

# SPACE & DEFENSE

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International Space Negotiations, Emerging Space Powers, and U.S. Efforts to Protect the Military Use of Space

Justin Anderson, Walt Conrad, and Sarah Jacobs Gamberini

International Commercial Avenues to Complement Deterrence Actions

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Special Report: Space Verification

Eisenhower Center for Space and Defense Studies

Publisher's Corner: "Don't Call It Cyberspace"

Ambassador Roger G. Harrison

EISENHOWER CENTER  
FOR SPACE AND DEFENSE STUDIES



# **Space & Defense**

## **Journal of the United States Air Force Academy Eisenhower Center for Space and Defense Studies**

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## Editor's Note

Volume 7 of *Space & Defense* marks a broadening of our editorial interest. We still aspire to be the premier journal for innovative ideas about military, civil, or commercial space that compel us to rethink defense of the nation. Research in this rapidly evolving policy area celebrates the Air Force's vital contributions to space studies dating back to the service's inception sixty-six years ago. Yet, our heritage at the Eisenhower Center for Space and Defense Studies, U.S. Air Force Academy touches a wider range of concerns. It was, after all, USAFA's Department of Political Science, the parent department of this Center, which in 1965 first conceived and published a graduate level textbook on American Defense Policy (ADP).

President Eisenhower, from whom the Center takes much inspiration, was a founding father of both the Air Force Academy and the U.S. Space Program. A most interesting aspect of his rich legacy as Commander-in-Chief, including his famous Farewell Address, was his clarion call for the nation to think through its defense in a transformed world. The appeal of Soviet ideology in recovering Europe and post-colonial states, combined with the advent of nuclear fusion bombs and ballistic missiles, changed dramatically the old calculus of national security. Eisenhower's administration picked up a wartime cue laid down by the former Office of Scientific Research and Development under President Roosevelt and reached out before the next hot war, sponsoring research at influential 1950s think tanks like RAND and at leading universities—not only for technology development but new knowledge in the social sciences, including economics and politics.

Certainly, professors and researchers could not simply deliver all the right policy

solutions to end the Cold War, but the intellectual effort, particularly during the late-1950s and early-1960s, transformed both the discipline of Political Science and the practice of policy making in positive ways, which in turn helped America meet novel defense challenges. The inkling that we may be entering another transformative period marked by globalized economic structures and security threats—this time with American values faltering abroad, despite, or perhaps in part because of, the lack of a recognizable superpower rival—prompted us several years ago to create the Center and launch this research journal on *Space & Defense*.

Of course, our home military service and our main patron, the U.S. Air Force, remains intensely interested in the future of space. We suspect that welcoming researchers from academia, government, and industry who share this interest and would take it as a novel vantage point from which to pursue broader questions of national defense in a world transformed—questions upending the old security calculus—will before long advance our original discussion on space.

Twenty-first century domains such as space, cyber, and violent non-state networks remain distinct from one another, but the logics of dealing with them are connected in subtle ways, which we believe will become more intriguing and useful as we explore. For example, because globalization shapes today's security priorities, several contemporary national defense concerns force us to consider tensions between transnational cooperation and inter-state competition; among civil, commercial, and military activities; and between traditional versus bounded or pooled sovereignty. We note how certain Cold War concepts such as deterrence frequently appear in these pages as they apply

to space; elsewhere deterrence has come up for cyber and again for terrorism. All these burgeoning literatures benefit from intellectual bedrock created during the Eisenhower era, but they have not, as yet, learned much from one another. This is where our journal can make a difference, cultivating some articles without space in the title that nevertheless help us think about new domains for strategic competition or security cooperation and, by the same token, articles with space in the title that urge us to contemplate arenas beyond space where defense policy makers face political, economic, organizational, and technological dilemmas in the new world opening before them.

