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U.S. Space Dominance: An Ethics Lens

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A paper submitted to the Faculty of the U.S. Naval War College in partial satisfaction of the requirements of the Ethics and Emerging Military Technology Graduate Certificate Program.

The contents of this paper reflect my personal views and are not necessarily endorsed by the U.S. Naval War College or Department of Defense.

23 April 2018

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ABSTRACT

There are various schools of thought regarding the use of outer space. On one end of the spectrum are those who believe space is an inevitable warfighting domain. On the other end are those who believe space should be treated as a sanctuary and should only be used for peaceful purposes. However, the dual-use nature of most space technology, whereby it can be used for both peaceful and military purposes, makes the latter viewpoint inherently untenable, especially since “peaceful” has been interpreted in multiple ways by different countries and venues. The U.S. has largely taken the position that space warfare is unavoidable and has, thus, championed the mantra of achieving U.S. space dominance in an effort to prevent potential adversaries from altering the balance of power in the world. U.S. space dominance rhetoric warrants a thoughtful ethics analysis since this approach could be a driving factor to a major conflict between the U.S., China, Russia, and/or others that includes space and could render space unusable for future generations. This ethics analysis explores U.S. space dominance through the following traditional ethics perspectives: utilitarian, rights, fairness, common good, and virtues. It also considers technology ethics, ethics as a function of time, and contractarianism. Finally, this analysis yields recommendations the U.S. can pursue to ensure it is not, through unintended consequences, creating rather than solving problems.

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CHAPTER 1: INTRODUCTION

"If the U.S. is to avoid a 'Space Pearl Harbor' it needs to take seriously the possibility of an attack on U.S. space systems."¹ That was the warning from the 2001 Rumsfeld Commission Report, chaired by the Honorable Donald Rumsfeld just prior to Rumsfeld becoming the 21st Secretary of Defense.² There are various schools of thought regarding the use of outer space. On one end of the spectrum, as the Rumsfeld Commission quote indicates, are those who contend space warfare is inevitable,³ thus, the rational and necessary response is to prepare for the worst. This school of thought suggests the only way, or at least the best way, for the U.S. to prevent a war in space is through sustained U.S. space superiority⁴ or even dominance,⁵ the two terms often used interchangeably, referencing an unchallengeable ability to control access to and actions in space. This school has increasingly prevailed as the U.S. approach to space security.

In a February 2018 speech in Orlando, Chief of Staff of the Air Force General David Goldfein said the U.S. will be waging war "from space...in a matter of years," and as a result, the Air Force must "embrace space superiority with the same passion and sense of ownership as we apply to air superiority today."⁶ Some U.S. decision makers are pushing the issue even further. Upon learning, from U.S. Strategic Command and U.S. Pacific Command assessments,⁷

¹ Rumsfeld et al., "Report of the Commission to Assess United States National Security Space Management and Organization," January 11, 2001, https://fas.org/spp/military/commission/executive_summary.pdf.

² Historical Office: Office of the Secretary of Defense, "Donald H. Rumsfeld: George W. Bush Administration," accessed January 31, 2018, <http://history.defense.gov/Multimedia/Biographies/Article-View/Article/571280/donald-h-rumsfeld/>.

³ Joan Johnson-Freese, *Space Warfare in the 21st Century: Arming the Heavens*, (New York: Routledge, 2017), 57-63.

⁴ Colin Clark, "CSAF Predicts War in Space 'In a Matter of Years,'" *Breaking Defense*, February 26, 2018, <https://breakingdefense.com/2018/02/csaf-predicts-war-in-space-in-a-matter-of-years/>.

⁵ General John Hyten, Secretary Heather Wilson, and Congressman Mike Rogers, "National Security Space Strategy," interview by David Martin, *CBS News*, December 2, 2017, <https://www.c-span.org/video/?438064-2/national-security-space-strategy>.

⁶ Clark, "CSAF Predicts War in Space."

⁷ General John Hyten et al., "National Security Space Strategy."

that China is now considered a ‘peer’ to the U.S. in terms of space capability, and Russia a ‘near peer,’ Representative Mike Rogers, chairman of the House Armed Services Subcommittee on Strategic Forces, said, “That’s unacceptable that we’ve allowed that to happen.”⁸ Moreover, Rogers has called for a separate Space Corps to be created to adequately manage the threats China and Russia pose to U.S. space assets.⁹ Indeed, even President Donald Trump in a March 2018 speech alluded to the possibility of a future military Space Force,¹⁰ although according to Scott Pace, the Executive Secretary of the National Space Council, the Trump Administration does not believe space warfare is inevitable.¹¹

On the other end of the spectrum are those who believe space should be regarded as a sanctuary and should only be used for peaceful purposes. However, the dual-use nature of most space technology, useful for both peaceful and military purposes and being difficult to know whether military technology is intended for offensive or defensive purposes, makes this perspective inherently untenable, especially since “peaceful” has been interpreted in multiple ways by different countries and venues.

An argument can also be made that if you believe war is inevitable, then war is inevitable,¹² which would include space warfare. Declaring space warfare to be inevitable coupled with continued U.S. space dominance rhetoric prompts an ethical analysis since this

⁸ Sandra Erwin, “Chairman Rogers: Space Corps Needed More Than Ever, Air Force ‘in Denial,’” *SpaceNews*, February 28, 2018, <http://spacenews.com/chairman-rogers-space-corps-needed-more-than-ever-air-force-in-denial/>.

⁹ Erwin, “Chairman Rogers: Space Corps Needed.”

¹⁰ Marina Koren, “What Does Trump Mean By ‘Space Force?’” *The Atlantic*, March 13, 2018, <https://www.theatlantic.com/science/archive/2018/03/trump-space-force-nasa/555560/>.

¹¹ Sandra Erwin, “In the Trump Administration, Deep Mistrust of Chinese, Russian Motives in Space,” *SpaceNews*, April 12, 2018, <http://spacenews.com/in-the-trump-administration-deep-mistrust-of-chinese-russian-motives-in-space/>.

¹² Marc Genest, “Thucydides Insights Into: Man, the State, and the Peloponnesian War,” (lecture, U.S. Naval War College, Newport, RI, November 28, 2017).

approach could be a driving factor to a major conflict between the U.S., China, Russia, and/or others that includes space and could render space unusable for future generations.

In his 2004 article titled “Moral and Ethical Decisions Regarding Space Warfare,” then Colonel John Hyten, now General Hyten and Commander of U.S. Strategic Command, provided another standpoint regarding the ethics of U.S. space policy. There he stated, “The conflict between moral and ethical principles revolves around whether, on the one hand, space should be held as a sanctuary from weapons or, on the other, whether our nation has a moral duty to furnish those it asks to go in harm’s way with the tools that will increase their effectiveness and reduce their casualties.”¹³ General Hyten also contended that since the U.S. depends on space more than anyone else, it would be unfair for the U.S. to sign an updated agreement or treaty since it would have to surrender its substantial advantage.¹⁴ Additionally, he argued the bulk of U.S. threats are either irrational or non-state actors, and as such, diplomatic reasoning with said threats is not an option.¹⁵

The methodology developed by Santa Clara University’s Markkula Center for Applied Ethics, utilizing utilitarian, rights, fairness, common good, virtue, and technology considerations as ethical decision-making lenses, provides an analytical framework for consideration of space dominance. The Markkula Center framework is useful in evaluating ethical implications of actions in and related to space since this framework is designed for application to practical real-world situations in which technology and ethics intersect. In addition, the ethics of space dominance as a function of time and contractarianism will be examined. Ethics, as defined by the Markkula Center, are “well-founded standards of right and wrong that prescribe what humans

¹³ John Hyten and Robert Uy, “Moral and Ethical Decisions Regarding Space Warfare,” *Air & Space Power Journal*, 18 no. 2 (2004): 54.

¹⁴ Hyten, “Moral and Ethical,” 58.

¹⁵ Hyten, “Moral and Ethical,” 58.

ought to do, usually in terms of rights, obligations, benefits to society, fairness, or specific virtues.”¹⁶ Morals, however, are often thought of as an individual’s personal compass and his/her definition of right and wrong. In practice, however, the terms ethics and morals are often used interchangeably and the forthcoming analysis will follow this convention.

¹⁶ Manuel Velasquez et al., “What is Ethics?”, *Markkula Center for Applied Ethics*, last updated in 2010, <https://www.scu.edu/ethics/ethics-resources/ethical-decision-making/what-is-ethics/>.

CHAPTER 2: TRADITIONAL ETHICS APPROACHES

THE UTILITARIAN APPROACH

The Markkula Center describes a utilitarian approach as one that focuses on consequences, and says that utilitarians deem an action ethical if it “produces the greatest balance of good over harm.”¹⁷ This approach is often the default in Western culture. For example, when fictional hero Jack Bauer, in the TV show *24*,¹⁸ must torture a suspected terrorist to obtain information that will save a city from imminent nuclear disaster, he is taking a utilitarian approach. Violating the suspect’s human right not to be tortured is morally justifiable because doing so will save thousands of lives and, thus, maximizes good versus harm. Similarly, it was through a utilitarian lens that the alleged torturing of suspected terrorists at Guantanamo Bay was deemed justifiable.

