Life and Death of Cosmos 954*, CIA Hist. Rev. Program Vol. 22, 1 (1978), http://media.nara.gov/dc-metro/rg-263/6922330/Box-19-51-1/263-a1-27-Box-19-51-1.pdf.

[289] *Id.* at 3-4.

[290] Disintegration of Cosmos 954 over Canadian Territory in 1978, Can. Dep't External Affairs Communiqué No. 27, ¶ 9 (Apr. 2, 1981) [hereinafter Cosmos 954 Communiqué].

[291] Weiss, *supra* note 288, at 3, 5.

[292] Cosmos 954 Communiqué, *supra* note 290, at ¶¶ 4-5, 7; Weiss, *supra* note 288, at 3-4.

[293] Weiss, *supra* note 288, at 4.

[294] Cosmos 954 Communiqué, *supra* note 290, at ¶ 3.

[295] Protocol in Respect of the Claim for Damages Caused by the Satellite "Cosmos 954," Can.-U.S.S.R., Apr. 2, 1981, 1981 U.N.T.S. 270, No 24934.

errant space object, as contemplated by OST Article IX.[296] Thanks to the information the United States was able to develop on its own, obtain from the Soviet Union, and share with Canada, it was possible to plan out disaster response and recovery efforts in the months before Cosmos 954 re-entered the atmosphere and impacted Canadian soil.[297] The incident also demonstrated the importance of the proactive SSA data-coordination measures taken by the United States.[298] Conversely, it illustrated how if the Soviet Union had remained silent, the incident could have proven a much more terrible surprise, requiring a more hastily improvised recovery plan and potentially provoking a major strategic misunderstanding.

8. Glasnost

For most of the decade following the Cosmos 954 incident, cooperation between the United States and the Soviet Union in space fluctuated with Cold War politics and the countries' respective military postures.[299] Then in 1987, the United States and Soviet Union forged another agreement enhancing cooperation in the use and exploration of space.[300] The Parties pledged to cooperate "in such fields of space science as solar system exploration, space astronomy and astrophysics, earth sciences, solar-terrestrial physics, and space biology and medicine,"[301] as well as "exchanges of technical information, equipment and data" in accordance with national and international laws.[302] Specific missions supported by the agreement included exploration of celestial bodies, study of environmental conditions on Earth and in outer space, and exchange of appropriate biomedical data from manned spaceflights.[303] This agreement also established a foundation for future collaborative efforts of the post-Soviet era, such as the Space Shuttle missions to the Russian space station *Mir*[304] and the International Space Station (ISS).[305]

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[296] Recall that OST art. VI holds launching states responsible for their national and non-governmental activities in other space, while OST art. IX directs States Parties to hold international consultations if they expect their space activities to cause harmful interference with another state's peaceful use or exploration of outer space. In addition, launching states bear liability for damage caused by their space objects in OST art. VII and in the Convention on International Liability for Damage Caused by Space Objects, Mar. 29 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 (entered into force 1 September 1972) [hereinafter, Liability Convention].

[297] Weiss, *supra* note 288, *passim*.

[298] *Id.* at 6-7.

[299] Sagdeev & Eisenhower, *supra* note 274.

[300] Agreement Concerning Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes, U.S.-U.S.S.R., Apr. 15, 1987, 2192 U.N.T.S. 203, No. 38751.

[301] *Id.* at art. 1.

[302] *Id.* at art. 4.

[303] *Id.* at annex. Among other things, the agreement specifically provided for the U.S. Deep Space Network to be used to track the position of the USSR's Phobos probe to the Martian moons.

[304] Jim Wilson, *Shuttle-Mir*, NASA (Nov. 23, 2007), http://www.nasa.gov/mission_pages/shuttle-mir/.

[305] Amiko Kauderer, *Partners Sign ISS Agreements*, NASA (Oct. 23, 2010), http://www.nasa.gov/

C. Post-Cold War, 1991-Present

1. The Emergence of a Multipolar World

With the Soviet Union's demise in 1991, the Cold War ended. Tensions between Russia and the West relaxed amid hopes for greater rapprochement in a world that was no longer bipolar.[306] Yet uncertainty and mistrust remained. While the threat of a full-scale nuclear war between the great powers no longer loomed large in the minds of policy makers or the public, Western concerns about Russia's endemic corruption and resurgent nationalism on the one hand, and Russia's sense of being threatened by NATO and EU expansion on the other, prevented a full integration of the former Soviet bloc into the "new world order" sought by the West.[307]

In addition, the list of nations with nuclear, space, and missile capabilities continued to expand. Although South Africa, Belarus, Kazakhstan, and Ukraine gave up their nuclear weapons in the early 1990s, they were soon replaced in the nuclear club by India, Pakistan, and North Korea.[308] Moreover, Ukraine,[309] Iran, North Korea, and South Korea all developed independent space launch capabilities after the Cold War ended, joining Russia, the United States, China, Japan, India, Israel,[310] and the European Space Agency (ESA).[311] In all, at least 60 states and intergovernmental organizations (IGOs), in addition to numerous private entities,

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mission_pages/station/structure/elements/partners_agreement.html.

[306] U.S. Dep't of State, Office of the Histor., *The Berlin Wall Falls and USSR Dissolves*, https://history.state.gov/departmenthistory/short-history/berlinwall (last visited May 4, 2016).

[307] President George H.W. Bush, State of the Union Address (Jan. 29, 1991) (transcript available at http://www.presidency.ucsb.edu/ws/?pid=19253); BBC News, *Russia Objects to NATO Expansion* (Oct. 4, 2006), http://news.bbc.co.uk/2/hi/europe/5407106.stm; Joan DeBardeleben, *The End of the Cold War, EU Enlargement and the EU-Russian Relationship*, *in* The Crisis of EU Enlargement 45-51 (2013), *available at* http://www.lse.ac.uk/IDEAS/publications/reports/pdf/SR018/DeBardeleben.pdf; Ariel Cohen, *Domestic Factors Driving Russia's Foreign Policy*, Heritage (Nov. 19, 2007), http://www.heritage.org/research/reports/2007/11/domestic-factors-driving-russias-foreign-policy.

[308] International Atomic Energy Agency (IAEA), *Nuclear Non-Proliferation: Chronology of Key Events* (Nov. 5, 2014), http://www.iaea.org/Publications/Factsheets/English/npt_chrono.html; Choe Sang-Hun, *North Korea Vows to Use "New Form" of Nuclear Test*, N.Y. Times, Mar. 30, 2014, http://www.nytimes.com/2014/03/31/world/asia/north-korea-promises-new-form-of-nuclear-test.html?_r=0.

[309] State Space Agency of Ukraine, *Statistics of Launches of Ukrainian LV*, http://www.nkau.gov.ua/nsau/catalogNEW.nsf/mainU/731F5A089D942FA8C2256FBF002DFA78?OpenDocument&Lang=E (last visited May 4, 2016).

[310] *Space in Israel*, Israel Space Agency, http://most.gov.il/English/space/space%20in%20Israel/Pages/default.aspx (last visited May 4, 2016).

[311] Federal Aviation Administration (FAA), *Commercial Space Transportation 2013 Year in Review* 1 (Jan. 2014), http://www.faa.gov/about/office_org/headquarters_offices/ast/media/faa_yir_2013_02-07-2014.pdf.

have launched satellites.[312] In this new multipolar world, with "rogue states"[313] and others joining the established powers in possessing orbital launch capabilities, terrorists launching increasingly sophisticated and deadly attacks, and the number of objects in orbit continuing to grow, SSA data acquisition and sharing became more important.[314]

2. U.S. Approaches to SSA Data Sharing in the 21st Century

As the new millennium approached, with growing concerns about the importance of obtaining and sharing SSA data in a timely and secure manner, the U.S. Department of Defense (DoD) sought to replace NASA as the primary outlet for sharing the SSA data it collected.[315] By engaging directly in SSA data sharing itself, DoD hoped to exert tighter control over who would receive the data, and provide time-sensitive information more promptly to approved users.[316] However, despite these hopes, the Air Force General Counsel and Air Force Space Command (AFSPC) Legal Office concluded in March of 2000 that DoD lacked statutory authority to use appropriated funds to share SSA data with CFEs.[317] Under U.S. law, Federal agencies may not provide services for third parties without specific Congressional authorization and appropriation of funds.[318]

Although military SSA data continued to be routed through NASA through the start of the 21st century, a security review following the terrorist attacks of 11 September 2001 prompted the U.S. government to reconsider its practices.[319] The

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[312] U.S. Nat'l Sec. Space Strategy, *supra* note 3, at 9. The UN, however, only lists 49 States and two international organizations as having provided registration information about space objects. UNOOSA, "Registration of Objects Launched into Outer Space," *supra* note 78. The gap indicates that several States have launched satellites without having registered them with the UN, partly because of situations involving multiple launching States. Yoon Lee, *supra* note 81, at 44.

[313] In Dancing with the Devil, *supra* note 233, Michael Rubin traces the origins of the term "rogue states," or more precisely, rogue regimes. He explains that characteristics of rogue regimes include aggressive and defiant behavior; disregard for international norms; coercive leadership; suppression of human rights; promotion of radical ideologies; and immunity to traditional forms of deterrence. *Id.* at Introduction, above nn.11-12. Rubin's examples of rogue regimes include Iran since the 1979 revolution, North Korea, Libya under Muammar Qaddafi, the Taliban in Afghanistan, Pakistan, Iraq under Saddam Hussein, and the Palestine Liberation Organization.

[314] Lt Gen Buck Statement, *supra* note 5, at 7-9.

[315] U.S. Gov't Accountability Off., GAO-02-403R, Space Surveillance Network: New Way Proposed to Support Commercial and Foreign Entities 1 (2002), http://www.gao.gov/new.items/d02403r.pdf.

[316] *Id.* at 3.

[317] Spillar & Pirtle, *supra* note 266, at 2.

[318] U.S. Const. art. I, § 9, cl. 7, provides, "No Money shall be drawn from the Treasury, but in Consequence of Appropriations made by Law…." 31 U.S.C. § 1301(a) provides, "Appropriations shall be applied only to the objects for which the appropriations were made except as otherwise provided by law."

[319] Schwomeyer, *supra* note 101, at 50-51.

Air Force then developed a legislative proposal for a three-year SSA data-sharing pilot program, which was incorporated into the National Defense Authorization Act (NDAA) for Fiscal Year 2004 and later extended through 2009.[320]

(a) *The Pilot Program*

During the pilot program, the Air Force and DoD progressively adjusted the command and control structure for the SSA missions, creating the Joint Space Operations Center (JSpOC) and Joint Functional Component Command for Space (JFCC SPACE) and joining them together at Vandenberg Air Force Base, California.[321] Meanwhile, the U.S. Space-Based Space Surveillance Satellite[322] and Canada's Sapphire and Near-Earth Object Surveillance Satellite (NEOSSat) satellite[323] programs were being developed to enhance tracking of space objects from space itself. Unfortunately, despite these changes, gaps in SSA remained, and the United States provided detailed tracking services on only a fraction of the then-active satellites.[324]

(b) *A Cosmic Accident*

On 10 February 2009 at 11:56 a.m. Eastern Standard Time, the Iridium 33 communications satellite suddenly fell silent.[325] Its owners could not detect what had happened to the 1,234-pound satellite, which had been providing mobile voice and data communications services to customers around the world as part of a 66-satellite constellation.[326] Alerted by Iridium, personnel at the JSpOC soon discovered a new debris field in orbit where the Iridium 33 was supposed to have been.[327] Regressing back to the point where the Iridium 33 had disappeared, the analysts discovered that its orbital path had intersected with the Cosmos 2251, a Russian communications satellite launched in 1993 that had been inoperable for a decade.[328] Another debris field, heading along the Cosmos 2251's track, was also located; the Cosmos 2251

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320 Spillar & Pirtle, *supra* note 266, at 2-3; Nat'l Def. Auth. Act for Fiscal Year 2004, Pub. L. No. 108-136, § 913, 117 Stat. 1392, 1565 (codified as amended at 10 U.S.C. § 2274).

321 Weeden, *supra* note 265, at 1; JFCC SPACE Fact Sheet, *supra* note 70.

322 GlobalSecurity.org, *Space Based Space Surveillance (SBSS)* (July 21, 2011), http://www.globalsecurity.org/space/systems/sbss.htm.

323 Gainor, *supra* note 113; NEOSSat, *NEOSSat's Dual Mission – HEOSS* (2013), http://neossat.ca/?page_id=99.

324 Bird, *supra* note 72, at 3.

325 Weeden, *supra* note 265, at 1.

326 *Id.* at 1; Becky Iannotta & Tariq Malik, *U.S. Satellite Destroyed in Space Collision* (Feb. 11, 2009), http://www.space.com/5542-satellite-destroyed-space-collision.html.

327 Weeden, *supra* note 265, at 1.

328 Iannotta & Malik, *supra* note 326; NASA, *Satellite Collision Leaves Significant Debris Clouds*, 13 Orbital Debris Q. News 2, 1 (2009), http://orbitaldebris.jsc.nasa.gov/newsletter/pdfs/ODQNv13i2.pdf; Ram Jakhu, *Iridium-Cosmos Collision and its Implications for Space Operations*, *in* Y.B. on Space Pol'y 2008/2009, 254, 256 (Kai-Uwe Schrogl et al. eds., 2010).

itself was nowhere to be found.[329] The message became clear: the Iridium 33 had collided with the Cosmos 2251, 790 kilometers above northern Siberia, at nearly a right angle and an impact velocity of over 11 kilometers per second, destroying both satellites and scattering thousands of pieces of trackable debris into orbit across 1,500 kilometers of altitude.[330] The collision was second only to the 2007 Chinese ASAT test in terms of the number of trackable pieces of debris generated.[331] The International Space Station (ISS) has had to maneuver multiple times to avoid debris from the collision,[332] much of which remains in orbit to this day.[333]

At the time, the JSpOC had not been actively monitoring or reporting potential conjunctions for all non-military satellites.[334] In addition, Iridium had not then been using a standard process for collision risk monitoring or collision avoidance.[335] SOCRATES, the commercial conjunction-predicting tool that Iridium relied upon, had calculated before the crash that Iridium 33 was in less danger of collision than at least 150 other satellites, including 16 other Iridium satellites.[336] Thus, given what it knew at the time, Iridium may not have acted unreasonably in failing to maneuver the Iridium 33 out of the path of the Cosmos 2251. In retrospect, its decision-making could have improved with more accurate SSA data and analysis.

The crash spurred the United States to intensify its efforts to thoroughly obtain and appropriately share SSA data in a timely fashion. On April 28, 2009, Lieutenant General Larry James, then Commander of JFCC SPACE, testified before a Congressional subcommittee that because the crash "tangibly demonstrate[d] the

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[329] Weeden, *supra* note 265, at 1.

[330] Iannotta & Malik, *supra* note 326; *Satellite Collision Leaves Significant Debris Clouds*, *supra* note 328; NASA, *Update on Three Major Debris Clouds*, 14 Orbital Debris Q. News 2, 4 (2010), http://orbitaldebris.jsc.nasa.gov/newsletter/pdfs/ODQNv14i2.pdf; M. Matney, NASA, *Small Debris Observations from the Iridium 33/Cosmos 2251 Collision*, *id.* at 6-7; T.S. Kelso, *Iridium 33/Cosmos 2251 Collision* (July 15, 2009), http://celestrak.com/events/collision.asp.

[331] *Fengyun-1C Debris Cloud*, *supra* note 11, at 2; Leonard David, *Effects of Worst Satellite Breakups in History Still Felt Today* (Jan. 28, 2013), http://www.space.com/19450-space-junk-worst-events-anniversaries.html.

[332] *ESA space ferry moves ISS to avoid debris*, Space Daily, Nov. 6, 2014, http://www.spacedaily.com/reports/ESA_space_ferry_moves_ISS_to_avoid_debris_999.html; NASA, *Another Debris Avoidance Maneuver for the ISS*, 17 Orbital Debris Q. News 1, 3 (2013), http://orbitaldebris.jsc.nasa.gov/newsletter/pdfs/ODQNv17i1.pdf. Before these incidents, the ISS also had to maneuver, or the astronauts take refuge in the Soyuz capsule, to avoid collisions with at least three other pieces of debris from the Iridium-Cosmos crash. *Increase in ISS Debris Avoidance Maneuvers*, *supra* note 193.

[333] Darren McKnight, *"Gravity" – Great Show, Average Physics*, 4 (panel discussion: "Gravity" in Real Life: Legal and Political Implications of an Accident in Space, Washington, D.C., 2013), http://swfound.org/media/126966/McKnight_Gravity-GreatShowAveragePhysics.pdf.

[334] Weeden, *supra* note 265, at 2; Jakhu, *supra* note 328, at 258.

[335] Jakhu, *supra* note 328, at 257.

[336] *Id*.

vulnerability of our assets,"[337] the Air Force began screening all Iridium satellites for conjunctions within five hours after the collision, and was rapidly increasing its capacity to more precisely track and analyze the on-orbit activities of all 800 active, maneuverable satellites, and expand its SSA data-sharing pilot program.[338]

(c) *The Pilot Program Becomes Permanent*

Less than nine months after the Iridium-Cosmos collision, the 2010 NDAA transformed the pilot program into a permanent one, amending 10 U.S.C. § 2274 into its current state as of this writing.[339] The law authorizes the Secretary of Defense to enter into agreements to "provide space situational awareness services and information to, and … obtain space situational awareness data and information from, non-United States Government entities … if the Secretary determines that such action is consistent with the national security interests of the United States."[340]

Under the law, non-U.S. governmental entities with which SSA data may be shared include U.S. states and their political subdivisions, U.S. and foreign commercial entities, and governments of foreign countries.[341] The U.S. government insists, however, that partner entities not re-disclose data or technical information without the Secretary's express approval, and foreign and commercial entities must reimburse DoD if the Secretary chooses to require it.[342] The Secretary is required to establish procedures to facilitate SSA data sharing, and may use a contractor to provide SSA services or information.[343]

The law also declares the immunity of the U.S. government and its agents "from any suit … arising from the provision or receipt of space situational awareness services or information … or any related action or omission."[344] Thus, while the United States remains potentially liable for space accidents involving any space

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[337] Keeping the Space Environment Safe for Civil and Commercial Users: Hearing Before the Space and Aeronautics Subcomm. of the H. Science and Technology Comm., 111th Cong. (2009) (statement of Lieutenant General Larry James, Commander, Joint Functional Component Command for Space) [hereinafter Lt Gen James Statement].

[338] Andrea Shalal-Esa, *Pentagon May Reach Satellite Analysis Goal Early*, Reuters, Apr. 28, 2009, http://www.reuters.com/article/2009/04/28/space-debris-idUSN2836780620090428; *see also* Mike Wasson, *Space Situational Awareness in the Joint Space Operations Center*, AMOS 1 (Sept. 16, 2011), http://www.amostech.com/TechnicalPapers/2011/SSA/WASSON.pdf.

[339] Nat'l Def. Auth. Act for Fiscal Year 2010, Pub. L. No. 111-84, § 912, 123 Stat. 2190, 2429 (Oct. 28, 2009).

[340] 10 U.S.C. §§ 2274(a), (c).

[341] 10 U.S.C. § 2274(b).

[342] 10 U.S.C. § 2274(c)-(d). However, DoD has decided not to charge for the services, so as to promote space safety by minimizing barriers to full disclosure and cooperation by satellite operators. Bird, *supra* note 72, at 1.

[343] 10 U.S.C. § 2274(f).

[344] 10 U.S.C. § 2274(g).

object of which it is considered a launching State under the OST and the Liability Convention,[345] it accepts no liability for space accidents where the sole U.S. involvement is as a provider of SSA data.

Finally, the law requires the Secretary to notify the congressional defense committees whenever a commercial or foreign entity "has declined or is reluctant to provide data or information … due to the concerns of such entity about the potential disclosure of such data or information."[346] This provision has a twofold purpose: it promotes an active role for the Secretary in forming partnerships to obtain SSA data from other entities, and it emphasizes the importance of safeguarding the data obtained from those entities.

Soon after the law took effect, the Secretary of Defense delegated responsibility for the SSA data-sharing program to the Commander of United States Strategic Command (USSTRATCOM).[347]

(d) *Present U.S. SSA Data-Sharing Operations*

By seeking to expand its abilities to obtain and disseminate SSA data, the United States is trying to improve the safety of space operations for all. Increasingly, other nations, private entities, and international organizations are joining these efforts, which collectively will enable them to achieve more comprehensive SSA than any nation could obtain on its own.[348] The program now encompasses three primary means of sharing SSA data outside the U.S. government: (1) to the general public via Space-Track.org; (2) through formal agreements with CFEs, to include commercial, governmental, intergovernmental, and mixed public-private organizations; and (3) through close-approach warnings to satellite owner/operators even without a formal agreement.[349] This article discusses each of these in turn.

(1) *Space-Track.org*

First, JFCC SPACE maintains the website Space-Track.org, which allows those who register to obtain basic data on any identified and unclassified space object that JFCC SPACE is tracking.[350] This basic data consists of "two-line element

[345] OST art. VII defines the launching state of a given space object as any state that launches or procures the launch of the space object, or from whose territory or facility the space object is launched. The same definitions are used in the Liability Convention, art. 1(c), UN Doc A/Res/1721/B 1 B (XVI), "n , Mongolia, Peru, s continues to develop ASATs

[346] 10 U.S.C. § 2274(h).

[347] Bird, *supra* note 72, at 1.

[348] Lt Gen Buck Statement, *supra* note 5, at 7.

[349] Bird, *supra* note 72, at 2.

[350] *Id.* at 1.

sets" (TLEs), decay data, and unclassified satellite catalogue details.[351] TLEs are a two-line series of alphanumeric-string data elements derived from mathematical formulae known as "general perturbations," which are less precise than the "special perturbations" used in service of the CFE agreements or close-approach warnings.[352] TLEs enable a user to calculate a satellite's approximate position and the shape of its orbit.[353]

(2) *Commercial and Foreign Entity Agreements*

Next, USSTRATCOM has used its statutory and delegated authority to enter into SSA data-sharing agreements with partners outside the U.S. government. It has inked agreements with ten allied governments,[354] the ESA and EUMETSAT,[355] and over 50 commercial satellite owner/operators,[356] with more agreements in the pipeline.[357] These agreements provide for mutual sharing of the most current and precise information available on a routine basis, for use in assessing orbital conjunctions; planning launches, on-orbit maneuvers, and satellite decommissioning activities; and investigating electromagnetic interference and other on-orbit anomalies.[358] SSA data sharing agreements have become especially important as U.S. domestic SSA capabilities, such as the string of radar installations constituting the first-generation "Space Fence," have fallen to budget cuts.[359]

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[351] *Id.*

[352] *Id.* at 2; *see also* NASA, *Definition of Two-Line Element Set Coordinate System* (Sept. 23, 2011), http://spaceflight.nasa.gov/realdata/sightings/SSapplications/Post/JavaSSOP/SSOP_Help/tle_def.html. Special perturbations theory accounts for factors such as solar and lunar gravitational pull, atmospheric drag, and updated observational data and ephemerides from U.S. tracking systems or the owner/operator.

[353] Bird, *supra* note 72, at 2.

[354] As of this writing, foreign SSA sharing partners include Australia, Italy, Japan, Canada, France, South Korea, the United Kingdom (UK), Germany, Israel, Spain, and the United Arab Emirates. *USSTRATCOM, UAE sign agreement to share space services, data* USSTRATCOM: Public Affairs (Feb. 16, 2016), https://www.stratcom.mil/news/2016/605/USSTRATCOM_UAE_sign_agreement_to_share_space_services_data/ [hereinafter, *USSTRATCOM, UAE sign agreement*].

[355] *Id*.

[356] *Id.* DoD has also entered into an SSA data sharing agreement with the Space Data Association (SDA), an association of governmental, intergovernmental, and commercial satellite operators that does not own or operate its own satellites. *Space Data Association: SDA and U.S. Department of Defense Sign Space Situational Awareness Agreement*, Bus. Wire, Aug. 8, 2014, http://www.businesswire.com/news/home/20140808005645/en/Space-Data-Association-SDA-U.S.-Department-Defense.

[357] Lt Gen Buck Statement, *supra* note 5, at 7.

[358] *USSTRATCOM, UAE sign agreement*, *supra* note 354.

[359] Mike Gruss, *US Military's "Space Fence" Shutdown Will Weaken Orbital Surveillance Network*, Space.com (Aug. 13, 2013), http://www.space.com/22354-space-fence-military-orbital-surveillance.html. A second-generation space fence is in the works.

In the tightest example of integration, the United States conducts combined space operations (CSpO) with the UK, Canada, and Australia.[360] In CSpO, the allies provide officers who work at each other's space tracking and control facilities and participate with their host organization in SSA, force support, launch and reentry assessment, and contingency operations.[361]

(3) *Conjunction Warnings*

To promote space safety even without a formal agreement, the JSpOC sends about 3,300 close-approach warning messages each day to satellite operators of impending potential collisions.[362] Whenever an active satellite above LEO is projected to come within five kilometers of another orbiting object, or when an active satellite in LEO is projected to come within one kilometer of another orbiting object and within 200 meters in the radial direction, a conjunction summary message (CSM) will be sent to the owner/operator of the satellite.[363] If the at-risk satellite is maneuverable, its operator may then be able to move it away to avoid the projected conjunction.[364] Such early warnings can save lives, as illustrated by the way that successive crews have maneuvered the ISS to avoid debris.

3. SSA Abroad

The United States was not the only spacefaring nation to seek to improve its SSA-generation and sharing ability in the wake of the Iridium-Cosmos crash. Beginning in 2009, the ESA initiated its own SSA Programme, with key mission areas of monitoring space weather, assessing near-Earth objects such as meteoroids, and surveillance and tracking of manmade space objects.[365] The ESA wants to obtain

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[360] Lt Gen Buck Statement, *supra* note 5, at 7.

[361] Cheryl Pellerin, *Stratcom, DoD Sign Space Operations Agreement with Allies* (Sept. 23, 2014), http://www.stratcom.mil/news/2014/516/Stratcom_DoD_Sign_Space_Operations_Agreement_With_Allies/.

[362] Lt Gen Buck Statement, *supra* note 5, at 6.

[363] Bird, *supra* note 72, at 2. While the collision-probability volume is sometimes visualized as a "box" around a satellite, a more accurate representation is of a long "cigar-shaped" ellipsoid. David Sibert et al., *Operational Impact of Improved Space Tracking on Collision Avoidance in the Future LEO Space Debris Environment* 5 AMOS (Sept. 16, 2010), http://www.amostech.com/TechnicalPapers/2010/Posters/Sibert.pdf. However, for simplicity's sake, NASA does still use a "pizza box" (1.5 x 50 x 50 km parallelepiped) shape to judge when manned spacecraft such as the International Space Station are threatened by a potential conjunction. NASA, *Space Debris and Human Spacecraft*, *supra* note 24.

[364] Not all satellite operators are able to act on the warnings they receive. For example, the JSpOC warned Ecuador in May 2013 about the impending passage of its first national satellite, "Pegaso," through a debris cloud. Pegaso, a small cubesat, was not equipped to maneuver away, and was injured in the ensuing passage. Ecuadorian Civilian Space Agency (EXA), *The History of Ecuador and Space* (2014), http://exa.ec/history.htm.

[365] European Space Agency (ESA), *SSA Programme Overview* (May 22, 2013), http://www.esa.int/Our_Activities/Operations/Space_Situational_Awareness/SSA_Programme_overview.

a more comprehensive SSA picture on its own, alleging information received from the United States may be inaccurate, incomplete, or too late.[366] It is compiling its own catalogue of near-Earth space objects, using space observations from existing radars and telescopes as well as data provided by the United States.[367] It has created a public website, similar to Space-Track.org but not yet operational, to lay the groundwork for satellite tracking efforts.[368]

Australia and the UK, in addition to their collaboration with the United States and the UK's membership in the ESA, have worked with each other to integrate SSA data and reduce errors in orbital calculations.[369]

India, having developed a robust civil space program, is now in dialogue with the United States about space security matters, to include SSA data sharing.[370]

South Korea is building its own worldwide SSA network, a system of six geographically distributed telescopes known as the Optical Wide-field patroL (OWL) that it intends to use to monitor Korean satellites and space debris.[371]

Russia has long maintained SSA capabilities for the sake of its own military and space programs, but has not always been proactive in sharing its SSA data, as illustrated in the Cosmos 954 incident.[372] However, Russia has proposed setting up an intergovernmental SSA data-sharing hub under the auspices of the U.N.[373] and the largely Russian International Scientific Optical Network (ISON), discussed in more detail below, and with sites around the world has made significant contributions to SSA generation and data sharing.[374]

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366 ESA, *Europe Flies Unprotected* (May 31, 2010), http://www.esa.int/Our_Activities/Operations/Europe_flies_unprotected.

367 *Id*.

368 ESA Space Surveillance and Tracking Centre (SSTC), *ESA – Space Situational Awareness* (May 20, 2015), https://sst.ssa.esa.int/cwbi/.

369 N.M. Harwood, M. Rutten & R.P. Donnelly, *Orbital Error Analysis for Surveillance of Space* 1 AMOS (Sept. 16, 2012), http://www.amostech.com/TechnicalPapers/2012/POSTER/HARWOOD.pdf.

370 U.S. Dep't of State, *Joint Statement on the Fifth India-U.S. Strategic Dialogue* (July 31, 2014), http://www.state.gov/r/pa/prs/ps/2014/07/230046.htm.

371 Jang-Hyun Park et al., Address at AMOS Technologies Conference: *Korean Space Situational Awareness Program: OWL Network* (Sept. 11-14, 2012), http://www.amostech.com/TechnicalPapers/2012/POSTER/PARK.pdf.

372 Weiss, *supra* note 288, at 3, 5.

373 Russian Federation, Long-term Sustainability of Outer Space Activities (Basic Elements of the Concept of Establishing a Unified Centre for Information on Near-Earth Space Monitoring under the Auspices of the United Nations and the most Topical Aspects of the Subject Matter), 51st Sess., U.N. STSC COPUOS, U.N. Doc. A/AC.105/C.1/2014/CRP.17 (2014) [hereinafter Long-term Sustainability of Outer Space Activities].

374 *See* text accompanying notes 381-383, *infra*.

China, several other Asian states, and Peru have created a treaty organization, the Asia Pacific Space Cooperation Organization (APSCO), to facilitate the exchange of space science and technology among members' collaborative space programs.[375] APSCO has approved development of an Asia Pacific Optical Space Observation System (APOSOS), led by China and Turkey, to generate and share SSA data among APSCO members, although it remains in the early stages and some members have limited observational capabilities.[376] China has recently signaled greater interest in receiving satellite collision avoidance data from the United States.[377]

4. Non-Governmental SSA

Although governments control the most powerful satellites, radars, and telescopes for obtaining SSA data, and fund the deepest pools of dedicated SSA analysts, the private sector also collects, analyzes, and distributes SSA data. Just as amateur astronomy enthusiasts were recruited to help track Sputnik 1 as it orbited over the United States and other Western countries in 1957, today various non-governmental organizations make SSA data accessible to their partners and the public in a variety of different formats.

The Center for Space Standards and Innovation (CSSI) operates a public website called CelesTrak and provides a collision warning service called "Satellite Orbital Conjunction Reports Assessing Threatening Encounters in Space" (SOCRATES), based on information in the DoD's public catalogue.[378] Analytical Graphics, Inc. (AGI), CSSI's parent company, even provides a 3D visual representation of satellite locations in Google Earth, updated every 30 seconds,[379] and provides commercial visualization and orbit determination software tools to the JSpOC itself.[380]

The International Scientific Optical Network (ISON), based largely in the former Soviet Union but with sites worldwide, is a non-governmental network coordinated by the Keldysh Institute of Applied Mathematics of the Russian Academy of Sciences.[381] ISON participants include the proprietors of astronomical observatories

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[375] Convention of the Asia Pacific Space Cooperation Organization (APSCO), Bangl.-P.R.C.-Indon.-Iran-Mong.-Pak.-Peru-Thail.-Turk., Oct. 28, 2005, 2423 U.N.T.S. 43736 (entered into force Dec. 10, 2006).

[376] Guo Xiaozhong, Nat'l Astronomical Observatories, Chinese Acad. of Sci., *Asia-Pacific Groundbase* [sic] *Optical Satellite Observation System*, Sec. World Found. (Oct. 2011), http://swfound.org/media/50867/Guo_APOSOS.pdf; *see also* Shen Ming, *Progress on APOSOS*, Sec. World Found. (Nov. 8, 2012), http://swfound.org/media/95032/Shen-Progress_APOSOS-Nov2012.pdf.

[377] U.S. Dep't of State, *U.S.-China Strategic and Economic Dialogue Outcomes of the Strategic Track* ¶ 87 (July 14, 2014), http://www.state.gov/r/pa/prs/ps/2014/07/229239.htm.

[378] T.S. Kelso, *SOCRATES* (Sept. 25, 2013), http://celestrak.com/SOCRATES/.

[379] Frank Taylor, *Positions of Satellites Around Earth* (2015), http://www.gearthblog.com/satellites.

[380] Analytical Graphics, Inc. (AGI), *AGI Solutions* (2014), http://www.agi.com/solutions/.

[381] Russian Academy of Sciences, Keldysh Institute of Applied Mathematics, *Results of GEO*

on five continents, who use powerful telescopes to identify and track space objects including space debris as far out as GEO.[382] ISON has identified hundreds of new pieces of space debris in many different orbital planes.[383]

The Space Data Association is an association of satellite owners, operators, and builders that facilitates SSA data sharing within the satellite industry and between commercial, governmental, and international satellite operators.[384] Members include satellite constellation operators such as Eutelsat, Intelsat, and Arabsat; satellite manufacturers such as Loral Space Systems; and civil participants such as NASA and NOAA.[385]

With private efforts such as these joining the new and long-established governmental SSA programs, SSA data are becoming increasingly accessible to those who need them to safely launch and operate satellites, or who are simply curious about the movements of mankind's own celestial bodies. If satellite operators act on the SSA data they receive, leveraging the increasing production and sharing of this data amongst major space-faring states holds out the promise of reducing the risk of future collisions involving maneuverable spacecraft.

As the next section will show, existing international law is inadequate to induce states to provide each other sufficiently detailed SSA data to maximize the safety of space operations. There are legitimate national sovereignty and national security reasons for this. To improve national SSA capabilities, therefore, more voluntary SSA data sharing initiatives will be needed.

IV. INTERNATIONAL LEGAL FRAMEWORK FOR SHARING SSA DATA

> *In order to promote international cooperation in the peaceful exploration and use of outer space, States … conducting activities in outer space … agree to inform the Secretary-General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of the nature, conduct, locations and results of such activities.*[386]

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and HEO monitoring by ISON Network in 2012, 50th Sess., STSC COPUOS (2013), http://www.unoosa.org/pdf/pres/stsc2013/tech-07E.pdf.

[382] *Id.* at 3.

[383] *Id.* at 13, 18.

[384] SDA Overview, *supra* note 71.

[385] SDA, *Members and Participants* (2015), http://www.space-data.org/sda/about/membersandparticipants/.

[386] OST art. XI.

A. Introduction

To satisfy the obligations of treaty and customary international law, space situational awareness (SSA) data sharing must be useful, accurate and timely. Satellite launchers and operators should want to avoid harmful interference with outer space activities, both those that they perform and those performed by other operators. Different types and amounts of information will be needed to avoid different types of interference. For example, a satellite operator launching a satellite into Low Earth Orbit (LEO) will need to worry about the risk of collision with the numerous spacecraft and other objects sharing the same orbital regime.[387] It will need to avoid causing signal interference with electromagnetic transmissions for satellites in all orbital regimes.[388] Operators placing satellites into Geosynchronous Orbit will need to maneuver them carefully to ensure a sufficient degree of separation from satellites of nearby longitudes to avoid collisions, minimize electromagnetic interference (EMI), and otherwise comply with International Telecommunication Union (ITU) regulations and the domestic regulations that implement them.[389]

National and international laws, as well as non-binding "soft law" documents such as U.N. General Assembly Resolutions, have evolved to facilitate the sharing of SSA data. This section will analyze the existing international legal framework for sharing SSA data and where it falls short. Section V will then evaluate various proposed solutions for filling the lacunae in the current legal framework.

B. U.N. Resolutions Related to Information Sharing on Space Activities and SSA

1. U.N. General Assembly Resolution 1472 (XIV)

Shortly after the July 1957 to December 1958 International Geophysical Year that included the launch of the first artificial Earth satellites, the United Nations (U.N.) General Assembly voted to establish a permanent Committee on the Peaceful Uses of Outer Space (COPUOS).[390] The U.N. charged the Committee with the responsibility of studying avenues for international cooperation in the exploration and use of outer space, as well as organizing the "mutual exchange and dissemination of information on outer space research."[391] In the ensuing decades, COPUOS

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[387] UCS Satellite Database, *supra* note 27; Fengyun-1C Debris Cloud, *supra* note 11.

[388] *See, e.g.*, Chris Forrester, *Will OneWeb Disrupt TV Signals?*, Advanced Television (June 30, 2015), http://advanced-television.com/2015/06/30/will-oneweb-disrupt-tv-signals/; Caleb Henry, *Intelsat Tempers Down Disagreement Over SpaceX's Experimental SmallSats*, Via Satellite, July 29, 2015, http://www.satellitetoday.com/technology/2015/07/29/intelsat-tempers-down-disagreement-over-spacexs-experimental-smallsats/.

[389] *See, e.g.*, ITU-RR art. 22; Satellite Communications, 47 C.F.R. Part 25 (2010).

[390] COPUOS, *COPUOS History*, UNOOSA (2016), http://www.unoosa.org/oosa/en/ourwork/copuos/history.html.

[391] International Co-operation in the Peaceful Uses of Outer Space, G.A. Res. 1472 A(1)(a)(ii),

became an important forum for the voluntary sharing of information about outer space. Its members drafted the five major space treaties[392] as well as a variety of non-binding resolutions and principles concerning the peaceful use and exploration of outer space.

2. U.N. General Assembly Resolution 1721 B (XVI)

In 1961, asserting that it would enhance international cooperation in the peaceful use of outer space for states to register their launches of space objects with the U.N., the General Assembly passed Resolution 1721 B.[393] This resolution called upon "States launching objects into orbit or beyond to furnish information promptly to [COPUOS], through the Secretary-General, for the registration of launchings,"[394] and requested "the Secretary-General to maintain a public registry of the information" so furnished.[395] The non-binding resolution did not specify what information was to be furnished, and did not require the creation of national registries of space objects.[396]

3. U.N. General Assembly Resolution 62/101

Over four decades later, in 2007, the U.N. General Assembly adopted Resolution 62/101, recommending specific points of data be provided to ensure consistency between and among registrations pursuant to Resolution 1721 B (XVI) and the Registration Convention, and to account for more recent developments in technology and space operations.[397] The resolution recommends the provision of several additional data elements not required in either of these prior documents. Specifically, it recommends that states report, where applicable, the international designator from the Committee on Space Research (COSPAR);[398] "Any useful

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U.N. GAOR, 14th Sess. (1959).

[392] The five major space treaties drafted by COPUOS members are the OST, the Rescue and Return Agreement, the Liability Convention, the Registration Convention, and the Moon Agreement. While the first four treaties have been widely adopted, the Moon Agreement has not been ratified by some of the most significant space powers such as the U.S., Russia, and China. *See* Status of Space Agreements, *supra* note 77.

[393] *See* G.A. Res. 1721 B, *supra* note 75.

[394] *Id.* at B(1).

[395] *Id.* at B(2).

[396] *Id.*

[397] *See* Recommendations on Enhancing the Practice of States and International Intergovernmental Organizations in Registering Space Objects, G.A. Res. 62/101, U.N. GAOR, 2008, Supp. No. 07-46983, U.N. Doc. A/RES/62/101 [hereinafter G.A. Res. 62/101 or Resolution 62/101].