This issue of *Space & Defense*, the first with our new editorial direction in mind, offers three peer-reviewed features, along with a special report from the Eisenhower Center and another installment of Publisher's Corner. In the lead article, SAIC (Science Applications International Corporation) analysts Justin Anderson, Walt Conrad, and Sarah Jacobs Gamberini respond to the globalization *Zeitgeist* in current space policy. They follow their previously published article on proposals from China, Russia, and Europe to prohibit weaponization of space with a fresh evaluation of arms control prospects involving emerging space powers, emphasizing potential contributions from India, Brazil, and South Africa. Jonty Kasku-Jackson of the National Security Space Institute in Colorado Springs widens the arc of cooperation from multilateral agreements to transnational legal codes. She explores the value of international liability law, presently observed by civil and commercial satellite operators, for supplementing national deterrence policies against attacks on space assets, including military satellites. Our final feature, from Adam Lowther of the Air Force Research Institute and Casey Lucius of the

Naval War College, serves as a point of departure, a marker for the limits on cooperation in space once the United States has settled, concretely and explicitly, upon its vital interests. This issue concludes with two products from the Eisenhower Center. The first is a special report, which was commissioned last year by the Office of the Secretary of Defense (OSD) in order to help the Department think through future policy dilemmas of *Space Verification*. The last item is our eagerly anticipated "Publisher's Corner." Former diplomat and founding director of the Eisenhower Center, Ambassador Roger Harrison, reflects on why discourse—specifically, how the policy machinery chooses to *name* a new national security domain such as "cyberspace"—matters so much when allies and adversaries alike sense the world transforming under their watch.

Damon Coletta  
Schuyler (Sky) Foerster  
USAFA, January 2014

## International Space Negotiations, Emerging Space Powers, and U.S. Efforts to Protect the Military Use of Space

Justin Anderson, Ph.D., Walt Conrad, Ph.D., and Ms. Sarah Jacobs Gamberini

In recent years strategists and diplomats from space faring nations have engaged in debates with their foreign counterparts (and in some cases, with each other) on a range of issues related to norms and laws – or the relative lack thereof – applicable to the military use of space.<sup>1</sup> Questions have run the gamut from the very broad (should the slim volume of outer space law relevant to military platforms and operations be expanded?) to the very specific (what new technical tools are available for the verification regime of a notional future space arms control agreement?).

As a major space power and a country that relies on the safe and secure use of space for a broad range of vital military functions both on the ground and across the “high frontier,” the process and outcome of these debates are critically important to the United States. In the post-Cold War era, U.S. policymakers and space experts have differed over what role the United States should play within these deliberations. Should it take the lead in proposing new measures? Or should it generally oppose any changes or additions, viewing them as possible constraints? The Obama administration has strongly supported the former, contending that U.S. leadership is vital to developing multilateral agreements and arrangements designed to mitigate an increasingly “congested, contested, and competitive” (often referred to as the “3 C’s”) space environment.<sup>2</sup>

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<sup>1</sup> All three authors are employees at Science Applications International Corporation (SAIC). The views in this article are those of the authors and do not reflect the views of SAIC or any of its U.S. Government clients.

<sup>2</sup> In March 2012 testimony before Congress, Ambassador Greg Schulte, Deputy Assistant Secretary of Defense for Space Policy, noted “We are taking a leading role in international efforts to promote responsible, peaceful, and safe use of space .... A more cooperative, predictable environment enhances U.S. national security and discourages destabilizing crisis behavior. We are supporting development of data

The administration has also articulated a clear litmus test for U.S. approval of any international proposal addressing the state use of space, to include draft space security or arms control agreements – they must be “equitable, effectively verifiable, and enhance the national security of the United States and its allies.”<sup>3</sup>

During 2013 a number of proposals intended to address the challenge posed by the 3 C’s, and suggesting various transparency measures or other mechanisms relevant to the military use of space, came up for discussion between major space powers or debate within international forums. These include a draft International Code of Conduct currently under development by the European Union (EU), United States, and other states and a number of recommendations issued within the July 2013 final report by the UN Group of Governmental Experts (GGE) on Transparency and Confidence Building Measures in Outer Space.<sup>4</sup>

As a major space faring nation and leading military space power, U.S. support for these and other initiatives proposing norms, rules, or laws relevant to the military use of space will play a significant role within the decision-making processes of other space actors weighing a decision to endorse or oppose these measures. At the same time, however, the support of the United States and its allies alone cannot necessarily

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standards, best practices, transparency and confidence-building measures, and norms of behavior for responsible space operations[.]” House Armed Services Committee, Ambassador Greg Schulte, Deputy Assistant Secretary of Defense for Space Policy, Statement, March 8, 2012: 5.