A limitation of the utilitarian approach, however, is its focus on consequences and time horizons. The underlying assumptions of utilitarianism are that: 1) the person or entity making the decision knows what the consequences of an action will be; and, 2) the intended consequences will be achieved. However, the potential for unintended consequences is always present. What if, for example, a heroic person saves five people who would have otherwise been killed by an oncoming train, but later, one of these five people turns into a mass murderer as a result of the emotional trauma experienced by his near-death experience? Moreover, intent is difficult to observe and measure. Further, the problem exists of determining the time horizon for which one is responsible for the consequences of his actions (more on this in Ethics as a Function of Time).

¹⁷ “A Framework for Ethical Decision Making,” *Markkula Center for Applied Ethics*, last modified August 1, 2015, <https://www.scu.edu/ethics/ethics-resources/ethical-decision-making/a-framework-for-ethical-decision-making/>.

¹⁸ *24*, created by Robert Cochran and Joel Surnow (Beverly Hills, CA: Imagine Entertainment, 2001-2010).

As the above hypothetical example illustrates, it is often difficult, if not impossible to determine intent and consequences of actions. Yet, consequences maximizing benefit over harm is the underlying principle of the utilitarian approach. Unlike hypothetical examples in which variables can be held constant, real-world situations tend to be even more complicated. To evaluate the ethics of the U.S. mindset that space warfare is unavoidable and, thus, that space dominance is necessary through a utilitarian perspective, several sub-questions must be answered.

First, does space domination yield the most good and/or the least harm for all those involved?¹⁹ As previously demonstrated, it is often impossible to know for certain what the consequences of one's actions will be, but sometimes history can provide an indication. For this case, consider the situation known as the Thucydides Trap, which stems from Thucydides' key lesson of the Peloponnesian War, i.e., "The growth of the power of Athens, and the alarm (fear) which this inspired in Sparta, made war inevitable."²⁰ Harvard Professor Graham Allison has taken Thucydides' hypothesis and applied it to other historical cases to test its accuracy and persistence. He has found that, "The past 500 years have seen 16 cases in which a rising power threatened to displace a ruling one. Twelve of these ended in war."²¹ Most recently, Allison warned that China's rise on the world stage, which threatens the U.S. position as the world hegemon, is the next case study for the Thucydides Trap.²² Combined, these lessons postulate

¹⁹ Markkula Center for Applied Ethics at Santa Clara University, "Ethical Decision Making" Apple App Store Vers. 2.4 (2018), <https://itunes.apple.com/us/app/ethical-decision-making/id799710217?mt=8> (accessed February 15, 2018).

²⁰ Robert Strassler, ed., *The Landmark Thucydides*, (New York: The Free Press, 1996), 16.

²¹ Graham Allison, "The Thucydides Trap: When One Great Power Threatens to Displace Another, War is Almost Always the Result – but it Doesn't Have To Be," *Foreign Policy*, June 9, 2017, <http://foreignpolicy.com/2017/06/09/the-thucydides-trap/>.

²² Allison, "The Thucydides Trap."

that as an emerging power such as China rises and inspires fear in the reigning power, the U.S., there is a 75% probability war will take place between the two states.

China's President Xi Jinping, however, says he disagrees with the concept of the Thucydides Trap. In a September 2015 speech in Seattle, Xi said, "There is no such thing as the so-called Thucydides Trap in the world. But should major countries time and again make the mistakes of strategic miscalculation, they might create such traps for themselves."²³ The irony in Xi's statement is that the 'mistakes of strategic miscalculation' he references are contributing factors, if not driving forces, in a Thucydides Trap situation arising and resulting in war.

Additionally, Thucydides' premise that nation-states base their decisions on some combination of fear, honor, and self-interest²⁴ lends to what international relations experts call the security dilemma. Harvard scholar John Herz coined this term in 1950 and described it as a situation in which a state is fearful of attack from other states and, thus, in "striving to attain security from such an attack, they are driven to acquire more and more power in order to escape the impact of the power of others, [which] in turn, renders the others more insecure and compels them to prepare for the worst."²⁵ States sometimes strategically misstep because they base their strategic calculus on apparent adversaries' perceived capabilities and assume the worst of their intentions. The logic behind this approach, common to the military, is simple: capabilities equal threats. However, as mentioned previously, dual-use space technology makes determining another's intent difficult, if not impossible, and at some point, a perpetual capabilities race

²³ Luo Bin, "Full Text of Xi Jinping's Speech on China-U.S. Relations in Seattle," *CRI English News*, September 24, 2015, <http://english.cri.cn/12394/2015/09/24/3746s897214.htm>.

²⁴ Strassler, *The Landmark Thucydides*, 43.

²⁵ John Herz, "Idealist Internationalism and the Security Dilemma," *World Politics* 2, no. 2, (1950): 157. doi:10.2307/2009187.

becomes unaffordable, unwinnable, and perilous (more on dual-use in When Technology Complicates Ethics).²⁶

A determination of whether U.S. rhetoric of space dominance yields the most good and/or the least harm for all those involved also requires identifying who is included in ‘all those involved.’ If defined as the nearly 7.5 billion²⁷ people on earth, theoretically in danger in the event a space war escalated into a war involving nuclear weapons, the utilitarian answer is likely no, U.S. space dominance rhetoric, with the intent to preserve the status quo for the 327 million Americans,²⁸ is not morally justified. While space warfare leading to a nuclear war could be considered an extreme, the strategic nature of many satellites, especially American, Chinese, and Russian satellites, renders the possibility that an attack on a strategic space asset could be met with a terrestrial or celestial nuclear response.²⁹ Next, if ‘all those involved’ are defined as the combined 1.7 billion people between the U.S. and China who would potentially be in harm’s way in the event of a war comprising only these two states, the utilitarian answer is still likely no, U.S. space dominance rhetoric, with the intent to preserve the status quo for the 327 million Americans, is not morally justified. If, however, the outcome is assumed to be that U.S. space dominance rhetoric leads to an increase in the standard of living, or even a perpetual status quo, for the majority of Americans, while not harming anyone else, this approach would be morally justified through a utilitarian perspective. Similarly, if assumed that without U.S. space dominance, the result would be that of a less benevolent state dominating the space environment,

²⁶ Johnson-Freese, *Space Warfare*, 8.

²⁷ U.S. Census Bureau, “U.S. and World Population Clock,” United States Census Bureau, accessed February 17, 2018, <https://www.census.gov/popclock/>.

²⁸ U.S. Census Bureau, “U.S. and World Population Clock,” United States Census Bureau, accessed February 17, 2018, <https://www.census.gov/popclock/>.

²⁹ Jonathan Broder, “Why the Next Pearl Harbor Could Happen in Space,” *Newsweek*, May 4, 2016, <http://www.newsweek.com/2016/05/13/china-us-space-wars-455284.html>.

thus, not maximizing the balance of good over harm for the 7.5 billion people on earth, space dominance would be morally justified from a utilitarian perspective.³⁰

What good and/or harm may occur as a result of the action taken³¹ must also be considered as part of a utilitarian assessment. On the one hand, U.S. space dominance rhetoric could be a component of a larger successful deterrence strategy that helps prevent major conflict between the U.S. and another major state possessing the capability to deceive, disrupt, deny, degrade, or destroy U.S. space assets. If this is the case, the outcome is good for the majority of Americans. However, it is more difficult to know the good or harm done to people of the rest of the world who may no longer get to enjoy the benefits of space should the U.S. decide to deny these benefits. To tip the utilitarian scale to ‘yes, it is morally justified’ in this case assumes a net benefit for Americans and either a status quo or net benefit for the rest of the world. This is because even if war does not result, a net gain for 327 million Americans with a corresponding net loss for the remaining 7.1 billion people in the world would not pass the utilitarian test. If, however, as Allison warns, should China or other entities interpret U.S. space dominance rhetoric as aggressive, which is plausible, the consequences could be the so-called strategic mistakes of which Xi spoke. If these strategic mistakes lead to conflict, the results could be catastrophic, either by destroying the space environment or escalating to nuclear war, and it would mean the U.S. space dominance approach would likely fail the utilitarian test.

Finally, how the outcome is measured, e.g., financial gain, suffering, net lives lost, security, etc. also comes into play.³² Space dominance advocates might contend that it leads to a sustained or improved standard of living for the majority of Americans enjoying the daily

³⁰ Tim Schultz (Associate Dean of Academics for Electives and Research, U.S. Naval War College), email correspondence with the author, February 26, 2018.

³¹ Markkula Center for Applied Ethics, “Ethical Decision Making” Apple App.