[398] *Id.* at § 2(*a*)(i). COSPAR, a body of the International Council for Science, has developed an internationally recognized system for designating identification strings for satellites, which is also used by NASA's National Space Science Data Center (NSSDC) to catalogue satellites with detailed narrative descriptions and other information. *See, e.g.*, NASA, *Hubble Space Telescope* (Aug.16, 2013), http://nssdc.gsfc.nasa.gov/nmc/spacecraftDisplay.do?id=1990-037B.

information relating to the function of the space object in addition to the general function requested by the Registration Convention;"[399] the GSO location;[400] any change of status in operations, including when a space object is no longer functional;[401] the approximate date of decay or re-entry;[402] the date and physical conditions of moving a space object to a disposal orbit;[403] and web links to official information on space objects.[404] Resolution 62/101 also recommends standardizing previously submitted inputs with the use of Coordinated Universal Time as the time reference for the launch date[405] and kilometers, minutes, and degrees as the standard units for basic orbital parameters.[406] In situations where ownership and state supervision of an orbiting space object changes, Resolution 62/101 recommends that the state of registry (or if there is none, the appropriate state under OST Article VI) furnish the date of change in supervision; the identification of the new owner or operator; any change of orbital position; and any change of function of the space object.[407]

Since the adoption of Resolution 62/101, the U.N. Office for Outer Space Affairs (UNOOSA) has promulgated a Registration Information Submission Form that satellite launchers and operators can use both for initial registrations and for updates on changes of status in operations, providing the information required by the Registration Convention and requested by Resolution 62/101.[408]

C. Outer Space Treaty

1. Overview

The OST, the seminal multinational treaty on outer space activities, alludes to SSA data sharing in a number of circumstances. These include providing information about phenomena in outer space that could endanger the life or health of astronauts;[409] registration of space vehicles[410] and space objects;[411] seeking consultations when a proposed space activity would cause potentially harmful interference

[399] G.A. Res. 62/101 § 2(*a*)(iv), *supra* note 397.

[400] *Id.* at § 2(*b*)(i).

[401] *Id.* at § 2(*b*)(ii).

[402] *Id.* at § 2(*b*)(iii).

[403] *Id.* at § 2(*b*)(iv).

[404] *Id.* at § 2(*b*)(v).

[405] *Id.* at § 2(*a*)(ii).

[406] *Id.* at § 2(*a*)(iii).

[407] *Id.* at § 4.

[408] *Registration Information Submission Form*, UNOOSA (Jan. 1, 2010), http://www.oosa.unvienna.org/pdf/misc/reg/regformE.pdf.

[409] OST art. V.

[410] *Id*.

[411] *Id.* at art. VIII.

with space activities of other states;[412] permitting foreign observation of space launches and space flights;[413] and providing the U.N. and the public information about space objects and the information they generate.[414] The OST also more generally endorses the principles of due regard, cooperation and mutual assistance in the peaceful exploration and use of outer space, of which SSA data sharing could be an important element.[415]

2. Phenomena Endangering Life or Health

While its calls for international cooperation and understanding in Articles I and III would certainly support the sharing of SSA data by spacefaring states, the OST's first direct obligation to share information about outer space is found in Article V, which requires States Parties to notify each other or the U.N. Secretary-General "of any phenomena they discover in outer space, including the Moon and other celestial bodies, which could constitute a danger to the life or health of astronauts." The use of the broad term "any phenomena" encompasses both natural and man-made occurrences, including but not limited to radiation, the behaviors of space objects, and the short- and long-term effects of microgravity on the human body.[416]

3. Registration

Articles V and VIII of the OST assume that states will register their space vehicles and space objects domestically, although the OST does not explicitly mandate that they do so.[417] Article V requires the return of stranded or shipwrecked astronauts to the "State of registry of their space vehicle." Article VIII assigns continuing jurisdiction and control for a space object to the State Party "on whose registry an object launched into outer space is carried," and provides that such objects or their component parts shall be returned to the State of registry if found outside its territory.[418] However, the OST does not expand upon Resolution 1721 B (XVI) in defining how the registration is to occur, nor does it specify what data

[412] *Id.* at art. IX.

[413] *Id.* at art. X.

[414] *Id.* at art XI.

[415] *See, e.g.*, OST preamble; OST arts. I, III, V, VIII-XIII.

[416] Although space medicine and physiology later became some of the less controversial fields of international cooperation and data sharing, the Soviet Union concealed its early astronauts' prolonged bouts of motion sickness in orbit from the Americans, even as the Americans were eavesdropping on their communications. THIS NEW OCEAN, *supra* note 1, at 338-339, 346-347.

[417] However, States Parties to the OST bear international responsibility for "assuring that national activities are carried out in conformity with the [OST]" and must provide "authorization and continuing supervision" for the activities of their non-governmental entities in outer space. OST art. VI. Registration is arguably a necessary core component of this assurance, authorization, and supervision scheme.

[418] OST art. VIII.

elements are to be included in it.[419] The OST simply assumes that there should be "identifying data"[420] sufficient to identify a space object or component with its State of registry. Specific requirements for registration would later be developed in the Registration Convention.

4. Article IX

(a) *Mutual Assistance and Due Regard*

Article IX of the OST includes provisions that are germane to the issues of both international SSA data sharing and avoiding the creation of space debris. It begins, "In the exploration and use of outer space … States Parties to the Treaty shall be guided by the principle of cooperation and mutual assistance and shall conduct all their activities in outer space … with due regard to the corresponding interests of all other States Parties to the Treaty."[421] SSA data sharing is one way in which spacefaring nations can cooperate with and assist one another, though this treaty provision does not prescribe particular modes of cooperation. No doubt, sharing SSA data and information enables States Parties to act with a greater degree of due regard for the corresponding interests of other States Parties. If a state does not know what other states' spacecraft or space objects are in orbit or where they are, it cannot treat them with "due regard" because it has no ability to "regard" them at all.[422]

(b) *Avoiding Harmful Contamination*

As to the space debris issue, OST Article IX requires States Parties to pursue studies and conduct exploration of outer space, including the Moon and other celestial bodies, "so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose."[423] While this provision certainly could limit the type of activities that caused immediate and widespread contamination of outer space, such as the nuclear tests and the

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[419] *Id*.

[420] *Id*.

[421] OST art. IX.

[422] Black's Law Dictionary (West Publishing Co., rev 4th ed. 1968) defines "due regard" as "Consideration in a degree appropriate to demands of the particular case" (citing *Willis v. Jonson*, 279 Ky. 416, 130 S.W.2d 828, 832). It defines "regard" as "Inspection; supervision." The "due regard" requirement was adopted in contrast to a Soviet draft provision that would have onerously required advance notification and prior consent for "any measures that might in any way hinder the exploration or use of outer space for peaceful purposes by other countries…." Michael Mineiro, FY-1C *and* USA-193 *ASAT Intercepts: An Assessment of Legal Obligations Under Article IX of the Outer Space Treaty*, 34 J. Space L. 321, 328-329 (2008) (quoting U.S.S.R., *Draft Declaration of the Basic Principles Governing the Activities of States in the Exploration and Use of Outer Space*, U.N. GAOR, 18th Sess., Annex III ¶ 6, U.N. Doc. A/5482 at 11 (1963)).

[423] OST art. IX.

West Ford needles project discussed above,[424] it allows states substantial flexibility to conduct their space activities because it is the states themselves that determine whether their space activities are likely to cause harmful contamination.[425] For the first few decades of the space race, for example, states routinely launched satellites into space without any end-of-life disposal plan. Only in more recent decades have states prioritized debris reduction as an important aspect of space mission planning.[426]

(c) *Consultations over Harmful Interference*

Finally, if a State Party "has reason to believe that any activity or experiment planned by it or its nationals in outer space … would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of space," OST Article IX obliges it to "undertake appropriate international consultations before proceeding with any such activity or experiment."[427] States Parties who believe their own space activities to be threatened by the space activities of another State Party may also request consultation.[428]

The "consultation" referred to in Article IX is a very general term, such that the form of the consultations is left entirely up to the state or states involved.[429] Arguably, a simple naked démarche would not do. For consultations to be meaningful, states would need to provide or exchange some relevant SSA data about the potential harmful interference and its mechanisms—e.g., information about the orbital parameters and radio frequencies of the new space activity or experiment being planned, as well as such information about existing space activities with which it might interfere.

While the OST encourages SSA data sharing in the event of a known and admitted risk of harmful interference, states can easily find reasons to refrain from sharing it in the consultations required by the OST. The OST does not establish any specific treaty mechanism or organization to facilitate the consultations.[430] Therefore, any communications through diplomatic channels that a state deems "appropriate" could qualify, such as direct bilateral contacts between the affected states, or broader consultations in a multilateral body such as the Committee on the Peaceful Uses of

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[424] *See supra* note 263 and accompanying text.

[425] OST art. IX.

[426] The U.S. first prioritized debris reduction as a goal in the National Space Policy Presidential Directive of 5 January 1988, and standardized debris reduction practices for U.S. government agencies in space were not approved until 2001. NASA, *Orbital Debris FAQs*, *supra* note 4; NASA History Office, *Presidential Directive on National Space Policy* (Feb. 11, 1988), http://www.hq.nasa.gov/office/pao/History/policy88.html.

[427] OST art. IX.

[428] *Id*.

[429] Ivan Vlasic, *The Space Treaty: A Preliminary Evaluation*, 55 Cal. L. Rev. 507, 517-518 (1967).

[430] *Id*.

Outer Space (COPUOS) or the ITU. Historically, even when conducting activities that could cause potentially harmful interference to other States Parties' peaceful space activities, some states have failed to engage in consultations (as with China's Fengyun 1C intercept and destruction).[431] In contrast, however, the United States did openly discuss and debate its own ASAT technology testing in the 1980s, and, prior to the NROL-21/US-193 intercept, gave a form of advance notice while claiming the potentially harmful activity was not risky enough to trigger the requirement for consultations.[432] The United States has continued this theme through its arguments for a voluntary non-binding Space Code of Conduct.[433]

5. Launch Observations

Article X of the OST encourages, but does not require, states to allow foreign observers to watch launches and flights of their space objects.[434] It leaves the extent, nature and conditions of these opportunities to be determined by agreement between the states concerned.[435]

6. U.N. Publicity

Article XI of the OST provides that for peaceful activities in the exploration and use of outer space, States Parties "agree to inform the Secretary-General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of the nature, conduct, locations and results of such activities."[436] The U.N. Secretary-General then must disseminate the information "immediately and effectively."[437] Arguably, this provision would appear to promote broad SSA data sharing, but states have narrowly interpreted terms such as "feasible" and "practicable" in order to afford themselves wide latitude in deciding what aspects of their space activities to publicize and which aspects to conceal.

In theory, any of a state's space activities *could* be publicized, and in that sense disclosure may be considered "feasible." However, states often have important national security interests that result in domestic laws and policies relating to export

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[431] Broad & Sanger, *supra* note 166.

[432] Mineiro, *supra* note 422, at 354.

[433] Dep. Ass't Sec. of State Frank A. Rose, Remarks at the Conference on Disarmament Plenary: Continuing Progress on Ensuring the Long-Term Sustainability and Security of the Space Environment (June 10, 2014) (transcript available at http://iipdigital.usembassy.gov/st/english/texttrans/2014/06/20140610301045.html); Christopher L. Buck, Remarks at Sixty-Ninth UNGA First Committee Thematic Discussion on Outer Space (Disarmament Aspects) (Oct. 27, 2014) (transcript available at http://www.state.gov/t/avc/rls/2014/233445.htm).

[434] OST art. X.

[435] *Id*.

[436] *Id.* at art. XI.

[437] *Id.*

controls, espionage, and security classification. This often makes it impracticable for states to offer the maximum disclosures suggested by OST Article XI. For example, the United States, while long and thoroughly publicizing NASA's space programs, classified for decades the very existence of the National Reconnaissance Office (NRO), let alone the imagery produced by its spy satellites—until after the collapse of the Soviet Union, its long-time Cold War antagonist.[438] Thus, while Article XI seemingly promotes a presumption of disclosure, it allows for exceptions whenever states consider certain space activities and findings to be impracticable to publicize.

7. Moon Visits

The circumstances contemplated in Article XII of the OST, which provides that States Parties shall allow representatives of other States Parties to visit their installations and vehicles on the Moon and other celestial bodies, have never materialized because such activities are wholly impracticable given the current maturity of human efforts at space colonization.[439] Nonetheless, this Article does contain a modest SSA data-sharing requirement in that it requires such visitors to give reasonable advance notice of any projected visit, so as to coordinate a safe visit that does not interfere with normal operations in the facility to be visited.[440]

8. Summary

The OST, with its repeated affirmations of international cooperation, encourages international SSA data sharing but leaves States Parties with substantial discretion as to the types of data they share and how they share them. Even where the OST states that states "shall" do certain things, such as avoid harmful contamination of space and undertake international consultations before engaging in a space activity that could cause harmful interference with other States Parties' peaceful space activities, states' practice has often been to preserve their own freedom of action, as demonstrated in events such as the West Ford needles experiment[441] and the various ASAT intercepts described in Section II.[442] However, considering that debris from those events has not yet caused harmful interference (though hundreds of pieces from the Soviet ASAT tests remained in orbit as of 2013),[443] one cannot conclusively

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[438] The NRO was created in 1961 and declassified in 1992. NRO, *About the NRO*, http://www.nro.gov/about/index.html (last visited May 4, 2016). Many of its specific missions were not declassified until much later, or remain classified. Bruce Berkowitz, The National Reconnaissance Office at 50 Years: A Brief History vi, 9 (2011), http://www.nro.gov/history/csnr/programs/NRO_Brief_History.pdf.

[439] Although U.S. astronauts have briefly visited the Moon during the *Apollo* program, and various states have deposited and operated vehicles on celestial bodies, no state has ever established a "station," "installation," or "facility" to visit.

[440] OST art. XII.

[441] *See* Hanson, *supra* note 238; *West Ford Needles*, *supra* note 101.

[442] *See*, e.g., Zeigler, *supra* note 123; Broad & Sanger, *supra* note 166.

[443] Marcia Smith, *"Gravity": The Real Story on Russian ASATs and China's Space Station* 3 (panel

judge the United States and Soviet Union to have violated their OST obligations by conducting the tests. Today, greater international understanding of the space debris problem may be strengthening states' understanding of what activities may produce potentially harmful contamination or harmful interference in outer space, which has led to measures such as the IADC Space Debris Mitigation Guidelines discussed earlier.[444]

D. Liability Convention

The Liability Convention says nothing explicit about the sharing of SSA data. However, because it deals with establishing liability for damage caused by space objects or their components, it must depend largely on SSA data to determine responsibility for any space object involved in an accident—particularly if the damage occurs in outer space, where the Liability Convention imposes liability only if a launching state or its persons are at fault.[445] Of course a state could concede fault at the outset of a dispute, which would limit the need for evidentiary examination. However, as found in the Cosmos 954 incident, a state may deny even the basic facts at the outset of an inquiry into the circumstances leading to a claim.[446]

Even if having SSA about a space accident is insufficient to prevent it from happening, it can help to identify the responsible launching state or states of the space objects involved, as well as details about the facts and circumstances of the incident. The involved parties can exchange whatever information they each may have, or perhaps obtain it from third-party SSA data collectors, in the course of discovery. This is essentially what eventually occurred in the Cosmos 954 incident. Similarly, although no international claim of any sort was filed in the case of the Iridium 33–Cosmos 2251 crash, SSA capabilities were necessary to forensically establish the nature of it after it happened, which could potentially have given rise to a claim if the fault had been more clearly divisible.[447]

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discussion: "Gravity" in Real Life: Legal and Political Implications of an Accident in Space, Washington, D.C. 2013), http://swfound.org/media/126969/Smith_GravityTalk_Dec2013.pdf.

[444] IADC Space Debris Mitigation Guidelines, *supra* note 32.

[445] Liability Convention, art. III.

[446] In secret meetings, Soviet officials warned U.S. counterparts that they had lost control of Cosmos 954, and that the spacecraft had failed to send the spent nuclear reactor core onboard into a safe disposal orbit. Then, after the Cosmos 954 reentered the atmosphere over western Canada, the Soviets claimed that the satellite had been completely destroyed during re-entry. That was not the case. Glenn Reynolds & Robert Merges, Outer Space: Problems of Law and Policy 179-180 (1998).

[447] Reasons proffered as to why no claim resulted from the collision include that Russia was a launching state of both satellites, and that both satellite owners shared fault. Jakhu, *supra* note 328, at 256-259.

E. Registration Convention

The Registration Convention was adopted in order to, *inter alia*, improve states' abilities to identify space objects and assign responsibility for damage caused by them, or to return pieces found outside the territory of their launching states.[448] As discussed in Section I of this article, it therefore establishes a specific set of data elements concerning space objects that States Parties must register with the U.N., as well as more specific registration procedures than were provided in U.N. General Assembly Resolution 1721 B (XVI).[449] It also requires States Parties to maintain their own national registries of space objects[450] of which they are a launching state.[451] If more than one launching state bears responsibility for a space object, they shall decide among themselves which state shall register the space object domestically and with the U.N..[452]

Another important provision of the Registration Convention is Article VI, which provides that where an unidentified space object has caused damage or presents a hazard to a State Party or to its persons, "other States Parties, including in particular States possessing space monitoring and tracking facilities, shall respond to the greatest extent feasible to a request by that State Party … for assistance under equitable and reasonable conditions in the identification of the object."[453] States Parties seeking such help should also provide any available details on the incident, and the provision of assistance is subject to the terms of any agreement the parties negotiate.[454] Of course, nothing in the Registration Convention prevents States Parties with space monitoring and tracking facilities from reaching out proactively to provide information such as the JSpOC's close approach warnings, even without a request from the injured state.

Unfortunately, states sometimes seem to take an overly permissive view of the Registration Convention's "as soon as practicable" language. For instance, neither the Iridium 33 nor the Cosmos 2251 had been registered with the U.N. at the time of their demise.[455] As some have argued, the Cold War superpowers intentionally designed the Registration Convention to allow for indefinite concealment of their most prized and secretive outer space assets.[456] Given the nature of the struggle, that

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[448] Registration Convention, preamble.

[449] *Id.* at art. IV.

[450] *Id.* at art. II(1).

[451] That is, a state that launches or procures the launch of a space object, or from whose territory or facility it is launched. *See id.* at art. I.

[452] *Id.* at art. II(2).

[453] *Id.* at art. VI.

[454] *Id.* at art. VI.

[455] Jakhu, *supra* note 328, at 258-259.

[456] Michel Bourbonnière & Ricky Lee, Legality of the Deployment of Conventional Weapons in Earth Orbit: Balancing Space Law and the Law of Armed Conflict, 18 Eur. J. Int'l. L. 5, 873,

may have been a wise decision because it tabled discussion of intractable security questions but still facilitated important dialogue that has led to enhanced sharing.

Laxity in registration is not confined to the United States and Russia. In fact, as one writer noted in 2006, "Of the 39 states that have launched space objects into Earth orbit or beyond, 16 are not parties to the Registration Convention. And of those 39 states, seven states … do not provide information to the United Nations."[457] Moreover, "[I]t should be noted with alarm that the percentage of non-registrations has been rising since the 1990s."[458] By resolution, the U.N. General Assembly itself has reminded space-faring states of the importance of ratifying and complying with the Registration Convention to reverse this trend, and encourages states to register their satellites in a timely manner.[459] Regardless, even full and timely registration information from all states to the U.N. as required by the Registration Convention would be inadequate to ensure space safety on its own. Rather, a much more robust and timely SSA sensor and notification system is needed to help predict and avoid collisions.

F. International Telecommunication Union (ITU) Rules

1. Introduction

The ITU's rules governing the registration of what frequencies and orbital positions satellites may use, and its procedures for resolving disputes over allegations of harmful interference, constitute an important portion of the international law concerning SSA data sharing. While U.N. space treaties and resolutions provide for registration and public sharing of basic data on satellites, the ITU's core governing documents, particularly the Radio Regulations, establish another international legal regime for the submission and coordination of information about satellites. They ensure radiofrequencies are allocated to satellite stations in ways that do not result in harmful interference with each other or with terrestrial radiocommunications.

The ITU, as a U.N. body, has 193 Member States, to which it adds over 700 non-governmental members in the communications industry.[460] The ITU's governing documents—that is, its Constitution, Convention, and Radio Regulations—are international treaties binding on all Member States, and Member States are bound to ensure that their telecommunications operators observe its operating rules designed to assure international services and minimize harmful radio-interference.[461]

892-893 (2008) (citing Ivan Vlasic, Disarmament Decade, Outer Space and International Law, 26 McGill L.J. 135, 190 (1981)).

[457] Yoon Lee, *supra* note 81, at 44.

[458] *Id.* at 50.

[459] G.A. Res. 62/101, *supra* note 397, at § 1.

[460] ITU, *About ITU* (2015), http://www.itu.int/en/about/Pages/default.aspx.

[461] Const. of the Int'l Telecommunication Union art. 6 (2011) [hereinafter ITU Constitution].

2. ITU Constitution

The ITU Constitution is the organization's foundational document.[462] It describes the ITU's first *purpose* as being "to maintain and extend international cooperation among all its Member States for the improvement and rational use of telecommunications of all kinds."[463] The ITU's first *duties* are to "effect allocation of bands of the radio-frequency spectrum, the allotment of radio frequencies and the registration of radio-frequency assignments and, for space services, of any associated orbital position in the geostationary-satellite orbit or of any associated characteristics of satellites in other orbits, in order to avoid harmful interference between radio stations of different countries;"[464] and to "coordinate efforts to eliminate harmful interference between radio stations of different countries and to improve the use made of the radio-frequency spectrum for radiocommunication services and of the geostationary-satellite and other satellite orbits."[465] These principles establish the ITU as a repository and coordinator of the types of data under its jurisdiction, some of which contribute to SSA.

The ITU Constitution recognizes that GSO and other orbits for satellites that use radio frequencies are limited natural resources. It therefore directs Member States to use only the minimum necessary amount of spectrum to provide their services, and to deconflict the reservations of orbital positions.[466] This, in turn, enables the most efficient, economical, and equitable allocation and use of these frequency bands and orbits for all countries.[467] Under the ITU Constitution, all stations, satellite or otherwise, "must be established and operated in such a manner as not to cause harmful interference to the radio services or communications of other Member States or of recognized operating agencies … which operate in accordance with the provisions of the Radio Regulations."[468]

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[462] *Id.* at art. 1.

[463] *Id.* at art. 1 § 1(*a*).

[464] *Id.* at art. 1 § 2(*a*).

[465] *Id.* at art. 1 § 2(*b*). Harmful interference is defined as "Interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with the Radio Regulations." ITU Constitution annex ¶ 1003. As applied in space, this definition is somewhat narrower than the way "harmful interference" is used in OST art. IX, which refers to harmful interference with any activities of other States in the peaceful exploration and use of outer space. However, since all satellites rely on radiocommunication to send their data back to Earth, any interference with a satellite that rose to the level of harmful interference under the ITU Constitution would probably also constitute harmful interference under the OST, unless the harmful interference were directed against a non-peaceful use of outer space.

[466] ITU Constitution art. 12.

[467] *Id.* at art. 44.

[468] *Id.* at art. 45 § 1.

For a Member State with space monitoring and tracking capabilities, maintaining and sharing SSA would be practical steps to keep its satellites from causing harmful radio- or kinetic interference with other stations. For example, if a Member State with SSA capabilities detects that a satellite is drifting out of its allotted position in GSO, it could notify the responsible Member State or satellite operator of the issue.

One key exemption in the ITU Constitution provides that "Member States retain their entire freedom with regard to military radio installations,"[469] although "so far as possible" they are to take measures to prevent harmful interference and "in general" comply with regulatory provisions for public correspondence services in which they may take part.[470] Military necessity or self-defense could plausibly be invoked to justify intentional harmful interference with an enemy belligerent's satellite communications, notwithstanding these provisions. In such situations, the Member State would likely characterize compliance with the harmful interference standards as impossible in light of military exigencies and overriding national security interests. However, as a practical matter, military users of the radiofrequency spectrum benefit substantially from having assured rights to use particular portions of the spectrum free from harmful interference.[471] Therefore, most Member States conform their own use of the military exemption to international standards, preferring to negotiate and work within the system to assure spectrum access.[472] Indeed, U.S. DoD electromagnetic spectrum management policy provides that "With very few exceptions, the rules and regulations of Radio Regulations of the International Telecommunication Union (ITU) … will be followed."[473]

3. ITU Convention

The ITU Convention is largely intended to set up the organizational structure of the ITU and its various constituent entities. One of these entities is the Radiocommunication Bureau, which bears the responsibility to "carry out studies

[469] *Id.* at art. 48 § 1.

[470] *Id.* at art. 48 §§ 2-3.

[471] *See, e.g.*, U.S. Dep't of Def. Instruction (DoDI) 4650.01, Policy and Procedures for Management and Use of the Electromagnetic Spectrum (Jan. 9, 2009).

[472] The U.S. Defense Spectrum Organization, for instance, actively coordinates requests for electromagnetic spectrum use within DoD, competes with other U.S. Federal Agencies and industry stakeholders to generate the U.S. national position, and attends each World Radiocommunication Conference (at which ITU policies are set) as a member of the U.S. Core Delegation. U.S. Defense Information Systems Agency, *Defense Spectrum Organization Repurposing* 3-4, http://www.disa.mil/Services/Spectrum/~/media/Files/DISA/Services/DSO/Strategic_Spectrum_Planning_Brochure.pdf (last visited May 4, 2016). The U.S. military also seeks to avoid interference with host nation spectrum uses, as illustrated by the recent negotiations between U.S. Pacific Command and Japan over activities within the 4.4-5.0 GHz frequency band. *See* Thu Luu, Address to 31st Annual USN-USMC Spectrum Management Conf.: Spectrum Certification 28 (Mar. 2010).

[473] DISA Circular 300-100-1, *Frequencies: Electromagnetic (EM) Spectrum Management and Use* (June 15, 2010), http://www.disa.mil/About/DISA-ssuances/~/media/Files/DISA/About/Publication/Circular/dc3001001.pdf.

to furnish advice with a view to … the equitable, effective and economical use of the geostationary-satellite and other satellite orbits, taking into account the needs of Member States requiring assistance, the specific needs of developing countries, as well as the special geographical situation of particular countries…."[474] While these studies could be conducted based on mathematical, physical, geographic, and economic analysis alone, the use of SSA data as part of some studies could supplement the theory with actual observations, to refine and improve the quality of the advice that comes out of the Radiocommunication Bureau's studies and any new policies that may be derived from them.

4. ITU Radio Regulations

(a) *Introduction*

The ITU Radio Regulations go into considerable detail defining the standards with which operators of international radiocommunications services must comply. They establish a Table of Frequency Allocations that breaks down the radiofrequency spectrum and records which types of services are authorized to operate within specific frequency bands along the spectrum in different geographical regions.[475] They also establish a Master International Frequency Register (MIFR) to recognize which stations have the right to use specific frequencies when transmitting signals internationally.[476] Once a frequency assignment is registered, it earns the right to be protected from harmful interference by any later registrants.[477]

Numerous types of satellite radiocommunication services are defined in the Radio Regulations.[478] Some stations may fall into more than one service, which the Radio Regulations acknowledge and prioritize.[479] The Radio Regulations also define three large geographic regions,[480] which collectively have somewhat different uses for different parts of the spectrum. Some frequency bands are allocated for the same

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[474] Convention of the Int'l Telecommunication Union, art. 12 § 4(a) (2011) [hereinafter ITU Convention].

[475] ITU-RR art. 5, § IV.

[476] *Id.* at art. 4, ¶ 4.3, art. 8, ¶ 8.1.

[477] ITU-RR art. 8, ¶¶ 8.3, 8.5.

[478] These include "fixed-satellite;" "inter-satellite;" "mobile-satellite" and its land, sea, and air variants; "broadcasting-satellite;" "radiodetermination-satellite;" "radionavigation-satellite" and its sea and air variants; "radiolocation-satellite;" "Earth exploration-satellite;" "meteorological-satellite;" "standard frequency and time signal-satellite;" "space research service;" "amateur-satellite;" and their associated feeder links. *Id.* at art. 1, § 3. A "feeder link" is a "radio link from an earth station at a given location to a space station, or vice versa, conveying information for a space radiocommunication service other than for the fixed-satellite service." *Id.* at art. 1, ¶ 1.115.

[479] *Id.* at art. 5, ¶¶ 5.23 *et seq*.

[480] Region I includes Europe, the former members of the USSR, Mongolia, the portion of southwest Asia west of Iran, and Africa. Region II includes the Americas and Greenland. Region III includes the remainder of Asia, Australia, and the South Pacific. *Id.* at art. 5, § I, ¶¶ 5.2-5.5.

use or uses across all three regions; some vary between one or more regions; and some vary even between individual countries.[481]

(b) *Registration*

To be assigned a frequency on the MIFR in support of a satellite, Member States must submit plans to the Bureau before they launch it on how they (or their domestic non-governmental operators) intend to use the satellite.[482] This submission provides information for ITU analysts to confirm whether they will or will not cause harmful interference with other existing radiocommunication services. Specifically, applicants seeking to be assigned a frequency on the MIFR must prepare and file the plans no earlier than seven years and no later than two years before they begin using a satellite or satellite system.[483] They also must "send to the Bureau a general description of the network or system for advance publication in the International Frequency Information Circular (BR IFIC)…."[484]

A lengthy list of the items satellite networks, earth stations, and radio astronomy stations may or must report when filing is found in Annex 2 to Appendix 4 of the Radio Regulations.[485] This list includes, over and above basic parameters such as those required in the Registration Convention, technical details about the station or network, such as the following:

- The easterly and westerly limits of longitudinal tolerance for GSO satellites;[486]
- The maximum number of non-GSO space stations simultaneously transmitting on the 3.4-4.2-GHz fixed-satellite service in the northern and southern hemispheres;[487]
- The collective orbital period (in seconds) of a satellite constellation that uses station-keeping to maintain a repeating ground track;[488]

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[481] For example, the 11.3-14 kHz band is allocated exclusively to radionavigation services in all three regions. *Id.* at art. 5, § IV, "Table of Frequency Allocations." However, the 890-942 MHz band has several different categories of service authorized to operate within it, which vary between and within regions, and it is subdivided into three smaller discrete bands in Region II. *Id.*

[482] *Id.* R art. 9, ¶ 9.1.

[483] *Id*.

[484] *Id.* The BR IFIC for space services is published every two weeks. ITU, *BR IFIC (Space services)* (2015), http://www.itu.int/ITU-R/go/space-brific/en.

[485] ITU-RR, app. 4, annex 2.

[486] *Id.* at § A.4.a.2.

[487] *Id.* at § A.4.b.3.

[488] *Id.* at § A.4.b.6.d.

- The minimum separation angle between the GSO arc, an associated ground station, and non-GSO satellites that can receive transmissions from the same station;[489]

- Commitments to comply with equivalent power flux-density requirements;[490]

- Identification and characteristics of antennae and their beams;[491] and

- "The connection between uplink and downlink frequency assignments for each intended combination of receiving and transmitting beams."[492]

In addition, proposed amendments to the registration plan must also be promptly reported to the Bureau, and must be published if they involve using a different frequency band, changing a geostationary satellite's orbital location by more than six degrees, or changing the reference body or direction of transmission of a non-geostationary satellite.[493]

Disclosures made through the registration process may contribute to SSA for ITU Member States that read the satellite's or satellite network's description in the BR IFIC, or later in the MIFR or the Radiocommunication Bureau's *List of Stations in the Space Radiocommunication Services and in the Radio Astronomy Service*.[494] Before the deployment of a satellite the Member State can coordinate with the satellite's intended owner to avoid harmful interference. After deployment it can monitor communications from space along the satellite's assigned frequency bands to maintain identification of the satellite.[495]

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[489] *Id.* at § A.14.b.5.

[490] *Id.* at §§ A.15 – A.17.

[491] *Id.* at § B.

[492] *Id.* at § D. The "uplink" is the communication channel by which the satellite receives commands or information from one or more ground stations. The "downlink" is the channel by which the satellite sends information back to Earth. A "crosslink" is a channel by which a satellite can communicate with other satellites in orbit. All satellites use uplink and downlink communications, but not all use crosslinks.

[493] ITU-RR art. 9, ¶ 9.2. The "reference body" is the object (e.g., Earth or the Moon) around which a satellite orbits.

[494] *Id.* at art. 20, ¶ 20.13.

[495] ITU-RR art. 16 permits states, groups of states, or international organizations, and private enterprises to conduct international frequency monitoring and report their findings to the ITU Radiocommunication Bureau. Moreover, all stations must transmit in a way that enables their identification. ITU-RR arts. 19.1, 27.6. At the same time, states must take measures to prevent the unauthorized interception or re-disclosure of non-public radiocommunications. ITU-RR art. 17; ITU Constitution art. 37.

(c) *Consultations*

As discussed above, States Parties to the OST may seek "appropriate international consultations" to avoid harmful interference with other states' peaceful space activities, although the OST does not elaborate as to the form such consultations should take.[496] However, the ITU Radio Regulations contain more detailed provisions under which Member States may invoke consultations when one Member State believes that another Member State's prospective satellite system may cause unacceptable interference to its own existing or planned satellite networks or systems.[497] To make such an invocation, it can notify the relevant state and the Radiocommunication Bureau to seek resolution of the identified interference.[498] Data about the actual or planned satellites' orbital positions, characteristics, and signal transmission would be shared between the parties to the conflict because the objecting state must provide "the particulars of the anticipated interference to its existing or planned systems,"[499] and thereafter both states "shall exchange any additional relevant information that may be available."[500]

Likewise, once a satellite station is operational, if it is believed to cause harmful interference, "the administration having jurisdiction over the receiving station experiencing the interference shall inform the administration having jurisdiction over the transmitting station whose service is being interfered with, *giving all possible information*."[501] (Emphasis added). The administration with jurisdiction over the allegedly interfering stations must also "furnish current ephemeral data necessary to allow determination of the positions of the space stations when not otherwise known."[502] Thus, this provision directly requires the sharing of SSA data as a basis for resolving the complaints of harmful interference. If consultations are unsuccessful, the administration suffering from the interference may appeal to the Bureau, provided it "shall then supply the Bureau with the full facts of the case, including all the technical and operational details and copies of the correspondence."[503]

(d) *Conclusion*

The ITU Radio Regulations comprise some of the most specific, detailed, and widely applicable requirements for the international sharing of SSA data. The registration and pre-clearance process requires substantially more information than

[496] OST art. IX.

[497] ITU-RR art. 9, ¶¶ 9.3-9.5B.

[498] *Id.* at art. 9 ¶ 9.3.

[499] *Id.*

[500] *Id*.

[501] *Id.* at art. 15, ¶ 15.31 (emphasis added).

[502] *Id.* at art. 15, ¶ 15.33.

[503] *Id.* at art. 15 ¶ 15.42.

the Registration Convention and its related U.N. resolutions.[504] The ITU's procedure for investigating cases of harmful interference is also much more explicit about SSA data sharing than the OST's.[505] The Radio Regulations make the ITU, and specifically its Radiocommunication Bureau, a very important clearinghouse for data about artificial Earth satellites both before and after they are launched.

That said, the ITU's primary mission is not SSA collection, and its procedures do not constitute a comprehensive framework for international SSA data sharing. For instance, being concerned with radio transmissions from satellites, it has nothing to say about SSA concerning potentially dangerous space objects that do not send radio signals, such as asteroids and defunct satellites. Additionally, while it directs that satellites must be designed with station-keeping abilities, the ITU does not mind if satellites drift off from their intended orbits as long as they do not cause harmful interference by doing so.[506] Thus, while ITU procedures must be carefully considered when evaluating any new SSA data-sharing proposals, and the structures developed are instructive, they are insufficient to govern the extent of international SSA data sharing that may occur separately under other authorities.

G. European Space Agency

The Convention for the Establishment of a European Space Agency (ESA)[507] provides a useful model for regional cooperation in space activities, to include the generation and sharing of SSA data between and among ESA members and associates. While it is not as universally applicable as the U.N. space treaties or the ITU Constitution, Convention, and Radio Regulations, the ESA Convention and its associated regulations acknowledge the utility of pooling its parties' national human, technical, and financial resources to conduct space activities,[508] and coordinating and integrating the European and national space programs.[509]

On the sharing of information gained from space research, the ESA Convention provides that Member States and the ESA "shall facilitate the exchange" of such information with each other, but that a Member State may preserve the secrecy of data gained outside the ESA if necessary to protect its national security or honor an

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[504] To illustrate, the ITU Radio Regulations contain tables spanning 40 pages of required data elements (ITU-RR, app. 4, annex 2), whereas the entire Registration Convention is only four pages long.

[505] Compare ITU-RR art. 15 with OST arts. IX and XI.

[506] *See, e.g.*, *id.* at art. 22, ¶¶ 22.10, 22.14, 22.18.

[507] Convention for the Establishment of a European Space Agency, May 30, 1975, CSE/CS(73)19, rev. 7, as amended through Jan. 1, 2010 (entered into force Oct. 30, 1980) [hereinafter ESA Convention].

[508] *Id.* at Preamble.

[509] *Id.* at art. II, ¶ d.

agreement with a third party.[510] Any technical data belonging to the ESA "shall be disclosed to the Member States and may be used for their own purposes by these Member States and by persons and bodies under their jurisdiction, free of charge."[511] This information should be understood to include SSA data as well as the formulae, diagrams, models, and training needed to generate and interpret it.[512] However, the ESA also retains the ability to limit disclosure of its data outside its membership.[513] It may do so by forbidding disclosure, by requiring that disclosure happen only pursuant to a written agreement, or by charging the third party for the data.[514]

The ESA is vested with the responsibility to "collect relevant information and disseminate it to Member States, draw attention to gaps and duplication, and provide advice and assistance for the harmonisation of international and national programmes."[515] This provision allows the ESA to serve as a central hub for some of its Member States' SSA data, as well as to coordinate the Member States' SSA-gathering programs.[516] The ESA also has the power to enter agreements with governments, organizations, and institutions of both Member and non-Member States,[517] as it has done with Canada's longstanding associate membership,[518] various contractors, and USSTRATCOM[519]—thus extending the benefits of its Members' internal SSA data sharing to external partners as well.

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[510] *Id.* at art. III, § 1. For example, if the U.S. shared confidential SSA data with the UK under a non-disclosure agreement, the UK would not have to provide this information to the ESA or its other Member States.

[511] *Id.* at art. III, § 4. However, the regulations associated with the ESA Convention narrow the "free of charge" clause to allow the ESA to charge royalties if a Member State intends to use or reproduce ESA information for purposes other than its own space research and technology or space applications. ESA, *Rules on Information, Data and Intellectual Property* (ESA/C/CLV/Rules 5), ch. 1 § 2, http://download.esa.int/docs/LEX-L/Contracts/20011219.ESA-C-CLV-Rules_5_EN.Resolution-Info-Data-&-IP.pdf [hereinafter ESA Data Rules].

[512] The ESA Data Rules at annex 1 define "Information and Data" as:

> "[K]nowledge which is not or cannot be protected by a legal title of IPR [intellectual property right]. It may take forms of technical data and technical assistance such as blueprints, plans, diagrams, models, formulae, tables, engineering designs and specifications, manuals, instructions, skills, training, working knowledge or consulting services, whether written or recorded on other media or devices such as disk, tape or read-only memories. This knowledge may belong to a legal person or body and may be protected by trade secret and know-how[.]"

[513] *Id.* at ch 5.

[514] *Id*.

[515] ESA Convention art. V, § 1(a)(iii).

[516] *Id.*; *see also id*. at art II.

[517] *Id.* at art. XIV, § 1.

[518] Lydia Dotto, *Canada and The European Space Agency: Three Decades of Cooperation*, ESA (May 2002), http://www.esa.int/esapub/hsr/HSR_25.pdf.

[519] USSTRATCOM Public Affairs, *USSTRATCOM Signs Space-Data Sharing Agreement with ESA* (Oct. 31, 2014), https://www.stratcom.mil/news/2014/524/USSTRATCOM_signs_Space-Data_Sharing_Agreement_with_ESA/ [hereinafter *Space-Data Sharing Agreement with ESA*].

As mentioned in Section III above, the ESA used the authority granted by its Convention to start a formal, though optional, SSA program in 2009.[520] The program involves three primary categories of SSA collection and sharing: space surveillance and tracking, space weather, and near-earth objects.[521] The space surveillance and tracking category is the one primarily concerned with observation of manmade space objects, while the other two categories deal with collecting and sharing data on natural phenomena.[522]

The ESA SSA Programme provides a worthy model for international cooperation in SSA data sharing. It enables a group of similarly situated Member States with a common interest in SSA to pool their resources to improve their collective space surveillance and tracking capabilities. It must be considered by any third party potentially interested sharing SSA data with an ESA Member State.

H. Other International Agreements

The foregoing international legal instruments are the most relevant ones for the purpose of this article on SSA data sharing. Others exist, but they are more tangential to the subject. For example, the Inter-Governmental Agreement for the International Space Station implicates SSA data sharing, but only insofar as it relates to the ISS project.[523] Likewise, there are international arrangements to coordinate the use of satellites, such as the Committee on Earth Observation Satellites (CEOS)[524] and the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters (Disaster Cooperation Charter).[525] These focus on using space capabilities to boost situational awareness of events on Earth, not improving the situation in outer space itself. Interestingly, the Disaster Cooperation Charter may be invoked in periods of "crisis" imminently preceding a natural disaster, and does not restrict its definition of "space facilities" to those observing the Earth.[526] Therefore, perhaps if a large asteroid were detected

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[520] Fourteen of 20 ESA Member States have joined to fund it. ESA, *SSA Programme Overview*, *supra* note 365.