<sup>3</sup> White House, *National Space Policy of the United States of America*, June 28, 2010: 7.

<sup>4</sup> United Nations General Assembly, Report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities (A/68/189), July 29, 2013.

guarantee the success of any proposed multilateral space initiative or agreement. Emerging space powers are increasingly making their voices heard on space issues, and represent important potential partners in future coalitions assembled to counter the 3 C's. The 15-member GGE, for example, includes representatives from states such as Brazil, South Africa, Chile, Romania, and Nigeria.

In the sections below, we consider the space programs, objectives, and views on international space law, military use of space, and space arms control held by three emerging space powers: India, Brazil, and South Africa. They represent three different points on the spectrum of emerging space powers, to include a state aspiring to join the first rank of space powers (India), a state with an ambitious space agenda balancing domestic programs and significant bilateral assistance from a major space power (Brazil), and a state that has chosen to focus its relatively limited resources on key niche capabilities (South Africa). The varying space policies, capabilities, and ambitions of these three states provide a good sample of the diverse programs and perspectives on space found across the population of emerging space powers.<sup>5</sup> The views of these states, and other space-faring nations outside of the traditional space powers, are increasingly important to international debates on outer space, and their support – or lack thereof – for future U.S. or international proposals on the use of space may make or break multilateral efforts to address the 3 C's and other key issues related to the military use of space.

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<sup>5</sup> Emerging space powers are defined here as space-faring nations outside of the major space powers (United States, Russian Federation, China, and the European Union). Different data sets provide varying answers regarding the current number of space-faring nations, reflecting a lack of consensus on the definition of a “space-faring” state. The number of states participating in UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS), however, provides a good indicator of the number of states claiming space equities. At present, UNCOPUOS has 74 members.

## INDIA

### *Civilian and Military Space Programs*

India is an increasingly important geopolitical player that is determined to attain recognition as a great power. Past and present Indian government leaders, while varying in their politics, have unanimously agreed that advancements in science and technology are critical to the future development and security of their state. The country established a Department of Space in 1972 and has long linked its national space program with the realization of broader national goals; its stated determination to achieve “self-reliance in Space Technology,” for example, is an ambition with important implications for the country's future economic and defense planning.<sup>6</sup>

Eager to explore space, capture a share of the growing international space market, and project power across and beyond South Asia – and wary of the economic growth and military space developments of China – India is devoting significant resources to civilian and military space projects. The country currently has one of the world's largest space budgets (by one estimate, the sixth largest in 2010-11).<sup>7</sup> The Department of Space's research arm, for example, announced a 67 billion rupee (US \$1.3 billion) budget for the 2012-13 fiscal year.<sup>8</sup>

Within the current community of space-faring nations, India is one of the few states outside of the major space powers to develop its own launch vehicle. Its Polar Satellite Launch Vehicle (PSLV), first launched in 1993, is the country's

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<sup>6</sup> Government of India, Department of Space, *Outcome Budget 2011-2012*, n.d.: 1.

<sup>7</sup> Ajey Lele, *Asian Space Race: Rhetoric or Reality?* (New Delhi: Springer India, 2013): 60; Deloitte, *Overview of Indian Space Sector 2010*, n.d.: 6. [http://www.deloitte.com.br/publicacoes/2007/A&D\\_Overview\\_Indian\\_Space\\_Sector2010.pdf](http://www.deloitte.com.br/publicacoes/2007/A&D_Overview_Indian_Space_Sector2010.pdf) (accessed April 24, 2013).