³² Markkula Center for Applied Ethics, “Ethical Decision Making” Apple App.

benefits of U.S. space technology. Indeed, it could be argued that the majority of the world's population benefits from this state of affairs. Perhaps the most obvious example of this is the GPS satellite constellation, paid for and operated by the U.S., providing Positioning, Navigation and Timing (PNT) data to people worldwide free of charge, and thereby, an increased standard of living than might otherwise exist. Additionally, there is an argument that U.S. space dominance ensures its military can operate successfully anywhere in the world and, therefore, Americans, and even the majority of the world's population, enjoy a more secure world than might otherwise exist. With the U.S. equipped to act as the world's peacekeeper, proponents could argue that fewer lives are lost due to unnecessary conflicts arising that might result if the U.S. was not able to act as mediator. This might well lead to less suffering and increased prosperity in the globalized economy. Given this outcome, space dominance easily passes the utilitarian test and would be deemed morally justified.

Alternatively, U.S. space dominance rhetoric leading to war that includes space could also mean the loss of the benefits Americans and the rest of the world enjoy from space technology. Were, for example, the GPS satellite constellation disrupted, denied, degraded, or destroyed, preventing not just the loss of positioning and navigation ability but also the loss of timing capability upon which many global financial firms depend for transactions, it is not a far stretch to imagine global pandemonium. The U.S., without its 'eyes and ears'³³ in space would be much less capable of knowing and understanding the global environment, and would be much less capable of intervening, which could foster more and/or continued conflicts across the globe. Certainly, if this were the outcome, the space dominance approach fails the utilitarian test and would not be morally justified.

³³ General John Hyten et al., "National Security Space Strategy."

THE RIGHTS APPROACH

The Markkula Center describes the “rights” approach to ethics as the “action that best protects and respects the moral rights of those affected [which] starts from the belief that humans have a dignity based on their human nature.”³⁴ Perhaps the most famous disciple of the rights approach is 18th century philosopher Immanuel Kant, who stated, “Act so that you treat humanity, whether in your own person or in that of another, always as an end and never as a means only.”³⁵ The rights approach is thereby often in contrast with the utilitarian approach that seeks to maximize good over harm that may include treating people as means to an end. Some examples of rights include “the right to life, the right to freedom from injury, and the right to privacy.”³⁶ Indeed, the U.S. Declaration of Independence declares that all people have “certain unalienable rights, that among these are Life, Liberty, and the Pursuit of Happiness.”³⁷ Described another way, rights are warranted assertions on others. For instance, if, as the Declaration of Independence ascribes, I have a right to life, this requires that others not kill me, or said differently, others have an obligation, or duty, to not interfere with my right to life.³⁸

Consider a hypothetical situation in which a bystander is standing on a bridge next to a stranger overlooking a track on which a train is approaching on course to kill five workmen.³⁹ The stranger, if placed between the train and the five workmen, comprises enough mass to prevent the train from killing the workmen, but this would kill the stranger. The bystander can

³⁴ “A Framework for Ethical Decision Making,” *Markkula Center for Applied Ethics*.

³⁵ Louis Zukofsky, “Sincerity and Objectification,” *Poetry* 37 (February 1931): 269, quoted in Bonnie Costello, *Marianne Moore: Imaginary Possessions* (Cambridge, MA: Harvard University Press, 1981), 78.

³⁶ Velasquez et al., “What is Ethics?” last updated in 2010.

³⁷ *The Constitution of the United States of America with the Declaration of Independence*, (New York: Fall River Press, 2012), 81.

³⁸ Manuel Velasquez et al., “Rights,” *Markkula Center for Applied Ethics*, last updated in 2014, <https://www.scu.edu/ethics/ethics-resources/ethical-decision-making/rights/>.

³⁹ William Casebeer, “The Neurobiology of Free Will,” (lecture, U.S. Naval War College, Newport, RI, September 27, 2017).

either let the train continue on its course allowing the five workmen to be killed or push the stranger in front of the train, killing the stranger, but saving the five workmen. Whereas a strict utilitarian might support this approach since it could be argued it achieves the greatest balance of good over harm, a Kantian approach would declare this action unethical since the stranger is being used as a means to achieve an end, i.e. sacrificing one to save five.

Given this hypothetical example as a backdrop, how ethical is the U.S. mindset that space warfare is unavoidable and, thus, that space dominance is necessary when viewed through a Kantian, or rights, perspective? Answering this question again requires further considerations. First, does this action best respect the rights and dignity of those who have a stake?⁴⁰ Consider which rights are at stake in this real-world scenario, specifically, as the 1967 Outer Space Treaty states:

Inspired by the great prospects opening up before mankind as a result of man's entry into outer space, recognizing the *common interest of all mankind* in the progress of the *exploration and use of outer space for peaceful purposes*, believing that the exploration and use of outer space should be carried on *for the benefit of all peoples* irrespective of the degree of their economic or scientific development, desiring to *contribute to broad international co-operation* in the scientific as well as the legal aspects of the exploration and use of outer space *for peaceful purposes*, believing that such co-operation will *contribute to the development of mutual understanding and to the strengthening of friendly relations* between States and peoples.⁴¹ (emphasis added)

The treaty makes it clear that space is intended to be used by and benefit all mankind and all peoples for peaceful purposes to contribute to international cooperation that stimulates mutual understanding and strengthens friendly relations. It seems equally apparent that any state's 'dominance' in space such that it impedes another's right to use space for peaceful purposes would inherently violate the Kantian ethical test. Nevertheless, proponents of U.S. space

⁴⁰ Markkula Center for Applied Ethics, "Ethical Decision Making" Apple App.

⁴¹ "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies," (General Assembly resolution 2222 (XXI), annex)—adopted on December 19, 1966, opened for signature on January 27, 1967, entered into force on October 10, 1967.

dominance contend the U.S. is only seeking the ability to deny states' use of space for non-peaceful purposes. Again, however, the dual-use nature of the vast majority of space technology makes it highly unlikely that the U.S., or any state, could adequately and consistently differentiate between another state's space technology being used for peaceful or non-peaceful purposes. Therefore, it seems more likely that one state's space dominance would infringe upon another state's right to use space for peaceful purposes as well as its inherent dignity, or self-respect, in its pursuit of peaceful space exploration and use. Thus, space dominance fails the Kantian test and would not be considered morally justified.

Equally important to answer are the questions of whether the actions treat others as a means to an end⁴² and whether the actions help or hinder others in obtaining a minimum standard of well-being?⁴³ In answering the former, an argument can be made that U.S. space dominance is achieved only insofar as it relates to the space capabilities, or lack thereof, of other entities. If the U.S. focuses solely on developing its own capabilities to attain space dominance, it is not using other entities as the means by which to achieve its end. The latter question is difficult to answer since it requires the daunting task of forecasting consequences, and is based on a subjective standard of well-being, which varies from culture to culture and even within a given culture. Consequently, the Kantian approach to analyzing the ethics of U.S. space dominance yields ambiguous results at best.

THE FAIRNESS APPROACH

The fairness approach, as described by the Markkula Center, states, "ethical actions treat all human beings equally-or if unequally, then fairly based on some standard that is defensible."⁴⁴

This perspective is the foundation of beliefs such as people deserving equal pay for equal work

⁴² Markkula Center for Applied Ethics, "Ethical Decision Making" Apple App.

⁴³ Markkula Center for Applied Ethics, "Ethical Decision Making" Apple App.

⁴⁴ "A Framework for Ethical Decision Making," *Markkula Center for Applied Ethics*.

and that people who work harder and/or contribute more to an organization or society deserve to be compensated more than those who work less hard and/or contribute less. That said, a defensible standard that would claim, for example, Chief Executive Officers of major corporations should be compensated more for the extraordinary value they bring to a company is often called into question when their salaries are hundreds of times that of the common company employee.⁴⁵ Once again, discerning the morality of the U.S. mindset that space warfare is unavoidable and, thus, that space dominance is necessary from a fairness vantage point requires addressing additional considerations.

First, does this action treat people impartially and equitably? The answer to this question is no, the U.S. space dominance approach inherently does not treat all people (or countries, as potential adversaries) impartially and equitably as the fairness approach to ethics requires. This is not surprising, however, since this type of rhetoric has been a staple of military commanders throughout history. Like military commanders of the past, U.S. military commanders are purposely and continuously seeking to gain an advantage over any potential adversary. As General Hyten articulated in a December 2017 interview, “China and Russia...for the last 20+ years have been...developing capabilities...to challenge the United States of America, to challenge our allies, and to change the balance of power in the world, and we cannot allow that to happen.”⁴⁶ Regardless, from a fairness perspective, this approach would not be morally justified unless there is a defensible standard allowing for the U.S. to seek an asymmetric advantage in space.

⁴⁵ “A Framework for Ethical Decision Making,” *Markkula Center for Applied Ethics*.

⁴⁶ General John Hyten et al., “National Security Space Strategy.”

Therefore, if the action does not treat people impartially and equitably, might there be a defensible standard to treat someone differently?⁴⁷ Space dominance proponents might contend that all peaceful states have a right to self-defense and correspondingly, the right to possess a military capable of defending the state from aggressions of another state. The logic goes that the U.S., like all states, has the right to protect itself, should the need arise, in all domains by which an adversary might attempt to attack. In the U.S. Defense Department, these domains are defined as land, air, sea, space, and cyberspace. From this grouping, the space environment is the ‘ultimate high ground’ providing the U.S. military with the key vantage point from which to control assets in the other domains.