[521] *Id*.

[522] *Id*.

[523] Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station, Jan. 29, 1998, T.I.A.S. 12927. For example, Article 19 provides for technical data exchanges, Article 23 for consultations, and Article 13 for integrated communications among U.S., Russian, and other compatible networks for support to the ISS.

[524] CEOS, *Committee on Earth Observation Satellites: Strategic Guidance* (Nov. 2013), http://www.ceos.org/images/CSS/CEOS_Strategic_Guidance_Nov_2013.pdf.

[525] Disaster Charter, *Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters* (Apr. 25, 2000), http://www.disasterscharter.org/web/charter/charter [hereinafter Disaster Cooperation Charter].

[526] Disaster Cooperation Charter, arts. I-II.

approaching Earth, which if it struck would likely produce great distress involving loss of human life or damage to property, a country that identified itself as threatened could invoke the Disaster Cooperation Charter to request that states and agencies operating satellites such as those in the Landsat and SPOT constellations[527] orient their sensors toward the asteroid for early warning and threat assessment purposes, then back toward Earth to assess the results of any impact.

I. Conclusion

Numerous treaties support SSA data sharing concepts, but largely leave states with the discretion as to how much data they wish to share. The Registration Convention and ITU Radio Regulations, along with the non-binding U.N. General Assembly Resolution 62/101, require the publication of certain basic parameters of satellites' orbits and functions, but do not require states to share their most current SSA information with each other on an ongoing basis. The data furnished pursuant to ITU Radio Regulations can play a role in long-term planning of space activities and resolution of EMI issues, and provide considerably more granular SSA data than the Registration Convention requires. The Registration Convention has not lived up to its promise as it has often been undermined by non-registration or delayed registration of spacecraft and associated objects by the responsible launching states, thanks in part to its generous "as soon as practicable" language.[528]

Beyond the initial registrations of space objects and frequencies and any voluntary updates to those registrations, states are obliged under the OST and the ITU Radio Regulations to inform each other when they detect a risk of harmful interference between their space object or radio communication station and another state's.[529] This may correspond to the vaguely defined "consultations" under OST Article IX, or the more specific dispute resolution process detailed in Article 15 of the ITU Radio Regulations.[530] However, even the "mandatory" language found in the ITU Radio Regulations does not mean that the ITU can force a state accused of harmful interference to turn over its SSA data if it refuses to do so.[531] The ITU is a consultative body that lacks enforcement powers even when its members are determined to misbehave.[532]

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[527] Disaster Charter, *Charter Members and Space Resources* (June 25, 2014), http://www.disasterscharter.org/web/charter/members.

[528] Registration Convention art. IV ¶ 1; *cf.* Yoon Lee, *supra* note 81.

[529] *See* OST art. IX; *cf.* ITU-RR art. 15, sec. V-VI.

[530] *See supra* Part VI.D.3.

[531] The ITU Radiocommunication Bureau may forward reports identifying suspected sources of harmful interference to governmental communications regulators, along with "a request for prompt action," but it has no independent punitive authority. ITU-RR, art. 15 ¶ 15.46.

[532] For example, the ITU has proven powerless to prevent Iranian jamming of satellite broadcasts or North Korea's unregistered "satellite launch." Peter de Selding, *France Seeks ITU Help to Halt Satellite Signal Jamming by Iran*, SpaceNews, Jan. 8, 2010, http://www.spacenews.com/article/france-seeks-itu-help-halt-satellite-signal-jamming-iran; Joanne Gabrynowicz, *North*

While current treaties encourage SSA data sharing, they only do so vaguely or in a way that is difficult to enforce. There must be a better way to achieve SSA sharing objectives in support of space safety and mission assurance. The final section will explore various concepts and proposals for the enhancement of international SSA data sharing in more detail.

V. PROPOSALS FOR THE FUTURE

> *The increasingly congested space environment means that an unparalleled level of information sharing is needed to promote safe and responsible operations in space and to reduce the likelihood of mishaps, misperceptions, and mistrust.*[533]

> *Any system that is developed to perform SSA sharing must balance realistic and unrealistic secrecy interests about national security space systems and commercial proprietary interests, against operational, safety and stability benefits.*[534]

A. Introduction

Some current proposals for improving international space situational awareness (SSA) include increased unilateral SSA data publication by states with SSA capabilities; bilateral or multilateral SSA data-sharing agreements; an international "code of conduct" for space activity; and an international space traffic management (STM) system. A potential corollary to increased international SSA data sharing is a treaty banning anti-satellite (ASAT) weapons. Collectively, measures that seek to increase the sharing of information and reduce international mistrust, often in an arrangement short of a formally binding treaty, are referred to as transparency and confidence-building measures (TCBMs). This section will discuss the merits and shortcomings of each of these approaches, and how some of them can be combined to best effect.

B. Potential Solutions

1. Unilateral SSA Data Publication

Any state, within the constraints of its own domestic law and national security considerations, can provide its SSA data to any other entity. As described previously, the United States even has a public website, Space-Track.org, providing

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Korea "Ignored Satellite Procedures," Res Communis, Apr. 8, 2009, http://rescommunis.olemiss.edu/2009/04/08/north-korea-ignored-satellite-procedures (citing The Yomiyuri Shimbun, Apr. 8, 2009).

[533] Loverro, *supra* note 241, at 5.

[534] Ryals & Rendleman, *supra* note 242, at 8.

basic SSA data to registered users. More states and non-governmental or inter-governmental entities could adopt this approach to make more data available; the European Space Agency (ESA) is already preparing a similar system.[535] If states and non-state space operators publish their own SSA data, they can choose the terms of publication and types of data to make available, which makes such publication a more attractive and feasible option.

One challenge for users of SSA data provided directly by various individual states is how to coordinate and interpret the data from these diverse sources. Differences in nomenclature, data formats, data elements, errors accepted, and atmospheric and space weather modeling, to include differences in actual observations and predictions, would all need to be resolved by the end-users before they could consider the shared data useful.[536] Given the complexity of the orbital environment and the models that simulate it to predict the movements of space objects, it is helpful for SSA inputs to be collected into compatible formats so that computers can run the calculations as efficiently and accurately as possible. Just as United Nations (U.N.) Resolution 62/101 helped to standardize the registration process for satellites in greater detail, it may be helpful for industry and state practice to converge on similar modes of SSA data reporting.

Another potential danger associated with the unilateral approach is that some states could track and publicize data about sensitive satellites that other countries do not want broadcast to the world. It has been reported that at one time, the United States included sensitive French reconnaissance and military communications satellites in its public catalogue, and France threatened to respond by publishing information about classified U.S. satellites that France and Germany were tracking.[537] Thus, even a "unilateral" approach to SSA data sharing will likely require some amount of international coordination to keep similar situations from recurring.

2. SSA Data-Sharing Agreements

(a) *Bilateral*

Bilateral agreements are useful because they enable states to select specific partners with which to share SSA data, and negotiate the details in a way that is tailored to the states' needs, capabilities, and level of trust. By selecting and screening partners in this way, states can share more timely and detailed information with

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[535] ESA – Space Situational Awareness, *supra* note 271.

[536] *See, e.g.*, ESA, *ESA supports global format for debris warnings* (July 18, 2013), http://www.esa.int/Our_Activities/Operations/Space_Situational_Awareness/ESA_supports_global_format_for_debris_warnings; Tamara Payne et al., *A Community Format for Electro-Optical Space Situational Awareness (EOSSA) Data Products*, AMOS (Sept. 10, 2014), http://www.amostech.com/TechnicalPapers/2014/Poster/PAYNE.pdf.

[537] Peter de Selding, *French Say "Non" to U.S. Disclosure of Secret Satellites*, SPACE.COM (June 8, 2007), http://www.space.com/3913-french-disclosure-secret-satellites.html.

each other via the agreement than they would consider safe to share with the general public. For example, the United States presently has bilateral SSA data-sharing agreements in place with Australia, Italy, Japan, Canada, France, South Korea, the United Kingdom, Germany, Israel, Spain, and the United Arab Emirates.[538] The key disadvantage of bilateral agreements is that they are effective only between the two state parties, and may not be able to incorporate SSA data generated by third countries and not shared with the signatories.

(b) *Multilateral*

Multilateral SSA data sharing agreements may be entered into by a small, close-knit group of states, or by a larger and more open group. Smaller, closed multilateral agreements would share most of the advantages and disadvantages of bilateral agreements. They would be able to expand the pool of data available to all parties beyond what a bilateral agreement would offer (assuming each of the parties is contributing some SSA capability that the others lack), but potentially would not ensure as comprehensive of an SSA picture as a more widely subscribed multilateral agreement would. They could, however, provide in depth what they lack in breadth, even to the point of integrating space operations as envisioned in the combined space operations construct.[539]

An intermediate level of multilateral SSA data-sharing agreement could be between an existing intergovernmental organization (IGO) such as the ESA and one or more non-member state parties, analogous to the air transport agreements that the European Union (EU) has entered with Canada[540] and with the United States, Iceland, and Norway,[541] and the ESA's SSA data-sharing agreement with USSTRATCOM.[542] Factors to consider in such an arrangement would be the degree to which partners outside an IGO trusted each of the individual members within an IGO, as well as how to treat, for example, ESA members who have not joined ESA's optional SSA program.

At the broadest level, an international convention on SSA data sharing could be open to any state willing to participate. Such a widely joined multilateral agreement would, at least in theory, provide the most comprehensive SSA picture for its participants. However, heightened security concerns among the participating

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[538] *USSTRATCOM, UAE sign agreement*, *supra* note 354; Lt Gen Raymond Statement, *supra* note 262, at 6.

[539] *See* Lt Gen Buck Statement, *supra* note 5, at 6.

[540] Agreement on Air Transport between Canada and the European Community and Its Member States, CE/CA/en (Dec. 17, 2009), http://ec.europa.eu/transport/modes/air/international_aviation/country_index/doc/canada_final_text_agreement.pdf.

[541] Air Transport Agreement between the United States of America and the European Union and Its Member States, Iceland, and Norway, U.S.-E.U.-Ice.-Nor. (June 16 and 21, 2011), http://www.state.gov/documents/organization/170897.pdf.

[542] Space-Data Sharing Agreement with ESA, *supra* note 519.

states would constrain widely-adopted agreements, especially if the participants included countries with hostile histories and political philosophies. These concerns could reduce the quantity and quality of data to be shared under such an agreement.[543] What a widely adopted multilateral agreement gained in breadth, it could lose in depth, as trust would tend to diminish with the increase in membership.

Some have even proposed that the U.N. create a new organization to serve as an international space surveillance hub.[544] However, such broadly shared collective measures would likely be fraught with problems. When responsibility is diffused among states, which may or may not have substantial indigenous interests in space, or which have contrary interests, it is difficult for the project to run effectively—or even to get off the ground in the first place. Pride, paranoia, and payment problems, as well as foreign disclosure, security classification, and export control laws, have often scuttled past attempts at international space cooperation.[545]

As examples of the challenges of international space cooperation, look to the tensions between the United States and Russia that began to emerge in recent years. The U.S. Congress thwarted Russia's attempts to build GLONASS positioning satellite ground stations in the United States in late 2013, citing security and competitive concerns.[546] Then in April 2014, NASA suspended most relations with Russia (apart from cooperation on the International Space Station) due to Russia's invasion of Crimea and its ongoing covert warfare in Ukraine.[547] In retaliation, Russia announced it would no longer allow Russian rocket engines to be used to launch U.S. military satellites,[548] and Russian Deputy Prime Minister Dmitry Rogozin quipped that the United States should deliver its astronauts to the ISS on a trampoline.[549] On

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[543] For example, States would not likely reveal the attributes, vulnerabilities, and maneuver capabilities of national security satellites, nor would commercial satellite owner-operators want to disclose sensitive proprietary information on the capabilities, life, and health of their commercial satellites. Ryals & Rendleman, *supra* note 242, at 8.

[544] *See, e.g.*, Long-term Sustainability of Outer Space Activities, *supra* note 373; Kiran Nair, Address at Manfred Lachs Conference on Space Governance: Space Situational Awareness under the United Nations 8, 10 (2014), http://www.mcgill.ca/iasl/files/iasl/mlc-2014-nair.pdf.

[545] James Rendleman & J. Walter Faulconer, *Improving International Space Cooperation*, Strategic Space Solutions 12 (2010), http://strategicspacesolutions.com/Public-papers/Intl-Space-Coop%206-5-10.pdf.

[546] Eric Schmitt & Michael Schmidt, *New Law All But Bars Russian GPS Sites in U.S.*, N.Y. Times, Dec. 28, 2013, http://www.nytimes.com/2013/12/29/world/europe/new-law-all-but-bars-russian-gps-sites-in-us.html?pagewanted=print; Mike Gruss, *Lawmakers Flag Proposal for U.S.-based Glonass Ground Stations* SpaceNews, Nov. 25, 2013, http://www.spacenews.com/article/military-space/38340lawmakers-flag-proposal-for-us-based-glonass-ground-stations.

[547] Arielle Duhaime-Ross, *NASA Suspends Contact with Russia over Ukraine Crisis*, The Verge (Apr. 2, 2014), http://www.theverge.com/2014/4/2/5574896/nasa-suspends-contracts-with-russia.

[548] Katie Zezima, *The Tug of War Between NASA and Russia Continues*, Wash. Post, May 13, 2014, http://www.washingtonpost.com/blogs/post-politics/wp/2014/05/13/the-tug-of-war-between-nasa-and-russia-continues/.

[549] Adam Taylor, *Russia's Deputy PM Tells U.S. Astronauts to Go to Space on a Trampoline;*

17 July 2014, Russian or Russian-backed forces in Ukraine shot down a Malaysian civilian airliner with 298 souls aboard.[550] With so little regard for even innocent human life and international law,[551] reminiscent of the Soviet shootdown of Korean Airlines Flight 007 in 1983,[552] should Russia be trusted to not attack a satellite if it decided to do so?

Other recent instances exposing the difficulty of maintaining international trust include the U.S. case unveiled against Chinese military members engaged in cyber-espionage.[553] Chinese military doctrine continues to emphasize the usefulness of a first strike on an enemy's space assets as part of modern "informatized" warfare,[554] necessary to offset the current U.S. advantages in space.[555]

Moreover, the U.N. has a history of corruption[556] and its mechanisms may not be trustworthy. It affords comparable and equivalent equal treatment to Member

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the Joke May Be on Him, Wash. Post, Apr. 30, 2014, http://www.washingtonpost.com/blogs/worldviews/wp/2014/04/30/russias-deputy-pm-tells-u-s-astronauts-to-go-to-space-on-a-trampoline-the-joke-may-be-on-him/.

[550] Michael Birnbaum & Anthony Faiola, *Initial U.S. Assessment: Pro-Russian Rebels Fired Missile that Downed Malaysia Jet*, Wash. Post, July 18, 2014, http://www.washingtonpost.com/world/missile-downs-malaysia-airlines-plane-over-ukraine-killing-298-kiev-blames-rebels/2014/07/18/d30205c8-0e4a-11e4-8c9a-923ecc0c7d23_story.html; Tom Rogan, *What to Do After MH 17*, Nat'l Rev. Online (July 18, 2014, 8:30 PM), http://www.nationalreview.com/article/383053/what-do-after-mh-17-tom-rogan.

[551] Chicago Convention art. 3 *bis*(a) provides: "The contracting States recognize that every State must refrain from resorting to the use of weapons against civil aircraft in flight and that, in case of interception, the lives of persons on board and the safety of aircraft must not be endangered…." Russia is a party to the protocol that added this article to the Chicago Convention. Protocol Relating to an Amendment to the
Convention on International Civil Aviation article 3 *bis* (signed at Montreal May 10, 1984, entered into force Oct. 1, 1998), *available at* http://www.icao.int/secretariat/legal/List%20of%20Parties/3bis_EN.pdf.

[552] Thom Patterson, *KAL Flight 007: How the Cold War fueled an unthinkable tragedy*, CNN, Aug. 31, 2013, http://www.cnn.com/2013/08/31/us/kal-fight-007-anniversary/index.html. Of note, art. 3 *bis* of the Chicago Convention was adopted after this incident.

[553] U.S. Dep't of Justice, U.S. Charges Five Chinese Military Hackers for Cyber Espionage Against U.S. Corporations and a Labor Organization for Commercial Advantage (May 19, 2014), http://www.justice.gov/opa/pr/2014/May/14-ag-528.html; Mandiant Corp, APT1: Exposing One of China's Cyber-Espionage Units (Feb. 19, 2013), http://intelreport.mandiant.com/Mandiant_APT1_Report.pdf.

[554] U.S. Dep't of Def., Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 33 (2013).

[555] As one senior U.S. defense official testified, "Any adversary would almost certainly trade its own ability to utilize space if in return it could deny U.S. use of space to support military and intelligence operations." Hearing Before the Strategic Forces Subcomm. of the H. Comm. on Armed Services 3, 114th Cong. (Mar. 15, 2016) (statement of Dyke Weatherington, Principal Director for Space, Strategic, and Intelligence Systems), *available at* hhrg-114-as29-wstate-weatheringtond-20160315.pdf.

[556] Stefan Halper, *A Miasma of Corruption: The United Nations at 50*, Cato Pol'y Analysis 253

States with vast differences in their practices and respect for human rights and international law.[557] Given the international tensions raging around the world today, it is difficult to conceive of a global space operations center manned by even the five permanent members of the U.N. Security Council, let alone the U.N. as a whole.

3. Space Code of Conduct

The European Union (EU) has drafted an international code of conduct (ICOC) for outer space activities.[558] The United States has expressed support for such a code in general terms,[559] but with reservations that have kept it from endorsing the EU document.[560] India, Australia, and Japan have indicated varying levels of interest in the Code.[561] The ICOC, as drafted, states that it seeks to reduce the potential for accidental damage, conflict, and misunderstanding between spacefaring states by setting non-binding guidelines to enhance the safety, security, and sustainability of human space activity.[562] The ICOC's current draft both implies and explicitly discusses sharing SSA data as a mechanism for achieving its goals.[563] Subscribing states also pledge to "refrain from any action which brings about, directly or indi-

(Apr. 30, 1996), http://www.cato.org/pubs/pas/pa-253.html; *Corruption at the Heart of the United Nations*, Economist, Aug. 9, 2005, http://www.economist.com/node/4267109; Associated Press, *Bolton: U.N. Riddled With "Bad Management, Sex and Corruption,"* Fox News (Feb. 25, 2006), http://www.foxnews.com/story/2006/02/25/bolton-un-riddled-with-bad-management-sex-and-corruption; Colum Lynch, *The Story of Russia's Fight to Keep the U.N. Corrupt*, Foreign Pol'y, June 25, 2013, http://www.foreignpolicy.com/articles/2013/06/25/the_inside_story_of_russias_fight_to_keep_the_un_corrupt.

[557] *See, e.g.*, U.N. Office of the High Commissioner for Human Rights, *Current Membership of the Human Rights Council* (2014), http://www.ohchr.org/EN/HRBodies/HRC/Pages/CurrentMembers.aspx (including such notorious serial human rights abusers as Cuba, China, and Venezuela); *cf.* Claudia Rosett, *The Real Rules of the U.N. Human Rights Council*, Nat'l Rev. Online (Sept. 11, 2012, 4:00 AM), http://www.nationalreview.com/article/316466/real-rules-un-human-rights-council-claudia-rosett.

[558] European Union, *Draft International Code of Conduct for Outer Space Activities* (2013), http://eeas.europa.eu/non-proliferation-and-disarmament/pdf/space_code_conduct_draft_ vers_16_sept_2013_en.pdf [hereinafter ICOC].

[559] Frank A. Rose, Dep. Ass't Sec. of State, Bureau of Arms Control, Verification & Compliance, Remarks to the National Space Symposium: Pursuing an International Code of Conduct for the Security and Sustainability of the Space Environment (Apr. 18, 2012), http://www.state.gov/t/avc/rls/188088.htm.

[560] Loverro, *supra* note 241, at 3; Chris Johnson, *Draft International Code of Conduct for Outer Space Activities Fact Sheet*, Sec. World Found. (Feb. 2014), http://swfound.org/media/166384/SWF_Draft_International_Code_of_Conduct_for_Outer_Space_Activities_Fact_ Sheet_February_2014.pdf.

[561] Rajeswari Rajagopalan, *The Space Code of Conduct Debate: A View from Delhi*, Strategic Stud. Q. 137, 143 (2012).

[562] ICOC § 1.1.

[563] *See, e.g.*, *id.* at § 5 (notifying other states of events related to space activity); § 6.1 (sharing information on policies and procedures to prevent accidents and space debris); and § 6.2 (providing timely information on natural space phenomena that may threaten spacecraft, which States have observed or forecasted with their own SSA tools).

rectly, damage, or destruction, of space objects unless such action is justified" by imperative safety considerations, self-defense or other terms of the U.N. Charter, or to reduce the creation of space debris.[564] It promotes international cooperation in outer space activities, while recognizing states' need to maintain, for example, "appropriate technology safeguard arrangements."[565]

The ICOC sets useful targets for its Subscribing States to strive towards, but its non-binding nature means that violating it will carry no legal consequences for a state, and potentially no security benefits for those that adhere to it, unless the violation also breaches the OST or other international obligations.[566] If some states adhere to it while others do not (whether they have signed it or not), the non-adherents could gain an unfair advantage over those states that try to follow it in good faith.[567] Others have expressed concerns that the ICOC could be invoked as an arms-control document in disguise, that it seeks to impose changes in domestic law from the top down even as states are already striving to meet many of its terms on their own, and that it could unduly limit freedom of action in outer space.[568] Still, the code of conduct reflects positive aspirations about how states should conduct space activities, and may help to improve cooperation and sustainability in the space environment if it is followed.

4. Space Traffic Management

Going beyond SSA data sharing alone, some have called for developing an international space traffic management (STM) system[569] akin to the international air traffic management (ATM) system fostered by the International Civil Aviation Organization (ICAO).[570] STM would require a foundation of widespread international SSA data sharing, and build on it an operational structure of space traffic controllers, responsible for coordinating and directing traffic in and between geospatial zones akin to the Flight Information Regions in international civil aerial navigation.[571] It

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[564] *Id.* at § 4.2.

[565] *Id.* at § 6.3.

[566] Laura M. Delgado, *Code of Conduct Is Like "Sarlacc Pit" Says Peter Marquez*, SpacePolicyOnline.com (Aug. 22, 2012), http://www.spacepolicyonline.com/news/code-of-conduct-is-like-sarlacc-pit-says-peter-marquez.

[567] Rajagopalan, *supra* note 561, at 144.

[568] *See, e.g.*, George C. Marshall Institute, *Codes of Conduct in Space: Considering the Impact of the EU Code of Conduct on U.S. Security in Space* 2, 4 (Feb. 4, 2011), http://marshall.wpengine.com/wp-content/uploads/2013/09/927.pdf.

[569] *See, e.g.*, Air University, *Space Traffic Control: The Culmination of Improved Space Operations*, SpaceCast 2020 Technical Report, Vol. 1 (June 22, 1994), http://www.au.af.mil/Spacecast/app-d/app-d.html; *Out There: Space Traffic Control System Needed*, Space.com (Nov. 9, 2008), http://www.space.com/6080-space-traffic-control-system-needed.html.

[570] *See* Chicago Convention arts. 37, 44, Annex 11, "Air Traffic Services" (2001).

[571] See *id*. at Annex 11.

would also require a more comprehensive and internationally integrated system of space surveillance than exists today.

STM still has many significant technological, legal, and manpower hurdles to overcome, from determinations of liability[572] to funding to national security concerns. The security concerns would be difficult to minimize, such that states would likely feel more vulnerable if they had to supply highly accurate and detailed information on their sensitive satellites to international STM authorities. However, just as state aircraft are exempt from the Chicago Convention,[573] militarily sensitive state satellites, and possibly some commercial satellites with militarily sensitive payloads or missions, could be exempted from having to follow STM requirements, subject to a requirement to act with due regard for the safety of other space objects. Indeed, the U.S. has endorsed such a distinction in the U.S. Commercial Space Launch Competitiveness Act of 2015, which directs a study of considerations and options for "space traffic management of United States Government assets and United States private sector assets in outer space and orbital debris mitigation,"[574] but recognizes the Defense Department's "vital and unique role in protecting national security assets in space" and does not affect the Secretary of Defense's authority to safeguard national security.[575] Of course, any STM regime that applies only at the national level, and only to a country's civil and commercial space assets, will necessarily be limited in scope.[576] However, having a national-level licensing regime for national on-orbit activities will improve states' ability to exercise "authorization and continuing supervision" over those activities as required by Article VI of the Outer Space Treaty, and to minimize their liability risks under Article VII of the Outer Space Treaty and Article III of the Liability Convention.[577]

5. ASAT Ban

Finally, China and Russia have proposed a Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (PPWT).[578] The proposal, similar to a treaty the Soviet Union

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[572] For example, if an accident is caused by a space traffic controller's negligence, will the STM authority be liable under the Liability Convention? *See* Jakhu, *supra* note 328, at 258.

[573] Chicago Convention art. 3.

[574] U.S. Commercial Space Launch Competitiveness Act, Pub. L. No. 114-90 § 109(a), 129 Stat. 704, 708 (2015).

[575] *Id.* at § 109(e).

[576] For instance, of the over 1,300 active satellites presently in orbit, over 100 of them are U.S. military and intelligence satellites. *UCS Satellite Database*, *supra* note 27; *cf.* Lt Gen Buck Statement, *supra* note 5, at 3; General Hyten Statement, *supra* note 228, at 11.

[577] OST arts. VI-VII; Liability Convention art. III.

[578] Russian Federation & People's Republic of China, Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (June 10, 2014), U.N. Doc. CD/1985 [PPWT].

proposed in 1983,[579] updates an earlier draft treaty presented in 2008.[580] While this document is not an SSA data sharing measure, it could be seen as a TCBM aimed at reducing ASAT fears and thus, indirectly, encouraging the greater sharing of SSA data. However, it fails in this regard.

The PPWT purports to proscribe the use or stationing of weapons in space, and the use or threat of force against space objects.[581] It has gained little support elsewhere in the U.N..[582] The PPWT contains no effective verification system;[583] does not improve the national security of other states as they see it; and could unduly restrict the use and development of technologies and techniques such as on-orbit servicing of satellites, space debris removal, and ballistic missile defense.[584] It does not prevent ground-based ASAT strikes such as the one China carried out in 2007, nor does it ban ASAT attacks on non-signatories.[585]

Underlying its textual flaws, the motivation behind the PPWT appears suspect. Both the PPWT's sponsors have a well-documented history of covert weapons program development in spite of their nominal agreement to weapons-control treaties.[586] Because of the risk of being cheated, states would do better not to sign onto such agreements in the first place, so that they would not face the dilemma of

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[579] U.S.S.R., Soviet Draft Treaty on the Prohibition of the Use of Force in Outer Space and from Space Against the Earth (Aug. 22, 1983), U.N. GAOR, U.N. Doc. A/38/194.

[580] Russian Federation & People's Republic of China, Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects (Feb. 29, 2008), U.N. Doc. CD/1839.

[581] PPWT art. II.

[582] Rather, the consensus reached by the UN's Group of Governmental Experts and endorsed by the General Assembly favored non-binding TCBMs and a multilateral code of conduct for space activities. Buck, *supra note* 433; *cf.* G.A. Res. 68/50, U.N. GAOR, 2013, U.N. Doc. A/RES/68/50.

[583] The draft treaty simply affirms that States Parties may engage in voluntary TCBMs and states, "Measures to verify compliance with the Treaty may form the subject of an additional protocol." PPWT art. V.

[584] United Nations Office at Geneva (UNOG), *Conference on Disarmament Holds Thematic Discussion on Prevention of an Arms Race in Outer Space* (June 5, 2012), http://www.unog.ch/80256EDD006B9C2E/(httpNewsByYear_en)/2C78A33C60703525C1257A140035DA86?OpenDocument.

[585] Michael Listner & Rajeswari Rajagopalan, *The 2014 PPWT: A New Draft but with the Same and Different Problems*, Space Rev. (Aug. 11, 2014), http://www.thespacereview.com/article/2575/1.

[586] *See, e.g.*, Bill Gertz, *Russia Violated '91 START till End, U.S. Report Finds*, Wash. Times, July 27, 2010, http://www.washingtontimes.com/news/2010/jul/27/russia-violated-91-start-till-end-us-report-says/print; Keith Payne & Mark Schneider, *The Nuclear Treaty Russia Won't Stop Violating*, Wall St. J. Online (Feb. 11, 2014, 7:58 PM) http://online.wsj.com/news/articles/SB10001424052702303442704579358571590251940#printMode; Michael Gordon, *U.S. Says Russia Tested Missile, Despite Treaty*, N.Y. Times, Jan. 29, 2014, http://www.nytimes.com/2014/01/30/world/europe/us-says-russia-tested-missile-despite-treaty.html; Joseph Rodgers & Kingston Reif, *Arms Control and Proliferation Profile: China*, Arms Control Ass'n (Oct. 2015), http://www.armscontrol.org/factsheets/chinaprofile; Rose, *supra* note 201.

having to violate an international obligation in order to defend their own national security.

In any case, even with an international ASAT ban, SSA capabilities would still be needed to verify compliance, to monitor the space activities of non-signatories, and to screen for space debris and environmental hazards.

C. Recommendations

The growing congestion in Earth orbit and the increasing dependence of humankind on space assets make it imperative that SSA data sharing expand and improve. At the same time, hostilities on Earth and the advancement and proliferation of actual and potential ASAT technologies require that states prepare themselves to deter and defeat potential ASAT threats, in part by shielding data about their most sensitive and irreplaceable satellites from unfriendly eyes.

To maximize the safety benefits of SSA data sharing while minimizing the security risks, states and other satellite owner-operators and SSA facilities should do the following.

1. Follow the Spirit and Intent of Existing Laws

At a very basic level, treaties such as the Registration Convention and the ITU Radio Regulations provide for the international sharing of essential SSA data identifying satellites and the orbits and frequencies they use.[587] These provide basic data points that can be used as a starting point for identifying and tracking satellites and avoiding collisions or radiofrequency interference with them, without revealing too much about the inner workings or particular operations of the satellites. Although these published data can be analyzed for greater intelligence value, states presumably would not have acceded to the treaties if they believed they were unduly jeopardizing their national security by registering their satellites and associated radio-frequencies and orbital positions. Therefore, states should not hesitate to register all their satellites as soon as practicable, in accordance with international and domestic laws, and to ensure that their domestic launch services organizations and satellite owner-operators know of their obligations as well. As U.N. General Assembly Resolution 62/101 recognized, too often states register their satellites too late or not at all.[588] Adherence to the existing international registration regime would improve SSA data for all without requiring states to accept any reduction in national security that they have not already accepted. States should also adhere more closely to TCBMs such as the IADC Space Debris Mitigation Guidelines and any appropriate space code of conduct that might be opened for adoption.

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[587] Registration Convention art. IV; ITU-RR, app. 4, annex 2.

[588] G.A. Res. 62/101, *supra* note 398.

2. Adopt and Implement National Laws Similar to 10 U.S.C. § 2274

Although most other countries likely do not have space surveillance and tracking programs as robust as that in the United States, the U.S. SSA data-sharing law is a useful model for other countries with SSA capabilities to adopt. States or organizations conducting space surveillance should maintain an unclassified catalogue of information on known space objects that is readily available at least to satellite owner-operators and launch services providers, and perhaps to the general public; establish programs for data exchange and combined operations with other states and non-state partners; and provide proactive conjunction warnings when they detect a potential upcoming collision. To make their information more useful to satellite launchers and operators, states and organizations that choose to publish their SSA data should work together, perhaps in concert with the Space Data Association, CelesTrak, or similar non-governmental entities, to standardize the types and formats of data that will be shared.

3. Enter More Bilateral and Small-Multilateral SSA Data-Sharing Agreements

As has begun to occur under the U.S. SSA data-sharing law and the ESA SSA Programme, as well as industry and non-governmental efforts such as the Space Data Association and International Scientific Optical Network, states and private entities can enhance their SSA by joining resources across national borders. States with mutual trust and common goals and interests in the use of outer space should increasingly work together to share SSA data with each other via formal agreements. As relationships forged through bilateral agreements begin to overlap, bilateral SSA data-sharing partnerships could evolve into multilateral ones, perhaps up to the scale of an organization such as the North Atlantic Treaty Organization[589] or the Organization for Economic Cooperation and Development.[590]

As endeavors such as the Apollo-Soyuz Test Project and the International Space Station have demonstrated, even rivals can share SSA data to achieve a common goal. However, international tensions continue to simmer. The post-1985 de facto moratorium on ASAT activity was destroyed along with the Fengyun 1C in 2007, and has not been fully restored. China continues its expansive programs, though arguably the international outcry against the Fengyun-1C strike has deterred further on-orbit kinetic intercepts thus far.[591] It would be premature to recommend a system of SSA data sharing that requires comprehensive high-fidelity disclosure of SSA data or integration of SSA networks between rival space powers or throughout

[589] Jan van Hoof, *Coalition Space Operations – A NATO Perspective*, 6 High Frontier 2, 7 (2010), http://www.afspc.af.mil/shared/media/document/AFD-100226-085.pdf.

[590] Organisation for Economic Co-operation and Development (OECD), *Members and partners – OECD* (2015), http://www.oecd.org/about/membersandpartners/list-oecd-member-countries.htm.

[591] *See, e.g.*, DoD China Report 2015, *supra* note 201, at 14 (noting that a suspected 2014 Chinese ASAT launch did not involve a satellite interception).

the international community at large. For now, increasing the number of states that provide proactive SSA services as the United States does, and carefully expanding the number and variety of trusted partnerships in which more detailed and time-sensitive information is shared, will be the most practicable way to broaden the sharing of SSA data.

4. Continue to Implement Transparency and Confidence-Building Measures

To diminish international fears about ASAT use, states should continue to work together to implement debris mitigation guidelines and a space code of conduct similar to the EU's draft international code of conduct (ICOC). The ICOC's provisions limiting ASAT activity are not as problematic as the PPWT's, in that they permit reasonable operations to destroy or deorbit dangerous satellites such as NROL-21, while preserving a general norm against ASAT testing for its own sake.[592] Whether through collective measures such as a space code of conduct or through domestic laws and unilateral declarations, states should make clear that they recognize the universal danger posed by space debris and that they will eschew anti-satellite warfare except insofar as self-defense requires it. Russia and China could even adopt a version of the PPWT between themselves if they wish, as a pledge of good faith and inducement for other nations to join. Future efforts to de-orbit dead satellites or otherwise remove space debris should be conducted in a transparent manner, with international collaboration on the launch, tracking, and maneuvering; ample consultations between space-faring states and states on the ground that might be affected by the operation; and advance arrangements concerning liability if there is a mishap.

D. Conclusion

Both the risk of accidental collisions between space objects and the threat of ASAT warfare are clear and present dangers to the peaceful use and exploration of outer space. The increased international production and sharing of SSA data will help to mitigate the risk of accidents, but certain controls should remain in place to keep such data from being used to launch an ASAT attack. While complying with their international obligations under treaties such as the Registration Convention and ITU Radio Regulations, states should remain free to conceal characteristics such as the specific missions, maneuvers, designs, capabilities, and vulnerabilities of their military and intelligence satellites, as well as high-accuracy tracking data, while remaining alert to collision risks and proactively notifying other affected parties if they sense a collision or re-entry is imminent. Basic orbital data on non-sensitive satellites should be freely shared. States should increasingly enter into agreements with compatible partners to share more timely and detailed SSA data and ensure that they honor each other's security concerns in the screening of classified satellites from public catalogues. States should promote an international norm against

[592] ICOC § 4.2.

ASAT warfare through transparency and confidence-building measures such as an international code of conduct for outer space activities, and by refraining from any further kinetic ASAT activities that are not justified on legitimate grounds of self-defense, protecting human safety, or space debris removal that is expected to cause a net reduction in dangerous debris. With measures such as these in place, international SSA data sharing will enhance the safety of the peaceful use and exploration of outer space for years to come.

THINKING GREEN NEAR THE RED ZONE: A COMPARATIVE STUDY OF ADHERENCE TO ENVIRONMENTAL POLICIES AND GUIDANCE DURING CONTINGENCY OPERATIONS BY MILITARY PERSONNEL AND CIVILIAN CONTRACTORS

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I. INTRODUCTION

In October 2009, Kellogg, Brown, and Root, Inc. ("KBR") announced it had launched a recycling campaign for the U.S. military forces stationed at Forward Operating Base Warhorse (FOB Warhorse) located in Diyala Province, Iraq.[1] Shortly thereafter, servicemembers stationed at FOB Warhorse began to see signs posted outside of the dining facility, which was run by KBR's subcontractor Najlaa International Catering Services Iraq, encouraging them to "Think Green" and pointing them down paths that led to several large recycling bins.[2] Once at the bins, servicemembers were further directed to sort their recyclable waste, such as aluminum cans and plastic silverware, into separate bins and do their part to help minimize the environmental footprint U.S. forces were to leave behind as a result of Operation Iraqi Freedom (OIF).[3]

While the recycling campaign appeared to be in full compliance with the military's contract with KBR (and may have even seemed heartening for the environmentally-conscious), there was one small problem.[4] Once the recycling bins had reache`d their full capacity, KBR contractors assigned to the dining facility emptied the contents of each bin into larger dumpsters used to collect other non-recyclable trash on base.[5] The larger dumpsters were then transported to the burn pit located outside of FOB Warhorse and burned in the burn pit, which was operated by military personnel and intended for disposal of non-hazardous solid waste.[6] When confronted by reporters concerning its nonoperational recycling campaign, KBR released a statement in which it stressed that it was "committed to environmental responsibility" and based on its "ongoing review, at sites where KBR provides services related to waste disposal, KBR complies with all applicable military directives and contractual requirements."[7]

Reports such as the one described above have begun to be more common in recent years due in large part to the fact that the U.S. military, over the last two decades, has divested many of the responsibilities that once belonged to military units and given them to civilian contractors.[8] Civilian contractors have thus provided

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[1] Tom A. Peter, *Iraq: US Military Contractor Burns Recyclables, Violating Contract*, The Christian Science Monitor, Oct. 30, 2009, http://www.csmonitor.com/World/Middle-East/2009/1030/p06s13-wome.html.

[2] *Id*.

[3] *Id*.

[4] *Id*.

[5] *Id*.

[6] *Id*.

[7] Peter, *supra* note 1.

[8] *See* David E. Mosher et. al, Green Warriors: Army Environmental Considerations for Contingency Operations from Planning to Post-Conflict 66 (2008), http://www.aepi.army.mil/docs/whatsnew/RAND_MG632.pdf.

a wide range of services during contingency operations,[9] which have included: guarding U.S. military bases and diplomatic facilities, escorting convoys and U.S. personnel, maintaining equipment and translating local languages, and erecting buildings and digging wells.[10] In its efforts to address environmental issues, the U.S. military has also relied heavily upon civilian contractors to run its base camps and manage its waste streams.[11] This reliance on civilian contractors for support during contingency operations has been reported as standing "at unprecedented levels," and has resulted in civilian contractors at times exceeding the number of U.S. military personnel in contingency locations, such as in Iraq and Afghanistan.[12]

In general, reports indicate that civilian contractors have "performed well in support of defense, diplomatic and development objectives" in contingency locations, and have been recognized for yielding several benefits to the U.S. forces in advancement of U.S. national objectives overseas.[13] Nevertheless, incidents of noncompliance by civilian contractors such as the one described above (some of which have resulted in lawsuits brought by U.S. servicemembers against civilian contractors in U.S. federal district court),[14] demonstrate the difficulties the United States has faced while using contractors.[15] Some have pointed to these difficulties and used them, along with other factors, such as weaknesses in federal planning and management, to conclude that the United States has come to over-rely on contractors.[16] Yet, these same critics recognize that the United States will most likely continue

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[9] U.S. Joint Chiefs of Staff, Joint Publication 1-02, Department Of Defense Dictionary of Military and Associated Terms (Feb. 15, 2016), [hereinafter Joint Pub 1-02], http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf (defining contingency operation as "[a] military operation that is either designated by the Secretary of Defense as a contingency operation or becomes a contingency operation as a matter of law (Title 10, United States Code, Section 101[a][13]).")