<sup>8</sup> The Roscosmos budget for 2013, as a comparison, is \$5.6 billion USD. “India Steps Up Space Program with Big Budget, Bigger Satellites and a Leap to Mars,” *RT.com*, September 30, 2012, <http://rt.com/news/india-space-satellite-budget-331/> (accessed April 24, 2013).

major space launch platform and has enjoyed a string of 18 successful launches since its last failure.<sup>9</sup> With an official payload capacity allowing it to place “1,600 kg satellites in 620 km sun-synchronous polar orbit and 1,050 kg satellite in geo-synchronous transfer orbit,” it has carried both Indian and foreign satellites into space.<sup>10</sup>

The country has also developed a Geosynchronous Satellite Launch Vehicle (GSLV) capable of launching larger payloads (up to 2.5 tons) into geosynchronous orbit. This platform, however, has a mixed record. The Indian Space Research Organisation (ISRO) lists five successes and three failures from the GSLV’s eight launches; expert commentators view the number of full or partial failures as higher.<sup>11</sup> India is also developing a larger GSLV Mark III designed to place 4-ton payloads into space.<sup>12</sup>

In addition, India is devoting significant resources to space exploration programs. The country launched a robotic Mars probe (15 kg payload) in November 2013 that is scheduled to reach the planet in late 2014.<sup>13</sup> The Indian Air Force has

<sup>9</sup> Stephen Clark, “India Launches Surveillance Satellite in ‘Grand Success,’” *Space.com*, April 26, 2012, <http://www.space.com/15440-india-rocket-launch-surveillance-satellite.html> (accessed April 24, 2013).

<sup>10</sup> Government of India, Department of Space, “Launch Vehicles,” n.d. <http://dos.gov.in/launchvehicles.aspx> (accessed April 24, 2013); William Graham, “Indian PSLV Successfully Lofts Multiple Satellites,” *NASASpaceflight.com*, February 25, 2013, <http://www.nasaspaceflight.com/2013/02/pslv-launch-multi-sats/> (accessed April 24, 2013).

<sup>11</sup> Lt Col James Mackey, USAF, “Recent US and Chinese Antisatellite Activities,” *Air and Space Power Journal* (Fall 2009), <http://www.airpower.au.af.mil/airchronicles/apj/apj09/fal09/mackey.html> (accessed April 24, 2013); Indian Space Research Organisation, “GSLV,” n.d. <http://www.isro.org/Launchvehicles/GSLV/gslv.aspx> (accessed April 24, 2013); Graham, “Indian PSLV.”

<sup>12</sup> Indian Space Research Organisation, “GSLV Mark III,” n.d. <http://www.isro.org/Launchvehicles/GSLVMARKIII/mark3.aspx> (accessed April 23, 2013).

<sup>13</sup> PTI, “Budget 2012: ISRO Gets Rs 125 cr for Mars Mission, Eyes Nov 2013 Launch,” March 16, 2012, [http://www.dnaindia.com/scitech/report\\_budget-2012-isro-gets-rs125-cr-for-mars-mission-eyes-nov-2013-launch\\_1663315](http://www.dnaindia.com/scitech/report_budget-2012-isro-gets-rs125-cr-for-mars-mission-eyes-nov-2013-launch_1663315) (accessed April 23, 2012); Snuderarajan P., “India to Launch Mars Mission Next

also started recruiting candidates from its ranks for future manned space flights.<sup>14</sup> Furthermore, India is determined to compete with major players in the increasingly lucrative commercial space launch market and has successfully launched twenty-nine commercial satellites into outer space.<sup>15</sup>

India has also devoted significant resources to developing remote-sensing satellites designed to address pressing national needs, such as close monitoring of factors affecting crop yields and providing a range of data assisting disaster management response.<sup>16</sup> The ISRO proudly touts its current constellation of eleven satellites as the largest of its kind in the world.<sup>17</sup> While the bulk

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Year,” *The Hindu*, March 16, 2012, <http://www.thehindu.com/sci-tech/technology/article3003109.ece> (accessed April 23, 2013).