The problem with treating all these domains as ‘just another warfighting domain’ is that, contrary to popular U.S. rhetoric, they are not the same, and space and cyberspace are very different. The land, air, and sea domains, international waters notwithstanding, can be physically claimed and upon which can be intruded. Cyberspace is different in that an entity can attack another without physically intruding into the other’s land, air, or sea domains. While the space environment is a physical location, the 1967 Outer Space Treaty specifically designates it as an open commons for all mankind to use for peaceful purposes. Moreover, the physics of space require a satellite in most orbits to ‘pass over’ a number of sovereign states in order to maintain its orbit. Perhaps most importantly though, space is different in that a kinetic conflict in the land, air, sea, and cyberspace domains that brings wreckage and destruction can usually, with the exception of total nuclear war, be cleaned up and repaired relatively quickly, whereas a kinetic conflict in space could render the entire domain unusable for generations. Therefore, determining whether or not a defensible standard exists justifying the U.S. approach to space dominance as morally acceptable depends on whether or not space is viewed as ‘another warfighting domain’

⁴⁷ Markkula Center for Applied Ethics at Santa Clara University, “Ethical Decision Making” Apple App.

or as the 1967 Outer Space Treaty stipulates, a ‘common interest for all mankind.’ This analysis takes the view of the latter and, thus, the U.S. space dominance approach would not be morally justified via the fairness lens.

The third consideration to be addressed in the fairness approach is whether there might exist some bias or self-interest causing the person taking the action to prefer one person, group or approach over others.⁴⁸ Even proponents of U.S. space dominance would agree “dominance” favors America and its allies over all others. From an international relations standpoint, this approach is expected. From a fairness perspective, however, this approach would not be morally justified.

THE COMMON GOOD APPROACH

The common good approach to ethics dates back to Plato and Aristotle,⁴⁹ and is defined by the Markkula Center as contributing to the “social systems, institutions, and environments on which we all depend [such that they] work in a manner that benefits all people.”⁵⁰ In Western cultures, this approach is perhaps the least intuitive since it may require acting against one’s self-interest for the benefit of the common good. When a for-profit company, for example, decides to spend money to develop packaging that reduces waste for the sake of a more sustainable environment, it is acting in accordance with the common good approach to ethics. Similarly, when an individual decides to limit his time in the shower, even when he would prefer to shower longer, in order to do his part to contribute to water conservation efforts, he is taking a common good ethics approach. The common good approach sometimes requires certain individuals or groups to shoulder more of the burden or bear more of the costs than others for the benefit of the common

⁴⁸ Markkula Center for Applied Ethics, “Ethical Decision Making” Apple App.

⁴⁹ Manuel Velasquez et al., “The Common Good,” *Markkula Center for Applied Ethics*, last updated in 2014, <https://www.scu.edu/ethics/ethics-resources/ethical-decision-making/rights/>.

⁵⁰ Velasquez et al., “The Common Good.”

good. For example, ensuring employment and promotion opportunities are equal for all people regardless of gender or race may require some groups to relinquish some of their own opportunities.⁵¹ Hence, assessing the morality of space dominance through a common good lens is structurally complex.

Utilization of the common good approach first requires consideration of whether the action best serves the community in general as opposed to simply benefitting some members.⁵² Again, space dominance proponents might argue that since the U.S. is a noble nation, the world in general is a better place with the U.S. as its peacekeeper, and space dominance is critical to the U.S.' ability to provide this global service. If that is the case, U.S. space dominance is not only morally justified but also morally imperative through the common good lens. Opponents, however, might contend that the U.S., like most, if not all nations, acts only in ways from which it benefits. They could, for example, question the congruence of the U.S.' supposed concern for human rights in areas it deems vital or critical to its interests, e.g. the Persian Gulf Region, but lack thereof in other areas, e.g. several countries with less than stellar human rights track records in Africa. Thus, they could assert U.S. space dominance disproportionately benefits America, its allies, and its interests compared to the benefit the rest of the world receives, which means U.S. space dominance would not be morally justified via the common good approach.

Whether or not the results of the action give everyone the prospect to flourish must also be considered,⁵³ as well as whether the action affects the resources everyone must share, including the environment.⁵⁴ Proponents and opponents would likely contend their same

⁵¹ Velasquez et al., "The Common Good."

⁵² Markkula Center for Applied Ethics, "Ethical Decision Making" Apple App.

⁵³ Markkula Center for Applied Ethics, "Ethical Decision Making" Apple App.

⁵⁴ Markkula Center for Applied Ethics, "Ethical Decision Making" Apple App.

respective response to the first question in the common good approach and, therefore, proponents would say U.S. space dominance is morally justified, while opponents would say it is not.

Regarding resources, such as orbital slots, proponents of U.S. space dominance might argue space dominance does not necessarily mean adding significantly more satellites to space, thereby claiming orbital ‘slots’ in desirable orbits. They might also say while the U.S. owns 803 of the 1,738 operational satellites in space as of August 31, 2017, compared to 204 satellites owned by China and 142 owned by Russia, 476 of the U.S.’ 803 satellites are commercial in nature, and therefore provide services to people worldwide, not only Americans.⁵⁵ This argument, however, appears weak at best. As opponents would assert, U.S. space dominance, by definition, affects the finite, albeit large, resource of highly desirable satellite orbits and orbital slots, and thus, this approach would not be morally justified based on the common good approach.

THE VIRTUE APPROACH

The virtue approach, or virtue ethics as it is often called, is defined by the Markkula Center as acting in accordance with virtues that facilitate becoming a virtuous person.⁵⁶ When performing an action and considering virtue ethics, a person must strive toward ideal virtues such as “honesty, courage, compassion, generosity, tolerance, love, fidelity, integrity, fairness, self-control, and prudence [and must ask], What kind of person will I become if I do this?”⁵⁷ Virtue ethics seek to move a person away from simply following ethical rules, and toward the person building a virtuous character through repetition of virtuous actions that become habits. For example, when a person decides to forgo a social event with friends in order to volunteer at the local homeless shelter, virtue ethicists would prefer this decision not be made because it will

⁵⁵ “UCS Satellite Database,” Union of Concerned Scientists, last updated November 7, 2017, <https://www.ucsusa.org/nuclear-weapons/space-weapons/satellite-database#.WooZDWbMxTY>.

⁵⁶ “A Framework for Ethical Decision Making,” *Markkula Center for Applied Ethics*.

⁵⁷ “A Framework for Ethical Decision Making,” *Markkula Center for Applied Ethics*.

provide the greatest balance of good versus harm as a utilitarian would suggest, nor because it provides the greatest benefit to the common good, but rather because doing so is consistent with, and propels the individual closer to achieving, their desire to become a generous person. Although, admittedly, virtue ethics by definition is likely in contrast with the notion of ‘national interest,’ and it is difficult to adequately apply virtue ethics across an entire nation-state writ large as opposed to an individual. Nevertheless, this analysis will treat the U.S. as an individual for purposes of a virtue ethics evaluation.

The first consideration of a virtue ethics analysis is whether the action is consistent with, and moves one closer to, the ideal type of person he or she is striving to become.⁵⁸ While proponents of U.S. space dominance might contend the world is a better place with the U.S. as its peacekeeper, they might find it difficult to point to a positive virtue this approach exemplifies, unless peacekeeper or policeman are defined as virtues. The U.S. has claimed aspirations of being the world’s beacon for democracy, freedom, equality, liberty, opportunity, and justice.⁵⁹ It would appear difficult to argue space dominance is consistent with, or moves the U.S. closer to, achieving what it claims to aspire to be; thus, this approach would not be deemed morally justified according to virtue ethics.

Also related to virtue ethics is the question of what character traits space dominance demonstrates.⁶⁰ Objectively, striving for space dominance might be characterized as demonstrating overconfidence and self-absorption. Overconfidence because the desire for space dominance stems from the refusal of the U.S. to accept that it is no longer the unipolar hegemon it was following the collapse of the Soviet Union in 1991, though intelligence reports

⁵⁸ Markkula Center for Applied Ethics, “Ethical Decision Making” Apple App.

⁵⁹ The Independence Hall Association, “American Government: The Nature of Government,” USHistory.org, accessed April 23, 2018, <http://www.ushistory.org/gov/1d.asp>.