[10] Comm'n on Wartime Contracting in Iraq & Afghanistan, At What Risk? Correcting Over-Reliance on Contractors in Contingency Operations 7 (2011) [hereinafter Comm'n on Wartime Contracting].

[11] Mosher et. al, *supra*, at 10, 48.

[12] Comm'n on Wartime Contracting, *supra* note 10, at 7-8 (finding number of civilian contractors used by DoD for fiscal year 2010 reached 144,705 compared to 202,100 U.S. military personnel in Iraq and Afghanistan at the end of fiscal year 2010).

[13] *Id*. at 8. *See also* Mosher et. al, *supra* note 8, at 10 (finding "U.S. efforts to address water, sewage, and trash issues are now widespread in Iraq, and many are being conducted by the Army and its contractors, sometimes with very good results.").

[14] *See* Katie Connolly, *A Lawsuit Over Wartime 'Burn Pits'*, Newsweek (Jun. 26, 2009, 8:00 PM), http://www.newsweek.com/lawsuit-over-wartime-burn pits-80787; Kelly B. Vlahos, *'X-File' Vet May Be Link to Burn-Pit Truth*, Anti-War.com (Jun. 30, 2009), http://original.antiwar.com/vlahos/2009/06/29/x-file-vet; Kelly Kennedy, *Nine Burn pit Lawsuits Filed Against KBR*, ArmyTimes (Apr. 28, 2009), http://www.combatptsdwoundedtimes.org/2009/04/nine-burn-pit-lawsuits-filed-against.html.

[15] *See* Comm'n on Wartime Contracting, *supra*, at 9.

[16] *Id*.

to use contractors to carry out many of its contingency-related requirements.[17] The challenge thus facing the military when electing to use contractors to fill their operational demands is "to identify and take all reasonable steps to neutralize or mitigate risks"—to ensure the good outweighs the bad.[18] To overcome this challenge, it is critical for the military to appreciate to what extent it loses the ability to ensure compliance with standards—particularly, environmental standards, which are designed to reduce risks to the health of U.S. servicemembers and individuals accompanying the force—when deciding to outsource certain support functions instead of keeping such tasks "in-house." This article is aimed at addressing this critical issue.

In order to do so, this article will begin with a brief discussion of the general legal framework that underlies the environmental standards that apply to the U.S. military during contingency operations. This article will then look at three separate support functions that commonly arise during contingency operations and require consideration of the environment—namely, solid waste management, potable and nonpotable water operations, and hazardous waste management. After providing brief detail concerning the environmental standards and regulations governing these specific support functions, this article will review the findings of three separate U.S. government-led inspections that looked at the extent to which civilian contractors and military personnel adhered to these environmental standards. Using the similar trends and concerns that are evidenced in the findings of these three investigations, this article will present this author's conclusion, which is: that despite the challenges associated with using civilian contractors during contingency operations, the military faces relatively little-to-no increased risk when outsourcing tasks that require adherence to environmental standards and may, in fact, be doing more to protect the environment and its servicemembers when opting to use civilian contractors rather than assigning its own personnel to perform such tasks.

II. U.S. POLICIES AND GUIDANCE

U.S. domestic environmental laws do not apply during contingency operations overseas.[19] In fact, as a general rule, U.S. environmental laws rarely have any application to U.S. activities overseas, with very few exceptions.[20] Unless Congress clearly expresses that it intends for a statute to have extraterritorial jurisdiction, courts have generally held domestic environmental laws do not apply outside the United States.[21] As a result, although environmental issues have been recognized as

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[17] *Id*.

[18] Comm'n on Wartime Contracting, *supra* note 10, at 9.

[19] U.S. Dep't of the Air Force, Handbook 10-222, Vol. 4, Environmental Considerations for Overseas Contingency Operations para. 1.4 (Sep. 1, 2012) [hereinafter AFH 10-222].

[20] Int'l & Operational Law Dep't, The Judge Advocate Gen.'s Legal Ctr. & Sch., U.S. Army, Operational Law Handbook 320 (2014) [hereinafter Operational Law Handbook].

[21] *See* NEPA Coal. of Japan v. Aspin, 837 F. Supp. 466 (D. D.C. 1993) (holding that Congress

having a significant impact on military operations,[22] there is very little guidance based in U.S. domestic law that governs environmental compliance during contingency operations overseas.

There are, however, a wide variety of applicable *policy* directives relating to environmental compliance that apply to the management of "established installations" under Department of Defense control in foreign countries.[23] Since these policy directives explicitly exempt "contingency locations and associated operations and deployments, including cases of hostilities, contingency operations in hazardous areas, peacekeeping missions, or relief operations," these directives also generally have no legally binding effect during contingency operations.[24] Nevertheless, these policy directives serve as a valuable resource for military commanders during the planning stages of any contingency operation, and are oftentimes adopted and used to create environmental compliance standards particularly as contingency operations transition into sustainment.[25] In order to understand what environmental compliance standards *may* apply during a contingency operation, therefore, one must have a basic understanding of the policy directives that govern fixed installations overseas.

Executive Order (E.O.) No. 12,114, *Environmental Effects Abroad of Major Federal Actions*,[26] is the overarching policy for environmental operations planning overseas.[27] Signed in 1979 by President Jimmy Carter, E.O. 12,114 directs all federal agencies to consider the effect of their actions on the environment overseas in certain circumstances.[28] While exempting action that "occurs in the course of armed conflict,"[29] E.O. 12,114 requires adherence to U.S. environmental laws, if feasible, and adopts many of the substantive concepts from our domestic environmental laws for major federal activities conducted overseas.[30]

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had not clearly expressed its intent to apply NEPA outside the U.S., thereby triggering a strong presumption against extraterritorial application).

[22] *See* Operational Law Handbook, *supra*, at 324.

[23] AFH 10-222, *supra*, at para. 1.4; Operational Law Handbook, *supra*, at 323-24. For purposes of these policy directives, "installations" are defined as "enduring locations" and thus do not apply to contingency locations. *Id.* at 324.

[24] U.S. Dep't of Def., Instruction 4715.05, Environmental Compliance at Installations Outside the United States para. 2.a.(2)(c) (Nov. 1, 2013) [hereinafter DoDI 4715.05].

[25] AFH 10-222, *supra* note 19, at para. 1.4. "Sustainment" is defined as "[t]he provision of logistics and personnel services required to maintain and prolong operations until successful accomplishment." *See* Joint Pub 1-02, *supra* note 9, at 356.

[26] Exec. Order No. 12,114, 44 Fed Reg. 1957 (1979) [hereinafter E.O. 12,114].

[27] Operational Law Handbook, *supra* note 20, at 321.

[28] E.O. 12,114, *supra* note 26, § 1-1.

[29] *Id*. § 2-5(a)(iii).

[30] Operational Law Handbook, *supra* note 20, at 321 (citing E.O. 12,114). For example, while recognizing that National Environmental Policy Act (NEPA) does not apply to U.S. federal activities overseas, E.O. 12,114 creates "NEPA-like" rules for overseas operations by requiring environmental impact analysis for major federal activities. E.O. 12,114 § 2-4(a)(i).

Department of Defense Directive (DoDD) 6050.7, *Environmental Effects Abroad of Major Department of Defense Actions*,[31] implements E.O. 12,114 and directs the military to prepare an environmental assessment before it proposes to engage in a major action anticipated to have a significant effect on the environment of the global commons (i.e., geographical areas that are outside the jurisdiction of any nation, including the oceans outside territorial limits and Antarctica).[32] This environmental assessment is used to determine if an environmental impact statement called for under E.O. 12,114 is going to be required.[33] While it would appear the requirements of DoDD 6050.7 would apply to most, if not all, contingency operations since each is typically anticipated to have a significant effect on the environment, DoDD 6050.7 incorporates the same general exemptions listed in E.O. 12,114 and includes a number of additional exemptions, including actions taken by or directed by the President or the Secretary of Defense in the course of armed conflict.[34] As a result, contingency operations are explicitly excluded from the procedural and other requirements of DoDD 6050.7.[35]

Likewise, Department of Defense Instruction (DoDI) 4715.05, *Environmental Compliance at Installations Outside the United States*, which is the principle authority for environmental compliance matters overseas, also does not apply to contingency operations.[36] DoDI 4715.05 only applies directly to established U.S. military installations in foreign countries, and thus does not apply to off-installation operations, operations of military aircraft and vessels, or to contingency locations.[37] Nevertheless, DoDI 4715.05 outlines two important aspects of environmental management overseas that may play a role in what standards are adopted by a military commander for a contingency operation.[38]

First, DoDI 4715.05 provides for the designation of a DoD Lead Environmental Component (LEC) for specific countries and overseas geographic locations.[39] The LEC acts as the environmental regulatory authority for all military operations that occur within its assigned geographic region and thus works with military commanders when deciding what environmental standards will apply during a con-

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[31] U.S. Dep't of Def., Directive 6050.7, Environmental Effects Abroad of Major Department of Defense Actions (Mar. 31, 1979) (certified current as of Mar. 5, 2004) [hereinafter DoDD 6050.7].

[32] *Id.* at para. 1, 3.4.Major action is defined as "an action of considerable importance involving substantial expenditures of time, money, and resources, that affects the environment on a large geographic scale or has substantial environmental effects on a more limited geographical area, and that is substantially different or a significant departure from other [DoD] actions." *Id.* at para. 3.5.

[33] AFH 10-222, *supra* note 19, at para. 2.10.2.

[34] DoDI 6050.7, *supra* note 31, at para. E.2.3.3.1.

[35] *Id*. at paras. E.2.3.3.1.3—E.2.3.3.1.4.

[36] DoDI 4715.05, *supra* note 24, at para. 2.a.(2)(c).

[37] DoDI 4715.05, *supra* note 24, at para. 2.a.(2).

[38] Operational Law Handbook, *supra* note 20, at 323.

[39] DoDI 4715.05, *supra* note 24, at Enclosure 3, para. 1.

tingency operation.[40] Second, DoDI 4715.05 establishes a requirement for specific environmental compliance standards for overseas installations, which are published as the Department of Defense Publication 4715.05-G, *Overseas Environmental Baseline Guidance Document*,[41] and is generally referred to by its acronym, OEBGD, rather than its publication number.[42] The OEBGD is a set of objective criteria and management practices developed by the DoD to protect human health and the environment.[43] The LEC uses the OEBGD, along with international and host-nation law, to develop country-specific, substantive provisions addressing environmental standards (such as limitations on wastes, discharges, etc.) known as Final Governing Standards (FGS).[44] While FGS may not exist for the country in which a contingency operation occurs, the OEBGD establishes minimum environmental standards and can be adopted for contingency operations if approved by the LEC in coordination with the Joint Task Force (JTF) Commander.[45]

Therefore, while there is relatively little legally binding authority governing environmental compliance during contingency operations, since environmental issues are seen as often having a significant impact on mission success, the policy directives and resources discussed above are commonly used by the military to develop environmental compliance standards for each contingency operation.[46] Once adopted, these environmental standards and guidance become binding upon U.S. forces and, when properly incorporated in the contract, upon the contractors accompanying the military.[47] However, ensuring compliance to all relevant standards and guidance by both military and contractor personnel is a different issue. While there are oversight measures in place—specifically, the military chain of command for military personnel, and military contracting officers, as well as other DoD agencies, such as the Defense Contract Management Agency (DCMA) and the Defense Contract Audit Agency (DCAA), for civilian contractors—adherence to all relevant standards and guidance can present unique challenges and obstacles to *both* parties as will be discussed in more detail below.[48]

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[40] Operational Law Handbook, *supra* note 20, at 319. DoDI 4715.05, *supra* note 24, at Enclosure 3, para. 4 outlines the procedures LECs use to establish the Final Governing Standards (FGS) for each host nation.

[41] U.S. Dep't of Def., Publication 4715.05-G, Overseas Environmental Baseline Guidance Document (May 1, 2007) [hereinafter OEBGD].

[42] DoDI 4715.05, *supra* note 24, at para. 3.b.

[43] *Id.* at 23.

[44] DoDI 4715.05, *supra* note 24, at Enclosure 3, para. 4.c.(1). *See also* Operational Law Handbook at 323-24.

[45] AFH 10-222, *supra* note 19, at 11. NOTE: The LEC is referred to as the Environmental Executive Agent (EEA) in AFH 10-222 and the OEBGD.

[46] Operational Law Handbook, *supra* note 20, at 324.

[47] AFH 10-222, *supra* note 19, at paras. 1.5.2.2, 1.5.6.

[48] U.S. Gov't Accountability Off., GAO-11-63, Afghanistan and Iraq: DoD Should Improve Adherence to Its Guidance on Open Pit Burning and Solid Waste Management 3 (2010) [hereinafter GAO-11-63].

III. SPECIFIC SUPPORT FUNCTIONS REQUIRING CONSIDERATION OF THE ENVIRONMENT

A. Burn pits

During contingency operations, expeditionary bases can generate roughly 9 to 12 pounds of solid waste per service member per day.[49] This waste can consist of a wide variety of materials including plastic and Styrofoam, discarded electronics, shipping materials, appliances, and other items such as mattresses, clothing, tires, metal containers, and furniture.[50] Since such accumulation of solid waste can quickly develop into a threat to health and safety, one of the principal environmental concerns for contingency planners is to develop and effectively implement a waste management system.[51]

In recent history, the U.S. military has relied heavily, and at times exclusively, on open air pits to dispose of this solid waste.[52] In general terms, open-air burn pits are shallow trenches or man-made ridges of sand that base commanders use to manage waste generated by military personnel using open burning.[53] While the oversight and operation of burn pits differ from one installation to the next, waste management decisions are typically made by base commanders and carried out by military personnel, contractors, or a combination of both.[54]

The military's decision to rely upon open burn pits is primarily one of expediency, especially during early phases of an operation when combat activity is most intense.[55] While burn pits offer the military an efficient and inexpensive means to dispose of waste, they do come at a price. Burn pits, for example, are typically located near contingency locations, and it is not uncommon for servicemembers to inhale the smoke emitted from burn pits.[56] This exposure has generated controversy as servicemembers returning from overseas contingency operations have complained of a host of health problems, from cancerous tumors to respiratory issues, blaming exposure to burn pits. This has resulted in media attention and lawsuits, principally

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[49] AFH 10-222, *supra* note 19, at para. 2.14.

[50] GAO-11-63, *supra* note 48, at 1.

[51] AFH 10-222, *supra* note 19, at para. 2.14.

[52] GAO-11-63, *supra* note 48, at 8-9. Beginning in 2004, the U.S. military introduced alternative waste disposal methods, such as incinerators, in Afghanistan and Iraq; however prior to that time, open burn pits were used exclusively in both countries. *Id.* at 9. Between November 2009 and August 2010, it was reported the number of active burn pits in Afghanistan ranged from 50 to 251. *Id.* Meanwhile in Iraq, the estimates ranged between 67 in 2009 and down to 22 in August 2010 as operations began to wind down. *Id.*

[53] *Id.* at 1.

[54] *Id*.

[55] *Id.* at 9.

[56] GAO-11-63, *supra* note 48, at 1-2.

directed at the civilian contractors hired by the U.S. military to manage and oversee its burn pit operations.[57]

To minimize the potential dangers and address the concerns regarding open burning, the U.S. military developed comprehensive guidance on operating and monitoring burn pits during contingency operations. However, this comprehensive guidance was not fully developed until 2009, despite the fact that the U.S. military had relied heavily on open burn pits for disposing of its solid waste from the beginning of hostilities in Afghanistan in 2001 and Iraq in 2003.[58] Before 2009, the policies and guidance in place offered little substantive direction to contingency commanders other than simply noting the inherent dangers of open burning and suggesting use of various alternate waste disposal methods (such as landfills).[59] Therefore, beginning in 2006, the U.S. Forces-Iraq (USF-I)[60] began issuing environmental policies for its operations to cover a host of environmental concerns, including management of solid waste.[61] These early policies discouraged the use of burn pits and advanced such practices, such as "the segregation of waste to facilitate reuse and recycling efforts."[62] In April 2009, USF-I revised its 2006 guidance and provided more specific instructions on the handling of solid waste during contingency operations.[63] This revised guidance explicitly precluded the use of open burning unless authorized in

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[57] *See* Leo Shane III, *Families, DoD Spar Over Dangers of Burn Pit Smoke*, Stars and Stripes (Nov. 6, 2009), http://www.stripes.com/news/families-dod-spar-over-dangers-of-burn pit-smoke-1.96179; Beth Hawkin, *Another Gulf War Syndrome?*, Mother Jones (Mar./Apr., 2010), http://motherjones.com/politics/2010/03/toxic-fire-pits-iraq-afghanistan-us-military; Leo Shane III, *Study: Respiratory Illnesses Higher Near Infamous Balad Burn Pit*, Stars and Stripes (Jul. 1, 2010), http://www.stripes.com/news/middle-east/crisis-in-iraq/study-respiratory-illnesses-higher-near-infamous-balad-burn-pit-1.109538; Leo Shane III, *Burn Pit Study Inconclusive on Health Effects*, Stars and Stripes (Oct. 31, 2011), http://www.stripes.com/blogs/stripes-central/stripes-central-1.8040/burn-pit-study-inconclusive-on-health-effects-1.159357; Jeff Glor, *Illness From Burn Pits a Health Issue for Returning Vets*, CBS News (Mar. 11, 2013, 12:49 PM),http://www.cbsnews.com/news/illness-from-burn-pits-a-health-issue-for-returning-vets/; Eric Levenson, *Veterans Are Sick Because the Military Dumped Trash in Massive Burn Pits*, The Wire (Oct. 28, 2013, 2:12 PM), http://www.thewire.com/global/2013/10/burn pits-iraq-and-afghanistan-are-causing-awful-health-problems/71006; Dina F. Maron, *Air Pollution: Pentagon Shifts Stance on Burn Pits, Acknowledges Health Effects*, E&E Publishing (Dec. 22, 2009), http://www.eenews.net/stories/85967/print.

[58] GAO-11-63, *supra* note 48, at 8.

[59] GAO-11-63, *supra* note 48, at 10. "For example, an Army Technical Bulletin on Guidelines for Field Waste Management, dated September 2006, notes that troops should use open burning only in 'emergency situations,' because it can lead to 'significant environmental exposures.'" *Id.*

[60] Prior to January 1, 2010, American forces operating in Iraq fell under the Multinational Forces-Iraq (MNF-I) (which was the strategic component) and Multinational Corps-Iraq (MNC-I) (which was the subordinate operational component). *Id.* at 5-6. On January 1, 2010 MNF-I and MNC-I merged to form U.S. Forces-Iraq (USF-I). *Id.* at 6. For ease of reference, the term USF-I will be used to refer to actions taken by the military command structure even if such actions occurred prior to January 1, 2010.

[61] *Id*. at 10.

[62] *Id*.

[63] *Id*. at 11.

writing by the base commander and also prohibited from destruction in burn pits a list of certain waste items, "including hazardous waste, batteries, tires, electronics, and appliances, among other things."[64]

Similarly, U.S. Forces in Afghanistan (USFOR-A)[65] established a goal to eliminate the need for burn pits, stating that open burning was "the least preferred method of solid waste disposal" and emphasizing that contingency locations "should use [burn pits] only until they can develop more suitable capabilities."[66] USFOR-A's guidance contained the same list of items that USF-I prohibited from disposal in burn pits and added to this list items including "pesticide containers, asphalt shingles, treated wood, and coated electrical wires."[67]

These efforts were followed up in late September 2009, when Central Command (CENTCOM), the combatant command responsible for all U.S. military activities in the Middle East, including Iraq and Afghanistan, issued detailed guidance for managing environmental concerns during contingency operations.[68] CENTCOM's guidance established minimal acceptable standards for solid waste disposal and even more stringent requirements than the nation-specific guidance issued in Iraq and Afghanistan.[69] Additionally, it explicitly established that the guidance applied to "all CENTCOM elements engaged in contingency operations throughout CENTCOM's area of responsibility," including U.S. military personnel *and* civilian contractors accompanying the force.[70]

In October 2009, Congress enacted the National Defense Authorization Act (NDAA) for Fiscal Year 2010,[71] which included a section requiring DoD to prescribe regulations prohibiting the disposal of "covered waste" in open-air burn pits during contingency operations except in circumstances in which it is determined no alternative disposal method is feasible.[72] In response, DoD issued in March 2010 Directive-Type Memorandum (DTM) 09-032, a world-wide policy applying

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[64] *Id*.

[65] Prior to 2009, American forces operating in Afghanistan fell under the International Security Assistance Forces (ISAF) (which was the strategic component) and the Combined Joint Task Force (CJTF) (which was the subordinate operational component). *Id.* at 5. In 2009, the designation for U.S. forces became U.S. Forces-Afghanistan (USFOR-A). *Id.* For ease of reference, the term USFOR-A will be used to refer to actions taken by the military command structure even if such actions occurred prior to 2009.

[66] GAO-11-63, *supra* note 48, at 10 at 11.

[67] *Id.*

[68] *Id*. at 12.

[69] *Id*.

[70] *Id*.

[71] National Defense Authorization Act for Fiscal Year 2010, Pub. L. No. 111-84, 123 Stat. 2190 (2009).

[72] *Id*. § 317(a)(1). *See also* GAO-11-63, *supra* note 48, at 12-13. *See infra* note 71 for the definition of "covered waste".

to all DoD components, including CENTCOM, and set forth the prohibitions and exceptions to the use of burn pits as called for in the NDAA.[73] Although DTM 09-032 explicitly allowed for the disposal of "covered waste" in *some* situations, and thus appeared somewhat less stringent than previous CENTCOM guidance, the CENTCOM guidance nevertheless remained in effect, meaning that all DoD components within CENTCOM, including all civilian contractors, continued to be precluded from disposing of the listed prohibited items in burn pits.[74]

1. Measuring Compliance with Burn Pit Operation Guidance

With comprehensive guidance in place for burn pit operations, the question that remained was whether the U.S. military and civilian contractors were complying with the comprehensive guidance provided—and, if not, whether there were any similarities and/or trends that may offer insight concerning the issue of enforcing environmental standards during contingency operations. In response to this question, the U.S. Government Accountability Office (GAO) published a report in October 2010 concerning its investigation into burn pit operations, upon the request from Congress.[75] In its investigation, GAO reviewed the extent of open burning in Afghanistan and Iraq, as well as the extent to which the U.S. military and civilian contractors were following current guidance.[76] GAO visited four burn pit sites in Iraq; three of the sites were operated by contractor personnel and one was operated by military personnel.[77] To varying degrees, *none* of the four burn pits was managed in accordance with military guidance.[78] The reasons offered highlight some of the

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[73] U.S. Dep't of Def., Directive-Type Memorandum 09-032, Use of Open-Air Burn Pits in Contingency Operations (Mar. 30, 2010) [hereinafter DTM 09-032]. DTM 09-032 also established the approval process which required any formal determination by a combatant commander that no alternative disposal method was feasible to be routed up through the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) within 15 days of the commander's decision. *Id.* at Attachment 3, para. 3.b. The USD(AT&L) is then required to make notification to the Senate and House Armed Services Committees not later than 30 days after the commander's decision. *Id.* at Attachment 2, para. 1.b.

[74] DTM 09-032 was subsequently canceled and replaced by U.S. Dep't of Def, Instruction 4715.19, Use of Open-Air Burn Pits in Contingency Operations (Feb. 15, 2011) (amended July 3, 2014) [hereinafter DoDI 4715.19], which is the current regulation governing the management of burn pit operations world-wide for military forces. "Covered waste" is defined as hazardous waste; medical waste; tires; treated wood; batteries; plastics; munitions; compressed gas cylinders; fuel containers; aerosol cans; polychlorinated biphenyls; petroleum, oils, and lubricants; asbestos; mercury; foam tent material; and any item containing any of these items. DoDI 4715.19, *supra*, at 11-12. DTM 09-032 and the initial version of DoDI 4715.19 did not list plastics or munitions under "covered waste." *Id.*; DTM 09-032, *supra*, at 8.

[75] GAO-11-63, *supra* note 48.

[76] *Id.* at 16-22. In the same report, GAO also looked at the alternatives to burn pits and whether the military had examined them, as well as the extent of efforts to monitor air quality and potential health impacts. *Id.* at 22-31.

[77] *Id*. at 3, 16-18.

[78] *Id*. at 16.

issues and challenges separating U.S. military-operated sites from those operated by civilian contractors.

First, GAO noted key differences between the U.S. military-operated site and two of the contractor-operated sites as to the level of understanding and adherence to the relevant guidance on what types of products could be disposed of using burn pits.[79] GAO found that military personnel at the military-operated site admitted they were unaware of the CENTCOM regulation and its requirements for burn pit operations.[80] While the two U.S. servicemembers who managed the site said they used a standard operating procedure outlined in a document given to them when they began managing the burn pit, upon further investigation, GAO learned that the servicemembers misunderstood the main purpose of the guidance as only directing their dealings with contractors delivering waste to the burn pit, and not on governing what items they were authorized to burn.[81] Meanwhile, GAO found that two of the contractor-operated sites did not have contracts reflecting the current guidance on burn pit operations.[82] The guidance provided for burn pit management in both of these contracts referenced the outdated 2006 USF-I guidance, which as discussed above, contained less stringent requirements than the subsequent CENTCOM 2009 regulation.[83] Although DoD had officially requested the contractor incorporate the updated guidance into its operations, the contractor believed the new guidance required activities beyond the scope of the existing task orders and thus was unwilling to comply with DoD's request.[84] While U.S. military contracting officers were pursuing the option of modifying the contracts at the time, GAO noted that such modifications are typically long and tedious, often requiring months of negotiations, and that as of June 2010, neither contract containing the outdated guidance had been successfully modified.[85]

Second, while attempting to identify what specific risks of exposure to potentially harmful burn pit emissions existed at each site, GAO noted the difficulty of its task at both the military and contractor operated sites.[86] With respect to the military-operated site, GAO concluded that, due to the lack of awareness and understanding of the applicable regulations as indicated above, the military operators were severely hampered in their ability to minimize the risks of exposure to U.S. servicemembers at the site since the operators did not have a full and complete understanding of what items they should and should not be burning.[87] In contrast,

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[79] *Id.* at 19.

[80] *Id*.

[81] *Id.*

[82] GAO-11-63, *supra* note 19.

[83] *Id.*

[84] *Id*.

[85] *Id*.

[86] *Id.*

[87] *Id*.

at one of the contractor-operated sites, GAO was simply unable to perform the assessment due to the lack of data maintained by the contractors.[88] At this burn pit site, which was operated by KBR, GAO was told by contractor personnel that the company did not maintain records on items burned in the burn pit because it was not contractually obligated to do so.[89] As a result, GAO was unable to definitively list the CENTCOM-guidance elements with which KBR had complied (such as the types of prohibited items burned) because GAO's observations and interviews with burn pit operators were insufficient to determine whether KBR had implemented those aspects of the regulation.[90]

Finally, in its third significant finding, GAO concluded that a significant disparity of resources devoted to burn pit operations helped explain the variability of compliance with regulations at the different sites.[91] By way of example, GAO noted that while all four burn pits visited had programs to sort incoming waste to avoid burning prohibited items, the amount of resources devoted between the military-operated site and contractor-operated sites varied substantially.[92] Thus, at one of the contractor-operated sites (which was under military supervision), the waste segregation process required a crew of 15 to 20 contractors who worked all day sorting the waste and separating prohibited items (i.e., recyclables) from the non-prohibited items.[93] In contrast, the military-operated site, which had only a staff of five enlisted military members, faced a much greater challenge in sorting the waste at the site since the job was simply too large for five people.[94] Without the assistance of machinery or equipment, the military operators, who had responsibilities other than operating the burn pit, were only able to spend about two hours a day sorting the waste, which resulted in a greater amount of prohibited items being burned.[95] Meanwhile, at the contractor-operated site, which had a segregation crew of 15-20 contractors working all day at sorting waste, GAO found that mostly non-prohibited items went into the burn pit, although there were some instances when a small number of prohibited items (such as plastic) slipped through the process and were burned.[96] Based on this finding of a disparity of resources, GAO concluded that the one contractor-operated site was better able than the military-operated site to protect personnel from exposure to potentially harmful burn pit emissions, as well

[88] *Id*. at 18.

[89] GAO-11-63, *supra* note 18.

[90] *Id.*

[91] *Id*. at 20.

[92] *Id*.

[93] *Id*.

[94] *Id*. at 21.

[95] GAO-11-63, *supra* note 21.

[96] *Id.* at 20.

as meet most of the regulations provisions, including the implementation of other waste disposal alternatives.[97]

B. Potable and Nonpotable Water

Another aspect of contingency operations that involves environmental consideration and the attention of military commanders is supplying a safe and adequate supply of water.[98] During contingency planning, military planners are tasked with developing a strategy for purifying, storing, testing, transporting, and distributing potable and nonpotable water to each contingency location.[99] Potable water supplies must be tested constantly for such matters as water temperature, total dissolved solids, turbidity, chlorine residual, pH, and presence of bacteria.[100] Nonpotable water, meanwhile, is used by deployed personnel for purposes such as laundry services and personal hygiene (i.e., bathing, showering, shaving and cleaning).[101] Although not intended for human ingestion, nonpotable water must also meet certain minimum safety standards since deployed personnel can be exposed to harmful contaminants in nonpotable water through the eyes, nose, and mouth as well as open cuts and wounds.[102]

In order to satisfy the demand for potable and nonpotable water, the U.S. military has relied upon civilian contractors, who are capable of providing adequate resources necessary for purification, storage, and distribution of potable and non-potable water.[103] In Iraq, for example, USF-I relied primarily upon two contractors, KBR and Oasis International Incorporated (Oasis), for operation of most of its water production sites.[104] At the time, KBR was the main provider of bulk potable water used by the military in Iraq for dining, medical, personal hygiene, and recreation facilities.[105] Oasis was the operator of six facilities that produced bottled water, which

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[97] *Id*. at 21-22.

[98] AFH 10-222, *supra* note 19, at para. 2.12.

[99] *Id*.

[100] U.S. Dep't of Army, Tech. Bulletin Medical 577, Sanitary Control and Surveillance of Field Water Supplies, para. 4-11 (May 1, 2010) [hereinafter TB MED 577]. NOTE: this is a joint publication and is also referred to as Navy Bureau of Medicine and Surgery P-5010-10 (NAVMED P-5010-10) and Air Force Manual 48-138_IP (AFMAN 48-138_IP). The Army designation will be used to reference this document because the Secretary of the Army has been designated as the DoD Executive Agent for management of land-based water resources in support of contingency operations. TB Med 577, *supra*, at Foreword.

[101] U.S. Dep't of Def. Inspector Gen., Report No. D-2008-060, Audit of Potable and Nonpotable Water in Iraq 1 n.1 [hereinafter DoD IG Report D-2008-060].

[102] *Id*. at 6. *See also* TB MED 577, *supra* note 100, at para. 2-2.b.

[103] DoD IG Report D-2008-060, *supra*, at 6.

[104] *Id*.

[105] *Id*. at 5. The contract issued to KBR was effective December 14, 2001 and was part of the Army's Logistics Civil Augmentation Program (LOGCAP), which was in place to provide logistical support, such as housing, food and water, to U.S. forces in Iraq, Afghanistan, Kuwait,

was the only drinking water authorized by USF-Iraq.[106] The military, meanwhile, maintained operations of the remaining water production sites used and relied upon its military water purification detachments to produce, store, and monitor the quality of bulk potable water.[107] As of February 25, 2007, there were 59 U.S. water production (treatment) sites in Iraq, with 37 sites being operated by contractors (KBR and Oasis) and 22 sites operated by the U.S. military.[108]

All water production sites operated by KBR and Oasis, as well as those operated by the military, were required to comply with the Army Technical Bulletin Medical 577, *Sanitary Control and Surveillance of Field Water Supplies*,[109] (TB MED 577), which established the field water-quality standards and water certification processes for water production in Iraq.[110] Since the water from all sources was initially nonpotable, the water treatment facilities operated by the contractors and the military used a process known as the reverse-osmosis purification method to transform the water into potable water.[111] After going through this purification process and receiving an infusion of chlorine, the water was stored at the water production sites until it was distributed to contingency locations where it was transferred into separate point-of-use storage containers for use by U.S. military forces.[112]

The purpose behind the requirements established by TB MED 577 was of course to ensure that the potable and nonpotable field water provided to deployed service members in Iraq was safe.[113] However, in early 2006, based on allegations that KBR had failed to provide safe nonpotable water to U.S. forces in Iraq, Senator Byron L. Dorgan, Chairman of the Democratic Policy Committee, requested that the Department of Defense Inspector General (DoD IG) conduct an audit to determine whether the processes for providing potable and nonpotable water to U.S. forces in Iraq were adequate.[114] The ensuing DoD IG audit, covering water operations in Iraq during OIF from January 2004 to December 2006 operated by both civilian contractors and the U.S. military, showed there were deficiencies in water operations, which

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Djibouti, and Georgia. *Id.* KBR's LOGCAP contract was a 10-year cost-plus-award fee contract with 1 base year and 9 options years, and called for services, such as water treatment and production, through individual task orders. *Id.*

[106] *Id*. The contract with Oasis was a separate contract, not under LOGCAP, and was issued by the Joint Contracting Command-Iraq to provide bottled drinking water to U.S. forces throughout Iraq. *Id.*

[107] *Id*. at 12.

[108] DoD IG Report D-2008-060, *supra* note 101, at 1.

[109] TB MED 577, *supra* note 100. The version that was in place when DoD IG Report D-2008-060 was completed was dated Dec. 15, 2005.

[110] DoD IG Report D-2008-060, *supra* note 101, at 5.

[111] *Id*. In Iraq, the main sources of water for the production and treatment facilities came from the Tigris and Euphrates Rivers. *Id.*

[112] *Id*.

[113] TB MED 577, *supra* note 100, at para. 1-1.a.

[114] DoD IG Report D-2008-060, *supra* note 101, at 1.

exposed U.S. forces to unmonitored and potentially unsafe water.[115] Specifically, DoD IG identified deficiencies (i.e., failure to meet standards) at three of the four contractor-operated facilities and at both of the military-operated facilities visited.[116]

1. DoD IG Audit Findings

First, with respect to the contractor-operated facilities, DoD inspectors found that both KBR and Oasis had produced and maintained potable water generally in compliance with all field water-quality standards required by TB MED 577 at the facilities they inspected, which included one bottled water production facility operated by Oasis and three bulk potable water production facilities operated by KBR.[117] In fact, inspectors observed that KBR not only effectively produced, stored, distributed, and maintained bulk potable water used at U.S. contingency locations for dining and medical purposes, but actually *exceeded* the TB MED 577 minimum water-quality standards for potable water produced for shower and latrine units.[118] However, DoD IG also discovered that there were three occasions KBR failed to meet its obligations under its contract and under the requirements set out in TB MED 577 with respect to quality monitoring and maintenance of nonpotable water.[119]

Two of these occasions involved KBR failing to perform water-quality tests at point-of-use storage containers, as it was contractually obligated to do.[120] Fortunately, at one of the installations, the military preventive medicine personnel had conducted monthly oversight tests of the water stored at its installation, as it was required to do, and thus inspectors were able to review the test results and conclude that the quality of water at this installation met TB MED 577 field water standards, thereby alleviating any health and safety concerns.[121] Due to the lack of safety concerns, inspectors did not include within their report any discussion as to why contractors had failed at that installation to perform the required water-quality testing, other than noting that corrective action had been taken by the military to remedy the deficiency and that KBR had since complied with the required testing.[122] At the other installation at which deficiencies were identified, however, inspectors were unable to draw the same conclusion since the quality of water produced, distributed, and stored in its point-of-use storage containers was unknown.[123] At this installation, neither KBR nor the U.S. military had accomplished water-quality con-

[115] *Id*. at 2.

[116] *Id*.

[117] *Id.* at 6.

[118] *Id*. at 7.

[119] *Id*. at 6.

[120] DoD IG Report D-2008-060, *supra* note 101, at 7-8.

[121] *Id*. at 7.

[122] *Id.*

[123] *Id*. at 8.

trol operations as required for roughly a seven-month window, and thus inspectors included additional information that described the reason behind the deficiencies.[124]

In that case, KBR had assumed the responsibility of distributing nonpotable bulk water produced at a military-operated facility.[125] The military had anticipated that, in assuming responsibility for distribution, KBR would also assume the duty of inspecting the quality of water and ensuring proper chlorine levels of the water in the point-of-use storage containers since its contract required KBR to perform such testing for water it distributed.[126] Although testing of point-of-use storage containers was not explicitly called for as part of the service KBR provided, the military inferred that KBR would conduct all water-quality testing as required under the contract (to include testing of the storage containers) since the "the water distribution and point-of-use storage containers were integral to the water works system."[127] In its defense, KBR stated that it did not perform water treatment and quality monitoring during the seven month period of time because it "was awaiting delivery and setup of its purification equipment," which it did not receive until a later date.[128] Upon receipt of the equipment, KBR was able to show that it performed all the water-quality testing as required.[129]

At the third installation at which deficiencies were identified, DoD IG discovered that for roughly twenty-three months (from March 2004 to February 2006), KBR had provided "chlorinated wastewater" to fill point-of-use containers used for personal hygiene purposes (i.e., shower and latrine) by military personnel.[130] Although TB MED 577 required wastewater to be properly disposed of and gave no option for its reuse, KBR elected to use the wastewater to meet its bulk nonpotable water demands under the contract because of "frequent source water shortages" at this contingency location.[131] The main problem, however, was that prior to using the wastewater, KBR failed to notify or properly inform military preventive medicine

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[124] *Id*.

[125] *Id*.

[126] DoD IG Report D-2008-060, *supra* note 101, at 8.

[127] *Id.*

[128] *Id.*

[129] *Id*.

[130] *Id*. at 10. "Wastewater" is a byproduct of the water purification process and therefore has a different contaminant concentration level than that of original source water. *Id.* Although there is a lower concentration of suspended solids in the wastewater (since such are removed through the water purification process), wastewater contains higher concentrations of dissolved solids, alkalinity, metals, and chloride concentrations. *Id.* As a result, in order to avoid any adverse health risks from its use, wastewater is typically subjected to additional analysis by medical personnel before it can be used. *Id.*

[131] *Id*. The water source for the camp was provided through a 21-mile pipeline network from the Tigris River that was "susceptible to power equipment failures, unauthorized access taps, sabotage, breaks, and frequent leaks," as well as frequent failures of the pumping station, electrical pumps and pipeline, which were 30 years old at the time. *Id.* at 10 n.16.

personnel, who could have performed additional water inspection and testing to ensure suitability and verify the water did not pose a health risk to U.S. forces.[132] Due to the lack of notification to military officials, inspectors concluded that military personnel were not only exposed to a higher water-quality risk, but also completely unaware of the pending risks during the time KBR provided the wastewater to meet its contractual demands.[133]

As for the two U.S. military-operated sites inspected, DoD IG discovered similar deficiencies as those found in the civilian contractor-operated facilities but for slightly different reasons.[134] Overall, DoD IG found that both U.S. military detachments visited failed to perform all required water-quality control tests and to keep appropriate records of all water produced, stored and issued at their respective sites.[135] Inspectors noted that U.S. military operators at one of the production sites failed to perform water quality control testing because they did not have the necessary equipment.[136] Specifically, the U.S. military operators at this site lacked the equipment needed to perform the requisite tests to measure for temperature, total dissolved solids, turbidity, chlorine residual, and pH levels, as called for under TB MED 577.[137] Further, at this site, military operators failed to maintain records to show the results of the water-quality testing they had accomplished and, of greater concern to inspectors, demonstrated a lack of full understanding of the complete water-quality testing requirements called for by the applicable military guidelines.[138] Meanwhile, while the other military production site had some records of the results of the water-quality testing it conducted, the records proved once again to be incomplete.[139] In that case, the records specifically failed to include "the results of hourly quality tests required during water production, the amount of water issued, or the organizations receiving water" as required by TB MED 577.[140]

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[132] DoD IG Report D-2008-060, *supra* note 101, at 10. It should be noted that DoD IG discovered that military preventive medicine personnel did not perform periodic water-quality monitoring at point-of-use storage during this timeframe, as it was required to do. *Id.* The military provided inspectors with several reasons for not performing the required oversight, which included lack of manning & transportation, and competing medical priorities. *Id.*

[133] *Id.* at 10-11. The military medical sick-call records, which covered a portion of the time KBR provided chlorinated wastewater (October 2005 through June 2006), indicated there were 38 cases the attending military medical official stated could have been "attributed to water, such as skin abscesses, cellulitis, skin infections, and diarrhea." *Id.* at 11.

[134] *Id.* at 12.

[135] *Id.*

[136] *Id*.

[137] *Id*. See TB MED 577, *supra* note 100, at table 4-6 for the current testing requirements.