<sup>14</sup> “IAF Developing Parameters for India’s Manned Space Mission,” *The Economic Times*, December 28, 2012,

[http://articles.economictimes.indiatimes.com/2012-12-28/news/36036517\\_1\\_manned-mission-selection-process-iaf](http://articles.economictimes.indiatimes.com/2012-12-28/news/36036517_1_manned-mission-selection-process-iaf) (accessed May 2, 2013).

<sup>15</sup> India launched its first commercial satellite (the Italian AGILE satellite) in 2007. Frank O’Donnell, “India’s Space Ascent Gains New Boost,” *Geopolitical Monitor*, May 11, 2011,

<http://www.geopoliticalmonitor.com/indias-space-ascent-gains-new-boost-4363> (accessed April 23, 2013) and Radhakrishna Rao, “The Indian Space Programme in 2012: A Review,” IDSA Comment, Institute for Defence Studies and Analysis, January 2, 2013, [http://www.idsa.in/idsacomments/TheIndianSpaceProgrammein2012\\_rrao\\_020113](http://www.idsa.in/idsacomments/TheIndianSpaceProgrammein2012_rrao_020113) (accessed April 23, 2012). See also the promotional brochure produced by the ISRO for the PSLV: Indian Space Research Organization, “PSLV-C21: 100<sup>th</sup> Indian Space Mission” (Bangalore, n.d.), <http://www.isro.org/pslv-c21/pdf/pslv-c21-brochure.pdf> (accessed April 23, 2013).

<sup>16</sup> For a detailed official Indian government briefing on the system, see Deviprasad Karnik, “Indian Remote Sensing Satellites,” presentation, Civil Commercial Imagery Evaluation Workshop, Fairfax, Virginia, March 17, 2010,

[http://calval.cr.usgs.gov/JACIE\\_files/JACIE10/Presentations/WedAM/Karnik\\_Deviprasad\\_JACIE2010FINAL.pdf](http://calval.cr.usgs.gov/JACIE_files/JACIE10/Presentations/WedAM/Karnik_Deviprasad_JACIE2010FINAL.pdf).

<sup>17</sup> ISRO, “Earth Observation Satellites,” n.d., <http://www.isro.org/satellites/earthobservationsatellites>

of India's space remote sensing resources are devoted to civilian uses, the 1998 Kargil conflict - fought to reclaim positions in high mountain areas covertly occupied by Pakistani troops -- led India's military to request improved space surveillance capabilities. The ISRO subsequently developed low-earth orbit satellites expressly designed for military use, to include imagery data on Pakistan's military forces and movements (with a focus on its ballistic missile arsenal).<sup>18</sup>

India's civilian space programs reflect its determination to establish itself as a first-order space power that can match the space launch, space exploration, and manned and unmanned programs (both legacy and under development) of the United States, EU, Russia, and China. While India faces a number of challenges in advancing major programs (such as the GSLV), and its use of major fiscal, scientific, and technical resources on space programs has faced a number of domestic and international critics, it is a leading member of the emerging space powers.<sup>19</sup>

India has also started to consider whether to compete with major space powers by developing a military space program. China's successful 2007 test of a ground-based anti-satellite (ASAT) weapon prompted Indian military leaders to call for the country's armed forces to develop both space officers and a range of space capabilities. At present, the military has a "small Integrated Space Cell" that may form the nucleus of a future "Indian Military Space Command," possibly reflecting a degree of wariness by Indian political leaders – and opposition from its well-established

civilian space program – to standing up a major, new, military space entity.<sup>20</sup>