⁶⁰ Markkula Center for Applied Ethics, “Ethical Decision Making” Apple App.

consistently characterize the world as multi-polar.⁶¹ Additionally, it demonstrates overconfidence because, pragmatically speaking, space dominance is a technical fallacy unachievable by any nation. The preponderance of satellites in space are made with lightweight and easily damageable material so as to maximize payload capability and fuel load, i.e., satellite life expectancy. Moreover, satellites are usually expensive and the kinetic energy of their orbits makes them susceptible to destruction from much smaller, less expensive means. Any nation with the launch capability to reach space could destroy the space environment for everyone. So, while the U.S. spends billions of dollars endeavoring to reach space dominance, a state or non-state entity could destroy the space environment for a fraction of the cost.⁶² Striving for space dominance also demonstrates self-centeredness because U.S. space dominance rhetoric broadcasts to the world the U.S. cares primarily about itself. While it can be argued this could likely be said of every state, self-centeredness has not been a virtue the U.S. has aspired to, although one could argue this mantra is shifting under the Trump Administration. Practical realism aside, it seems clear the U.S. space dominance approach would fail the virtue ethics test since it does not demonstrate the character traits it claims to aspire to portray.

Finally, what character habits would one develop by taking this action?⁶³ Building upon the previous consideration, U.S. space dominance objectively exemplifies the character traits of overconfidence and self-centeredness, thus, the resultant habits being developed could be labeled respectively as arrogance and narcissism. While self-interest is normal from an international relations standpoint, applying a virtue ethics lens to U.S. space dominance uncovers traits to

⁶¹ Linda Yueh, "America's Place in a Multi-Polar World," *BBC News*, April 27, 2015, <http://www.bbc.com/news/business-32427364>.

⁶² Lewis Duncan (Provost, U.S. Naval War College and founding member of the Board of Directors of the Center for the Advancement of Science in Space), interview by the author, February 13, 2018.

⁶³ Markkula Center for Applied Ethics, "Ethical Decision Making" Apple App.

which the U.S. has not claimed to aspire throughout its history and thus, U.S. space dominance would not be morally justified through virtue ethics.

CHAPTER 3: OTHER ETHICS APPROACHES

WHEN TECHNOLOGY COMPLICATES ETHICS

The Markkula Center defines technology ethics as “the application of ethical thinking to the practical concerns of technology.”⁶⁴ Technology ethics requires pushing beyond the question of ‘Can it be done?’ to the question of ‘Should it be done?’ The premise of technology ethics is essentially that almost every technology is dual-use in that it can be used for good and/or evil purposes as seen in the following examples.

At a simple level, a hammer can help a person build a house, or can be used to kill someone. The Romans build the largest and most complex road system in the ancient world, which enabled the Roman Empire to expand to almost 1.7 million square miles,⁶⁵ but which also led to the overexpansion that contributed to its downfall.⁶⁶ During the 19th century as the U.S. expanded westward, the transcontinental railroad connected the east and west coasts, which made travel and economic expansion much more attainable to the masses, but in doing so it destroyed the Plains Indians’ way of life and forced them onto reservations.⁶⁷

More recently, social media has been under the technology ethics microscope. While social media is touted as a technology to bring people together and help people maintain relationships that might otherwise be lost, the 2016 U.S. presidential election highlighted how it can be used for nefarious purposes. Specifically, Facebook admitted that approximately 470

⁶⁴ Brian Green, “What is Technology Ethics,” *Markkula Center for Applied Ethics*, Santa Clara University, accessed January 25, 2018, <https://www.scu.edu/ethics/focus-areas/technology-ethics/>.

⁶⁵ Evan Andrews, “10 Innovations That Built Ancient Rome,” History Stories, *History.com*, last modified November 20, 2012, <http://www.history.com/news/history-lists/10-innovations-that-built-ancient-rome>.

⁶⁶ Evan Andrews, “8 Reasons Why Rome Fell,” History Stories, *History.com*, last modified January 14, 2014, <http://www.history.com/news/history-lists/8-reasons-why-rome-fell>.

⁶⁷ Gilbert King, “Where the Buffalo No Longer Roamed,” *Smithsonian.com*, last modified July 17, 2012, <https://www.smithsonianmag.com/history/where-the-buffalo-no-longer-roamed-3067904/>.

Russian Kremlin-linked accounts purchased “more than \$100,000 worth of divisive ads on hot-button issues”⁶⁸ designed to influence the outcome of the election.⁶⁹

Likewise, one can hardly browse the news today without stumbling across artificial intelligence (AI), which promises copious advantages such as helping humans not only make sense of but also leverage large data sets. Regarding AI, Russian President Vladimir Putin said, “Whoever becomes the leader in this sphere will become the ruler of the world,”⁷⁰ while entrepreneur and technology guru Elon Musk warned in a September 2017 Tweet, “Competition for AI superiority at the national level most likely cause of WW3 imo [in my opinion].”⁷¹ As these examples show, technology generally is neither inherently good nor evil.⁷² In the vast majority of cases, technology is dual-use, and whether its function is good or evil is determined by how people use it.

Such is the case with space technology. In addition to the GPS examples previously provided, remote sensing satellites are used by militaries to detect theater and intercontinental missile launches, and to cue missile defense systems.⁷³ Alternatively, civil and commercial agencies can use remote sensing satellites to map forest fires, forecast weather, and track changes

⁶⁸ Scott Shane and Vindu Goel, “Fake Russian Facebook Accounts Bought \$100,000 in Political Ads,” *The New York Times*, September 6, 2017, <https://www.nytimes.com/2017/09/06/technology/facebook-russian-political-ads.html>.

⁶⁹ Shane and Goel, “Fake Russian Facebook Accounts.”

⁷⁰ The Associated Press, “Putin: Leader in Artificial Intelligence Will Rule World,” *U.S. News & World Report*, September 1, 2017, <https://www.usnews.com/news/business/articles/2017-09-01/putin-leader-in-artificial-intelligence-will-rule-world>.

⁷¹ Brett Molina, “Elon Musk: Artificial Intelligence Battle ‘Most Likely Cause’ of WWII,” *USA Today*, September 5, 2017, <https://www.usatoday.com/story/tech/talkingtech/2017/09/05/elon-musk-artificial-intelligence-battle-most-likely-cause-wwii/632362001/>.

⁷² Melvin Kranzberg, “Kranzberg’s Laws,” *Technology and Culture* 27, no. 3, (Jul 1986): 544-560, accessed September 20, 2017, <http://www.jstor.org/stable/3105385>.

⁷³ “Space Based Infrared System (SBIRS),” Lockheed Martin, accessed February 17, 2018, <https://www.lockheedmartin.com/en-us/products/sbirs.html>.

to forests and farmlands over time.⁷⁴ Similarly, rocket-launching technology itself is dual-use in that the technology capable of propelling a satellite into orbit is virtually the same as the technology necessary to deliver a nuclear warhead across the globe. Moreover, roughly the same technology is used for ballistic missile defense as is used in anti-satellite (ASAT) weapons designed to shoot down a satellite.⁷⁵

Theoretically, any satellite with the ability to maneuver in space could be used as a weapon to hit another satellite. Recent space technology considerations have caused both hopefulness and consternation. For example, highly maneuverable satellites capable of close rendezvous proximity operations (RPO) could theoretically be used to inspect one's own satellites for damage, replace broken or defunct spacecraft components, upgrade spacecraft hardware, or refuel satellites. Alternatively, a satellite capable of RPO could inspect adversary satellites, or hinder adversary satellite capability—for example, spray-painting the lens of the adversary's satellite payload, or using other physical or cyber means to deceive, disrupt, deny, degrade, or destroy adversary satellite capability. Similarly, several approaches, from robotic arms to lasers, are being considered to develop ways to reduce, or clean up, space debris—an irrefutably noble cause. However, a satellite with these capabilities could also be used to deceive, disrupt, deny, degrade, destroy, or hijack an adversary satellite. For these reasons and more, the vast majority of space technology can be considered dual-use.

A particular ethical challenge of the dual-use nature of space technology is using it to disguise intent. This creates a dilemma for an adversary who is trying to ascertain the intent of one's actions, which has been the case since the beginning of the Cold War. Is the adversary

⁷⁴ “What is Remote Sensing and What is it Used For?”, USGS: Science for a Changing World, last modified August 18, 2016, https://www.usgs.gov/faqs/what-remote-sensing-and-what-it-used-0?qt-news_science_products=7#qt-news_science_products.

⁷⁵ Ashton Carter, “The Relationship of ASAT and BMD Systems,” *Daedalus*, 114, no. 2, (1985), 171-189, <https://www.belfercenter.org/sites/default/files/files/publication/20024984.pdf>.

developing a missile defense system or an ASAT weapon, or both? Is the adversary building rocket-launching capability to send a communications satellite into space or to launch a missile across the planet, or both? The ‘safe’ answer from a military perspective is to assume the worst and prepare. What this has meant for the U.S. military regarding space in particular is to strive toward space dominance. As an example, in February 2018⁷⁶ the U.S. National Space Defense Center (NSDC), previously called the Joint Interagency Combined Space Operations Center, or JICSpOC, began 24-hour operations to consolidate the “Defense Department, intelligence community and commercial sector to address threats in space, and unify plans and efforts in orbit.”⁷⁷

The NSDC began in 2015 as an experiment⁷⁸ as a result of fears the U.S. might be losing its space superiority to China and Russia. China’s January 2007 ASAT demonstration destroyed one of its own obsolete satellites generating “the largest debris cloud ever...by a single event in orbit”⁷⁹ and creating more than 3,000 pieces of space debris in the highly congested low earth orbit⁸⁰ where many U.S. intelligence, surveillance, and reconnaissance satellites and the International Space Station reside. This is believed to be the first kinetic ASAT action since the U.S. and Soviet Union demonstrated this capability in the 1980s.⁸¹ China was subsequently

⁷⁶ Tom Roeder, “Super Secretive Space Defense Center Near Colorado Springs Begins 24-Hour Operations,” *The Colorado Springs Gazette*, February 18, 2018, <https://m.gazette.com/super-secretive-space-defense-center-near-colorado-springs-begins-24-hour-operations/article/1621233>.