[138] DoD IG Report D-2008-060, *supra* note 101, at 12 Specifically, the military operators did not fully understand the requirements for "hourly quality control checks during production, daily tests of water stored at the production site, and a test for potability before use." *Id.*

[139] *Id.* at 13.

[140] *Id*.

C. Hazardous Material and Hazardous Waste

Another area necessitating the implementation of environmental standards relates to the proper management of hazardous material (HM) and hazardous waste (HW). HM can be defined as "any material, based on chemical or physical characteristics (i.e., corrosive, explosive, flammable, reactive, toxic) that pose a threat to human health and/or the environment if improperly disposed of, handled, stored, labeled, or transported."[141] Similarly, HW is described as "discarded material that may be solid, semi-solid, liquid, or contained gas, and exhibits a hazardous characteristic (i.e., ignitability, corrosivity, toxicity or reactivity)."[142] While accepting that it is nearly impossible to rule out exposure to hazardous chemicals during contingency operations, DoD recognizes the importance of taking all actions necessary to reduce the likelihood of future exposures to HM/HW and minimize the potential impact.[143] Therefore, during contingency planning, the military requires planners to identify what storage areas, supplies and equipment will be needed immediately upon arrival at a contingency location for proper management of HM/HW.[144] Additionally, the military requires planners to develop standard operating procedures and training on spill prevention and response for personnel who will handle or be exposed to HM/HW.[145] Despite these requirements, military and contractor personnel involved in the proper management of HM/HW have not always been in full compliance with DoD standards and aspirations.

In 2011, for example, in response to requests from the Senate Armed Services and Democratic Policy Committees, the DoD IG reviewed actions taken by the military and contractors with regards to the exposure of approximately 1,000 military soldiers and civilian employees to sodium dichromate at the water treatment plant at Qarmat Ali, Iraq in 2003.[146] What inspectors found was that neither the contractor's initial actions, nor the military's subsequent reaction, effectively addressed the environmental hazards discovered prior to beginning work to restore the water treatment plant to full service. [147] Thus, the Qarmat Ali water treatment facility provides further helpful information relating to the issue of compliance with environmental standards during contingency operations.

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[141] AFH 10-222, *supra* note 19, at para. 2.15.

[142] *Id*.

[143] U.S. Dep't of Def. Inspector Gen., Report No. SPO-2011-009, Exposure to Sodium Dichromate at Qarmat Ali Iraq in 2003: Part II – Evaluation of Army and Contractor Actions Related to Hazardous Industrial Exposure ii [hereinafter DoD IG Report SPO-2011-009].

[144] AFH 10-222, *supra* note 19, at para. 2.15.

[145] *Id.*

[146] DoD IG Report SPO-2011-009, *supra*, at i.

[147] *Id*. at i-ii.

In March 2003, in anticipation of combat operations in Iraq, the U.S. Army Corps of Engineers (USACE) contracted with KBR to restore Iraq's oil industry.[148] USACE specifically sought assistance from KBR to restore several hundred oil production facilities, including several oil wells and gas oil separation plants, and the water treatment plant located at Qarmat Ali, Iraq.[149] The Qarmat Ali water treatment plant had been constructed in the 1970s by the Union of Soviet Socialist Republics and was critical to the maintenance of several surrounding oil fields.[150] Water treated at the facility was distributed to pumping stations, which in turn injected the water into the ground to create pressure to drive oil to the surface.[151]

Prior to the arrival of U.S. military and KBR contractors, the site was operated by the Iraqi Southern Oil Company, which "treated filtered water with sodium dichromate, a corrosion inhibitor, to increase the life of the pipelines, pumps, and other equipment."[152] Sodium dichromate is an orange-colored powder that contains hexavalent chromium (chromium VI), a known carcinogen.[153] Due to pre-war operations and post-war vandalism, parts of the facility were contaminated with sodium dichromate.[154] As a result, after arrival of U.S. forces, multiple soldiers, civilian employees, and contractors were exposed to industrial hazards, including sodium dichromate, while providing site security and conducting renovations to the facility.[155] In the subsequent investigation conducted by DoD IG, inspectors found that 1) the military had significantly changed the scope of the contract with KBR, and 2) KBR's recognition of, and response to, the health hazards associated with sodium dichromate at the water treatment site was delayed.[156]

First, in regards to the change in the scope of the contract, DoD IG noted that, in the original task order issued to KBR, the primary mission described was that of fighting oil fires.[157] However, after the military realized the sabotage of oil fields by the Iraqis did not rise to the level of destruction anticipated, the military's mission evolved significantly "into a focus on restoring pumping and refining capabilities to generate oil for export."[158] The military subsequently modified the task order with KBR to go beyond minor emergency repairs to include providing all labor, support and equipment necessary to restore oil facilities to operating condition; however,

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[148] DoD IG Report SPO-2011-009, *supra* note 143, at 1.

[149] *Id*.

[150] *Id.* at 3.

[151] *Id*.

[152] *Id*.

[153] *Id*. at 1.

[154] *Id*. at 3.

[155] *Id*. at 1.

[156] DoD IG Report SPO-2011-009, *supra* note 143, at 1.

[157] *Id*. at 10.

[158] *Id.*

there was one small problem.[159] The modification to the task order did not occur until after KBR had deployed its contractor element to Kuwait and had conducted initial site surveys in Iraq.[160] As a result, there was insufficient time for the military and KBR to plan and execute a deliberate response to the expanded scope of work.[161]

The second significant finding reached by DoD IG was directly related to KBR's delayed recognition of, and response to, the health hazards associated with the presence of sodium dichromate at the Qarmat Ali facility.[162] KBR's contract set forth "specific health and safety requirements [it] was required to comply with in performing services under the contract, including [OEBGD], [Occupational Safety and Health Administration] standards, industry standards, [Comprehensive Environmental Response, Compensation, and Liability Act] requirements, environmental assessment requirements, Army safety regulations, and [USACE] safety standards."[163] Therefore, as part of its contract, KBR was required to take a number of actions in order to protect the health and safety of its employees and military personnel: including completing an accident prevention plan; conducting workplace assessments, activity hazard analysis, and hazard communication; and providing personal protective equipment.[164] Yet, DoD IG discovered that KBR failed to fully comply with these safety requirements.[165]

Despite evidence that KBR had identified in a report, dated May 27, 2003, of workplace hazards at the Qarmat Ali facility, including "residual chemicals hazards," DoD IG found no evidence that prior to beginning work KBR conducted an effective activity hazard analysis that met the criteria of the applicable military regulations incorporated in its contract.[166] In addition, despite an internal email in June 2003 wherein a KBR employee discussed sodium dichromate contamination at the Qarmat Ali site and recommended remedial measures be taken, KBR did not notify the military of the chemical's presence until August 12, 2003, when it issued an official report to the Army indicating that sodium dichromate at the facility constituted as "serious health hazard."[167] Although DoD IG did not describe the specific reasons behind KBR's 61-day delay before informing military officials of the chemical hazard at Qarmat Ali, DoD IG concluded that "[t]imely and effective completion of a workplace assessment or compliance with hazard communication and personal protective equipment requirements contained in the KBR Accident Prevention Plan would likely have reduced the exposure of Service members and

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[159] *Id*.

[160] *Id*.

[161] *Id*.

[162] *Id*. at 12.

[163] Bixby v. KBR, Inc., 895 F. Supp. 2d 1075, 1079 (D. Or. 2012).

[164] DoD IG Report SPO-2011-009, *supra* note 143, at 13.

[165] *Id*. at 12.

[166] *Id*. at 13-14.

[167] *Bixby*, 895 F. Supp. 2d at 1079.

DoD civilian employees to sodium dichromate contamination and mitigated the potential for chronic health effects and future liabilities."[168]

IV. SIMILAR TRENDS AND RELATED CONCERNS

Before discussing any similar trends and related concerns manifested in the three government-led investigations above, it is important to recognize several significant limitations to any conclusions that may be drawn from these investigations. First, it is critical to note that this article only addresses three support functions that may affect the environment. There are a host of other environmental functions the military must consider and all of them are governed by specific standards and guidelines, which present their own set of unique challenges that may not necessarily be addressed in the scope of the three support activities discussed in this article.[169] Second, while this article provides a brief discussion of some of the policy directives that govern U.S. military operations overseas, there are other key references and environmental policies left unaddressed in this article that may be relevant and worthy of consideration depending on the specific location in which the contingency operation is executed.[170] Finally, it is important to emphasize that the three government-led investigations referenced in this article were not created for the purpose of comparing military and contractor operated sites during contingency operations.[171] Nevertheless, a few common themes seemed to surface and overlap between these investigations that are worth noting and may serve some value in assessing the utility of using civilian contractors over military personnel during contingency operations.

A. U.S. Military Personnel Trends & Concerns

A look at the sites operated by U.S. military personnel reveals some trends or concerns. In these investigations, the responsible personnel managing the sites were not always aware of or did not necessarily have a complete understanding of the applicable environmental standards and regulations. In the GAO report, for example, the U.S. military operators misconstrued the CENTCOM regulations and did not understand that one of the fundamental purposes behind the guidance

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[168] DoD IG Report SPO-2011-009, *supra* note 143, at 15.

[169] These functions include, among others: pollution prevention; treatment, reuse, and disposal of wastewater; storage of petroleum, oils, and lubricants; storage, treatment and disposal of medical waste; pest management; spill prevention, response, containment, and cleanup; storm water management; protection and preservation of natural, cultural, and historical sites; and protection and preservation of plant and animal life. *See* AFH 10-222, *supra* note 19, at para. 2.5.

[170] Other key references that may impact contingency operations include bilateral treaties, Status of Forces Agreements, other International Agreements, as well as multinational doctrines. *See Id.* at para. 1.4.

[171] In fact, as noted in its report on burn pits, GAO explicitly states that its findings were limited to the four sites visited and were not intended to be generalizable to other sites GAO did not visit. *See* GAO-11-63, *supra* note 48, at 4.

provided for burn pit management was to prevent disposal of specified "prohibited items."[172] Likewise, in the DoD IG investigation of water production sites, once again, the U.S. military personnel responsible for operating the water treatment facility demonstrated to investigators an incomplete understanding of all the water-quality treatment testing required under TB MED 577.[173] Some possible reasons exist why enforcement and compliance may be a greater challenge for the U.S. military when such functions are kept "in-house" instead of outsourced to civilian contractors.

As explained above, U.S. military contingency operations range widely in scope and duration. As a result, the number of military personnel required to support any given contingency operation will vary widely, and turnover rates are high. Under these circumstances, it should not be surprising if all pertinent and relevant information is not effectively "turned over." Given the rapidly changing nature of contingency operations, as well as the fact that each operation may be governed by its own unique set of environmental guidelines or standards, some loss of information between U.S. military operators can only be expected.

Second, the investigations revealed a disparity in resources and equipment available to U.S. military personnel compared to that available to civilian contractors. For example, in the GAO report, investigators noted the stark contrast between the U.S. military-operated site, which was managed by five enlisted personnel, versus the contractor-operated site that used 15-20 civilian contractors to sort through the solid waste.[174] Likewise, in the DoD IG investigation of water treatment sites, the U.S. military-operated site was identified as lacking the necessary equipment to perform all the required water-quality testing.[175] Of course, the challenge of acquiring needed equipment and sufficient resources is not unique to the U.S. military. Given that contingency locations are often remote and isolated, one can safely infer civilian contractors also struggle with ensuring access to all essential equipment. DoD IG reported, for example, that KBR failed to perform water-quality testing as required because, as the company explained, it was waiting for the arrival of equipment.[176] Despite these common logistical challenges, one should recognize that there is a difference between simply not having essential equipment and waiting for the arrival of essential equipment. In DoD IG's investigation into water treatment facilities, investigators did not make this distinction when talking about one of the U.S. military-operated sites lacking the necessary equipment, but given the fact that investigators noted a number of other correctional measures taken at the different sites in its report, one may safely conclude that the investigators did not foresee the lack of all necessary equipment in that case being remedied in the near future.[177]

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[172] *Id.* at 19.

[173] DoD IG Report D-2008-060, *supra* note 101, at 12.

[174] GAO-11-63, *supra* note 48, at 20.

[175] DoD IG Report D-2008-060, *supra* note 101, at 12.

[176] *Id*. at 8.

[177] DoD IG Report D-2008-060, *supra* note 101, at 12.

B. Civilian Contractors Trends & Concerns

Turning to the trends and similarities raised at the sites operated by civilian contractors, three concerns seemed universal between investigations. The first concern was of the reduced level of flexibility when using civilian contractors versus military personnel. For example, in the burn pit investigation, one of the critical findings in that report was that comprehensive guidance on burn pit operations was not made available until several years after contingency operations in Iraq and Afghanistan began.[178] As a result, while the military expects any standards adopted by a combatant commander will be binding upon civilian contractors, such is the case only if the appropriate standards are properly incorporated into the contract.[179] At times, this requires a modification to the contract, which as noted in the burn pit investigation, is a time intensive process.[180] Thus, in situations where there is a need to change, update or modify standards or regulations, as often may be the case with environmental concerns during contingency operations, the military may be better able to quickly adapt its operations in order to comply with any new standards when keeping such functions "in-house." If civilian contractors are involved, a significant amount of time may lapse before compliance to the updated standards can be expected.[181] Likewise, a similar challenge exists when the scope and/or nature of the contingency mission changes. In Iraq, for example, the work performance and focus of the contract USACE had with KBR to restore Iraqi oil transformed tremendously after the military did not experience the oil fires it had anticipated and was forced to redirect its effort to restoring pumping and refining capabilities of Iraqi oil industries.[182] While it is difficult to draw any direct conclusions as to how the shift of mission focus in that case resulted in the failures by KBR at the Qarmat Ali site, it is worth noting to demonstrate how using civilian contractors during contingency operations may impact the military in its ability to remain flexible.

A second similar trend suggested in the investigations discussed is the difficulties the military faces in terms of assessing accountability when using civilian contractors. In the burn pit report, for example, GAO was unable to determine what level of exposure to potentially toxic emissions military members experienced at one of the contractor-operated sites because KBR failed to maintain records on what types of items were burned in its operation.[183] In that case, KBR claimed that it had not maintained any records because it was not contractually obligated to do so.[184] Likewise, in the investigation of water treatment facilities, DoD IG was also unable to identify the full level of health and safety risks experienced by military

[178] GAO-11-63, *supra* note 48, at 8.

[179] *Id*. at 19.

[180] *Id*.

[181] *Id.*

[182] DoD IG Report SPO-2011-009, *supra* note 143, at 10.

[183] GAO-11-63, *supra* note 48, at 18.

[184] *Id*.

members at one of the contractor-operated sites because KBR had failed to perform the water quality tests required under the contract.[185] Of course, in that case, the military preventive medicine personnel responsible for water quality testing also failed to perform the requisite testing, but this fact does not justify disregarding the concern related to the challenge of holding civilian contractors accountable.[186] While recordkeeping is unquestionably a performance task that can be built into to any contract, the real challenge presented to the military during contingency operations is that it is not always possible to identify every possible task that will satisfy the need for recordkeeping to ensure compliance, especially in cases where the military is forced to change the focus of its mission or the applicable standards governing a particular function.

Finally, the third similar trend is a breakdown in communication and failure of contractors to notify the military of remedial actions taken during unanticipated contingencies. For example, in its investigation of water treatment sites, DoD IG discovered that KBR had used chlorinated wastewater without notifying the military as it was required to do under its contract.[187] In that case, the problem was not directly linked to the use of chlorinated wastewater to meet its demand, although the regulations prohibited reuse of any wastewater.[188] KBR's decision to use wastewater stemmed from an apparently unavoidable situation in which the water production site suffered from a water shortage.[189] Thus, there is no evidence that suggests that the water shortage would have been avoidable had the military maintained operations of the water treatment facility. The crux of the problem in that case was that, in making its decision to use the wastewater, KBR failed to notify the appropriate military personnel.[190] During contingency operations, the military is equipped and trained to accept and absorb inherent risks in an operation by implementing additional remedial or control measures to minimize the impact; but such measures cannot and will not be taken unless the risks are known.[191] Thus, open communication between all concerned parties and prompt notification during contingency operations is critical.

Another example of civilian contractors failing to notify the military of risks is in the investigation of the Qarmat Ali site. In that case, the issue faced by civilian contractors was minimizing exposure to sodium dichromate.[192] Once again,

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[185] DoD IG Report D-2008-060, *supra* note 101, at 8.

[186] *Id*. at 10.

[187] DoD IG Report D-2008-060, *supra* note 101, at 10.

[188] *Id.*

[189] *Id.*

[190] *Id*.

[191] *See generally* U.S. Dep't of Def., Instruction 6055.01, DoD Safety and Occupational Health (SOH) Program Enclosure 3, para. 8, at 20-25 (Oct 14, 2014) (discussing risk management principles and processes).

[192] DoD IG Report SPO-2011-009, *supra* note 143, at 1.

there is no evidence to suggest that there would have been no issues had the military owned the operation since it was shown that, prior to the arrival of U.S. forces, the Iraqi Southern Oil Company had used the chemical in its operation of the site.[193] The carcinogen would thus have been present at the site regardless due to pre-war operations and post-war vandalism.[194] However, what may have been different if the military owned operations was the length of any delay in notifying other military personnel about the presence of the risk. In that case, DoD IG learned that it took KBR 61-days before notifying the military of the presence of sodium dichromate at the site, which resulted in over 1,000 servicemembers being exposed unnecessarily to the hazardous chemical.[195] Certainly with multiple branches within the military, as well as various independent missions, the military is not immune from breakdowns in communication. However, in electing to outsource certain functions with environmental concerns the importance and challenge of open communication appears to be a concern when using civilian contractors during contingency operations.

V. CONCLUSION AND OPINION

In reviewing the similar trends and concerns raised in this article, the only safe take-away is that factoring in the environment during contingency operations is a difficult and challenging task for the military whether it decides to keep certain environmental functions "in-house" or elects to outsource to civilian contractors. Consequently, and given the limitations discussed above, it is difficult to conclude decisively whether the military or civilian contractors do a "better job" at complying with all applicable environmental standards and guidelines during contingency operations. Likewise, it is difficult to conclude which presents the best option with respect to who best protects greater public values and other U.S. national objectives. However, a review of the available evidence suggests that the U.S. military's movement toward relying more heavily upon civilian contractors does not increase the risk of noncompliance to environmental standards, and may very well offer the best option to the U.S. military in this regard despite the limitations associated with their use. While the results of these investigations indicate that using civilian contractors to fulfill important environmental functions has the potential to create more immediate risks to U.S. military servicemembers due to the lack of flexibility, less oversight, and lack of clear communication channels with the military, civilian contractors bring essential equipment, resources, and knowledge that the military struggles to acquire when keeping these functions "in-house." Therefore, when viewed collectively, civilian contractors are better situated than military personnel to address the challenges presented during contingency operations and to implement the steps necessary to comply with environmental standards.

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[193] *Id*. at 3.

[194] *Id*.

[195] *Id.* at 4.

Obviously, there is work yet to be done in improving civilian contractors' level of compliance with environmental standards during contingency operations, and the military should make greater efforts to bring all parties into full compliance with current standards. However, each of the trends and concerns raised in this article relating to the use of civilian contractors are manageable and can be overcome. For purposes of moving forward, the most important consideration for the military is to understand the specific challenges associated with using civilian contractors so it can successfully absorb the risks as it is fully capable and trained to do.

WAGING WAR WITH CERCLA: DIVISIBILITY FOR THE SOVEREIGN

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I. Introduction

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§ 9601-9675, was enacted in 1980 to address mounting environmental concerns from industrial pollution.[1] CERCLA's goal is to "promote the 'timely cleanup of hazardous waste sites' and to ensure that the costs of such cleanup efforts were borne by those responsible for the contamination."[2] The United States Supreme Court remarked, "As its name implies, CERCLA is a comprehensive statute that grants the President broad power to command government agencies and private parties to clean up hazardous waste sites."[3] CERCLA liability can attach to a Federal Government entity in accordance with §9607 which defines classes of liability and §9620 which contains a waiver of sovereign immunity.

Under this liability scheme and sovereign immunity waiver, the difficult issues of how to reconcile CERCLA's liability provisions with the demands of waging war arise. For example, CERCLA can be retroactively applied, meaning the Federal Government can be, and has been, on the hook for past wartime production that created hazardous waste disposal sites. Moreover, under the strict liability provisions of CERCLA, the Federal Government may be found jointly and severally liable for the entire costs of CERCLA cleanup efforts at a contaminated hazardous waste site which was used to produce needed materials to support American efforts in World War II.[4] Such an outcome does not comply with the intent of CERCLA. This article explores the possibility of alternative outcomes for future wartime production CERCLA cases through an application of the doctrine of sovereign immunity, evolving common law principles related to strict liability and ultrahazardous activities, and the recent United States Supreme Court decisions in *Burlington* and *Bestfoods*.[5] An analysis of CERCLA's history and evolving refinement through the judicial system support the conclusions (a) that joint and several liability should not be applied to a federal entity in the context of wartime production, and (b) that any liability should be divisible in accordance with *Burlington*.

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[1] Burlington N. & Santa Fe Ry. v. United States, 556 U.S. 599, 602 (2009); United States v. Bestfoods, 524 U.S. 51, 55 (1998).

[2] CTS Corp. v. Waldburger, 134 S.Ct. 2175, 2180 (2014); *Burlington*, 556 U.S. at 602 (quoting Consol. Edison Co. of N.Y. v. UGI Utils., Inc., 423 F.3d 90, 94 (2d Cir. 2005)); *see also* Meghrig v. KFC W., 516 U.S. 479, 483 (1996); Dedham Water Co. v. Cumberland Farms Dairy, 805 F.2d 1074, 1081 (1st Cir. 1986).

[3] *Bestfoods*, 524 U.S. at 55 (quoting Key Tronic Corp. v. United States, 511 U.S. 809, 814 (1994)).

[4] *See* United States v. Shell Oil Co., 294 F.3d 1045 (9th Cir. 2002).

[5] *See Burlington*, 556 U.S. at 602; *Bestfoods*, 524 U.S. at 55.

II. CERCLA Liability

Under CERCLA, responsibility for cleanup costs is thrust upon "covered persons,"[6] also known as "potentially responsible parties" or "PRPs."[7] There are four categories of PRPs.[8] Included in these categories are owners and operators of qualifying facilities, as well as transporters and arrangers of qualifying hazardous substances.[9] Once a party is "identified as a PRP, it may be compelled to clean up a contaminated area or reimburse the Government for its past and future response costs."[10]

Identification as a PRP brings the weight of CERCLA to bear against a party in the form of, often times significant, financial liability. PRPs are liable under CERCLA for:

> (A) all costs of removal or remedial action incurred by the United States Government or a State or an Indian tribe not inconsistent with the national contingency plan;
>
> (B) any other necessary costs or response incurred by any other person consistent with the national contingency plan;
>
> (C) damages for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction, or loss resulting from such a release; and
>
> (D) the costs of any health assessment or health effects sturdy carried out under section 9604(i) of [CERCLA]. [11]

In effect, CERCLA provides the Federal Government a mechanism to "take action against current problems created by past improper disposal practices" of hazardous waste by placing cleanup costs on PRPs.[12] In the event a PRP is not identified or a

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[6] 42 U.S.C. § 9607 (2016).

[7] *Burlington*, 556 U.S. at 608.

[8] 42 U.S.C. § 9607(a).

[9] *Id.* ("(1) the owner and operator of a vessel or facility, (2) any person who at the time of disposal of any hazardous substance owned or operated any facility at which such hazardous substances were disposed of, (3) any person who by contract, agreement, or otherwise arranged for disposal or treatment, or arranged with a transporter for transport for disposal or treatment…and, (4) any person who accepts or accepted any hazardous substances for transport to disposal or treatment facilities….").

[10] *Burlington,* 556 U.S. at 609; Cooper Indus. v. Aviall Servs., 543 U.S. 157, 161 (2004).

[11] 42 U.S.C. § 9607(a)(4).

[12] Steven Ferrey, *The Toxic Time Bomb: Municipal Liability for the Cleanup of Hazardous Waste*, 57 Geo. Wash. L. Rev. 197, 222 (1988).

hazardous waste site is abandoned, the President is authorized to take appropriate response and remedial actions through the Hazardous Substance Response Trust Fund, or "Superfund."[13] Regardless of whether a PRP is identified, the President, through the EPA, is able to respond quickly to releases or threatened releases of hazardous waste with the Superfund.[14] If a PRP is identified, "[t]he government then acquires the right, subject to a lien on the affected property, to seek reimbursement from PRPs for costs incurred for cleanup, oversight, administration, legal removal, and resource restoration. The reimbursed money is used to replenish the Superfund."[15] This is CERCLA broken down to its most basic components.

Identifying liable parties under CERCLA sets the stage for one of the most litigated issues in environmental law. Courts have been left to interpret the statutory categories of liability for owners, operators, transporters, and arrangers. Liability under 42 U.S.C. § 9607 is tied to "covered persons." CERCLA defines the term "person" to include, "an individual, firm, corporation, association, partnership, consortium, joint venture, commercial entity, United States Government, State, municipality, commission, political subdivision of a State, or any interstate body."[16] Most notable here is the inclusion of the United States Government as a "person"[17] under this statute and thus an eligible "covered person"[18] under CERCLA's liability provisions. Congress went a step further and explicitly applied liability provisions under CERCLA to the Federal Government:

> Each department, agency, and instrumentality of the United States (including the executive, legislative, and judicial branches of government) shall be subject to, and comply with this chapter in the same manner and to the same extent, both procedurally and substantively, as any nongovernmental entity, including liability under section 9607 of this title. [19]

This provision serves as a waiver of sovereign immunity for liability purposes under CERCLA. Pursuant to this waiver, agencies of the Federal Government may therefore be PRPs under CERCLA as owners, operators, transporters, or arrangers of hazardous wastes.

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[13] *Id.* at 223; 42 U.S.C. § 9604(a) (2016).

[14] Ferry, *supra* note 12, at 224; 42 U.S.C. § 9604(a).

[15] Ferry, *supra* note 12, at 224; 42 U.S.C. § 9612(c)(3) (2016).

[16] 42 U.S.C. § 9601(21) (2016).

[17] *Id.*

[18] 42 U.S.C. § 9607.

[19] 42 U.S.C. § 9620(a)(1) (2016).

III. Sovereign Immunity

A. Origin of Sovereign Immunity

The doctrine of sovereign immunity traces its roots back to common law and the "underlying theory the 'King can do no wrong.'"[20] The United States Supreme Court has held, "[i]t is elementary that 'the United States, as sovereign, is immune from suit save as it consents to be sued…and the terms of its consent to be sued in any court define that court's jurisdiction to entertain the suit.'"[21] Therefore, absent an express waiver of sovereign immunity, the government is not liable for damages in any suit in federal court.[22]

Dean Harold J. Krent, in his article *Reconceptualizing Sovereign Immunity*, explains sovereign immunity "derives not from the infallibility of the state but from a desire to maintain a proper balance among branches of the Federal Government, and from a proper commitment to majoritarian rule."[23] Thus, the "fundamental principle underlying the doctrine of sovereign immunity is the recognized need to allow the executive branch to make crucial policy decisions unhampered by concerns over its potential liability to individual citizens."[24] Professor Gregory C. Sisk's succinct description states the doctrine of sovereign immunity strips from the courts the ability to apply traditional negligence or strict liability analyses to policy decisions of the legislative and executive branches.[25] The doctrine of sovereign immunity prevents the judiciary from essentially standing in the shoes of the other branches of government.[26] Sovereign immunity has evolved in U.S. law and policy as a tool to support separation of powers and ultimately leads to the practical application that "Congress and the executive branch can be sued only if Congress permits."[27]

The Supreme Court sovereign immunity waiver test, as outlined in *Department of Energy v. Ohio*, 503 U.S. 607, 615 (1992), requires: (1) a presumption that Congress is familiar that any waiver of sovereign immunity must be unequivocal[28];

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[20] Harold J. Krent, *Reconceptualizing Sovereign Immunity*, 45 Vand. L. Rev. 1529, 1530 (1992).

[21] United States v. Mitchell, 445 U.S. 535, 538 (1980) (quoting United States v. Sherwood, 312 U.S. 584, 586 (1941)); *see also* Ruckelhaus v. Sierra Club, 463 U.S. 680, 685 (1983); United States v. King, 395 U.S. 1, 4 (1969).

[22] Van S. Katzman, *The Waste of War: Government CERCLA Liability at World War II Facilities*, 79 Va. L. Rev. 1191, 1203 (1993).

[23] Krent, *supra* note 20, at 1530.

[24] Katzman, *supra* note 22, at 1213.

[25] Gregory C. Sisk, *The Inevitability of Federal Sovereign Immunity*, 55 Vill. L. Rev. 899, 900 (2010).

[26] *Id.* at 903.

[27] Krent, *supra* note 20, at 1535.

[28] McNary v. Haitian Refugee Ctr., Inc., 498 U.S. 496 (1991); United States v. Mitchell, 445 U.S. 535, 538 (1980).

(2) waivers have to be "construed strictly in favor of the sovereign;"[29] and, (3) waivers of sovereign immunity must not be broadened beyond the meaning of the statutory text.[30] The express and unequivocal waiver of sovereign immunity may not be taken from legislative history; rather, "the unequivocal expression of elimination of sovereign immunity that we insist upon is an expression in statutory text."[31]

B. Evolution of Sovereign Immunity in United States Environmental Law

The role of sovereign immunity in evolving federal environmental laws of the last half century has developed out of tragedy. No environmental case can highlight the impact and ramifications of federal sovereign immunity quite like the Texas City Disaster of 1947.[32] In this catastrophe, fertilizer explosions killed more than 560 people, injured another 3,000, destroyed the town of Texas City, Texas, and the resulting explosion's shockwave shattered windows forty miles away in the city of Houston, Texas.[33] This tragedy originated from the storage of thousands of tons of ammonium nitrate fertilizer aboard two steamships.[34]

On April 15, 1947, thousands of bags of ammonium nitrate fertilizer were loaded onto the French steamship *S.S. Grandcamp*, which was docked at Texas City, Texas.[35] The next morning, smoke was observed coming from the hull of the ship.[36] A fire started in one of the holds containing fertilizer, so the ship's captain, in accordance with standard maritime practices, ordered the hatches closed.[37] Within an hour, 880-tons of fertilizer in the fourth hold exploded and subsequently detonated the fertilizer in the second hold of the ship.[38] The fire from the *Grandcamp's* explosion quickly spread across the Texas City docks toward the sulphur and ammonium nitrate cargo of the *S.S. High Flyer*.[39] Tugs attempted to tow the *S.S. High Flyer*

[29] McMahon v. United States, 342 U.S. 25, 27 (1951).

[30] Ruckelhaus v. Sierra Club, 463 U.S. 680, 685 (1983); E. Transp. Co. v. United States, 272 U.S. 675, 686 (1927).

[31] Lane v. Pena, 518 U.S. 187, 192 (1996).

[32] Dalehite v. United States, 346 U.S. 15 (1953); Sisk, *supra* note 25, at 912–13; *see also* Hugh W. Stephens, The Texas City Disaster, 1947 3 (1997).

[33] *Dalehite*, 346 U.S. at 15; Sisk, *supra* note 25, at 912–13; *see also* Stephens, *supra* note 32.

[34] *Dalehite*, 346 U.S. at 15; Sisk, *supra* note 25, at 912–13; *see also* Stephens, *supra* note 32.

[35] *Dalehite*, 346 U.S. at 47.

[36] *Id.* at 48.

[37] *Id.* at 23 n.7 ("The Grandcamp exploded about an hour after the fire was noticed. Meanwhile the captain of the ship had ordered all personnel off and the hatches closed. Steam was introduced into the holds. All admit that this is normal fire-fighting procedures aboard ships, but that it was less than effective in this case because of the oxidizing properties of the Fertilizer Grade Ammonium Nitrate.").

[38] *Id.* at 48.

[39] *Id.*

out to sea before its cargo ignited.[40] Just after midnight on April 17, the cargo of the *High Flyer* exploded.[41]

Dalehite originated as the first ever class-action lawsuit against the United States, as a claim under the Federal Tort Claims Act (FTCA), which includes a waiver of sovereign immunity.[42] A decedent's estate claimed negligence against federal officials involved in the production of the Fertilizer Grade Ammonium Nitrate (FGAN), the compound that ignited and caused the initial fire aboard the *S.S. Grandcamp*.[43] The FGAN that literally ignited the Texas City disaster had been produced to fulfill the United States' post-World War II obligations as an "occupying power" to "deal with the problem of feeding the populations of Germany, Japan, and Korea."[44] Since the shipment of foodstuffs to these countries was not practical, the U.S. created a plan to ship supplies these countries could use to revitalize agriculture efforts abroad.[45] As Sisk explains, "the primary ingredient in the only fertilizer that could be produced in sufficient quantities was ammonium nitrate, which had also been used in explosives during the war."[46] To meet this hefty demand, the government employed the use of decommissioned ordinance plants and updated them to produce fertilizer, vice ordinance.[47] This ultimately led to the production of 2850-plus tons of FGAN that had been loaded aboard the *Grandcamp* and *High Flyer*.[48]

In the District Court for the Southern District of Texas, the plaintiff prevailed and his estate was awarded $75,000 in damages.[49] On appeal to the Court of Appeals for the Fifth Circuit, the court unanimously reversed, and the Supreme Court granted certiorari.[50] There, the majority opinion's analysis explained:

> The legislative history indicates that while Congress desired to waive the Government's immunity from actions for injuries to person and property occasioned by the tortious conduct of its agents acting within their scope of business, it was not contemplated that the Government should be subject to liability arising from acts of a governmental nature or function. [51]

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[40] *Id.*

[41] *Id.*

[42] Sisk, *supra* note 25, at 914; *see also* Federal Tort Claims Act, 28 U.S.C. § 1346(b)(1) (2006).

[43] *Dalehite*, 346 U.S. at 18. *Dalehite* was the test case for the remaining 300 suits pending against the U.S. government, all stemming from the Texas City disaster.

[44] *Id.* at 19.

[45] Sisk, *supra* note 25, at 911.

[46] *Id.*

[47] *Id.*

[48] *Dalehite*, 346 U.S. at 22.

[49] *Id.* at 17.

[50] *Id.*

[51] *Id.* at 27–28.

The majority reviewed the legislative history for the FTCA, finding that Congress intended an exception to the waiver of sovereign immunity where "no negligence on the part of any Government agent is shown, and the only ground for suit is the contention that the same conduct by a private individual would be tortious. . . ."[52] The majority then affirmed the Fifth Circuit's decision and held the government could not be liable because this discretionary function exception precluded liability.[53]

For purposes of this analysis under CERCLA, the dissent in *Dalehite* is just as important to consider. Justice Jackson began the dissent by remarking "This was a man-made disaster; it was in no sense an 'act of God.'. . . The disaster was caused by forces set in motion by the Government, completely controlled or controllable by it."[54] Borrowing from Judge Cardozo's *The Growth of Law*,[55] Justice Jackson opined, "Some theory of liability, some philosophy of the end to be served by tightening or enlarging the circle of rights and remedies, is at the root of any decision in novel situations when analogies are equivocal and precedents are silent."[56] The dissent continued by stating tort law for negligence is premised on sanctions for a departure in the "degree of care suitable to the conditions of contemporary society and appropriate to the circumstances of the case."[57] Justice Jackson opined the availability of a civil law remedy "is one of the law's most effective inducements to the watchfulness and prudence necessary to avoid calamity from hazardous operations in the midst of an unshielded populace."[58] However, the dissent warned, when the Federal Government is brought to court as a civil defendant, there is the fear that government action for the "public interest" can "clothe official carelessness," and prevent a legal remedy for the aggrieved plaintiff.[59] Applied to the facts in *Dalehite*,

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[52] *Id.* at 30 n.21 ("[S]ection 402 specifies the claims which would not be covered by the bill…. The first subsection of section 402 exempts from the bill claims based upon the performance or nonperformance of discretionary functions or duties on the part of a Federal agency or Government employee, whether or not the discretion involved be abused, and claims based upon the act or omission of a Government employee exercising due care in the execution of a statute or regulation, whether or not valid. This is a highly important exception, intended to preclude any possibility that the bill might be construed to authorize suit for damages against the Government growing out of an authorized activity, such as flood-control or irrigation project, where no negligence on the part of any Government agent is shown, and the only ground for suit is the contention that the same conduct by a private individual would be tortious, or that the statute or regulation authorizing the project was invalid….").

[53] *Id.* at 42 ("In short, the alleged 'negligence' does not subject the Government to liability. The decisions held culpable were all responsibly made at a planning rather than operational level and involved considerations more or less important to the practicability of the Government's fertilizer program.").

[54] *Id.* at 48.

[55] *Id.* at 49, Jackson, J., dissenting.

[56] *Id.*

[57] *Id.*

[58] *Id*.

[59] *Id.* at 50.

the dissent explained, "our fear that the Court's adoption of the Government's view in this case may [begin] an unfortunate trend toward relaxation of private as well as official responsibility in making, vending or transporting inherently dangerous products."[60]

Placing the dissent's concerns in perspective, Justice Jackson emphasized the need to consider the "basic criteria" that must be employed by the judiciary in deciding questions of liability:

> This is a day of synthetic living, when to an ever-increasing extent our population is dependent upon mass producers for its food and drink, its cures and complexions, its apparel and gadgets. These no longer are natural or simple products but complex ones whose composition and qualities are often secret. Such a dependent society must exact greater care than in more simple days and must require from manufacturers or producers increased integrity and caution as the only protection of its safety and well-being. [61]

Adding to this consideration, the dissent focused on the fact that the disaster could not have occurred "from any prudently operated government project, and that injury so sudden and sweeping should not lit where it has fallen."[62] In effect, expediency cannot be realized at the cost of prudent safety considerations.[63] Justice Jackson went on to opine that a private corporation would undoubtedly be found liable under this fact pattern, and the FTCA creates the same liability for the Government with its waiver of sovereign immunity.[64] Finally, the dissent explained, "The Government's negligence here was not in policy decisions of a regulatory or governmental nature, but involved actions akin to those of a private manufacturer, contractor, or shipper."[65] For these reasons, the dissenting justices would have found the government liable under the FTCA.[66]

The majority and dissent in *Dalehite* analyzed key concepts of sovereign immunity and liability that were captured in the statutory text of CERCLA nearly forty years later.[67] Unlike the majority's holding, there is no discretionary exception

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[60] *Id.*

[61] *Id.* at 51.

[62] *Id.* at 54.

[63] Sisk, *supra* note 25, at 916. Despite the reliance upon governmental policy by the majority, Justice Jackson's dissent "argued forcefully that the case involved nothing more than the kind of 'conflict between safety and expediency' that is at the heart of every claim that an actor failed to exercise due care."

[64] *Dalehite*, 346 U.S. at 57.

[65] *Id.* at 60.

[66] *Id.*

[67] 42 U.S.C. §§ 9607, 9620 (2016).

that would preclude Federal Government liability in the CERCLA context. Justice Jackson's characterization of government action in his dissent "akin to those of a private manufacturer, contractor, or shipper," summarizes classes of liability for PRPs under what would become § 9607 of CERCLA.[68] The impact that sovereign immunity played in this case was seemingly captured in later environmental statutes that waive sovereign immunity. For example, CERCLA § 9620 waives sovereign immunity for Federal facilities, which, if retroactively applied to the Texas City Disaster, arguably would have resulted in a holding in-line with Justice Jackson's dissenting opinion. Additionally, whether intentional or not, Congress' creation of liable parties under § 9607 mirrors Justice Jackson's language in the dissent that would have found the government liable in the Texas City Disaster.[69] For all intents and purposes, a waiver of sovereign immunity in environmental statutes is the legislatively chosen mechanism relied upon to prevent another Texas City disaster, Love Canal, or Valley of the Drums.[70]

Given a similar fact pattern, private industry would have easily been saddled with liability for negligence had they filled the shoes of the Federal Government.[71] Private industry is always going to make an economically driven calculus, balancing costs and benefits of its actions, even with regards to engagement in ultrahazardous activities.[72] Government on the other hand, is not solely driven by economics or fiscal considerations. Sisk argues, "When policy considerations underlie what might appear to be parallel government conduct…countervailing factors of efficiency and risk are weighed not in the pursuit of commercial profit but to consider which course best advances the common good."[73] This reasoning may too narrowly paint government priorities but does offer a helpful distinction from the private sector. Taking this vein of argument one step further, the government acts and decides

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[68] *Dalehite*, 346 U.S. at 57.