The country has made significant progress, however, in regard to space systems with either military or dual civil-military applications. India has successfully developed and launched RISAT-1, an earth imaging satellite with monitoring capabilities that serve both civilian and national defense needs.<sup>21</sup> The country is also planning to build its own national equivalent to the Global Positioning System (GPS) satellite constellation, recognizing the importance of these dual-use systems to the U.S. military and reluctant to rely on a foreign power for an important defense capability.<sup>22</sup>

The most important military space development catalyzed by the 2007 Chinese ASAT test, however, was the decision by India's Defense Research Development Organisation (DRDO) to state that it was prepared to rapidly construct and deploy, if needed, an ASAT to match Beijing's. V.K. Saraswat, head of DRDO, has repeatedly stated that India already possesses the "building blocks" of an ASAT system due to earlier or ongoing work on rocket, missile guidance, and missile defense systems developed for other national security programs.<sup>23</sup>

Indian government officials and non-government analysts discussing the need for an indigenous ASAT program cite the development of ASAT systems by Russia, the United States, and China as key factors driving New Delhi's pursuit of this type of capability.<sup>24</sup> Former Indian Air Force

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.aspx (accessed November 27, 2013).  
[http://calval.cr.usgs.gov/JACIE\\_files/JACIE10/Presentations/WedAM/Karnik\\_Deviprasad\\_JACIE2010FINA\\_L.pdf](http://calval.cr.usgs.gov/JACIE_files/JACIE10/Presentations/WedAM/Karnik_Deviprasad_JACIE2010FINA_L.pdf) (accessed November 27, 2013).

<sup>18</sup> Gautum Sen, ed. *Conceptualizing Security for India in the 21<sup>st</sup> Century* (Atlantic: New Delhi, 2007): 146.

<sup>19</sup> Palash Ghosh, "Red Planet Blues: India to Launch Mars Space Mission but some Question Priorities," *International Business Times*, February 22, 2013, <http://www.ibtimes.com/red-planet-blues-india-launch-mars-space-mission-october-some-question-priorities-1101142#> (accessed May 2, 2013).

<sup>20</sup> Craig Covault, "India Races China in Space for Asian Prestige, Military Security," *Spaceref.com*, December 13, 2012, <http://spaceref.com/asia/india-races-china-in-space-for-asian-prestige-military-security.html> (accessed April 23, 2013).

<sup>21</sup> Rao, "The Indian Space Programme in 2012."

<sup>22</sup> Ibid.

<sup>23</sup> T.S. Subramanian and Y. Mallikarjun, "Capability to Neutralise Enemy Satellites Proved," *The Hindu*, March 7, 2011, <http://www.thehindu.com/news/national/capability-to-neutralise-enemy-satellites-proved/article1515159.ece> (accessed April 23, 2013).

<sup>24</sup> Both Russia and the United States, however, retired their ASAT programs before the end of the Cold War. Victoria Samson, "India and Space Security," *The*

Chief P.V. Naik stated in a January 2010 address that India's increasing reliance on satellites made these assets potential targets in future conflicts. Without expressly mentioning China, Naik stated, "Our satellites are vulnerable to ASAT weapon systems because our neighborhood possesses one," and advocated the development of Indian ASAT capabilities.<sup>25</sup> Naik and other Indian strategic thinkers, recognizing the inherent difficulty of developing means to shield fragile satellites from attacks, argue that an offensive ASAT weapon offers the best deterrent – and only defense – for the country's civilian and military assets in outer space. Saraswat, for example, has stated that India remains firmly committed to a policy of not threatening to "attack anyone in space," but given the threat of foreign ASAT programs, "we have all the technology elements required to integrate a system through which we can defend our satellites or take care of future requirements."<sup>26</sup>

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*Space Review*, May 9, 2011, <http://www.thespacereview.com/article/1838/1> (accessed April 23, 2013); Bharath Gopalaswamy and Gaurav Kampani, "Piggybacking Anti-Satellite Technologies on Missile Defense," *Carnegie Proliferation Analysis*, April 19, 2011, <http://carnegieendowment.org/2011/04/19/piggybacking-anti-satellite-technologies-on-ballistic-missile-defense-india-s-hedge-and-demonstrate-approach/316#3> (accessed April 23, 2013); A. Adityanjee, "Pining for PAROS or Parity?," *C3S Paper* # 111, <http://www.c3sindia.org/us/193> (accessed April 23, 2013).