⁷⁷ Phillip Swarts, “The JICSpOC is Dead; Long Live the National Space Defense Center,” *SpaceNews*, April 4, 2017, <http://spacenews.com/the-jicspoc-is-dead-long-live-the-national-space-defense-center/>.

⁷⁸ Roeder, “Super Secretive Space.”

⁷⁹ Brian Weeden, “2007 Chinese Anti-Satellite Test Fact Sheet,” updated November 23, 2010, https://swfound.org/media/9550/chinese_asat_fact_sheet_updated_2012.pdf.

⁸⁰ Weeden, “2007 Chinese Anti-Satellite Test.”

⁸¹ Shirley Kan, *China’s Anti-Satellite Weapon Test* (Washington, DC: Congressional Research Service, 2007), 2.

internationally condemned for this 2007 test because of the space debris it created.⁸² Then, in 2013, the alarm bells sounded in the U.S. when China launched what it claimed to be a “high-altitude scientific experiment”⁸³ that reached higher than 10,000 kilometers in altitude. This led the U.S. to believe China potentially possessed ASAT capability to reach geosynchronous earth orbit where the U.S.’ strategic, and very expensive, military communications and missile warning/defense satellites dwell, and which the U.S. previously considered a relatively safe orbit from ASAT attacks. In addition, in May 2014, Russia launched a communications satellite, which was no cause for concern until a few months later when an object from the launch, previously considered useless space debris, maneuvered to a new orbit and rendezvoused with the rocket stage that launched it.⁸⁴ Finally, in December 2016, China created a Strategic Support Force whereby it could consolidate space, cyberspace, and electronic warfare competencies.⁸⁵

As these examples illustrate, China and Russia appear to be advancing their space capabilities. The U.S. response thus far has been that it ‘cannot allow that to happen’ and that it must achieve space dominance in order to protect the status quo way of life for America and its allies. From a technology ethics lens, however, is this approach morally justified? Recall that technology ethicists stipulate one should ask ‘Should it be done?’ versus ‘Can it be done?’ In this case, as previously discussed, it is unrealistic to believe any state could actually achieve space dominance since a few nuclear warheads, or even large conventional warheads, launched by any

⁸² Marc Kaufman and Dafna Linzer, “China Criticized for Anti-Satellite Missile Test,” *Washington Post*, January 19, 2007, <http://www.washingtonpost.com/wp-dyn/content/article/2007/01/18/AR2007011801029.html>.

⁸³ Brian Weeden, “Anti-Satellite Tests in Space—The Case of China,” *Secure World Foundation*, updated August 16, 2013, https://swfound.org/media/115643/china_asat_testing_fact_sheet_aug_2013.pdf.

⁸⁴ Jane Hu, “The Battle for Space,” *Slate.com*, December 23, 2014, http://www.slate.com/articles/health_and_science/space_20/2014/12/space_weapon_law_u_s_china_and_russia_developing_dangerous_dual_use_spacecraft.html.

⁸⁵ Nirmal Ghosh, “U.S. Seeks to Stay Ahead of China, Russia in Space Race,” *The Straits Times*, December 11, 2017, <http://www.straitstimes.com/world/united-states/us-seeks-to-stay-ahead-of-china-russia-in-space-race>.

disgruntled entity could destroy the space environment for everyone. Nonetheless, assuming for a moment that space dominance could be attained, whether or not it should be is a different question.

Answering that question requires examining its potential outcome. In his 2017 book *Destined for War*, Allison hypothesizes, “China and the United States are currently on a collision course for war—unless both parties take difficult and painful actions to avert it.”⁸⁶ Tempering grandiose U.S. space dominance rhetoric is potentially the type of ‘difficult and painful action’ to which Allison is referring, to avoid a conflict. Since space dominance is not an achievable goal unless all other states and entities were to acquiesce and make it so, the probabilities of which approach zero according to the history of human nature and international relations, then space dominance is not a proposition that decreases the chances of armed conflict between the U.S. and another state or entity, especially China. It would seem to be the case, then, that the U.S. striving toward space dominance brings it closer to armed conflict, and risks, indeed provokes, a more rapid and malignant buildup of space weapons by other nations (recall the strategic mistakes of which China’s President Xi spoke). Perhaps a better option is to again heed the words of Thucydides:

That war is an evil is a proposition so familiar to everyone that it would be tedious to develop it. No one is forced to engage in it by ignorance, or kept out of it by fear. If both should happen to have chosen the wrong moment for acting, advice to make peace would not be unserviceable. *This, if we did but see it, is just what we stand most in need of at the present juncture.*⁸⁷ (emphasis added)

This analysis arrives at the conclusion that U.S. space dominance, assessed through technology ethics, would not be morally justified.

⁸⁶ Graham Allison, *Destined for War: Can America and China Escape Thucydides’s Trap?*, (New York: Houghton Mifflin Harcourt, 2017), Preface.

⁸⁷ Thucydides, Hermocrates addresses the Sicilians, 424 BCE, quoted in Graham Allison, *Destined for War: Can America and China Escape Thucydides’s Trap?*, (New York: Houghton Mifflin Harcourt, 2017), 187.

SPACE DOMINANCE AS A FUNCTION OF TIME

In his 1974 essay *Technology and Responsibility*, Hans Jonas, likely reflecting on the advent of nuclear weapons, argued that ethics tools and frameworks up to that point were not sufficient to evaluate the morality of the use of technologies of such magnitude, and that people have the moral responsibility to contemplate on and respect forthcoming generations, and to guarantee the world remains suitable for human inhabitation.⁸⁸ He described that prior to the advent of nuclear weapons, human actions were appropriately morally judged based on a relatively short perspective of time in terms of consequences, but post-nuclear weapons this approach no longer suffices. Specifically, he stated, “It is the aggregate, not the individual doer or deed that matters here; and the indefinite future, rather than the contemporary context of the action, constitutes the relevant time horizon of responsibility.”⁸⁹ He went on to explain the unknown consequences of the future are the responsibility of the people performing the actions since, “the *future* is not represented...the non-existent has no lobby, and...are powerless,...and when they can make their complaint, then we, the culprits, will no longer be there [to answer for our actions].”⁹⁰ In short, Jonas took the limitations of consequentialism and extrapolated them further into time. As previously discussed, when judging the morality of an action based on consequences, it is often difficult, if not impossible to know what the consequences of one’s action will be, and if one’s action will yield the intended consequences.

The case of the space environment raises a similar ethical conundrum as does the use of nuclear weapons in that the cataclysmic consequences are potentially irreversible, at least for a very long time. In the space environment, this possibility is known as the Kessler Syndrome,

⁸⁸ Hans Jonas, “Technology and Responsibility,” in *Readings in the Philosophy of Technology*, 2nd ed., ed. David Kaplan (Maryland: Rowman & Littlefield Publishers, 2009), 173-184.

⁸⁹ Jonas, “Technology and Responsibility,” 178.

⁹⁰ Jonas, “Technology and Responsibility,” 183.

named after Donald Kessler, a NASA scientist who published a paper in 1978 articulating the exponential rate at which space debris could multiply following a satellite collision.⁹¹ As (over)dramatized in the 2013 movie *Gravity*,⁹² space debris traveling at speeds of up to 17,500 miles per hour⁹³ can quickly create more debris, which creates exponentially more debris at an ever increasing rate, until the entire space environment is essentially rendered useless pending such time that people develop a way to remove the debris, or until it eventually experiences ‘orbital decay’ and either burns up in earth’s atmosphere or falls to earth, which could take generations. This escalating debris process is also known as collisional cascading.⁹⁴

Analysis of the morality that space warfare is inevitable and, thus, U.S. space dominance is necessary through an “ethics as a function of time” approach requires consideration of the potential outcomes. One outcome is that all other states and entities agree the U.S. should be the dominant space user, prolonged peace ensues, and no accidental satellite collisions ignite a Kessler Syndrome situation, destroying the space environment. While this outcome appears exceedingly unlikely, ethics as a function of time might deem U.S. space dominance as morally justified in this case since the consequences did not result in destruction of the space environment. Another, more likely outcome of U.S. space dominance rhetoric is that it incites China, Russia, and others to build up their offensive space capabilities at an increasing rate in an attempt to catch up to the U.S. and to prevent the U.S. from achieving so-called space dominance. From here, one could say three broad eventualities are possible: 1) no accidental

⁹¹ Donald J. Kessler and Burton Cour-Palais, “Collision Frequency of Artificial Satellites: The Creation of a Debris Belt,” *Journal of Geophysical Research* 83, no. A6, (1978), 2,637, <http://webpages.charter.net/dkessler/files/Collision%20Frequency.pdf>.