[69] *See Id.* at 60 ("But many acts of government officials deal only with the housekeeping side of federal activities. The Government, as landowner, as manufacturer, as shipper, as warehouseman, as shipowner and operator, is carrying on activities indistinguishable from those performed by private persons. In this area, there is not good reason to stretch legislative text to immunize the Government or its officers from responsibility for their acts, if done without appropriate care for the safety of others.").

[70] James R. MacAyeal, *The Comprehensive Environmental Response, Compensation, and Liability Act: The Correct Paradigm of Strict Liability and the Problem of Individual Causation*, 18 UCLA J. Envtl. L. & Pol'y 217, 254–55 n.194 (2000, 2001), ("Love Canal was an area where chemical companies dumped more than 21,000 tons of hazardous waste. The area was later developed for residential use. The government relocated over 700 families and destroyed or boarded up the homes…. The Valley of the Drums was a seven acre site near Louisville, Kentucky where EPA discovered 17,000 abandoned drums, six thousand of which were leaking toxic substances….").

[71] *See* Sisk, *supra* note 25, at 916 (arguing that courts would not hesitate to apply "basic standard of negligence" (or even an absolute standard of strict liability) on a private entity for what occurred in *Dalehite*).

[72] *Id.*

[73] *Id.*

from the perspective of politically viable options, vice economic advantage.[74] A waiver of sovereign immunity acts to nullify the distinction between a private entity driven by economic advantage and a federal agency attempting to pursue the best interest of the common good. With these considerations in mind, this article will now explore CERCLA's waiver of sovereign immunity under § 9620 and the case law precedents that have developed this provision of the statute in the context of operations and production of materials for war.

C. CERCLA's Waiver of Sovereign Immunity

The sovereign immunity waiver under § 9620 of CERCLA has been challenged at various levels of the federal judiciary. Most notably, the Supreme Court and various federal circuit courts of appeal have established the guiding principles that § 9620 is to be analyzed under. To frame an analysis of CERCLA's waiver of sovereign immunity in the context of war production, opinions from the Ninth Circuit, Third Circuit and D.C. Circuit Courts of Appeal are prudent to consider, below.[75]

In *United States v. Shell Oil Co.*, 294 F.3d 1045 (9th Cir. 2002), the U.S. government and the State of California brought suit in the United States District Court for the Central District of California against appellant oil companies to recover environmental cleanup costs at a Superfund site used to produce aviation fuel during World War II.[76] The appellants counterclaimed and alleged the Federal Government was a PRP and that sovereign immunity was waived under § 9620.[77] The district court determined that both the appellants and Federal Government were PRPs and that the Federal Government had waived sovereign immunity under 42 U.S.C. § 9620(a)(1).[78] The District Court also held that "100% of the cleanup costs for all the waste… should be allocated to the United States, and 0% to the Oil Companies, under [CERCLA's PRP contribution provision]."[79] On appeal, the Ninth Circuit upheld the waiver of sovereign immunity determination, agreeing that 42 U.S.C. § 9620(a)(1), as determined by the Supreme Court, is "an unambiguous waiver of sovereign immunity of the United States."[80] Relying on the Supreme Court's rationale in *Pennsylvania v. Union Gas Co.*, 491 U.S. 1, 105 (1989), the Ninth Circuit

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[74] *Id.*

[75] *See* United States v. Shell Oil Co., 294 F.3d 1045 (9th Cir. 2002); FMC Corp. v. U.S. Dep't of Commerce, 29 F.3d 833, 842 (3d Cir. 1994); E. Bay Mun. Util. Dist. v. U.S. Dep't of Commerce, 142 F.3d 479, 482 (D.C. Cir. 1998).

[76] *Shell Oil*, 294 F.3d at 1048. This case involved three iterations, each tackling the issue of arranger liability for the parties, in the Central District California, Shell I (1993), Shell II (1995), and Shell III (1998), before heading to the Ninth Circuit Court of Appeals in 2001.

[77] *Id.*

[78] *Id.*

[79] *Id.*

[80] *Id.* at 1052.

Court of Appeals found state liability provisions under 42 U.S.C. § 9607(d)(2) were analogous to the language of 42 U.S.C. § 9620(a)(1) for the Federal Government.[81] To clarify this analogy, the Ninth Circuit then quoted *Union Gas*:

> It can be no coincidence that in describing the potential liability of the States in [§ 9607(d)(2)], Congress chose language mirroring that of [§ 9620(a)(1)]. In choosing this mirroring language in [§ 9607(d)(2)], therefore, Congress must have intended to override the States' immunity from suit, just as it waived the Federal Government's immunity in [§ 9620 (a)(1)]. [82] (emphasis added).

The Ninth Circuit also stated that, even though *Union Gas* was overruled by *Seminole Tribe v. Florida.*, 517 U.S. 44 (1996), its conclusion as to Congressionally legislated waivers of State immunity was stated as, "[the Seminole Tribe] does nothing to cast doubt on the correctness of the Court's understanding of the meaning of §9620(a)(1)."[83]

In *Shell Oil*, the Federal Government argued the sovereign immunity waiver under §9620(a)(1) is "limited to cases in which [the Federal Government] has undertaken 'nongovernmental' activities."[84] This argument was two-fold.[85] First, the government argued that the heading for §9620 titled "Federal facilities" demonstrated the intent of Congress "to waive sovereign immunity only with respect to federally-owned facilities."[86] Second, the government claimed §9620's language "in the same manner and to the same extent… as any nongovernmental entity" tailors a waiver of sovereign immunity only to "those situations in which the government acts as a 'nongovernmental entity."[87] The Ninth Circuit rejected this argument and held "CERCLA's waiver of sovereign immunity is coextensive with the scope of liability imposed by 42 U.S.C. §9607."[88] The Ninth Circuit also recognized this holding aligned them with both the D.C. Circuit and the Third Circuit.[89]

FMC Corp. v. U.S. Department of Commerce involved a U.S. Department of Commerce (DOC) appeal to the Third Circuit Court of Appeals. The United States District Court for the Eastern District of Pennsylvania held the Federal Government liable as an owner, operator and arranger under CERCLA for response costs at an

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[81] *Id.*

[82] *Id.* (quoting Pennsylvania v. Union Gas Co., 491 U.S. 1, 105 (1989)).

[83] *Id.*

[84] *Id.*

[85] *Id.*

[86] *Id.*

[87] *Id*.

[88] *Id.* at 1053.

[89] *Id.*, *see also* FMC Corp. v. U.S. Dep't of Commerce, 29 F.3d 833, 842 (3d Cir. 1994); E. Bay Mun. Util. Dist. v. U.S. Dep't of Commerce, 142 F.3d 479, 482 (D.C. Cir. 1998).

industrial facility which produced rayon during World War II.[90] FMC Corporation (FMC) purchased the facility decades after the war had ended and had no relation to American Viscose, the company that owned and operated the plant during World War II.[91] After the EPA sought to recover CERCLA response costs from FMC, FMC brought suit against DOC for contribution based on their claim "the government became involved so pervasively in the facility that it effectively operated the plant along with American Viscose and, accordingly, should share in the response costs."[92]

In a motion for summary judgment to the district court, the government "argued that it had not waived sovereign immunity under CERCLA for purely regulatory activities…."[93] Then, on appeal to the Third Circuit, the government claimed there is not a waiver of sovereign immunity under CERCLA for "claims arising from its wartime regulatory activities…."[94] To support this argument, the Federal Government "contends that CERCLA's waiver, although express, is not limited and that [the court] must construe it narrowly."[95] Additionally, the government claimed § 9620 "does not apply to federal regulatory actions that a non-governmental entity cannot undertake."[96] Next, the government turned to prior Third Circuit cases where the Federal Government undertook action to cleanup hazardous waste sites.[97] This analogy enabled the government to argue the waiver of sovereign immunity "does not extend to situations in which the EPA has undertaken response or remedial actions at a hazardous waste site."[98] In sum, "the government contends these cases establish a per se rule that regulatory activities cannot constitute the basis for CERCLA liability, because only a government can regulate."[99]

The Third Circuit rejected this argument outright.[100] First, the plain text of § 9620(a)(1), Congress did not create an exception to the waiver for "regulatory activities."[101] Taking this a step further, the Court remarked that "when the government engages in activities that would make a private party liable if the private party engaged in those types of activities, then the government is also liable."[102] The Third Circuit then supported its position by drawing on the Supreme Court's

[90] *FMC Corp*., 29 F.3d at 834.

[91] *Id.*

[92] *Id.* at 835.

[93] *Id.* at 836.

[94] *Id.* at 838-39.

[95] *Id.* at 839.

[96] *Id.*

[97] *Id.*

[98] *Id.* (quoting United States v. Atlas Minerals & Chems., Inc., 797 F. Supp. 411, 420 (E.D. Pa. 1992)).

[99] *Id.*

[100] *Id.* at 840.

[101] *Id.*

[102] *Id.*

interpretation of the FTCA's sovereign immunity waiver in *Indian Towing Co. v. United States*, 350 U.S. 61, 76 (1955). There, the Supreme Court held sovereign immunity could be waived for activities private parties could not perform as "all Government activity is inescapably 'uniquely governmental' in that it is performed by the Government."[103]

Next, the Third Circuit explained how its interpretation of § 9620(a)(1) "comports with the rest of CERCLA."[104] First, the Court noted that "the 'regulatory' exception suggested by the government would be inconsistent 'with CERCLA's broad remedial purposes, most importantly its essential purpose of making those responsible for problems caused by disposal of chemical poisons bear the costs and responsibility for remedying the harmful conditions they created.'"[105] The Court reasoned that similar to a third-party entity, the Federal Government should "internalize the full costs…[that hazardous] substances impose on society and on the environment."[106] Thus, if the government created the mess, they were responsible for cleaning it up. Second, the Third Circuit highlighted the inclusion by Congress of only three specific defenses to CERCLA liability under § 9607, which do not include a "regulatory exception."[107] The statutory defenses to § 9607, found in § 9607(b), include "an act of God, an act of war," and third, what amounts to a negligence third party claim by the defendant.[108] Last, the appellate court relied on the Congressional "creation of an exception for cleanup activities by state and local governments" to demonstrate the intent of the legislature not to "protect a government from liability simply because it acts in a regulatory capacity."[109] Thus, the Court reasoned that the only extra protection a government receives under CERCLA is for response measures taken in accordance with § 9607(d)(2).[110]

Finally, the Third Circuit addressed DOC's argument that the sovereign immunity waiver of § 9620(a)(1) only applied to "federal facilities."[111] Like the Ninth Circuit in *Shell Oil*, the Third Circuit also rejected this argument.[112] First, the court stated that § 9620(a)(1) is not limited to federal facilities but applies to the entire "Federal Government."[113] Next, the Court observed "even though Congress

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[103] *Id.* (quoting Indian Towing Co. v. United States., 350 U.S. 61, 67 (1955)).

[104] *Id.*

[105] *Id.* at 840 (quoting Lansford-Coaldale Joint Water Auth. v. Tonolli Corp., 4 F.3d 1209, 1221 (3d Cir. 1993)).

[106] *Id.* (quoting United States v. Atlas Minerals & Chems., Inc., 797 F. Supp. 411, 413 n.1 (E.D. Pa. 1992)).

[107] *Id.*

[108] 42 U.S.C. § 9607(b) (2016).

[109] *FMC Corp.*, 29 F.3d at 841.

[110] *Id.*

[111] *Id.* at 842.

[112] *Id.*

[113] *Id.*

added section 120 dealing with 'Federal Facilities' to CERCLA in 1986, Congress waived sovereign immunity in the original version of CERCLA in 1980 in language not materially different from the amended language in 1986." Third, Congress' subjection of § 9607 liability to government agencies under § 9620(a)(1) when the sovereign immunity waiver was transferred from § 9607 to § 9620(a)(1), proves "Congress did not expressly limit the scope of the waiver."[114] In sum, the Third Circuit commented, "we think it is quite clear that the transfer of the waiver of sovereign immunity provision was nothing more than a logical reordering of the waiver provision accompanying the enactment of section 120."[115] Similar to *Shell Oil*, the holding by the Third Circuit in *FMC Corp*. found the Federal Government liable for CERCLA cleanup costs under § 9607.

In *East Bay Mun. Util. Dist. v. U.S. Department of Commerce*, a California municipality, the "District," was developing a reservoir system when hazardous wastes were identified at an abandoned mine and CERCLA actions were initiated.[116] The hazardous materials were traced back to mining operations during World War II.[117] The District claimed Federal Government intervention under the theories of "owner" and "arranger" liability for "a variety of measures [the U.S. government] employed during and shortly after World War II, all aimed at assuring the production of zinc, a critical ingredient in armaments."[118] These "measures" included government purchase agreements at above market prices, a loan to cover the costs of reopening the mine, and the implementation of regulations that ensured ample workers were available to mine zinc.[119]

Again, the U.S. government grounded its defense on the argument that § 9620(a)(1)'s waiver of sovereign immunity does not apply to regulatory activities.[120] Specifically, the government claimed sovereign immunity was intact for "uniquely and inherently sovereign" activities like those "imposing … price and labor regulations."[121] The D.C. Circuit was unconvinced and opined "CERCLA's strong tendency to focus on the substance of the government's (or any entity's) activities, rather than their form, cuts against the government's view."[122] Then, just like the Third Circuit, the D.C. Court of Appeals drew on an analogy to the FTCA and quoted *Indian Towing*,[123] remarking it was, "hard to think of any governmental

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[114] *Id.*

[115] *Id.*

[116] E. Bay Mun. Util. Dist. v. U.S. Dep't of Commerce, 142 F.3d 479, 480 (D.C. Cir. 1998).

[117] *Id.*

[118] *Id.* at 480–81.

[119] *Id.*

[120] *Id.*

[121] *Id.* at 481.

[122] *Id.* at 482-83.

[123] Indian Towing Co. v. United States, 350 U.S. 61, 67 (1955).

activity on the 'operational level,'[124] … which is 'uniquely governmental,' in the sense that its kind has not at one time or another been, or could not conceivably be, privately performed."[125] Taking this reasoning a step further, the D.C. Circuit remarked, "The converse is also true—it is hard to imagine any act that might lead to a finding of government 'operator' liability that could not be re-characterized at a higher level of abstraction as a uniquely governmental activity."[126]

Then, the Court drew out an additional distinction within the text of CERCLA on this point. The court explained, "§ 9607(d)(1) of the Act confers a defense on 'all persons' for costs or damages as a result of actions taken or omitted in the course of rendering care, assistance, or advice in accordance with the National Contingency Plan,' but does 'not preclude liability for costs or damages as a result or negligence."[127] The Court further reasoned, "As it appears that such activities are primarily or exclusively governmental, creation of the defense suggests a congressional assumption that immunization of specific purely governmental activities required a specific provision."[128] Lastly, the Court concludes this point by explaining, "CERCLA abrogates state and local government immunity in terms virtually identical to the waiver of federal immunity… so the exclusion of liability for emergency remediation efforts seems to imply a background assumption that the waiver would otherwise extend to such a typical governmental activity."[129]

The D.C. Circuit concluded their sovereign immunity waiver analysis by invoking the Supreme Court's holding in *Union Gas* where state liability was "unequivocal" and "unqualified" as enacted under § 9601(20)(D), which indicates "the statute's most authoritative reader may not be inclined to view the [sovereign immunity] waiver as hedged by unwritten exceptions."[130] Although the D.C. Circuit's sovereign immunity analysis cut against the Federal Government, the court ultimately held the Federal Government's actions with regard to the Penn Mine did not invoke liability as an owner or arranger under § 9607.[131]

Shell Oil, *FMC Corp.,* and *East Bay*, frame the dialogue for an analysis of CERCLA's wavier of sovereign immunity as applied to war-time production. These three circuits have agreed that regulatory activity is not an end-around for the government to avoid liability under §9607. Additionally, these cases appear to

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[124] *See E. Bay,* 142 F.3d at 483 ("The term 'operational' is used by the Court here in contradistinction to activities excluded from liability by the 'discretionary function' exception to the FTCA's waiver.").

[125] *Id.* (quoting *Indian Towing Co. v. United States*., 350 U.S. 61, 68 (1955)).

[126] *Id*.

[127] *Id.*

[128] *Id.*

[129] *Id.* at 484.

[130] *Id.*

[131] *Id*. at 487.

stand for the proposition that war-time production does not provide a higher burden for a plaintiff to overcome in proving to the courts the government is a PRP under § 9607. Rather, these appellate courts, as the D.C. Circuit remarked, "focus on the substance of the government's activities, rather than their form…."[132]

IV. CERCLA's Liability Framework and the United States Supreme Court

To fully address Federal Government liability under CERCLA for war-time production, the Supreme Court decisions of *United States v. Bestfoods* and *Burlington Northern & Santa Fe Ry. v. United States* must be incorporated into the analysis. These two cases help define the scope of CERCLA liability under § 9607.

A. *United States v. Bestfoods*

The Supreme Court addressed § 9607's operator and owner liability in-depth in the case of *Bestfoods*. There, the issue before the Court was "whether a parent corporation that actively participated in, and exercised control over, the operations of a subsidiary may, without more, be held liable as an operator of a polluting facility owned or operated by the subsidiary."[133] In the late 1970s, the Michigan Department of Natural Resources discovered "land littered with thousands of leaking and even exploding drums of waste, and the soil and water saturated with noxious chemicals" at a shutdown chemical manufacturing plant near Muskegon, Michigan.[134] The plant had first manufactured chemicals under the ownership of the Ott Chemical Company ("Ott I") in 1957. In 1965, CPC International, Inc. created a subsidiary company, also named Ott Chemical Company ("Ott II"), which maintained its manufacturing output, and continued to pollute the land.[135] Of significance is the fact that "CPC kept the managers of Ott I, including its founder, president, and principal shareholder, Arnold Ott, on board as officers of Ott II. Arnold Ott and several other Ott II officers and directors were also given positions at CPC, and they performed duties for both corporations."[136] Then, in 1972, the plant was sold to Story Chemical Company, who continued operations until they declared bankruptcy in 1977.[137]

Through the efforts of the Michigan Department of Natural Resources, the Muskegon plant was purchased by Aerojet-General Corporation.[138] Aerojet created a California subsidiary, Cordova Chemical Company (Cordova/California) to purchase the business.[139] Then, to purchase the property, Cordova/California cre-

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[132] *Dalehite*, 346 U.S. at 49.

[133] United States v. Bestfoods, 524 U.S. 51, 55 (1998).

[134] *Id.* at 56.

[135] *Id.*

[136] *Id.* at 56-57.

[137] *Id.* at 57.

[138] *Id.*

[139] *Id.*

ated a Michigan subsidiary, Cordova Chemical Company of Michigan (Cordova/Michigan), which continued in the chemical manufacture business at the site until 1986.[140]

In 1981, the EPA established a remediation plan for the site that "called for expenditures well into the tens of millions of dollars."[141] In 1989, the Federal Government initiated litigation to recover response and remediation costs from CPC, Aerojet, Cordova/California, Cordova/Michigan, and Arnold Ott.[142] At trial, the district court was tasked with determining owner and operator liability under §9607(a)(2) for CPC and Aerojet.[143] The district court held "operator liability may attach to a parent corporation both directly, when the parent itself operates the facility, and indirectly, when the corporate veil can be pierced under state law."[144] To explain this holding, the district court stated:

> [A] parent corporation is directly liable under section 107(a)(2) as an operator only when it has exerted power or influence over its subsidiary by actively participating in and exercising control over the subsidiary's business during a period of disposal of hazardous waste. A parent's actual participation in and control over a subsidiary's functions and decision-making creates 'operator' liability under CERCLA; a parent's mere oversight of a subsidiary's business in a manner appropriate and consistent with the investment relationship between a parent and its wholly owned subsidiary does not. [145]

The district court then found both CPC and Aerojet liable as operators under § 9607(a)(2).[146] This holding was reversed by the Sixth Circuit Court of Appeals.[147] The Sixth Circuit applied Michigan corporate law and determined the corporate veil had not been pierced because both "the parent and subsidiary corporations maintained separate personalities, and the parents did not utilize the subsidiary corporate form to perpetrate fraud or subvert justice."[148]

To examine this issue, the Supreme Court first turned to corporate law. Justice Souter remarked, in writing the majority opinion, "It is a general principle of corporate law deeply 'ingrained in our economic and legal systems' that a parent corporation (so-called because of control through ownership of another corporation's

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[140] *Id.*

[141] *Id.*

[142] *Id.* at 58.

[143] *Id.*

[144] *Id.*

[145] *Id.* at 58-59.

[146] *Id.* at 59.

[147] *Id.*

[148] *Id.* at 60.

stock) is not liable for the acts of its subsidiaries."[149] This principle can be read into CERCLA as well because "nothing in CERCLA purports to reject this bedrock principle, and against this venerable common-law backdrop, the congressional silence is audible.[150] The Court acknowledged that the corporate veil could only be pierced when "the corporate form would otherwise be misused to accomplish certain wrongful purposes, most notably fraud, on the shareholder's behalf."[151] Justice Souter then explained that common law principles will not be ignored unless a statute expressly touches on "the question addressed by common law."[152] To that extent, the Supreme Court upheld the Sixth Circuit's ruling that a parent corporation could only be liable under § 9607 for a subsidiary's actions when the corporate veil was pierced.[153] However, § 9607(a)(2) addresses both ownership and operation, and the Sixth Circuit failed to analyze CPC and Aerojet's actions in operating facilities owned by their subsidiaries.[154] It is this distinction that may be brought to bear in any analysis of a federal entity under § 9607(a)(2). Although the Federal Government may not "own" facilities in cases dealing with wartime production, courts have found the government may qualify as an "operator" under § 9607(a)(2).

The Supreme Court next stated, "The fact that a corporate subsidiary happens to own a polluting facility operated by its parent does nothing, then, to displace the rule that the parent 'corporation is [itself] responsible for the wrongs committed by its agents in the course of its business."[155] The Court then distinguished between the law of piercing the corporate veil and that statutory text of § 9607.[156] "[W]hereas the rules of veil-piercing limit derivative liability for the actions of another corporation, CERCLA's 'operator' provision is concerned primarily with direct liability for one's own actions."[157] The majority relied on the "plain language of the statute" to find liability for any "person who operates a polluting facility."[158] This principle applies, regardless of the "covered person's" status, a parent corporation, subsidiary, or as the Court explained "even a saboteur who sneaks into the facility at night to discharge its poisons out of malice."[159] Direct liability as an operator trumps any

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[149] *Id.* at 61 (quoting Douglas & Shanks, *Insulation from Liability Through Subsidiary Corporations*, 39 Yale L. J. 193 (1929)).

[150] *Bestfoods*, 524 U.S. at 62.

[151] *Id.*

[152] *Id.* at 63.

[153] *Id.* at 63–64.

[154] *Id.* at 64.

[155] *Id.* at 65 (quoting Mine Workers v. Coronado Coal Co., 259 U.S. 344, 395 (1922)).

[156] *Id.*

[157] *Id.*; *see* Sidney S. Arst Co. v. Pipefitters Welfare Ed. Fund, 25 F.3d 417, 420 (7th Cir. 1994) ("[T]he direct, personal liability provided by CERCLA is distinct from the derivative liability that results from piercing the corporate veil.").

[158] *Bestfoods*, 524 U.S. at 65.

[159] *Id.*

protections under state corporate law.[160] Again, this analysis can apply to a federal entity: status as a federal agency would not negate liability under CERCLA.

Applying the "ordinary or natural meaning" to the statutory text, the Court then defined "operator" as "simply someone who directs the workings of, manages, or conducts the affairs of a facility."[161] Justice Souter provided greater clarity through application of this definition by remarking "an operator must manage, direct, or conduct operations specifically, related to pollution, that is, operations having to do with the leakage or disposal of hazardous waste, or decisions about compliance with environmental regulations."[162] The Supreme Court noted the Sixth Circuit's error was "limiting direct liability under the statute to a parent's sole or joint venture operation, so as to eliminate any possible finding that CPC is liable as an operator on the facts of this case."[163] The focus of the Supreme Court was on whether CPC operated the Muskegon plant, and is not restricted to just whether the parent corporation, CPC, operates the subsidiary, which has day-to-day control over the plant.[164] Therefore, analysis of direct operator liability under § 9607(a)(2) requires the focus to remain on the parent corporation's relationship to the plant itself and not the subsidiary corporation.[165] The district court failed to draw this distinction and attempted to hold CPC directly liable simply based on the extent to which officers of the parent corporation were involved with the subsidiary.[166] Such a conclusion contradicts a basic principle of corporate law in which "control thru ownership… does not fuse the corporations, even when the directors are common to each."[167]

Last, the Supreme Court examined whether "an agent of the parent with no hat to wear but the parent's hat might manage or direct activities at the facility."[168] The Court prefaced analysis of this issue by explaining, "…the acts of direct operation that give rise to parental liability must necessarily be distinguished from the interference that stems from the normal relationship between parent and subsidiary."[169] Direct operator liability under § 9607(a)(2) would only be invoked if the "actions directed to the facility by an agent of the parent alone are eccentric under accepted

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[160] *Id.*

[161] *Id.* at 66.

[162] *Id.* at 66–67.

[163] *Id.* at 67.

[164] *Id.* at 68.

[165] *Id.*

[166] *Id.* at 69.

[167] *Id.* (quoting Kingston Dry Dock Co. v. Lake Champlain Transp. Co., 31 F.2d 265, 267 (2d Cir. 1929)); *see also* American Protein Corp. v. AB Volvo, 844 F.2d 56, 57 (2d Cir. 1988) ("[I]t is entirely appropriate for directors of a parent corporation to serve as directors of its subsidiary, and that fact alone may not serve to expose the parent corporation to liability for its subsidiary's acts.").

[168] *Bestfoods*, 524 U.S. at 71.

[169] *Id.*

norms or parental oversight of a subsidiary's facility."[170] Ultimately, the Supreme Court remanded this issue for the lower court to develop more facts in determining whether the conduct of a parent corporation's agent opened the door to operator liability. The focus of *Bestfoods* was on the actions of a party with the operation of a facility. Status and organizational hierarchy are irrelevant as CERCLA only looks to the facts in determining whether a parties actions rise to the level of control that would amount to an "operator" under § 9607(a)(2).

B. *Burlington Northern & Santa Fe Ry. v. United States*

In 2009, the U.S. Supreme Court returned to the issue of CERCLA liability under § 9607 in the case of *Burlington Northern & Santa Fe Ry. v. United States*.[171] This time, the Court took on the issues of "arranger" liability under § 9607(a)(3) and divisibility of harm among PRPs.[172] Both issues are key to an analysis of federal agency liability for war-time production. Executive agency action can be invasive to the point that a federal entity could be found by the courts to be an "arranger" under § 9607(a)(3). Additionally, federal PRPs should seek to mitigate their liability by sharing the cost of remediation through apportionment. *Burlington* speaks to both these issues.

Beginning in 1960, Brown and Bryant, Inc. (B&B) commenced operations of "an agricultural chemical distribution business."[173] B&B would purchase chemicals and pesticides from third party suppliers, such as Shell Oil Company (Shell), and then use the products on customers' farms.[174] Initially, B&B started its business on a 3.8-acre plot of land located in Arvin, California.[175] Then, in 1975, B&B "expanded operations onto an adjacent .9-acre parcel of land owned jointly by the Atchison, Topeka & Santa Fe Railway Company and the Southern Pacific Transportation Company (now known respectively as the Burlington Northern and Santa Fe Railway Company and Union Pacific Railway Company)."[176]

B&B maintained an inventory of "the herbicide Dinoseb, sold by Dow Chemicals, and the pesticides D-D and Nemagon, both sold by Shell" during operations of its business.[177] The chemical "Dinoseb was stored in 55-gallon drums and 5-gallon containers on a concrete slab outside B&B's warehouse."[178] The pesti-

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[170] *Id.* at 72.

[171] Burlington N. & Santa Fe Ry. v. United States, 556 U.S. 599, 602 (2009); *Bestfoods*, 524 U.S. at 55 (1998).

[172] *Burlington,* 556 U.S. at 608.

[173] *Id.*

[174] *Id.*

[175] *Id.*

[176] *Id.*

[177] *Id.* at 603.

[178] *Id.*

cide Nemagon was kept in "30-gallon drums and 5-gallon containers inside the warehouse."[179] Initially, D-D was stored in 55-gallon drums.[180] Then, in the mid-1960s, "Shell began requiring its distributors to maintain bulk storage facilities for D-D.[181] Due to its high corrosive characteristics, "bulk storage of D-D led to numerous tank failures and spills as the chemical rusted trains and eroded valves."[182] The district court determined B&B took "stewardship" of "D-D as soon as the common carrier entered the Arvin facility."[183] Whenever B&B moved D-D on its property, "leaks and spills" were common.[184]

The Arvin facility was "graded toward a sump and drainage pond" and "neither the sump nor the drainage pond was lined until 1979, allowing waste water and chemical runoff from the facility to seep into the ground water below."[185] B&B was described as a "sloppy operator… [o]ver the course of B&B's 28 years of operation, delivery spills, equipment failures, and the rinsing of tanks and trucks allowed Nemagon, D-D, and Dinoseb to seep into the soil and upper levels of ground water of the Arvin facility."[186] The Court noted "of particular concern was a plume of contaminated ground water located under the facility that threatened to leach into an adjacent supply of potential drinking water."[187]

Shell began implementing various D-D precautionary measures in the late 1970s after spills of the chemical became a regular occurrence with its distributors.[188] First, "Shell provided distributors with detailed safety manuals and instituted a voluntary discount program for distributors that made improvements in their bulk handling and safety facilities."[189] Second, Shell required inspections and implemented a self-certification process to ensure continuity of safety measures among its distributors.[190] Despite these measures, B&B continued to have a number of

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[179] *Id.*

[180] *Id.*

[181] *Id.*

[182] *Id.*

[183] *Id.*

[184] *Id.*

[185] *Id.*

[186] *Id.* at 604.

[187] *Id.* n.3 ("The ground water at the Arvin site is divided into three zones. The A-zone is located 60-80 feet below the ground. It has been tested and found to have high levels of contamination. The B-zone is located 150 feet below ground. Although the B-zone is not currently used as a source of drinking water, it has the potential to serve as such a source. No contamination has yet been found in that zone. The C-zone is an acquifer located 200 feet below ground. It is the sole current source of drinking water and, thus far, has suffered no contamination from the Arvin site."); United States v. Bestfoods, 524 U.S. 51, 55 (1998).

[188] *Burlington*, 556 U.S. at 604.

[189] *Id.*

[190] *Id.*

spills and accidents with the hazardous materials it handled.[191] In 1989, B&B was bankrupt and the Arvin facility was placed on the National Priority List.[192]

In response to an EPA administrative order, the Railroads spent over $3 million to remediate environmental issues at the Arvin site.[193] After the Railroads brought suit against B&B to recover some of the remediation costs, the California Department of Toxic Substances Control (DTSC) and the EPA brought two recovery actions against Shell and the Railroads. All claims were consolidated and the District Court determined that both Shell and the Railroads were PRPs.[194] The Railroads were found to be a PRP due to their ownership of a portion of the Arvin facility.[195] Shell was a PRP as an arranger under § 9607(a)(3) for its sale and delivery of D-D.[196] The court, however, did not impose full liability on Shell and the Railroads, but instead "concluded the harm was divisible and therefore capable of apportionment."[197]

On appeal to the Ninth Circuit Court of Appeals, the holding explained that even though Shell was not a "traditional" arranger, Shell was still a PRP "under a broader category of arranger liability if the disposal of hazardous wastes was a foreseeable byproduct of, but not the purpose of, the transaction giving rise to arranger liability."[198] The Ninth Circuit expounded on this holding:

> Shell arranged for delivery of the substances to the site of its sub-contractors; was aware of, and to some degree dictated, the transfer of arrangements; knew that some leakage was likely in the transfer process; and provided advice and supervision concerning safe transfer and storage. Disposal of a hazardous substance was thus a necessary part of the sale and delivery process. [199]

The Ninth Circuit also reversed the District Court's finding of apportionment and determined Shell and the Railroads were jointly and severally liable for all response costs incurred by DTSC and the EPA.[200]

The Supreme Court granted certiorari to determine whether Shell did in fact qualify as an arranger under § 9607(a)(3) and whether response costs could

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[191] *Id.*

[192] *Id.* at 605.

[193] *Id.*

[194] *Id.*

[195] *Id.*

[196] *Id.*

[197] *Id.* at 606.

[198] *Id.* at 606–07.

[199] *Id.* at 607.

[200] *Id.* at 608.

be attributable to the Railroads and Shell.[201] On the issue of arranger liability for Shell, the Court found that the language of the statute and legislative intent did not clearly define the term "arranger," and therefore the Court would use its common meaning.[202] Using the common meaning of "arranger" the Supreme Court explained, "In order to qualify as an arranger, Shell must have entered into the sale of D-D with the intention that at least a portion of the product be disposed of during the transfer process by one or more of the methods described in [the Solid Waste Disposal Act's definition of arranger (42 U.S.C. § 6903(3))]."[203] With this definition, the Court concluded that the evidence did not support "an inference that Shell intended such spills to occur," and that "Shell's mere knowledge that spills and leaks continued to occur is insufficient grounds for concluding that Shell 'arranged for' the disposal of D-D within the meaning of § 9607(a)(3)."[204]

Next, the Court turned to the issue of divisibility. Since Shell was absolved of liability under § 9607(a)(3), only liability for the Railroads was addressed by Justice Stevens' majority opinion.[205] Relying on the "seminal opinion" on the issue of apportionment under CERCLA of *United States v. Chem-Dyne Corp.*,[206] the majority agreed that although CERCLA created a "strict liability standard," joint and several liability was not required.[207] As *Chem-Dyne* identified, "Congress intended the scope of liability to be determined from traditional and evolving principles of common law."[208] Then, relying on § 433A of the Restatement (Second) of Torts, courts are able to apportion the harm when "there is a reasonable basis for determining the contribution of each cause to a single harm."[209] The majority then looked back at the factors considered by the District Court in its apportionment analysis, which included, "percentages of land area, time of ownership, and types of hazardous products," and reversed the Ninth Circuit's holding of joint and several liability, thereby reinstating apportionment to the Railroads of 9% of the total costs of remediation.[210]

In sum, *Bestfoods* defined operator liability under § 9607(a)(2) and *Burlington* created a test to identify whether a party qualified as an "arranger" under § 9607(a)(3) and established that even though CERCLA does provide for joint and several liability, divisibility among PRPs and apportionment of costs is permissible under § 9607. For federal facilities, this establishes a framework to analyze

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[201] *Id.*

[202] *Id.* at 610–11.

[203] *Id.* at 612.

[204] *Id.* at 613.

[205] *Id.*

[206] United States v. Chem-Dyne Corp., 572 F. Supp 802 (S.D. Ohio 1983).

[207] *Burlington*, 556 U.S. at 613.

[208] *Id.* (quoting *Chem-Dyne,* 572 F. Supp at 808).

[209] *Burlington,* 556 U.S. at 614 (quoting Restatement (Second) of Torts § 433A(1)(b) (1963–1964)).

[210] *Id.* at 617–19.

liability under § 9607 and a starting point to forming an argument supporting cost apportionment among PRPs.

V. Strict Liability

A. Strict Liability for Ultrahazardous Activities

The doctrine of strict liability for ultrahazardous activities traces its roots to the notorious English case of *Rylands v. Fletcher*.[211] There, a landowner sought to create a water reservoir on his property.[212] Unbeknownst to the landowner, the contractor built the reservoir on land that contained abandoned underground mine shafts.[213] When the reservoir was filled with water, the mine shafts below were flooded, which in turn flooded an adjacent landowner's coal mining operation.[214]

At trial, the defendant landowners prevailed and were not found negligent because they had no knowledge of the abandoned mining operation.[215] However, on appeal, Justice Blackburn explained how the defendants were liable under the principle of strict liability.[216] This legal principle was ultimately adopted in the Restatement of Torts, Section 519.

Section 519 of the Restatement provides "[O]ne who carries on an ultrahazardous activity is liable to another whose person, land or chattels the actor should recognize as likely to be harmed by the unpreventable miscarriage of the activity for harm resulting thereto from that which makes the activity ultrahazardous, although

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[211] Rylands v. Fletcher, (1868) 3 L.R.E. & I. App. 330 (H.L.); *see also* Clark-Aiken Co. v. Cromwell-Wright Co., 323 N.E.2d 876 (1975).

[212] *Clark-Aiken*, 323 N.E.2d at 878.

[213] *Id*.

[214] *Id*.

[215] *Id*.; *see also* MacAyeal, *supra* note 70 (explaining "Under English law at the time the owners could not be held vicariously liable for the acts of their contractors.").

[216] MacAyeal, *supra* note 70, at 225 ("[T]he true rule of law is, that the person who for his own purposes brings on his lands and collects and keeps there anything likely to do mischief if it escapes must keep it in at his peril, and if he does not do so, is prima facie answerable for all the damage which is the natural consequence of its escape. He can excuse himself by showing that the escape was owing to the plaintiff's default; or perhaps that the escape was the consequence of vis major, or the act of God…. The general rule, as above stated seems on principle just. The person whose grass or corn is eaten down by the escaping of cattle of his neighbor, or whose mine is flooded by the water from his neighbor's reservoir, or whose cellar is invaded by the filth of his neighbor's privy, or whose habitation is made unhealthy by the fumes of noisome vapors of his neighbor's alkali works, is damnified [injured] without any fault of his own; and it seems but reasonable and just that the neighbor who has brought something on his own property which was not naturally there, harmless to others so long as it is confined to his own property, but which he knows to be mischievous if it gets on his neighbor's, should be obliged." (quoting *Rylands*, 3 L.R.E. & I. App. at 279)).

the utmost care is exercised to prevent the harm."[217] An activity is "ultrahazardous" if it, "necessarily involves a risk of serious harm to the person, land or chattels of others which cannot be eliminated by the exercise of the utmost care, and is not a matter of common usage."[218]

In 1965, Dean William Prosser, as the Reporter for the Restatement (Second) of Torts, changed the strict liability test of "ultrahazardous activities" to "abnormally dangerous activities."[219] The Restatement (Second) of Torts, § 519 explains, "One who carries on an abnormally dangerous activity is subject to liability for harm to the person, land or chattels of another resulting from the activity, although he has exercised the utmost care to prevent the harm."[220] Additionally, Dean Prosser edited § 520 and provided additional factors to consider in determining whether an activity was ultrahazardous or abnormally dangerous:[221]

> (A) existence of a high degree of risk of some harm to the person, land or chattels of others;
>
> (B) likelihood that the harm that results from it will be great;
>
> (C) inability to eliminate the risk by the exercise of reasonable care;
>
> (D) extent to which the activity is not a matter of common usage;
>
> (E) inappropriateness of the activity to the place where it is carried on; and,
>
> (F) extent to which its value to the community is outweighed by its dangerous attributes.[222]

As MacAyeal points out, the judiciary has "come to conceptualize strict liability in terms of the placement or use by the defendant of an 'instrumentality' that is likely to escape and cause damage."[223] The courts, in applying strict liability, do

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[217] Restatement of Torts § 519 (1934).

[218] Restatement of Torts § 520 (1934).

[219] Restatement (Second) of Torts § 519 (1965).

[220] *Id.*

[221] MacAyeal, *supra* note 70, at 226.

[222] Restatement (Second) of Torts § 520 (1965).

[223] MacAyeal, *supra* note 70, at 226. *See also* Bolivar v. R&H Oil & Gas, 789 F. Supp. 1374, 1383 (S.D. Miss. 1991) (characterizing an oil well, blown out from reworking, as instrumentality that was abnormally dangerous); Inland Steel v. Pequignot, 608 N.E.2d 1378, 1385 (Ind. App. 1993) (noting that under *Rylands*, a person who chooses to use an abnormally dangerous instrumentality is strictly liable); Clark-Aiken Co. v. Cromwell-Wright Co., 323 N.E.2d 876, 885 n.17 (1975) (noting that strict liability for harm caused by escape of dangerous instrumentality has been law of Commonwealth since 1868); Toy v. Atlantic Gulf & Pac. Co., 4 A.2d 757, 765 (Md. 1939)

not focus on the personal acts of the defendant, but rather the instrumentality, or how the instrumentality is used in a given activity.[224] This concept is fundamental to how strict liability is applied to ultrahazardous activities under the common law.[225]

Case law is filled with examples of strict liability applied to ultrahazardous activities. The courts have held particular instrumentalities, such as the disposal, transportation, and storage of hazardous substances, are essentially per se ultrahazardous activities that require the application of strict liability.[226] MacAyeal explains that each of these cases contains the same basic concept:

> [T]he defendant has placed on property or used an object that can easily escape control or cause damage. If the instrumentality does in fact escape control, the defendant is liable for all types of damages that make the instrumentality or activity abnormally hazardous. The defendant is held liable based on a relationship to the instrumentality such as being the owner, operator, or user. [227]

This illustrates the correlation between common law strict liability and CERCLA § 9607 for owner, operator, and arranger liability.