<sup>25</sup> Bhargavi Kerur, "Air Chief Marshal PV Naik wants Missiles to Destroy Enemy Satellites," January 23, 2010, *DNAIndia*, [http://www.dnaindia.com/bangalore/report\\_ir-chief-marshall-pv-naik-wants-missiles-to-destroy-enemy-satellites\\_1338174](http://www.dnaindia.com/bangalore/report_ir-chief-marshall-pv-naik-wants-missiles-to-destroy-enemy-satellites_1338174) (accessed April 23, 2013).

<sup>26</sup> Indrani Bagchi, "India Working on Tech to Defend Satellites," *Times of India*, March 6, 2011, [http://articles.timesofindia.indiatimes.com/2011-03-06/india/28659986\\_1\\_missile-defence-asat-test-space-systems](http://articles.timesofindia.indiatimes.com/2011-03-06/india/28659986_1_missile-defence-asat-test-space-systems) (accessed April 23, 2013); "India has Technology to Defend Satellites," *The Economic Times*, February 11, 2011, [http://articles.economictimes.indiatimes.com/2011-02-11/news/28540512\\_1\\_cruise-missile-agni-v-satellites](http://articles.economictimes.indiatimes.com/2011-02-11/news/28540512_1_cruise-missile-agni-v-satellites); Siddharth Srivastava, "India Hones its Missile Shield," *Asia Times*, April 16, 2011, [http://www.atimes.com/atimes/South\\_Asia/MD16Df01.html](http://www.atimes.com/atimes/South_Asia/MD16Df01.html) (accessed April 23, 2013).

There is limited public information available, however, about the technical specifications of an Indian ASAT system or the strategy or operations concepts that would guide its use. Saraswat has described Indian research and development of an ASAT system as embedded within broader efforts to design, test, and field a range of ballistic missile defense systems. In April 2012, Saraswat described an Indian ASAT's "kill vehicle" as travelling aboard an Agni-V ballistic missile and using "advanced seekers ... to home in to the target satellite."<sup>27</sup> These details indicate the DRDO is opting for a ground-based, rather than a space-based, ASAT. India likely views a ground-based offensive weapon as providing a means to respond to potential attacks on its satellites without "weaponizing" outer space. Saraswat, for example, has explained that India is not planning to develop "offensive space capabilities."<sup>28</sup> The DRDO has also stated it has no future plans to test an Indian ASAT in space and will rely on a series of ground-based tests and simulations to test system components.<sup>29</sup>

In the absence of testing, and with the DRDO implying it would construct an ASAT using technology and systems designed for other purposes, skeptics have suggested India may have underestimated the difficulty of constructing and employing an anti-satellite kill vehicle.<sup>30</sup> Nevertheless, India's stated interest in an ASAT reflects its interest in catching up with the sophisticated military space capabilities fielded by

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<sup>27</sup> "India Developing Anti-Satellite Weapons," *UPI*, April 23, 2012, <http://www.upiasia.dev.upi.com/Top-News/2012/04/23/India-developing-anti-satellite-weapons/UPI-87941335189998/> (accessed April 23, 2013); Rajat Pandit, "After Agni V Launch, DRDO's New Target is Anti-Satellite Weapons," April 21, 2012, <http://economictimes.indiatimes.com/news/politics/nation/after-agni-v-launch-drdo-s-new-target-is-anti-satellite-weapons/articleshow/12772355.cms> (accessed April 23, 2012).

<sup>28</sup> "India Developing Anti-Satellite Weapons," *UPI*.

<sup>29</sup> Rajat Pandit, "N-Tipped Agni Can Hit all of China, Pak," *Times of India*, February 11, 2010.