⁹² *Gravity*, directed by Alfonso Cuarón (Burbank, CA: Warner Bros. Pictures, 2013).

⁹³ “Space Debris and Human Spacecraft,” edited Mark Garcia, NASA, last updated August 7, 2017, https://www.nasa.gov/mission_pages/station/news/orbital_debris.html.

⁹⁴ Chairman, U.S. Joint Chiefs of Staff, *Space Operations*, Joint Publication (JP) 3-14 (Washington, DC: CJCS May 29, 2013), I-9, http://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_14.pdf.

collision in space occurs despite the rapid influx of space assets as multiple states strive to attain space dominance; 2) an accidental collision in space occurs leading to a Kessler Syndrome situation; or, 3) a purposeful collision or attack in space occurs either as the result of a terrestrial war, or as a first-strike option to destroy another state's 'eyes and ears' in space prior to, or while simultaneously, attacking another state terrestrially. In this case, only the first eventuality described could pass the ethics as function of time test. The latter two have the potential to render space an unusable environment for generations to come, and the human way of life would be dramatically affected. Thus, as the ethics as a function of time approach dictates, one must contemplate and respect forthcoming generations' rights, which means, given the latter two eventualities described, U.S. space dominance would not be morally justified through the ethics as a function of time lens.

It is important to note, however, General Hyten and virtually every other U.S. national security space leader has championed the mantra that creating space debris is not acceptable. In 2015, General Hyten, as the Commander of U.S. Air Force Space Command, stated regarding offensive and defensive space capabilities, "Whatever you do, don't create debris...it's bad for the world."⁹⁵ Indeed, U.S. national security space leaders have been very clear that the U.S. will only seek to utilize non-kinetic, i.e. not physically attacking satellites, approaches to deceive, disrupt, deny, degrade, or destroy space capabilities. They have also set parameters that when deceiving, disrupting, denying, or degrading an adversary's space capability, these effects should be temporary, not permanent. The problem with this seemingly well-meaning approach is that simply because the U.S. is planning to use non-kinetic means of interference does not necessarily mean other states or entities will do the same. Furthermore, by broadcasting its planned progress

⁹⁵ Lee Billings, "War in Space May Be Closer Than Ever," *Scientific American*, August 10, 2015, <https://www.scientificamerican.com/article/war-in-space-may-be-closer-than-ever/>.

toward space dominance, the U.S. will most likely instigate other states to more rapidly build up their capabilities, the result of which could mean that space, an environment on which the U.S. depends so heavily, could be destroyed.

MORALITY BY SOCIAL CONTRACT

The 1967 Outer Space Treaty can also be evaluated through a concept similar to 17th century English philosopher Thomas Hobbes' idea of a social contract that exists between the governing and the governed for the sake of collective security and benefit.⁹⁶ This social contract, Hobbes said, defines the duties of the governing and the rights of the governed.⁹⁷ The underlying premises of Hobbes' social contract are that individuals are rational, interested in maximizing the benefit for themselves, and will therefore, find it morally rational to enter into this social contract with the understanding that they stand to benefit more from collective cooperation and order than from narcissism and chaos.⁹⁸

More recently, 20th century Canadian-American philosopher David Gauthier derived Hobbes' theory of social contract into what Gauthier called the contractarian theory of morality, or contractarianism.⁹⁹ This theory "holds that persons are primarily self-interested, and that a rational assessment of the best strategy for attaining the maximization of their self-interest will lead them to act morally (where the moral norms are determined by the maximization of joint interest)."¹⁰⁰ Contractarianism is based on the premises that people are driven to act morally

⁹⁶ Tom Sorell, "Thomas Hobbes: English Philosopher," *Encyclopedia Britannica*, last updated March 29, 2018, <https://www.britannica.com/biography/Thomas-Hobbes>.

⁹⁷ The Editors of Encyclopedia Britannica, "Social Contract: Political Philosophy," *Encyclopedia Britannica*, accessed April 13, 2018, <https://www.britannica.com/topic/social-contract>.

⁹⁸ Encyclopedia Britannica, "Social Contract: Political Philosophy."

⁹⁹ "The Weaponization of Outer Space: Ethical and Legal Boundaries," *Center for Ethics and the Rule of Law*, University of Pennsylvania, conference attended by authors, April 5-7, 2018.

¹⁰⁰ Ann Cudd and Seena Eftekhari, "Contractarianism," *The Stanford Encyclopedia of Philosophy* (Summer 2018 Edition), Edward N. Zalta (ed.), accessed April 13, 2018, forthcoming URL <https://plato.stanford.edu/archives/sum2018/entries/contractarianism/>.

within this construct because 1) they are susceptible to others' nefarious actions, and 2) they understand they stand to benefit more via cooperation than they would if everyone acted in isolation.¹⁰¹

An argument can be made that the 1967 Outer Space Treaty has been a success from a contractarianism perspective. As of this writing, 91 countries have signed the treaty, including the U.S., China, and Russia,¹⁰² no known nuclear weapons or weapons of mass destruction reside in space, and there have been no kinetic conflicts in space or claims of ownership of the moon or other celestial bodies, as restricted by the treaty. On the other hand, there has been considerable debate about whether space-faring countries are following the intent of the treaty regarding its use strictly for peaceful purposes. For example, in 2007, even Japan, one of the last space-faring countries to prohibit the use of space for military purposes, updated its definition of peaceful purposes from "non-military" to "non-aggressive," meaning it could now use space for defensive military purposes.¹⁰³

There are, however, at least three inherent limitations of contractarianism that should be addressed. First, like most agreements, it is vulnerable to game theory dynamics whereby one party may find it advantageous to cheat the others. Second, contractarianism tends to be exclusionary in nature in that it only includes and applies to those who agree to the contract. This means that in addition to one party of the agreement acting as a spoiler, an outside party could be a spoiler as well. Third and finally, contractarianism relies on all parties to be rational thinkers who enter into and adhere to the contract because doing so is in their individual morally rational

¹⁰¹ Cudd and Eftekhari, "Contractarianism."

¹⁰² U.S. Department of State, "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies," accessed April 13, 2018, <https://www.state.gov/t/isn/5181.htm#signatory>.

¹⁰³ Manuel Manriquez, "Japan's Space Law Revision: the Next Step Toward Re-Militarization?" *Center for Nonproliferation Studies*, January 1, 2008, <http://www.nti.org/analysis/articles/japans-space-law-revision/>.

best interest. One of the difficulties caused by rationality underpinning this theory is that different cultures often have different ideas about the meaning of rational action. For example, in World War II, the U.S. considered Japanese kamikaze pilots to be irrational while Japan, with its samurai and bushido culture placing honor above almost everything else, considered these kamikaze pilots, or suicide dive-bombers, to be not only rational actors, but also heroes.

Despite these limitations, contractarianism could be a useful foundation for developing more modern space norms of behavior. An agreement of this sort would not likely immediately include all space-faring countries, but if the major space-faring countries took the lead to establish space norms of behavior, or a space code of conduct, smaller space-faring countries might be inclined to join. The result could be a more secure space environment, accessible to and in the best interest of all space-faring countries.

A MORAL DUTY TO MAINTAIN ASSYMETRIC ADVANTAGE IN SPACE?

General Hyten's prior referenced 2004 article, "Moral and Ethical Decisions Regarding Space Warfare,"¹⁰⁴ is based on three assumptions. The first assumption, that the U.S. has the "moral duty to furnish those it asks to go in harm's way with the tools that will increase their effectiveness and reduce their casualties,"¹⁰⁵ could be argued as contrary to Kantian tests for moral justification.¹⁰⁶ This assumption could also be challenged from a utilitarian perspective in that while the U.S. attempts to minimize the risk of those it sends into harm's way, it is potentially inadvertently increasing the threat to its population becoming subject to attack, which does not maximize the balance of good versus harm.¹⁰⁷ The second assumption, that since no

¹⁰⁴ Hyten, "Moral and Ethical," 51.

¹⁰⁵ Hyten, "Moral and Ethical," 54.

¹⁰⁶ Robert Johnson and Adam Cureton, "Kant's Moral Philosophy," *The Stanford Encyclopedia of Philosophy* (Spring 2018 Edition), Edward N. Zalta (ed.), <https://plato.stanford.edu/archives/spr2018/entries/kant-moral/>.

¹⁰⁷ Schultz, email.

other state depends on space as much as the U.S. does, it would be unfair for the U.S. to sign an updated agreement or treaty since it “would have to give up much more than the other signatories would have to surrender;”¹⁰⁸ would fail the fairness approach to ethics described previously. In fact, the fairness approach often requires a person or group to shoulder more of the burden to achieve an overall condition of fairness.¹⁰⁹

Additionally, the U.S. has the asymmetric reliance on space that it does because it was the first to have the technology and economic power to do so. Unless this technology and economic power were a direct result of moral underpinnings, simply being the first to dominate a physical environment that has been internationally agreed upon to be a commons for all mankind would not morally justify the U.S. to maintain this dominance.