With that connection in mind, it is also important to distinguish between strict liability for criminal or civil offenses and strict liability for ultrahazardous activity.[228] As MacAyeal explains, the main goal of strict liability in the criminal and civil context is to prevent specific conduct, whereas the focus of strict liability in the ultrahazardous activity context is to "compensate plaintiffs injured by lawful conduct."[229] This presents a unique dynamic between the risks posed by the ultrahazardous activity and the value of the activity to society.[230] Justice Stewart articulated this relationship in his dissent opinion to *Laird v. Nelms*:

> The law … imposes liability for harm caused by certain narrowly limited kinds of activities even though those activities are not prohibited and even though the actor may have exercised the utmost

("The basic concept underlying the rule is that a person who elects to keep or bring upon his land something which exposes the adjacent land or its owner or occupant to an added danger should be obliged to prevent its doing damage. So, it follows that if the escape be of oil, gas, electricity, explosives, sewage or water artificially accumulated and stored and damage is done to an adjacent property, the occupier is within the rule.").

[224] MacAyeal, *supra* note 70, at 226.

[225] *Id.*

[226] *Id.* at 228–31.

[227] *Id.* at 232.

[228] *Id.*

[229] *Id.*

[230] *Id.*

> care. Such conduct is 'tortious' not because the actor is necessarily blameworthy, but because society has made a judgment that while the conduct is so socially valuable that it should not be prohibited, it nevertheless carries such a high risk of harm to others, even in the absence of negligence, that one who engages in it should make good any harm caused to others thereby. [231]

By placing the burden of costs on the actor, the public at large will not be forced to pay for injuries resulting from ultrahazardous activities, and "the true costs of the activity will be distributed among those who benefit from the activity."[232] From a causation perspective, any injury that results from an ultrahazardous activity will attach liability to a defendant if the evidence demonstrates the defendant exercised ownership or control over the ultrahazardous activity.[233]

B. Evolution of Strict Liability for Ultrahazardous Activities under CERCLA

The doctrine of strict liability for ultrahazardous activity was first incorporated into the text of the Clean Water Act.[234] Under the Clean Water Act, the terms "vessel"[235] and "facility"[236] are defined as instrumentalities to which strict liability attaches.[237] Per the Clean Water Act, owners and operators of these two instrumentalities were strictly liable for any resulting cleanup costs associated with these instrumentalities.[238] Invoking the common law doctrine created in *Rylands v. Fletcher*, MacAyeal explains, "the Clean Water Act focused on the harm caused by the instrumentality, not on the particular conduct of the owners and operators

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[231] *Id.* at 232 (quoting Laird v. Nelms, 406 U.S. 797, 804–05 (1972)).

[232] *Id.* at 233 (Stewart, J., dissenting).

[233] *Id.* at 239; *see also* United States v. Tex-Tow Inc., 589 F.2d 1310, 1314–15 (7th Cir. 1978) ("Tex-Tow was engaged in the type of enterprise which will inevitably cause pollution and on which Congress has determined to shift the cost of pollution when the additional element of actual discharge is present."); Ind. Harbor Belt R.R. Co. v. Am. Cyanamid Co., 662 F. Supp. 635, 645 (N.D. Ill. 1987) ("One who engages in an abnormally dangerous activity is liable for all injury resulting from the activity, period, regardless of who was at fault.").

[234] MacAyeal, *supra* note 70, at 247; Clean Water Act, 33 U.S.C. §§ 1251–1387 (1972).

[235] 33 U.S.C. § 1321(a)(3) (defining "vessel" as every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water other than a public vessel).

[236] 33 U.S.C. § 1321(a)(10) (defining "onshore facility" as any facility (including, but not limited to, motor vehicles and rolling stock) of any kind located in, on, or under, any land within the United States other than submerged land); 33 U.S.C. § 1321(a)(11) (defining "offshore facility" as any facility of any kind located in, on, or under, any of the navigable waters of the United States, and any facility of any kind which is subject to the jurisdiction of the United States and is located in, on, or under any other waters, other than a vessel or a public vessel).

[237] MacAyeal, *supra* note 70, at 247.

[238] *Id.*

linked to the instrumentality."[239] Congress then incorporated the doctrine of strict liability into CERCLA.[240]

The incorporation of common law strict liability principles into CERCLA was much broader than what Congress had done in the Clean Water Act.[241] CERCLA, like the Clean Water Act, included the instrumentalities of vessels[242] and facilities[243] and added "geographic areas where hazardous substances had been deposited."[244] Additionally, CERCLA included transporters[245] and generators[246] of hazardous substances.[247] Broadening the incorporation of common law strict liability even further, CERCLA also expressly made liability retroactive for owners, operators, arrangers and transporters of qualifying ultrahazardous instrumentalities.[248]

MacAyeal posits that the unambiguous inclusion of common law strict liability into CERCLA demonstrates the legislative intent for courts to "consider the paradigm of strict liability for ultrahazardous activity to resolve questions of individual causation under CERCLA.[249] This conclusion is supported considering the historical context of environmental disasters in the 1970s that precipitated the passage of CERCLA into law.[250] A string of high profile oil spills and incidents at abandoned toxic waste sites incentivized Congress to pursue legislation to fund these cleanups.[251] Congress incorporated Superfund mechanisms in other environmental statutes but never to an all-encompassing extent like CERCLA.[252] Ultimately, the

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[239] *Id.*

[240] *Id.*

[241] *Id.*

[242] 42 U.S.C. § 9601(28) (2016).

[243] 42 U.S.C. § 9601(9).

[244] MacAyeal, *supra* note 70, at 247.

[245] 42 U.S.C. § 9607(a)(3).

[246] 42 U.S.C. § 9607(a)(2).

[247] MacAyeal, *supra* note 70, at 247; 42 U.S.C. § 9601(14).

[248] MacAyeal, *supra* note 70, at 247; United States v. Ne. Pharm. & Chem. Co., 810 F.2d 726, 732-33 (8th Cir. 1986).

[249] MacAyeal, *supra* note 70, at 247.

[250] *Id.* at 254.

[251] *Id.* at 253.

[252] *Id.* at 254 ("Clean Water Act § 311 established a $35 million revolving fund for cleanup of releases of oil and designated hazardous substances into navigable waters and restoration of natural resources; Trans-Alaska Pipeline Authorization Act, 43 U.S.C. § 1651 (2000), established a $100 million fund for damages, cleanup costs, restoration of natural resources, and economic loss, resulting from spills of oil transported through the pipeline; The Outer Continental Shelf Amendments of 1978 amended the Outer Continental Shelf Lands Act, 43 U.S.C. § 1331 (1994), to establish a $200 million fund for damages, cleanup costs, property damage and loss of income and tax revenue, resulting from spills of oil produced on the Outer Continental Shelf; The Deep Water Port Act of 1974, 33 U.S.C. § 1502 (1994), established a $100 million fund for damages resulting from oil pollution from vessels or facilities engaged in deepwater port operations.").

environmental catastrophes at Love Canal and Valley of the Drums served as the catalyst for Congress to pass a more encompassing strict liability-based statute to fund cleanups of environmental hazardous waste sites.[253]

Congressional rationale for applying strict liability to ultrahazardous activities in CERCLA is best explained in a legislative history report for Senate Bill 1480.[254] The report explains that strict liability for an environmental superfund statute is an appropriate standard in equity and ensures the cleanup costs are placed on the parties who create the ultrahazardous risks.[255] This legislative report further states, "The most desirable system of loss distribution is one in which the prices of goods accurately reflect their full costs to society."[256] To implement this system in a statute, Congress must place the cost of injury from ultrahazardous activities on the entities responsible for the activity, and, the responsible entity in turn should calculate the potential cost of injury into its business costs needed to fund the ultrahazardous activity.[257] This application of strict liability would spread the costs of injury "over a greater population and over a larger time period," and enable responsible parties to push the price of potential injury into costs for the consumer.[258] Congress' reliance on strict liability for ultrahazardous activities led to the creation of § 9607 liability provisions under CERCLA.[259]

VI. CERCLA Liability During War

Taken together, *Shell Oil*, *FMC Corp*., and *East Bay* demonstrate a consensus, at least at the U.S. Court of Appeals level, that § 9620(a)(1) applies to all Federal Government entities, is not precluded by only "regulatory" or purely "governmental" activities, and demonstrates the intent of Congress to hold federal entities liable under § 9607 like any other "covered person."[260] These cases also present the difficult issue of how to reconcile CERCLA's liability provisions with the demands of waging war. As Katzman explains, the Federal Government "historically exercised pervasive regulatory control over countless aspects of American economic, political, and social life," while prosecuting a war.[261] It is this governmental regulation that led to increased production of needed war resources, "such as rubber, steel, aluminum, and rayon," but also led to the creation of "massive quantities of industrial waste,

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[253] *Id.* at 254–55.

[254] *See id.* at 269–75.

[255] *Id.*

[256] *Id.*

[257] *Id.*

[258] *Id.* at 341.

[259] MacAyeal, *supra* note 70, at 277–78.

[260] 42 U.S.C. §§ 9601(21), 9607 (2016).

[261] Katzman, *supra* note 22, at 1191. *See also* David Novick et al., Wartime Production Controls (1949) (discussing the breadth of federal regulatory power exercised during first and second world wars).

hazardous to both the human health and the environment."[262] These wartime production needs that created hazardous waste disposal sites now must be addressed under the retroactively applied CERCLA.

Under § 9607, liability classes are broadly defined and such a reading squares with congressional intent and key principle inherent to CERCLA, that the polluter pays.[263] This "polluter pays principle" has been used by the judiciary in assessing CERCLA liability.[264] Interestingly, this principle which is so widely cited by the courts presents a paradox. CERCLA was intended to place the costs of hazardous waste cleanup onto the responsible parties so that society at large would not bear such costs.[265] By waiving sovereign immunity under § 9620 and then qualifying the Federal Government as a PRP under §9607 for wartime regulatory actions, the costs of hazardous waste cleanup will still be shouldered by the American taxpayer.[266] This paradox places a significant financial burden on the American public since the Federal Government has continually exercised increased control over various industries in the United States during wartime.[267] Yet, this "public cost-sharing approach" is exactly what Congress rejected when enacting CERCLA.[268]

In *Shell Oil*, *FMC Corp.,* and *East Bay*, the courts determined that "Government regulatory control…was a least an ingredient precipitating the contamination at these sites."[269] Katzman posits a reexamination of factors the courts have considered in assessing the government's CERCLA liability at war production facilities may lead to a different conclusion.[270] First, Katzman argues that privately held facilities were not coerced into increased production of war materials, which led to increased

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[262] Katzman, *supra* note 22, at 1191–92.

[263] *Id.* at 1193 ("In one sense, expanding the liability circle appears consistent with the congressional intent that those who planted the seeds of pollution and reaped the profits of industrial activity bear the cost of cleanup.").

[264] *Id.* At 1193 n.25 ("CERCLA's combination of a tax on generators and strict liability for site remediation 'places the costs of releases of hazardous wastes on the sector most responsible for pollution and which benefits most from chemical production, rather than on the victim or taxpayers,"…This is often referred to as the 'polluter pays' principle. Numerous courts have reaffirmed it as one of the guiding principles of the statute. *See* Kaiser Aluminum & Chem. Corp. v. Catellus Dey Corp., 976 F.2d 1338, 1340 (9th Cir. 1992); Dedham Water Co. v. Cumberland Farms Dairy, Inc., 805 F.2d 1074, 1081 (1st Cir. 1986); United States v. Azrael, 765 F. Supp. 1239, 1245 (D. Md. 1991); United States v. New Castle County, 727 F. Supp. 854, 866 (D. Del. 1989)").

[265] Katzman, *supra* note 22, at 1231–32.

[266] *Id.*

[267] *Id.* at 1195 ("Given the Federal Government's control over much of the nation's industrial complex during World War II, the Korean War, the Vietnam War, and to a lesser extent, the Persian Gulf War, the number of waste sites for which the government may have to contribute to cleanup costs is potentially enormous.").

[268] *Id.* at 1230.

[269] *Id.* at 1196.

[270] *Id.* at 1196.

amounts of hazardous wastes.[271] Instead, he explains, "strong evidence supports the notion that federal wartime contracts and requirements, far from burdening privately run facilities, were seen as a government carrot, guaranteeing manufacturers a lucrative market for their products."[272]

Next, Katzman relies on "a baseline assumption in American law," which stands for the proposition "that when the Federal Government acts in a policymaking capacity, it is immune from liability for damages."[273] If Congress sought to overrule this presumption in CERCLA, Katzman argues, it would have done so explicitly.[274] This line of argument is supported by the cases in which the federal courts have held § 9620's waiver of sovereign immunity is not absolute.[275] An absolute waiver of sovereign immunity would attach government liability under § 9607 to any governmental action taken with respect to a privately run facility during war.[276] In *United States v. Nordic Village*,[277] the Supreme Court emphasized the "rule of strict construction" which, as Katzman explains, "if language is susceptible to more than one reading – as section 120 appears to be – it is not 'unambiguous' and thus does not qualify as an effective waiver of sovereign immunity."[278] Relying on this rule and the federal courts that have "proffered a limited waiver theory" under § 9620.[279] Katzman concludes by proposing that waivers of sovereign immunity under CERCLA must be narrowly construed, especially when applied to policymaking determinations by the government.[280]

The third prong of Katzman's analysis is grounded in the legislative history of § 9620.[281] Compared to prior environmental statutes that waived sovereign immunity, CERCLA was clearly intended to mirror those statutes.[282] The sovereign immunity waiver in each of these environmental statutes ensured that federal

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[271] *Id.*

[272] *Id.* ("American Viscose Corporation, the owner of the rayon manufacturing facility at issue in *FMC Corp*., increased its profits by 300% during the war despite governmental regulation… citing documents revealing a profit increase at the Front Royal Facility from $339,148 in 1940 to $1,080,000 in 1944."); *id.* at 1196 n.39 ("The United States experienced an over 50% increase in GNP – after allowance for inflation – between 1939 and 1944.").

[273] *Id.* at 1196; *see* Krent, *supra* note 20, at 1532–33.

[274] Katzman, *supra* note 22, at 1196.

[275] *Id.* at 1204 n.97.

[276] *Id.* at 1205.

[277] United States v. Nordic Vill. Inc., 503 U.S. 30 (1992).

[278] Katzman, *supra* note 22, at 1205; FMC Corp. v. U.S. Dep't of Commerce, 29 F.3d 833, 840 (3d Cir. 1994).

[279] Katzman, *supra* note 22, at 1205.

[280] *Id.* at 1206.

[281] *Id.*

[282] *Id.* ("It is readily apparent that Congress modeled the CERCLA sovereign immunity waiver after nearly identical waiver provisions in the Clean Water Act, the Clean Air Act, and the Resource Conservation and Recovery Act.").

facilities and operations by federal entities would be held to the same standards as private entities.[283] However, Katzman is adamant, "[t]here is no indication that these provisions were meant to waive sovereign immunity in situations where the government takes regulatory action against private facilities (as the blanket waiver theory holds)."[284] To support this, the legislative history for CERCLA contains Senator Robert Stafford's proclamation that § 9620 was "designed to institute fundamental reforms of the Federal facilities cleanup effort … to assure that the cleanup effort at Federal facilities is both adequate and consistent with parallel efforts at privately owned or operated sites."[285] Examining § 9620 with this lens demonstrates a stark contrast from a blanket waiver of sovereign immunity. Senator Stafford's remarks focus on federal facility operations and not Federal Government action at privately owned facilities. This view would square with one of the government's arguments in *Shell Oil* and *FMC Corp.* that § 9620's heading of "Federal Facilities" demonstrated legislative intent to apply a waiver of sovereign immunity to federally-owned facilities only.[286]

Focusing in on governmental regulation during war production, and using the WPB in *FMC Corp.* as an example, Katzman states, "The issuance of priority orders, allocation of scarce raw materials, the imposition of taxes, price controls and labor restrictions all represent governmental conduct that no private entity was 'obligated to perform.' Nor, for that matter, were nongovernmental entities capable of performing such regulatory deeds."[287] These sovereign actions are distinct and foreign to the actions of a private entity, and thus require that any analysis under § 9620 differentiate "between the government as regulator and the government 'as a business' for the purposes of sovereign immunity accords…."[288] Such an interpretation under CERCLA would mesh with the "fundamental principle underlying the doctrine of sovereign immunity" which shields executive policy determinations from the threat of individual citizen suit.[289] This "fundamental principle" is best applied on the context of wartime decision-making.[290] Katzman fully illustrates this proposition by articulating, "Perhaps nowhere is this need to insulate governmental decision-making more compelling that in the wartime context, where Executive Branch policy choices directly affect the defense of the nation."[291] If government regulatory decisions over private industry during wartime are not excluded from

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[283] *Id.*

[284] *Id.*

[285] *Id.* at 1206–07, n.112–13; FMC Corp. v. U.S. Dep't of Commerce, 29 F.3d 833, 842 (3d Cir. 1994).

[286] United States v. Shell Oil Co., 294 F.3d 1045, 1052 (9th Cir. 2002).

[287] Katzman, *supra* note 22, at 1212 n.153 (citing *In re* Paoli R.R. Yard PCB Litigation, 790 F. Supp. 94, 97 (E.D. Pa. 1992)).

[288] *Id.* at 1213.

[289] *Id.* at 1213 n.161.

[290] *Id.*

[291] *Id.* at 1213 n.163.

the waiver of sovereign immunity under § 9620, the United States could be faced with "undesirable, even absurd consequences."[292] Such an interpretation of § 9620 could stifle national defense regulatory and policy-driven action by the Federal Government.[293] Therefore, since § 9620 does not expressly apply to regulatory actions of government, courts should apply this fundamental policy of sovereign immunity to exclude "policy-laden decision-making" under CERCLA.[294] Applying § 9607 liability to government regulatory action could ultimately "deter actions that society values."[295]

Last, Katzman explains, "waiving sovereign immunity when the government acts to regulate a facility would be incongruous with the liability framework of CERCLA."[296] One of the key legislative considerations when drafting CERCLA was the fact that under the retroactive applicability of the statute, certain private parties, who would be PRPs, would be "insolvent or otherwise unavailable for suit" by the time liability under § 9607 attached.[297] To counter this possibility, Congress incorporated joint and several liability into CERCLA.[298] The net result is that solvent PRPs can be responsible for all cleanup costs at a given CERCLA site.[299] This result also places the Federal Government in the unfair position of being "the ultimate [deep pocket]" that will always be available for suit and would never be insolvent as a PRP.[300] Thus, as Katzman concludes, "the practical consequence of holding the government liable for purely regulatory acts would be to expose the United States as a prime target for CERCLA cost-shifting, providing private industry with a new key to unlock the coffers of the federal treasury." Katzman's position illustrates the paradox of CERCLA that has evolved in case law where the government is identified as a PRP for regulatory action, then the American taxpayer will be left to foot the bill of a CERCLA cleanup.[301]

VII. Divisibility and the Costs of War

The paradox created by the judicial application of CERCLA's liability scheme to the government's regulatory decision-making while prosecuting a war requires a new approach. Applying joint and several liability to the Federal Government in this context causes the end result that CERCLA was created to prevent, which

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[292] *Id.* at 1214.

[293] *Id.*; Krent, *supra* note 20, at 1546.

[294] *Id.*

[295] *Id.* at 1231.

[296] *Id.*

[297] *Id.*

[298] 42 U.S.C. § 9604 (2016).

[299] Katzman, *supra* note 22, at 1231–32.

[300] *Id.* at 1232.

[301] *Id.* at 1230–31.

is forcing the American public to shoulder the costs of cleanup efforts at hazardous waste sites. The Supreme Court's analysis of PRP divisibility in *Burlington* offers the following framework for a new approach to Federal Government liability under CERCLA during war.

As the Court in *Burlington* explained, joint and several liability is not required under CERCLA.[302] Apportionment of cost can be judicially determined. Using *Chem-Dyne* as an example, a court can rely on "traditional and evolving principles of common law"[303] and *Restatement (Second) of Torts* § 433A to support divisibility in cases involving a government PRP who acted in a regulatory capacity during the prosecution of war. Both legal and policy considerations support such a conclusion.

At the forefront of this proposition are the roles of the legislature and the executive branch as defined by the U.S. Constitution. Under Article I of the Constitution, Congress is expressly given the power to declare war and fund the military.[304] The President, under Article II, is identified as the Commander in Chief, which empowers the President to prosecute wars.[305] Currently, the use of joint and several liability in CERCLA case precedent could, and has, placed the burden of congressionally supported and Presidentially executed wartime prosecution measures back onto the American taxpayer. In one respect, the United States citizenry is liable in tort for its government's exercise of constitutionally granted powers in the defense of our nation. From a policy perspective, this raises the question of whether, and if so to what extent, national security actions and decisions in the wartime context should be insulated from suit.

The employment of retroactive joint and several liability under CERCLA for facilities tied to war production has the overwhelming likelihood of placing the cost of cleanup solely on the Federal Government. As exemplified by *FMC Corp.*, it is all too common that PRPs in existence at the time that liability under § 9607 would attach no longer exist or are solvent when contamination at a site is identified decades, or sometimes more than half a century, later. Thus, the only PRP always available for suit is the United States government. Judicially apportioned costs for the Federal Government would mitigate the extent to which the American taxpayer would be on the hook for cleanup at these wartime production sites. In theory this practice would yield an equitable result for the American public and not overburden society with extravagant costs borne from private industry wartime production. In reality, the issue would then become what party is responsible for the remainder of

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[302] Burlington N. & Santa Fe Ry. v. United States, 556 U.S. 599, 614 (2009).

[303] *Id.* at 617–19.

[304] U.S. Const., art. I, § 8 ("The Congress shall have Power…To declare war…To raise and support armies….").

[305] U.S. Const., art. II, § 2 ("The President shall be Commander in Chief of the Army and Navy of the United States….").

the cleanup costs that were not apportioned to the Federal Government. The default, absent other PRPs, would require the EPA to use the Superfund for remaining cleanup efforts, similar to EPA's use of the Superfund to cover orphan shares. Such a result could eventually overburden the Superfund and require congressional action to ensure CERCLA's Superfund maintains an adequate balance.

Turning back to *FMC Corp.*, the Third Circuit's holding rejected the government's argument that regulatory actions should be exempt from CERCLA.[306] The Third Circuit held that liability should attach to governmental activity if it would attach to a private party for the same conduct.[307] Additionally, the Third Circuit explained that the federal government, like private industry, should internalize the costs of remediation under CERCLA when engaged in ultrahazardous activities.[308]

Using the Third Circuit's analysis, application of divisibility to cases stemming from wartime production, when the government is a PRP, would not free the federal government from liability. Divisibility would only mitigate the government's overall liability. Second, use of divisibility in these cases would still require the federal government to internalize costs associated with CERCLA cleanups, like any other PRP, while also preventing private industry from potentially escaping liability altogether. Lastly, the application of divisibility in these cases does not require a regulatory exception be read into the statute. Rather, *Burlington*, common law, and legislative intent offer divisibility in the wartime production context as a judicially enforceable measure.

In the context of sovereign immunity, using divisibility to lower the ceiling of the government's potential liability under § 9607 enables the executive to make crucial wartime policy decisions free from concerns of unforeseen penalties and costs that may later result under CERCLA.[309] Even though Congress incorporates a waiver of sovereign immunity under § 9620 of CERCLA, there is no evidence to suggest that Congress' intent with CERCLA was to in anyway inhibit executive actions associated with the national defense in prosecuting war. The application of divisibility and apportionment still results in liability for the sovereign and thereby avoids a Texas City Disaster outcome where the federal government escaped liability. The federal government would not escape all liability but would also not be liable for all costs of CERCLA cleanup efforts under joint and several liability.

From a policy and equity perspective, denying private industry the argument the Federal Government should be jointly and severally liable for the full costs of any CERCLA cleanup at war production facilities recognizes the increased business and profits enjoyed by private industry in fulfilling wartime contracts. For future wartime

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[306] FMC Corp. v. U.S. Dep't of Commerce, 29 F.3d 833, 840 (3d Cir. 1994).

[307] *Id.*

[308] *FMC Corp.*, 29 F.3d at 840–42.

[309] Katzman, *supra* note 22, at 1213.

government and private industry contracts, judicial use of divisibility would ensure consideration of future CERCLA-related costs would be factored into such agreements. Drawing from Sisk's analysis, limiting the liability of government parties in the wartime context also recognizes a key distinction between government and private industry namely, private industry is always focused on commercial profit, whereas the government acts, or should act, for the common good.[310]

VIII. Conclusion

CERCLA's waiver of sovereign immunity under § 9620 has evolved in case law to be all but absolute, holding the federal government to the same standards as private industry. Superfund sites created from wartime production facilities pose a unique challenge to the judiciary in applying the liability provisions of CERCLA. As case law has repeatedly explained, there is no defense under CERCLA for regulatory actions by the federal government. As a result, the judiciary has applied joint and several liability which can have the effect of finding the government completely liable under § 9607 for CERCLA-related cleanup costs at wartime production facilities that were owned and operated by private industry. This result may burden the American taxpayer with the additional costs tied to cleanup at previous wartime production sites, often from wars fought decades in the past.

To mitigate this result and meet the intent of CERCLA, courts should apply case law precedent from *Bestfoods* and *Burlington*. *Bestfoods* defined operator liability under § 9607(a)(2) and requires direct operator control to find CERCLA liability.[311] In any suit alleging the government as a PRP involving a wartime production facility or waste area, demonstrating operator liability under *Bestfoods* will require proof that some government agent or party exercised direct control over operations at a facility. *Bestfoods* made clear that organizational hierarchy or status are irrelevant to an analysis of whether a party is an operator for purposes of § 9607. This rule acts to create a more difficult burden for a private party to meet when alleging the government acted as an actual operator of a facility for purposes of § 9607(a)(2) liability.

Burlington analyzed arranger liability under § 9607(a)(3) and provided guideposts for applying divisibility among PRPs. The Supreme Court explained that arranger liability only attached in cases where a party demonstrated an intent to dispose of a hazardous substance as defined by CERCLA.[312] Additionally, the Court held that mere knowledge of a party that spills of a hazardous substance are occurring does not attach arranger liability to that party absent a demonstrated intent

[310] Sisk, *supra* note 25, at 916 ("When policy considerations underlie what might appear to be parallel government conduct…countervailing factors of efficiency and risk are weighed not in the pursuit of commercial profit but to consider which course best advances the common good.").

[311] Burlington N. & Santa Fe Ry. v. United States, 556 U.S. 599, 608 (2009).

[312] United States v. Chem-Dyne Corp., 572 F. Supp 802 (S.D. Ohio 1983).

for disposal of the hazardous substance.[313] Taken together, these cases provide the first step in analyzing a federal entity's potential liability under CERCLA. First, the federal entity must have exercised enough control at a Superfund site to qualify as a PRP under § 9607. Where a federal entity does not exercise the level of control necessary to qualify it as a PRP under § 9607, then the analysis ends there. If the courts determine that a federal entity is a PRP, then divisibility should be applied.

Burlington outlined when divisibility is appropriate under CERCLA. First, the majority opinion explained that although CERCLA applied a strict liability standard, joint and several liability was not required for every dispute that arose under § 9607 among PRPs.[314] Rather, § 433A of the *Restatement (Second) of Torts*[315] can be employed and courts may apportion the harm when "there is a reasonable basis for determining the contribution of each cause to a single harm."[316] To meet the intent of CERCLA, divisibility and apportionment of costs should be applied by the courts specifically in cases where the government is alleged as a PRP for performing wartime-related regulatory functions. The use of divisibility applied to the government also meets the intent of common law strict liability for ultrahazardous activities, by avoiding the result that the public at-large, the American taxpayer, will be stuck with full liability under § 9607.

Although federal regulatory conduct has been rejected as a defense under CERCLA in *Shell Oil* and *FMC Corp.*, the application of divisibility will not seek to avoid government liability altogether but rather ensures the government will only be liable for the portion of any harm the courts determine based on the facts of the case. Such an outcome satisfies the intent of CERCLA and advances beneficial legal and policy considerations for the American public at large.

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[313] *Id.*

[314] *Burlington*, 556 U.S. at 613.

[315] *See* RESTATEMENT (SECOND) OF TORTS, §§ 433A, 881 (1976) ("[W]hen two or more persons acting independently caus[e] a distinct or single harm for which there is a reasonable basis for division according to the contribution of each, each is subject to liability only for the portion of the total harm that he has himself caused.").

[316] Rylands v. Fletcher, (1868) 3 L.R.E. &I. App. 330 (H.L.).

FUNDAMENTALS OF MILITARY HEALTH LAW: GOVERNANCE AT THE CROSSROADS OF HEALTH CARE AND MILITARY FUNCTIONS

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I. INTRODUCTION

Health care is the professional undertaking that seeks to minimize the incidence and effects of illness and injury. The armed forces are authorized to use lethal force when necessary to protect and advance national security interests. Where these two functions intersect operates the Military Health System. Governance at this crossroads of health care and military functions is the subject of military health law and this article.

To start, the following definition is offered: military health law is the set of legal powers and duties of the United States government derived from the Constitution, statutes, regulations, judicial decisions, and international law requirements to carry out military and related humanitarian functions through health care professionals and systems interacting with military personnel, public and private entities, and other individuals.

This definition is shaped by the attributes and functions of the Military Health System. As stated in a 2001 Department of Defense (DoD) Directive, the mission of the Military Health System "is to provide, and to maintain readiness to provide, medical services and support to members of the Armed Forces during military operations, and to provide medical services and support to members of the Armed Forces, their dependents and others entitled to DoD medical care."[1] In 2015, the Military Health System included 56 inpatient hospitals, 359 outpatient clinics, 249 dental clinics, 85,000 military personnel, and 67,000 civilian personnel in the United States and a number of other countries.[2] The Military Health System also includes a world-wide aeromedical evacuation system,[3] a medical school (the Uniformed Services University of the Health Sciences),[4] and other assets. Additionally, it includes a health services reimbursement system for private sector health care, called TRICARE,[5] similar to Medicare and health insurance programs.

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[1] U.S. Dep't of Def. Directive No. 5136.12, TRICARE Management Activity (TMA) 3 (May 31, 2001). All Department of Defense directives, instructions, and manuals cited in this article are available at http://www.dtic.mil/whs/directives/.

[2] Office of Mgmt. & Budget, Budget of the United States Government, Fiscal Year 2016 Supplemental Appendix 249 (Jun. 3, 2015) *available at* http://www.whitehouse.gov/sites/default/files/omb/budget/fy2016/assets/mil.pdf.

[3] U.S. Dep't of Def. Instruction No. 6000.11, Patient Movement (PM) (May 4, 2012).

[4] 10 U.S.C. § 2112 (2015).

[5] 10 U.S.C. §§ 1072(7), 1097 (2015).

II. INTERACTIONS WITH MILITARY PERSONNEL

A. The Function of Force Health Protection

A good place to begin a summary of military health law is in relation to the interaction of the Military Health System with military personnel. This in turn must start with a recognition that, as stated succinctly by the Supreme Court, the "military constitutes a specialized community governed by a separate discipline from that of the civilian," and that "the very essence of [military] service is the subordination of the desires and interests of the individual to the needs of the service."[6] This fundamental principle that for members of the armed forces the needs of the military take precedence over the interests of the individual is a foundation block of military medicine and military health law.

As an example of the operation of this principle in the health care context, the Court of Appeals for the District of Columbia Circuit upheld the right of the DoD and the Food and Drug Administration (FDA) to allow the military command preparing for the 1991 Persian Gulf War to require members to receive drugs the military thought necessary against potential biological and chemical weapons but classified by the FDA as investigational.[7] The Court explained that although in most circumstances "the Constitution's due process guarantee protects an individual's liberty to decide whether or not to submit to serious medical treatment," DoD had "legitimate government interests that…counterbalance an individual's interest in being free from experimental treatment without giving informed consent."[8] First, "administering the drugs uniformly prevents unnecessary danger to troops and medical personnel from injury to, or the death of, fellow military personnel in battle. Also, the [DoD] had an interest in successfully accomplishing the military goals of Operation Desert Storm."[9] In this case, the Court found the desires and interests of the individual in having autonomy over his own health care decisions were subordinated to the needs of the service in preserving the effectiveness of the fighting force and accomplishing the military mission. Other judicial decisions have affirmed that military commanders have authority to order members to receive medical treatment, such as a vaccine to protect against a potential biological warfare agent, determined appropriate for accomplishing a military purpose, and that members who refuse to obey such a lawful order may be punished under the Uniform Code of Military Justice.[10] Balancing the interests of individual autonomy

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[6] Orloff v. Willoughby, 345 U.S. 83, 92, 94 (1953).

[7] Doe v. Sullivan, 938 F.2d 1370, 1371 (D.C. Cir. 1991).

[8] *Id.* at 1383 (internal quotations and citations omitted).

[9] *Id.*

[10] *E.g.*, U.S. v. Kisala, 64 M.J. 50 (C.A.A.F. 2006).

over health care decisions and the collective fighting effectiveness of the force is a recurring theme in military health law.

This interaction of military members with the health system is also the subject of a significant amount of legislation and DoD regulation, particularly for members deploying in support of a military operation. For each person entering the armed forces, DoD must collect "baseline health data."[11] For members deploying overseas for a military operation, they must receive a pre-deployment medical examination, a post-deployment medical examination, and a subsequent reassessment 90 to 180 days after the deployment, which must include, among other tests, an assessment of traumatic brain injury, post-traumatic stress disorder and mental health.[12] In addition, reserve component members must "have a comprehensive medical readiness health and dental assessment on an annual basis."[13] All members on active duty or in drilling reserve units must receive an annual "person-to-person mental health assessment."[14] All members must undergo "a physical examination immediately before" separation from the armed forces.[15] These are implemented through a set of DoD regulations.[16]

Additionally, the Military Health System, through the Armed Forces Health Surveillance Center, carries out comprehensive health surveillance during a member's period of military service, including capturing data on health status, medical interventions, occupational and environmental exposures, and other information for evaluation and analysis of health concerns, as well as for sharing information with the Department of Veterans Affairs for purposes of future health care and possible disability compensation.[17] The Armed Forces Health Surveillance Center also maintains a DoD Serum Repository of periodic serum samples that may assist future clinical diagnoses and sero-epidemiologic studies of deployment related exposures.[18]

These health examinations, assessments, and surveillance activities serve two purposes. First, consistent with the Hippocratic tradition of medical care as a profession, they serve the humanitarian purpose of identifying potential health

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[11] 10 U.S.C. § 1092a (2015).

[12] 10 U.S.C. §§ 1074f, 1074m (2015).

[13] 10 U.S.C. § 10206 (2015).

[14] 10 U.S.C. § 1074n (2015).

[15] 10 U.S.C. § 1145(a)(5) (2015).

[16] U.S. Dep't of Def. Instruction No. 6490.03, Deployment Health (Aug. 11, 2006) [hereinafter DODI 6490.03]; U.S. Dep't of Def. Instruction No. 6025.19, Individual Medical Readiness (Jan. 3, 2006); U.S. Dep't of Def. Instruction No. 6490.12, Mental Health Assessments for Service Members Deployed in Connection with a Contingency Operation (Feb. 26, 2013).

[17] U.S. Dep't of Def. Directive No. 6490.02E, Comprehensive Health Surveillance (Feb. 8, 2012).

[18] *Id.* at 2; DODI 6490.03, *supra* note 16, at 24, 31.

problems to promote or restore optimal health of the individual members. This humanitarian purpose of military medicine is recognized in international law, including the Geneva Conventions, which refer to the "humanitarian duties" of medical units in treating the fighting force and require that medical personnel be "protected in all circumstances" as noncombatants.[19] Even beyond the Hippocratic tradition at the core of the medical profession generally, the Military Health System is expected to be a major implementing agent of a fundamental trust obligation of the military that in return for the obedience of military members, even at the risk of life and health, the military and the U.S. Government will do everything feasible to preserve life and restore health.[20]

The second purpose of these force health protection activities, complementary to the first, is to ensure that military members are fit for duty. Under 10 U.S.C.§ 1201, a member who is "unfit to perform the duties of the member's office, grade, rank, or rating" is to be separated or retired.[21] DoD's implementing regulation provides that a Service member "will be considered unfit when the evidence establishes that the member, due to disability, is unable to reasonably perform duties of his or her office, grade, rank, or rating," the "member's disability represents a decided medical risk to the health of the member or to the welfare or safety of other members," or the "member's disability imposes unreasonable requirements on the military to maintain or protect the Service member."[22] The primary purpose of these statutory and regulatory provisions regarding fitness for duty is to preserve the capability of the fighting force.

Other examples of this dual purpose mission of the Military Health System include rehabilitation of members with substance abuse disorders;[23] tailored medical monitoring of special categories of personnel, such as those who have mission responsibilities involving nuclear weapons;[24] mandatory medical clearance for return

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[19] Geneva Convention (I) for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field arts. 21, 24, Aug. 12, 1949, 6 U.S.T. 3114 [hereinafter Wounded and Sick].

[20] *See, e.g.*, National Defense Authorization Act for Fiscal Year 2008, Pub. L. No. 110-181, § 1611 (2008).

[21] 10 U.S.C. § 1201(a) (2016).

[22] U.S. Dep't of Def. Instruction No. 1332.38, Disability Evaluation System (DES) 27–30 (Aug. 5, 2014).

[23] U.S. Dep't of Def. Instruction No. 1010.04, Problematic Substance Use by DoD Personnel (Feb. 20, 2014).

[24] U.S. Dep't of Def. Instruction No. 5210.42, Nuclear Weapons Personnel Reliability Program (PRP) (Jul. 16, 2012).

to full duty for members exposed to potentially concussive events;[25] and specific protocols for combat and operational stress control.[26]

B. Application of FDA Rules to Force Health Protection

This focus on force health protection sometimes presents the need for balance noted above between individual autonomy and the strength of the fighting force. One example of this, as in the appellate case mentioned above, relates to the role of the FDA. In general, the FDA is the federal government's instrument for protecting the consumer community at large from unsafe or ineffective medical products. For the "specialized community" of military personnel, FDA rules intertwine with military command authority in complex ways to reconcile autonomy interests, patient protection, and collective fighting effectiveness. Under 10 U.S.C. § 1107, enacted in 1997, DoD generally follows FDA rules in providing medical services to military personnel. The FDA generally disallows interstate distribution or marketing of unapproved products, as well as approved products for unapproved uses. An exception, based on the FDA's lack of jurisdiction over medical practitioners in a provider-patient relationship, allows them to use an approved product for an unlabeled indication as part of the practice of medicine.[27] Another exception allows investigational use of medical products under special rules designed for the regulation of medical research, usually requiring the informed consent of the patient.[28] These exceptions are allowed for military practitioners, and section 1107 further allows the President to waive informed consent for use of an investigational new drug "if the President determines, in writing, that obtaining consent is not in the interests of national security." Executive Order 13139, issued by President Clinton in 1999, outlines detailed standards and procedures for such a waiver.[29] Since the enactment of § 1107 there has never been a waiver of informed consent under this section.

Congressional enactment of § 1107 implicitly reflected an acknowledgment that generally applicable FDA-administered processes, largely designed to protect against for-profit drug and other medical product manufacturers marketing medical products without adequate proof of safety and effectiveness, also keep from the market less profitable but needed medical countermeasures for novel threats, such as chemical and biological weapons. Following the terrorist attack on the United States in 2001 and the unsuccessful effort a few months later by the Centers for Disease Control and Prevention—in response to an attack using anthrax sent through the

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[25] U.S. Dep't of Def. Instruction No. 6490.11, DoD Policy Guidance for Management of Mild Traumatic Brain Injury/Concussion in the Deployed Setting (Sept. 18, 2012).

[26] U.S. Dep't of Def. Instruction 6490.05, Maintenance of Psychological Health in Military Operations (Nov. 22, 2011).

[27] 21 C.F.R. § 312.2(d) (2014).

[28] 21 C.F.R. pt. 312 (2014).

[29] Exec. Order No. 13139, 64 Fed. Reg. 54,175 (Sept. 30, 1999).

mail—to protect postal workers with anthrax vaccine under an investigational new drug protocol and its required research-based informed consent form,[30] Congress gave the FDA new authority to permit the emergency use of promising but unapproved medical countermeasures to chemical, biological, radiological, and novel disease threats.[31]

This "Emergency Use Authorization" (EUA) mechanism involves a reduced standard compared to the standard applicable to approval of a product for general commercial marketing. Rather than proof of safety and effectiveness, an EUA requires a conclusion by the FDA Commissioner that "based on the totality of scientific evidence…it is reasonable to believe that…the product may be effective in diagnosing, treating, or preventing" a serious or life-threatening condition and "the known and potential benefits of the product…outweigh the known and potential risks, taking into consideration the material threat posed" by the agent or disease threat.[32] Further, in contrast to the informed consent requirements applicable to unapproved products used under the investigational new drug rules, the FDA may establish conditions for the emergency use, including that "to the extent practicable given the circumstances" of the emergency, "individuals to whom the product is administered are informed…of the option to accept or refuse administration of the product."[33]

FDA consideration of a product for an EUA is preceded by a determination by the Secretary of Health and Human Services that circumstances exist justifying the authorization on the basis of a determination by either the Secretary of Homeland Security, Secretary of Defense, or Secretary of Health and Human Services of a real or significant potential emergency. In the case of the Secretary of Defense, the military emergency involves "a heightened risk to United States military forces of attack with a biological, chemical, or nuclear agent or agents."[34] The requirement that the military emergency involve an "attack with a biological, chemical, or nuclear agent" results in an EUA not being available for unapproved but promising medical countermeasures for traumatic injuries caused by firearms and explosives. This separation of medical response to trauma from that to chemical or biological harm contrasts with National Institutes of Health authorities under which research on trauma treatment encompasses injuries resulting from "exposure to" "a mechanical force" or "another extrinsic agent, including an extrinsic agent

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[30] Sandra Quinn, *The Anthrax Vaccine and Research: Reactions from Postal Workers and Public Health Professionals,* 6 Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science, 321, 321 (2008).

[31] The Project BioShield Act of 2004, Pub. L. No. 108-276, 118 Stat. 835 (2004).

[32] 21 U.S.C. § 360bbb-3(c) (2015).

[33] 21 U.S.C. § 360bbb-3(e) (2015).

[34] 21 U.S.C. § 360bbb-3(b) (2015).

that is thermal, electrical, chemical, or radioactive."[35] In the Iraq and Afghanistan hostilities during the period 2001 – 2015, there were approximately 6,800 deaths of U.S. military personnel[36] caused primarily by firearms and explosives and none caused by biological, chemical or nuclear agents. Some of those deaths that occurred after the initiation of medical care, either before or after the patient reached a combat hospital, involve what military medical researchers classify as "potentially survivable injuries," with hemorrhage accounting for many of these.[37] Increasing survival rates among those potentially survivable injuries remains a major objective of military medicine through whatever means are available under statutory and regulatory authority.

C. Human Research Subjects Protection and Medical Information Confidentiality

Another context in which military health law addresses interests of individual autonomy is in the area of protection of human research subjects. DoD has adopted the "common rule" for protection of human research subjects[38] and has issued a companion regulation, incorporating a DoD-specific statute applicable to human research subjects[39] and providing additional protections for military personnel as human subjects.[40] These include a prohibition on superiors in a member's chain of command being present at recruiting sessions for volunteers, the inclusion of an ombudsman on an Institutional Review Board for research involving more than minimal risk, and special additional rules for any research where any information required by the institutional review board for review or oversight or by the research subjects for informed consent includes classified information.[41]

The DoD human subjects protection rules also seek to resolve applicability issues that may be the source of confusion in civilian public health and social services agencies and organizations. The DoD regulation clarifies that not every systematic investigation using scientific methods and involving individuals constitutes human subjects research. Excluded are activities, including program evaluation, customer satisfaction surveys, user surveys, outcome reviews, and other methods, designed solely to assess the performance of DoD programs where the results of the evalu-

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[35] 42 U.S.C. § 300d-61(h)(3) (2015).

[36] http://www.defense.gov/casualty.pdf (May 10, 2016).

[37] Nicholas Langan, *Changing Patterns of In-Hospital Deaths Following Implementation of Damage Control Resuscitation Practices in U.S. Forward Military Treatment Facilities*, 149 JAMA Surgery 940, p. E6 (2014).

[38] 32 C.F.R. pt. 219 (2014).

[39] 10 U.S.C. § 980 (2015).

[40] U.S. Dep't of Def. Instruction No. 3216.02, Protection of Human Subjects and Adherence to Ethical Standards in DoD-Supported Research (Nov. 8, 2011).

[41] *Id.* at 23–24, 29–30.

ation are only for the use of government officials responsible for the operation or oversight of the program being evaluated and are not intended for generalized use beyond such program.[42]

The confidentiality or lack thereof of health information is another context in which military health law governs the balancing of individual autonomy and mission effectiveness. The general rule under the health information privacy regulations of the Department of Health and Human Services promulgated under the Health Insurance Portability and Accountability Act (HIPAA) is that control of one's health information is a function of health care autonomy controlled by the patient unless outweighed by a greater society interest, such as one reflected in disclosures required by law.[43] Under the Department of Health and Human Services (HHS) HIPAA regulations, a "covered entity" (which includes a covered entity not part of or affiliated with the DoD) "may use and disclose the protected health information of individuals who are Armed Forces personnel for activities deemed necessary by appropriate military command authorities to assure the proper execution of the military mission."[44] DoD's implementing regulation parrots this language and adds examples of such purposes, including "to determine the member's fitness for duty" or "fitness to perform any particular mission."[45]

But the subordination of the individual's autonomy interest to the military command's interest in disclosure is limited by several DoD policies that subordinate the command's interest to the individual's desire for confidentiality to encourage members to overcome any reluctance they may have to seek mental health care. As part of a policy initiative to dispel stigma in seeking mental health care, a DoD regulation reverses the general HIPAA rule allowing disclosure to command authorities and directs military medical personnel not to tell command about mental health services provided to members unless a specific exception applies – the exceptions essentially identifying cases of serious mental health conditions, such as a risk of harm to self or others or unfitness for duty.[46] This effort to de-stigmatize mental health care for military members is reinforced by a specific statutory direction in 10 U.S.C. § 1090a to the Secretary of Defense to promulgate regulations that "to the greatest extent possible" "seek to eliminate perceived stigma associated with seeking and receiving mental health services, promoting the use of mental health services on a basis comparable to the use of other medical and health services."[47]

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[42] *Id*. at 37–38.

[43] 45 C.F.R. pt. 164 (2014).

[44] 45 C.F.R. § 164.512(k)(1)(i) (2014).

[45] U.S. Dep't of Def. Regulation 6025.18-R, DoD Health Information Privacy Regulation 69–70 (Jan. 2003).

[46] U.S. Dep't of Def. Instruction No. 6490.08, Command Notification Requirements to Dispel Stigma in Providing Mental Health Care to Service Members (Aug. 17, 2011).

[47] 10 U.S.C. § 1090a(b)(1) (2015).

Similar rules disallowing command notification as a means to encourage members to obtain appropriate health care include a generally applicable requirement that health care personnel honor decisions of sexual assault victims and domestic violence victims on whether they wish to involve command or law enforcement authorities.[48]

The recurring theme of balancing of individual autonomy of military members with mission needs of military command is also reflected in unique requirements for members of the armed forces to provide a specimen sample suitable for DNA identification analysis. In contrast to statutory privacy protections that generally prevent employers of civilians from collection genetic information,[49] military personnel must provide a specimen sample to the Armed Forces Repository of Specimen Samples for the Identification of Remains, which is for the exclusive purpose of identifying a dead, captured, or missing member.[50] The only exceptions to this exclusive use, other than internal quality assurance purposes, are with the consent of the member or next-of-kin or upon a court order under 10 U.S.C. § 1565a for a criminal investigation of a felony or sexual offense when no other source is reasonably available. In contrast to the rule in the civilian employment context, the military has an overriding interest in personnel accounting of the fighting force.[51]

III. RELATIONSHIP TO NON-MILITARY REGULATION OF CLINICAL PRACTICE

A. Application of Professional Standards

In addition to the balancing of interests between individual autonomy and mission needs, military health law balances military mission needs with other governmental interests that regulate clinical practice. In this regard, the Military Health System operates as part of the American medical system and is subject to at least some of the same regulatory apparatus that applies generally. For example, under 10 U.S.C. § 1094, DoD health care practitioners must hold a State license to practice their profession. For physicians, the license must be "an unrestricted license that is not subject to limitation on the scope of practice ordinarily granted to other physicians for a similar specialty by the jurisdiction that granted the license."[52] However, in contrast to typical health professional practice in States, it need not

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[48] U.S. Dep't. of Def. Instruction No. 6495.02, Sexual Assault Prevention and Response (SAPR) Program Procedures, 35–36 (Mar. 28, 2013); U.S. Dep't of Def. Instruction No. 6400.06, Domestic Abuse Involving DoD Military and Certain Affiliated Personnel 40–44 (Aug. 21, 2007).

[49] 42 U.S.C. § 2000ff-1 (2015).

[50] U.S. Dep't of Def. Instruction No. 5154.30, Armed Forces Institute of Pathology Operations 15–17 (Mar. 18, 2003).

[51] *See* Mayfield v. Dalton, 901 F. Supp. 300 (D. Haw. 1995), *vacated as moot*, Mayfield v. Dalton, 109 F.3d 1423 (9th Cir. 1997).

[52] 10 U.S.C. § 1094(a) (2015).

be a license from the State where the health care is being provided. State Medical Practice Acts typically exempt physicians practicing in Federal facilities,[53] but even where that is not in force, 10 U.S.C § 1094(d) preempts State laws to the extent they would interfere with members of the armed forces, civilian employees of the Department of Defense, personal services contractors, or potentially certain other individuals who hold a current license from a State from "performing authorized duties for the Department of Defense" "at any location in any State."[54] This operates to permit practice of the applicable health profession in circumstances such as training in civilian facilities, disaster response, and telemedicine across State lines. In recognition of the important role of State licensing boards, DoD regulations generally require coordination with those boards "before performing off-base duties" and cooperation with any board inquiries or investigations that might arise.[55] But overall it is clear that in reconciling the interest in an effective system of military medicine – which is a uniquely Federal interest – with that of regulating professional medical practice – primarily a State function – the Federal interest sometimes takes precedence.

In addition to licensure of individual health care professionals, the Military Health System also requires that its hospitals and clinics be accredited by The Joint Commission or other appropriate accrediting body.[56] Further, the Military Health System reports to the National Practitioner Data Bank adverse privileging actions, and also reports malpractice or military disability case payment awards in cases in which the Surgeon General of the Army, Navy, or Air Force, as applicable to the case involved, determines that the payment was caused by a provider's failure to meet the prevailing standard of care.[57] As with civilian health systems, peer reviews of Military Health System clinical performance and clinical quality are under 10 U.S.C. § 1102 confidential and generally exempt from civil discovery or disclosure outside the DoD. Moreover, under the Federal Tort Claims Act, for most health care provided in military hospitals and clinics (exclusive of care to military members incident to service, as discussed below), Federal law adopts State law standards for establishing the prevailing standard of care, the failure of which to meet may lead to a determination of medical malpractice.[58] These attributes of military health law reflect that while military medicine has some unique characteristics, it also incorporates many prevailing mechanisms of general health law that promote quality health care.

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[53] *E.g.*, Cal. Bus. & Prof. Code § 715 (2015).

[54] 10 U.S.C § 1094(d) (2015).

[55] U.S. Dep't of Def Manual No. 6025.13, Medical Quality Assurance (MQA) and Clinical Quality Management in the Military Health System (MHS) 27–28 (Oct. 29, 2013).

[56] *Id*. at 17–20.

[57] *Id*. at 68–73.

[58] 28 U.S.C. § 2674 (2015).

B. Medical Malpractice Compensation

Another context in which military health law reflects a balancing of individual interests and those of the military service is the inapplicability of medical malpractice litigation actions or other judicial remedies to address alleged medical malpractice by U.S. government personnel against military members on active duty. The Supreme Court decided in 1950, in Feres v. United States, that military personnel may not sue the United States under the Federal Tort Claims Act for personal injuries or death incurred incident to military service. [59] In the 65 years since, Congress and the Supreme Court have often considered but never acted to reverse the Feres Doctrine for medical malpractice or other tort actions. Although the Feres Doctrine has been criticized as lacking textual support in the Federal Tort Claims Act,[60] supporters offer several defenses.

Among these is that reversal of Feres would create an unsustainable inequity between some military members allowed to sue and others, such as those injured in combat, not allowed to sue. Without the doctrine, an injured member or the family of a deceased member outside of combat would be allowed to sue the U.S. Government based on an allegation that some other military member or government employee was negligent, but military members injured or the families of members killed in combat or other military operations would have only the normal military no-fault compensation system, even if the injury or death were due to "friendly fire" or there were some other issue of negligence by another military member. The combat injury or death would appear to be valued lower than an injury or death where a tort claim would be allowed. Such disparate treatment would conflict with the premise of the no-fault compensation system currently applicable to all workers' compensation programs, including military death and disability compensation programs. It would also run counter to the premise of the military compensation system that like injuries are treated alike. All State and Federal workers' compensation laws provide a no-fault compensation system as the exclusive remedy for work-related injuries.[61] Employees may not sue the employer to seek larger recoveries, but employees will be compensated even if there was no negligence by the employer or a fellow employee. The military compensation system has the same premise, except that military members are considered to be "on duty" 24-hours a day. Their no-fault compensation applies to virtually all injuries at work or at home, and they may not sue their employer (the United States) for any injuries. For serious injuries, that system provides a military retirement, including lifetime pension, health coverage, and other benefits.[62]

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[59] Feres v. United States, 340 U. S. 135, (1950).

[60] *E.g.*, United States v. Johnson, 481 U. S. 681, 693 (1987) (Scalia, J., dissenting).

[61] *E.g.*, 5 U.S.C. § 8116(c) (provision of Federal Employees Compensation Act, 5 U.S.C. §§ 8101–8151) (2015).

[62] 10 U.S.C. §§ 1201–1222 (2015).

In addition to the debate over injury compensation policy and equity, Feres Doctrine supporters also argue that repeal would weaken the effectiveness of military medicine and ultimately the fighting force. As stated by dissenting members of the House Judiciary Committee with respect to 2010 proposed legislation (which was not enacted) to establish a medical malpractice exception to the Feres Doctrine:

> Because of the nature of the military, the medical system interacts with the individual patient to a much greater extent than in the civilian world. Health screenings and assessments, limitations on duty, eligibility for deployment, annual physicals, fitness for duty determinations, specialized evaluations for pilots, indigenous disease vaccinations, biological defense countermeasures, mental health evaluations, and other interactions are the everyday work of the military medical system. And while these medical interactions are usually far removed from the battlefield, they are essential to effective military operations. Every such interaction would be a potential tort claim for which defenses would need to be planned and defensive medicine practiced, threatening to re-delegate military medical readiness from medical professionals and military commanders to civilian lawyers and judges.[63]

This caution from members of the House Judiciary Committee sounded an echo from a unanimous 1983 Supreme Court decision disallowing Constitutional tort claims by military members against their superiors.[64] In that case the Court reasoned that because "centuries of experience have developed a hierarchical structure of discipline and obedience to command, unique in its application to the military establishment and wholly different from civilian patterns," "[c]ivilian courts must, at the very least, hesitate long before entertaining a suit which asks the court to tamper with the established relationship" of military members to command, a relationship "at the heart of the necessarily unique structure of the Military Establishment."[65] This relationship and the need for medical readiness of the fighting force make the Feres Doctrine a keystone of military health law.

C. Public Health Emergencies

Another example of the reconciliation of potentially competing interests is on the issue of emergency health powers. In the Military Health System, as with civilian sector public health activities, the potential relationships among those activities, police powers of the jurisdiction, and individuals subject to those powers may change significantly in a public health emergency. A DoD regulation addresses

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[63] H. Rept. No. 111-466, at 23–24 (2010) (dissenting views).

[64] Chappell v. Wallace, 462 U.S. 296, (1983).

[65] *Id.* at 300.

those potential changes and directs a program of planning and preparedness for such an emergency.[66] Among the emergency powers that may be invoked in a public health emergency in order to protect a military installation, the missions carried out there, and those who work and live there are restrictions of movement, including potential quarantines, which can be enforced under a criminal statute.[67] Informed by the Model State Emergency Health Powers Act,[68] the DoD regulation includes procedures for allowing affected individuals to request review of a quarantine order and for coordinating activities with the Centers for Disease Control and Prevention at the Federal level and State and local public health agencies, or with host nations outside the United States.

DoD policy also authorizes "situational standards of care" "to the extent necessary to deal with mass casualties" "without unnecessarily compromising the quality of care."[69] Among these could be to expand the scope of practice certain categories of providers (such as hospital corpsmen) are ordinarily authorized to perform, suspending normal practices for specialty referrals, confirmatory clinical testing, provider-to-patient ratios, and the like, reducing recordkeeping requirements, use of alternate sites that do not meet normal facilities standards, expanded utilization of telemedicine, and greater use of volunteers. In addition, when "all available resources are insufficient to meet the health care needs of beneficiaries in a public health emergency," the Military Health System "shall use the limited resources to achieve the greatest good for the greatest number," with "'good' defined as lives saved and suffering alleviated."[70]

Related to the issue of managing public health emergencies on military installations, the Military Health System has a role in supporting civil authorities in their management of public health emergencies off military installations. Under the National Response Plan, for which the Department of Homeland Security is the overall Federal lead, HHS is the lead agency and DoD a supporting agency for Emergency Support Function (ESF) 8, Health Services.[71] Under the authority of the Stafford Act[72] for a major emergency or the Economy Act[73] for more routine

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[66] U.S. Dep't of Def. Instruction 6200.03, Public Health Emergency Management within the Department of Defense (Mar. 5, 2010) [hereinafter DODI 6200.03].

[67] *Id*., Enclosure 3, § 2.

[68] The Model State Emergency Health Powers Act, A Draft for Discussion Prepared by The Center for Law and the Public's Health at Georgetown and Johns Hopkins Universities for the Centers for Disease Control and Prevention (2001), http://www.publichealthlaw.net/ModelLaws/MSEHPA.php (January 3, 2015).

[69] DODI 6200.03, *supra* note 65, at 29–32.

[70] *Id*.

[71] 42 U.S.C. § 300hh (2015).

[72] 42 U.S.C. §§ 5121–5201 (2015).

[73] 31 U.S.C. § 1535 (2015).

support, the Military Health System may, with the approval of the Secretary of Defense, deploy assets requested by the Secretary of HHS. In such a case, while the Secretary of HHS exercises "operational control of emergency public health and medical response assets," "members of the armed forces under the authority of the Secretary of Defense shall remain under the command and control of the Secretary of Defense, as shall any associated assets of the Department of Defense."[74] This ensures that the normal chain of command for the armed forces, which runs to the President through the Secretary of Defense, remains intact when military forces provide support to civil authorities in a public health emergency.

Another Military Health System role in support of the Department of HHS-led emergency preparedness is the operation, along with the Department of Veterans Affairs, of Federal Coordinating Centers for the National Disaster Medical System (NDMS) network of hospitals to provide definitive medical care in response to a disaster or catastrophic event, as determined by the Secretary of HHS.[75] The NDMS network of hospitals has a dual purpose for DoD in that it can also be activated by the Assistant Secretary of Defense for Health Affairs in the event of a military health emergency, such as the possibility of military casualties exceeding the inpatient capability of the Military Health System and Veterans Health Administration.[76]

One other aspect of potential DoD support to civil authorities in a public health emergency – although this is decidedly outside the role of the Military Health System – is in providing security or law enforcement capability in support of a Federal response, such as enforcement of a Federal quarantine ordered by the Secretary of HHS under 42 U.S.C. § 264. The armed forces are generally barred by the Posse Comitatus Act[77] from undertaking law enforcement functions in the civilian community, but the President may order the armed forces to perform such functions if the President considers it necessary to suppress "any insurrection, domestic violence, unlawful combination, or conspiracy" that "obstructs the execution of the laws of the United States,"[78] such as widespread violations of a Federal public health quarantine.

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[74] *Id*.

[75] 42 U.S.C. § 300hh-11 (2015); National Disaster Medical System Memorandum of Agreement Among the Departments of Homeland Security, Health and Human Services, Veterans Affairs, and Defense (2005) (available at http://fhp.osd.mil/ndms/docs/NDMS_Partners_MOA_24_Oct05.pdf).

[76] *Id*.

[77] 10 U.S.C. § 375 (2015), 18 U.S.C. § 1385 (2015).

[78] 10 U.S.C § 333 (2015) (commonly referred to as "Insurrection Act").

IV. FUNCTIONING OUTSIDE TRADITIONAL ROLES OF A HEALTH CARE PROVIDER

A. Support of Law Enforcement, Judicial, Intelligence, and Detention Operations

In addition to the role of health care provider, the Military Health System also supports military functions in roles different from those of typical civilian health systems. For example, the Military Health System includes the Armed Forces Medical Examiner System. Under 10 U.S.C § 1471, the Armed Forces Medical Examiner may conduct a forensic pathology investigation, including autopsy, to determine the cause or manner of death of a deceased active duty member or other person in certain circumstances, such as a death on a military installation of apparently unnatural or unlawful means or from an infectious disease or hazardous material that threatens the military installation. The medical examiner provides direct support to Military Department Criminal Investigation Divisions. The Armed Forces Medical Examiner is also authorized by the statute to conduct such an investigation at the request of the Federal Bureau of Investigation, the National Transportation Safety Board, or any other Federal agency. In a case where a State, local, or foreign authority has primary jurisdiction to conduct a forensic pathology investigation, the Armed Forces Medical Examiner must defer, but then may proceed if the authority with primary jurisdiction fails to perform an autopsy.

In addition to this law enforcement-related function, the Military Health System may also be called upon by a commanding officer with authority to convene a court martial for a violation of the Uniform Code of Military Justice or military judge to conduct "an inquiry into the mental capacity or mental responsibility of the accused."[79] The inquiry is conducted by "a board consisting of one or more persons," each member of which "shall be either a psychiatrist or a clinical psychologist."[80] The board is required to provide findings on whether the accused has "a severe mental disease or defect" that caused him or her to be at the time of the alleged criminal conduct "unable to appreciate the nature or quality or wrongfulness of his or her conduct," or that presently causes him or her to be "unable to understand the nature of the proceedings…or to conduct or cooperate intelligently in the defense."[81]

Similar to these roles supporting law enforcement or judicial functions, Military Health System practitioners on some occasions may provide support to intelligence gathering. In this context, a clinical psychologist may be temporarily detailed from clinical activities and noncombatant status to an assignment as a behavioral science consultant to an intelligence unit conducting interrogations.

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[79] RULES FOR COURTS-MARTIAL 706, MANUAL FOR COURTS-MARTIAL (2012 ed.).

[80] *Id.*

[81] *Id.*

Under a detailed DoD regulation,[82] behavioral science consultants "are authorized to make psychological assessments of the character, personality, social interactions, and other behavioral characteristics of detainees" and "advise authorized personnel performing lawful interrogations."[83] They "may observe, but shall not conduct or direct, interrogations" "nor act as medical monitors during interrogations."[84] Although affiliated during this assignment with an intelligence unit rather than a medical unit, the psychologist continues to "have a duty in all matters affecting the physical and mental health of detainees to perform, encourage, and support, directly and indirectly, actions to uphold the humane treatment of detainees and to ensure that no individual in the custody or under the physical control of the Department of Defense, regardless of nationality or physical location, shall be subject to cruel, inhuman, or degrading treatment or punishment, in accordance with and as defined in U.S. law."[85] This duty includes reporting suspected violations of standards for the protection of detainees to the chain of command, and if not acted upon properly, to senior Military Health System officials.[86]

Also related to detainee operations, the Military Health System must not only provide health care to prisoners of war or other detainees, it must also support the U.S. Government policy on preventing self-harm by those being detained in the conduct of hunger strikes. Consistent with U.S. Bureau of Prisons policy,[87] the DoD regulation on medical program support for detainee operations authorizes involuntary enteral feeding "based on a medical determination that immediate treatment or intervention is necessary to prevent death or serious harm."[88] Because this policy subordinates patient autonomy to other governmental interests, it is controversial in the general medical community. The American Medical Association, for example, although not mentioning hunger strikes in its ethics code or policy statement, endorses a World Medical Association declaration that favors deference to the wishes of a determined hunger striker, if apparently competent and exercising free will, even if it leads to his death.[89] But in contrast to the controversy in the general medical community, Federal court rulings in both the U.S. Bureau of Prisons and the U.S. Detention Facility at Guantanamo Bay contexts have consistently upheld

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[82] U.S. Dep't of Def. Instruction 2310.08E, Medical Program Support for Detainee Operations (Jun. 6, 2006) [hereinafter DODI 2310.08E].

[83] *Id.* at 9.

[84] *Id*. at 9–10.

[85] *Id*. at 2.

[86] *Id.* at 4.

[87] 28 C.F.R. pt. 549, subpt. E, "Hunger Strikes, Inmate" (2014).

[88] DODI 2310.08E, *supra* note 81, at 5.

[89] Am. Med. Ass'n Policy Statement H-65-997 (2016) (available at https://www.ama-assn.org/ssl3/ecomm/PolicyFinderForm.pl?site=www.ama-assn.org&uri=/resources/html/PolicyFinder/policyfiles/HnE/H-65.997.HTM); World Med. Assembly Declaration of Malta on Hunger Strikes (2006) (available at http://www.wma.net/en/30publications/10policies/h31/).

the legality of the U.S. Government policy on management of hunger strikes.[90] In addition to the strong penological interest in keeping order in the detention facility, courts have recognized the difficulty in assuring capacity to make a life or death decision when "incarceration can place a person under psychological strain and the jail or prison under a commensurate duty to prevent the prisoner from giving way to the strain."[91] And with respect to free will, the Supreme Court has acknowledged (in a different context) a detention facility's "substantial interest in preventing" risk taking actions by inmates "as a result of coercion" by other inmates.[92]

B. Humanitarian Assistance, Health Stability Operations, and Global Health Engagement

Another Military Health System function different from typical civilian health systems is its engagement in a variety of activities defined in statute as "health stability operation[s] conducted by the Department of Defense outside the United States in coordination with a foreign government or international organization to establish, reconstitute, or maintain the health sector of a foreign country."[93] The legal authorities for these activities include 10 U.S.C. § 401, which authorizes humanitarian and civic assistance in conjunction with military operations, including "medical, surgical, dental, and veterinary care provided in areas of a country that are rural or are underserved,…including education, training, and technical assistance relating to the care provided."[94] DoD policy calls for medical stability operations to be given "priority comparable to combat operations" in providing governmental services, infrastructure, and humanitarian relief.[95] As an example of global health engagement, the Military Health System administers a portion of the President's Emergency Plan for AIDS Relief (PEPFAR).[96]

Related to humanitarian assistance, another dimension of this recurring theme of reconciling the potentially competing interests of military mission and personal autonomy occurs in the context of the relationship between military command and military health care professionals. Again, legal authority supports the preeminence of the military mission. For example, in a case from the Vietnam War era, the U.S. Court of Appeals for the Third Circuit held that a military physician was punishable under the Uniform Code of Military Justice for willful disobedience

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[90] *E.g.,* Aamer v. Obama, 953 F. Supp. 2d 213 (D.D.C. 2013), *aff'd*, 742 F.3d. 1023 (D.C. Cir. 2014).

[91] Freeman v. Berge*,* 441 F.3d 543, 547 (7th Cir 2006).

[92] Florence v. Bd. of Chosen Freeholders of Burlington*,* 132 S. Ct. 1510, 1520 (2012).

[93] National Defense Authorization Act for Fiscal Year 2013, Pub. L. No. 112-239, § 715(d) (2013).

[94] 10 U.S.C. § 401(e) (2015).

[95] U.S. Dep't of Def. Instruction 6000.16, Military Health Support for Stability Operations (May 17, 2010).

[96] 22 U.S.C. §§ 2151b-2, 7611 (2015).

of a lawful order to provide medical training to Special Forces aidmen (medical technicians) who would use the training to provide medical services to Vietnamese villagers in an effort to increase support for the U.S. military's combat objectives. The military physician's defense was that this violated his medical ethics to participate in a combat-related mission objective and could potentially associate him with war crimes against Vietnamese villagers. The Court rejected this defense and found that the physician had an obligation to obey the lawful order.[97]

C. International Law Obligations

Some sources of military health law are international law. These are obligations of the U.S. armed forces for which the Military Health System has an implementation role. For example, the Geneva Conventions require that members of an opposing force and certain other affiliated persons shall be "cared for by the Party to the conflict in whose power they may be, without any adverse distinction founded on sex, race, nationality, religion, political opinions, or any other similar criteria," and "[o]nly urgent medical reasons will authorize priority in the order of treatment to be administered."[98] In addition, for those who become prisoners of war, those "suffering from serious disease, or whose condition necessitates special treatment, a surgical operation or hospital care, must be admitted to any military or civilian medical unit where such treatment can be given."[99] Further, Military Health System activities in foreign countries in disease surveillance, health care, medical evacuation, or other matters may trigger a reporting requirement to the World Health Organization (WHO) of a potential "public health emergency of international concern" under the WHO International Health Regulations.[100]

V. REGULATION OF HEALTH BENEFITS

A. Affordable Care Act, Insurance Regulation, and Medicare

As noted above, the Military Health System includes TRICARE, a health reimbursement program similar to private sector health insurance. TRICARE is considered "minimum essential coverage" for purposes of the individual mandate under the Affordable Care Act.[101] However, Affordable Care Act requirements

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[97] Levy v. Parker, 478 F.2d 772, 779 (3d Cir. 1973) (conviction set aside on other grounds but subsequently reinstated by Levy v. Parker, 417 U.S. 733 (1974)).

[98] Wounded and Sick, *supra* note 19, at Art. 12.

[99] Convention (III) relative to the Treatment of Prisoners of War, Art. 30, Aug. 12, 1949 (available at https://www.icrc.org/ihl/INTRO/375?OpenDocument).

[100] DODI 6200.03, *supra* note 65, at 1–2; DoD Instruction 6000.11, "Patient Movement (PM)," May 4, 2012, encl. 2, para. 6.a; World Health Association, International Health Regulations (2005), Art. 9.

[101] 26 U.S.C. § 5000A(f)(1)(A)(iv) (2015).

applicable to employer-sponsored plans do not apply to TRICARE based on a post-Affordable Care Act amendment to 10 U.S.C. § 1073 providing that "the Secretary of Defense shall have responsibility for administering the TRICARE program and making any decision affecting such program." Legislative history of this provision indicates it was intended to codify one product of the many negotiations that cobbled together the necessary votes for enactment of the Affordable Care Act, an agreement to reassure champions of military health care that "the Secretary of Defense would continue to maintain sole authority over TRICARE."[102]

In the context of State regulation of health insurance, TRICARE is exempt from such regulation under 10 U.S.C. § 1103, which preempts any "law or regulation of a State or local government relating to health insurance, prepaid health plans, or other health care delivery or financing methods" "to the extent that the Secretary of Defense" determines necessary to achieve any "important Federal interest."[103] TRICARE is administered by regional contractors, which also establish and administer preferred provider networks of institutional and individual providers. These providers generally offer discounted prices and in the case of institutional providers, are, like under Medicare, considered recipients of Federal financial assistance for purposes of Title VI of the Civil Rights Act and related laws.[104] Medicare and TRICARE are also linked in statute in that to maintain eligibility for Medicare reimbursements, institutional providers must accept TRICARE,[105] and for all providers, TRICARE payment methodologies and amounts generally follow those of Medicare.[106]

B. Retirees' Entitlement to Health Care

The Military Health System, as discussed above, identifies its primary mission in relation to health care support of the fighting force. But as measured in dollars spent, the impression can be created that its primary mission is actually retiree health care. As specified in Congressional enactments over time, military retirees and their families are entitled to space-available care in military hospitals and clinics and to coverage under TRICARE for health services received from civilian sector providers, including coverage supplemental to Medicare for those so eligible.[107] The vast majority of DoD-funded health care services for retirees and their families is

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[102] 111 Cong. Rec. H1714 (daily ed. March 20, 2010) (comments of Mr. McKeon); HASC No. 5, House Armed Services Committee Legislative Text and Joint Explanatory Statement accompanying H.R. 6523, the proposed National Defense Authorization Act for Fiscal Year 2011 (Dec. 2010), at 440.

[103] 10 U.S.C. § 1103 (2015); 32 C.F.R. § 199.17(a)(7) (2014).

[104] 32 C.F.R. §§ 199.6(b)(2)–(3), 199.17(p)(1) (2014).

[105] 42 U.S.C. § 1395cc (2015).

[106] 10 U.S.C. §§ 1079(h), 1079(h)(j) (2015).

[107] 10 U.S.C. § 1086 (2015).

from private sector providers. In Fiscal Year 2013, there were 3.43 million eligible active duty members and their family members and 5.29 million eligible retirees and their dependents; the Military Health System spent about $14 billion for active duty members and their families and about $20 billion for health care for retirees and their families.[108] (These cost data do not include military personnel salaries of those who staff military hospitals and clinics.) Although TRICARE is a generous health plan, it does not provide the "free lifetime health care" some retirees believe they were promised by military recruiters. When this issue was litigated, the U.S. Court of Appeals for the Federal Circuit ruled that no such perceived promises could create a legal entitlement to free lifetime health care:

> [The retiree plaintiffs] agreed in an express, written contract to be bound by military regulations and statutes. Those regulations and statutes expressly address health care for military retirees, and provide expressly that retirees and their dependents were not entitled to full free lifetime medical care. Accordingly, the retirees' contract claim is foreclosed because an implied-in-fact contract cannot exist if an express contract already covers the same subject matter.[109]

Retiree health care supports the military mission as a component of a compensation structure that incentivizes retention of skilled combat arms professionals. Congressional decisions on the generosity of TRICARE coverage have been independent of DoD assessments of the cost-benefit analysis for additional retention incentives. Nonetheless, based on Congressional preeminence in matters of government spending, military health law reflects the most favored status of military retirees.[110]

C. Relationship with the Department of Veterans Affairs

In recent years Congress has enacted numerous statutes requiring that certain Military Health System activities be conducted in coordination with the Department of Veterans Affairs in an effort to promote a smooth transition of military members to veteran status or enhance government efficiency. Examples include multiple provisions of the 2008 Wounded Warrior Act[111] and requirements for the two Departments to implement electronic health records systems that will be "interoperable,"

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[108] U.S. Dep't of Def., Def. Health Agency Evaluation of the TRICARE Program: Access, Cost, and Quality, Fiscal Year 2014 Report to Congress (Jan. 3, 2015) (available at http://www.health.mil/Reference-Center/Reports/2014/02/25/Evaluation-of-the-TRICARE-Program).

[109] Schism v. United States, 316 F.3d 1259, 1278 (Fed. Cir. 2002) (en banc) (internal citation omitted).

[110] *See,* e.*g.*, H.R. 4310, 112th Cong., § 701 (proposed National Defense Authorization Act for Fiscal Year 2014) (passed on May 18, 2012).

[111] National Defense Authorization Act for Fiscal Year 2008, Pub. L. No. 110-181, Title XVI (2008).

defined as "the ability of different electronic health records systems or software to meaningfully exchange information in real time and provide useful results" to each other.[112] Another recent enactment requires that military members' service treatment records be provided to the Department of Veterans Affairs in an electronic format promptly after separation from military service, specifying that such disclosures are permissible under HIPAA health information privacy rules.[113] Congress also enacted authority for a demonstration project for the two Departments to operate jointly a medical facility complex made up of a Veterans Medical Center in North Chicago, Ill. and an ambulatory care clinic serving Naval Station Great Lakes.[114] These Congressional actions are in addition to the more traditional authority of the two health systems to share health resources.[115] While collaboration between the Veterans Health Administration and the Military Health System is extensive and growing, the two systems still have decidedly different missions, the former focused on past conflicts, the latter on present and future ones.

VI. MILITARY HEALTH SYSTEM GOVERNANCE

To round out this summary of military health law, some description of the governance of the Military Health System is appropriate. The Military Health System has multiple components and a somewhat complex governance structure. Military medical personnel are almost entirely members of the Army, Navy or Air Force. Similarly, most military hospitals and clinics are under the authority and control of the Secretaries of the Army, Navy, and Air Force (referred to as the Military Departments) and subordinate senior military officers, including the Surgeons General of the Army, Navy, and Air Force. All of these personnel and assets are under the authority, direction and control of the Secretary of Defense.[116] The Secretary of Defense has delegated substantial authority for the operation of the Military Health System to the Assistant Secretary of Defense for Health Affairs, who functions under the authority, direction and control of the Under Secretary of Defense for Personnel and Readiness, and the Defense Health Agency, a Defense agency established under the authority of 10 U.S.C. § 191 to "provide for the performance of a supply or service activity that is common to more than one military department by a single agency of the Department of Defense." Under authority delegated from the Secretary of Defense, the Assistant Secretary of Defense for Health Affairs, a Presidential appointee with Senate confirmation[117] – DoD's "top doc" – "exercises authority, direction, and control over the DoD medical and dental personnel authorizations and policy,

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[112] National Defense Authorization Act for Fiscal Year 2014, Pub. L. No. 113-66, § 713 (2014).

[113] *Id.* at § 525.

[114] National Defense Authorization Act for Fiscal Year 2010, Pub. L. No. 111-84, §§ 1701-1706 (2010).

[115] 38 U.S.C. § 8111 (2015); 10 U.S.C. § 1104 (2015).

[116] 10 U.S.C. § 113(b) (2015).

[117] 10 U.S.C. § 138 (2015).

facilities, programs, funding, and other resources in the DoD," but may not "direct a change" "with respect to medical personnel assigned" to a chain of command, meaning he or she may not remove a Surgeon General or other military member from an assigned position in a chain of command in a military service.[118] Restated, the Assistant Secretary of Defense for Health Affairs can establish binding requirements on the Military Health System, but would need the Secretary of Defense's authority to replace an officer or employee under a Military Department who the Assistant Secretary believes is unsatisfactorily implementing those requirements.

The Defense Health Agency shares authorities with the Military Departments for the operation of the Military Health System.[119] The Director of the Defense Health Agency is a military officer in the grade of Lt. General or Vice Admiral, the same grade as the Surgeons General of the Army, Navy, and Air Force.[120] The Director of the Defense Health Agency "[e]xercises management responsibility for shared services, functions, and activities in the MHS, including but not limited to, the TRICARE Health Plan, pharmacy programs, medical education and training, medical research and development, health information technology, facility planning, public health, medical logistics, acquisition, budget and resource management, other common business and clinical processes, and other shared or common functions or processes, as determined by" the Assistant Secretary of Defense for Health Affairs.[121] The Director of the Defense Health Agency may issue regulations governing these functions and activities that "are binding on DoD Components," including the Military Departments.[122] However, "the Service Medical Departments remain accountable for the delivery of patient care, and related medical and health services in facilities under their jurisdiction."[123] Restated, the Military Departments maintain authority over the hospitals, clinics, and personnel under their jurisdiction, but must defer to Defense Health Agency management authority over shared functions and common business and clinical processes of the Military Health System.

The sharing of authorities among the Assistant Secretary of Defense for Health Affairs, Director of the Defense Health Agency, and Surgeons General of the Military Departments is a subject for "the advice and assistance of governance councils" at multiple management levels of the Military Health System.[124] The Defense Health Agency is also designated a combat support agency, giving it a

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[118] U.S. Dep't of Def. Directive 5136.01, Assistant Secretary of Defense for Health Affairs (ASD(HA)) 1–4 (Sept. 30, 2013).

[119] U.S. Dep't of Def. Directive 5136.13, Defense Health Agency (DHA) (Sept. 30, 2013) [hereinafter DoDD 5136.13].

[120] 10 U.S.C. §§ 3036, 5137, 8036 (2015).

[121] DoDD 5136.13, *supra* note 118, at 4.

[122] *Id*. at 12.

[123] *Id*. at 6.

[124] *Id*. at 3.

role of support for operating forces engaged in planning for or conducting military operations. This support is directed to the Combatant Commands with respect to research and development, medical logistics, public health, and other matters.[125]

VII. CONCLUSION

The Constitution, statutes, regulations, judicial decisions, and international law requirements that rule the crossroads of two distinct functions of the United States Government – military and health care – form a unique governance of the powers and duties of the U.S. armed forces and the DoD to carry out military and related functions through health professionals and systems. The major theme of this governance is the reconciliation of the government's interests in accomplishing military missions with other cherished governmental interests, including health promotion, individual autonomy, patient protection, research ethics, privacy, federalism, medical professionalism, public health, emergency preparedness, humanitarianism, health care financing, and governmental efficiency. The increasing emphasis in recent years on many of these cherished government interests coupled with changing national security challenges the military must be prepared to meet makes the governance of this crossroads of military and health care functions of the U.S. government complex and evolving. This unique, evolving governance is the subject of military health law.

[125] *Id*.

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