The third assumption, that the “majority of threats to the United States come from nonrational or nonstate actors,”¹¹⁰ goes against former Chairman of the Joint Chiefs of Staff General Martin Dempsey’s advice not to trivialize other entities’ rationality, but instead to seek to understand, through Thucydides’ truism of fear, honor, and self-interest, why another entity is taking the approach it is.¹¹¹ Since General Hyten’s article was written in 2004, it is not clear precisely what potential adversaries he was describing as irrational actors, and undeniably, the geopolitical landscape has changed since then.

The countries and entities considered the primary threats to the U.S. today, known as the “four plus one,” are Russia, China, North Korea, Iran, and violent extremist organizations (VEOs). Russia seeks to regain its status as a major world power, feels threatened and betrayed

¹⁰⁸ Hyten, “Moral and Ethical,” 58.

¹⁰⁹ Duncan, interview.

¹¹⁰ Hyten, “Moral and Ethical,” 58.

¹¹¹ General Martin Dempsey, “Testimony,” House, The Department of Defense and the Fiscal Year 2013 Budget: Hearing on the Budget, 112th Cong., 2nd sess., 2012, 36, <https://www.gpo.gov/fdsys/pkg/CHRG-112hhrg72697/pdf/CHRG-112hhrg72697.pdf>.

by NATO's expansion in Eastern Europe, and is tired of being viewed internationally as an impotent military and economic state. China seeks to continue to recover from its Century of Humiliation, views itself as the Middle Kingdom, existing between earth and heaven,¹¹² and desires to be the dominant economic player in the world. North Korea has witnessed through others the benefits of becoming a nuclear state and desires to be seen as a powerful state capable of developing formidable technology. Iran seeks to become the regional hegemon in the Middle East and desires for the U.S. to leave the region. Lastly, while it would be impossible to lump the interests of all VEOs into one, Islamist terrorist groups predominantly seek to establish a caliphate to govern Muslims under the law of Islam,¹¹³ and desire for the U.S. to leave the Middle East. As broadly summarized here, a case can be made that each of the current U.S. threats has rational reasons for its actions when viewed from each one's perspective.

¹¹² Luke Kwong, "What's in a Name: Zhongguo (or 'Middle Kingdom') Reconsidered," *The Historical Journal* 58, no. 3 (2015), 793, <http://dx.doi.org.usnwc.idm.oclc.org/10.1017/S0018246X14000570>.

¹¹³ Asma Afsaruddin, "Caliphate: Islamic History," *Encyclopedia Britannica*, last updated March 30, 2018, <https://www.britannica.com/place/Caliphate>.

CHAPTER 4: CONCLUSIONS AND RECOMMENDATIONS

Determining the ethical ‘goodness’ of complicated real-world situations is no easy task, but it is a task national security representatives are morally obligated to relentlessly pursue. Oftentimes with ethics analyses, disagreements between informed debaters can be distilled down to differing opinions of underlying definitions such as what constitutes justice, rights, common good, and well-being. When there is a clear choice between right and wrong, good and evil, the decision is less about ethics and more about having the courage to do what is right, even when it may be difficult. A principled ethics analysis, however, can act as a guidepost during situations that seem to have no ‘good’ options.¹¹⁴

As the above analysis illustrates, determining whether U.S. space dominance is ethical largely depends on the lens applied, the underlying definitions used, the assumed consequences, the ability to evaluate the U.S. as one might evaluate an individual, etc. As a result, this analysis finds no clear answer one way or another. What does seem apparent, however, is U.S. national security space leaders should take prudent steps to ensure the U.S. is not inadvertently encouraging others to pursue aggressive space capabilities that could ultimately render space an unusable environment for everyone.

Furthermore, the U.S. pursuit of space dominance appears to stem mostly from fear and self-interest in terms of Thucydides’ model of fear, honor, and self-interest. A better approach might be to shift more closely to honor and self-interest. The U.S. could do so by pursuing a more balanced approach – combining prudence regarding military readiness with an equal amount of active, preventive diplomatic efforts regarding protecting the space environment for

¹¹⁴ Mike Riordan, “Ethics in the Military: A Multidisciplinary Approach,” (lecture, U.S. Naval War College Newport, RI, February 14, 2018).

U.S. use.¹¹⁵ The absence of that currently is evidenced through an examination of the supporting bureaucracy.

Proactive policymaking requires commitment, manpower, and funding. As of fiscal year 2013, by way of comparison, the same budget is allocated for all U.S. global space diplomacy efforts as for an in-house Pentagon think tank tasked to devise new counterspace capabilities. In terms of manpower, even before Trump Administration cuts in the State Department, the Arms Control, Verification and Compliance Bureau staff, responsible for all matters regarding nuclear, biological, and chemical weapons arms control, nonproliferation and disarmaments agreements – and the space portfolio – was fewer than 150 people.¹¹⁶ It seems apparent diplomacy is not receiving the support and funding likely required to achieve successful outcomes.

Many U.S. national security space experts have accurately stated there is no such thing as a war in space, there is only war, and war could include space.¹¹⁷ As General Hyten has correctly indicated, the U.S. has the most to lose¹¹⁸ if a war were to extend into space rendering it unusable. It then makes sense that, if others were to become as dependent on space as is the U.S., they would likewise be as concerned about maintaining space as a shared commons even if war were to erupt in the terrestrial environment.¹¹⁹ It is in the U.S. self-interest that space be available for everyone to use, rather than denied to all.¹²⁰ Cooperation with other countries also strategically “entangles” countries in ways that require them to move past disagreements.

¹¹⁵ Theresa Hitchens and Joan Johnson-Freese, “Toward a New National Security Space Strategy: Time for a Strategic Rebalancing,” *Atlantic Council Strategy Paper* no. 5, (Washington, DC: The Atlantic Council of the United States, June 2016), http://www.atlanticcouncil.org/images/publications/AC_StrategyPapers_No5_Space_WEB1.pdf.

¹¹⁶ Johnson-Freese, *Space Warfare*, 173.

¹¹⁷ General John Hyten et al., “National Security Space Strategy.”

¹¹⁸ Hyten, “Moral and Ethical,” 58.

¹¹⁹ Duncan, interview.

¹²⁰ Duncan, interview.

Continued U.S. and Russian cooperation on management and operations of the International Space Station serves as an example of this.

General Hyten and many other national security space leaders have stated they support the development of space norms of behavior.¹²¹ The U.S. should take an active leadership role in guiding the international community to making this a reality. Much like the mutually assured destruction of nuclear war, the effects of a major war including space would be difficult, if not impossible, to reverse. Finally, another reason it is important to establish space norms of behavior is because non-state entities, especially those known as NewSpace actors, such as SpaceX, Virgin Galactic, and others financed with private funding, continue to play an increasing role in space missions and space-related activities, and currently have very little to follow in terms of norms or rules. This poses a problem for those who wish to maintain space as a sustainable environment since, for example, at current time, there are no international norms regarding the disposition of upper stage boosters that become space debris.¹²² The International Civil Aviation Organization¹²³ and the United Nations Convention on the Law of the Sea¹²⁴ are used in the air and sea domains, respectively, and could serve as starting points for developing space norms of behavior. As more non-state entities seek to explore and benefit from space, such as through space tourism, it will become increasingly important for them to have an international rulebook to follow.

Finally, the U.S. should focus on its strategic communication style to ensure it is not, through unintended consequences, creating rather than solving problems. Certainly, part of any

¹²¹ General John Hyten et al., “National Security Space Strategy.”

¹²² Maj Gen Roger Teague, USAF (Ret) (former Director of Space Programs, Office of the Assistant Secretary of the Air Force for Acquisition), interview by the author, September 13, 2017.

¹²³ Tim Schultz, email.

¹²⁴ “United Nations Convention on the Law of the Sea,” (General Assembly resolution 2749 (XXV))—opened for signature on December 10, 1982, entered into force on November 16, 1994, http://www.un.org/depts/los/convention_agreements/convention_overview_convention.htm.

successful deterrence strategy involves ensuring potential adversaries understand one's capabilities, but "a constant drum beat of pugilistic language from the United States that centers on 'domination' and 'control'—likely intended to show strength and resolve—smacks of the kind of hubris that the public opinion polls...have shown work against the United States rather than in its favor."¹²⁵ In sum, it is time for the U.S. to internalize the words of Roman emperor Marcus Aurelius and "No longer talk at all about the kind of man that a good man ought to be, but be such."¹²⁶

¹²⁵ Johnson-Freese, *Space Warfare*, 182.

¹²⁶ Marcus Aurelius, *The Meditations of the Emperor Marcus Aurelius Antoninus*, trans. George Long (New York, NY: John W. Lovell Company), 254.

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