<sup>30</sup> Michael Listner, "India's ABM Test: A Validated ASAT Capability or a Paper Tiger?" *The Space Review*, March 28, 2011, <http://www.thespacereview.com/article/1807/1> (accessed April 23, 2011).

major powers. India may soon conclude that a military space program – to include a command structure, specially trained personnel, and purpose-built capabilities – is both an additional requirement of membership within the top tier of space powers and necessary to protect and deter attacks on valuable satellites in an increasingly hostile space environment.

### ***Views on Proposed Space Agreements, Military Use of Space, and Space Arms Control***

Within international negotiating forums, Indian officials stress the importance of ensuring outer space remains free and open to all states<sup>31</sup> and emphasize the vital role that current international treaties and international law (including the 1967 Outer Space Treaty (OST)) play in safeguarding space as a global commons.<sup>32</sup> Speaking to the UN Conference on Disarmament (CD) in May and June 2012, Indian Ambassador Sujata Mehta called on the international community to take steps to protect the sovereign right of all states to access outer space.<sup>33</sup> She also stated that India opposes the “weaponisation” of

space. Ambassador Mehta suggested that ensuring space remains a peaceful environment will require space-faring nations to negotiate a legally binding treaty addressing state use of outer space. This process, however, could be “complemented” by the negotiation and implementation of a series of politically binding transparency and confidence-building measures (TCBMs).

India is against the weaponization of space ... it is essential to preserve and promote the benefits flowing from advances in space technology [by preserving free access to space]. This would require a step-by-step approach wherein legal measures are complemented with TCBMs that are non-discriminatory and evolved through an inclusive process with the participation of all space faring nations.<sup>34</sup>

Indian diplomats and space officials also express concerns regarding the increasing amount of debris in outer space. While stating that international cooperation is necessary to address the problem, they also assert that states most responsible for generating space debris should take the lion’s share of the responsibility for cleaning it up.<sup>35</sup>

Within UN bodies, India has provided general support to measures opposing the “weaponization” of space, regularly voting in favor of “Prevention of an Arms Race in Outer Space” (PAROS) resolutions in the General Assembly.<sup>36</sup> It has also stated that it supports “consideration” of these resolutions within the CD. It has stopped short,

<sup>31</sup> “We believe that it is essential to preserve and promote the benefits flowing from advances in space technology by ensuring access to and use of space.” Ambassador Sujata Mehta, Permanent Representative of India to the Conference on Disarmament, UN Conference on Disarmament Plenary statement, May 15, 2012, [http://www.unog.ch/80256EDD006B8954/\(httpAssets\)/6543A9D189C14E93C12579FF0035EF29/\\$file/1257\\_India.pdf](http://www.unog.ch/80256EDD006B8954/(httpAssets)/6543A9D189C14E93C12579FF0035EF29/$file/1257_India.pdf) (accessed April 22, 2013).

<sup>32</sup> “We support the development and continuous evolution of law for the peaceful use and exploration of outer space so as to ensure benefits to all countries. We are of the view that the sovereign right of every country to have access to space and opportunity to utilize space for developmental programmes should be well respected.” R.G. Nadadur, statement, UN COPOUS Legal Subcommittee 768<sup>th</sup> Meeting, April 1, 2008, COPOUS/LEGAL/T.768: 3.

<sup>33</sup> Permanent Mission of India to the Conference on Disarmament, Ambassador Sujata Mehta, Statements, UN CD Plenary, May 15, 2012 and June 5, 2012, [http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/cd/2012/statements/part2/15May\\_India.pdf](http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/cd/2012/statements/part2/15May_India.pdf) and <http://meaindia.nic.in/pmcd.geneva/?50031169> (accessed April 23, 2013).

<sup>34</sup> Ambassador Sujata Mehta, UN CD Plenary statement, May 15, 2012.

<sup>35</sup> “Rogue Activity Can Cause Major Space Debris Problems in Future: Expert,” *The Hindu*, August 7, 2011; R.G. Nadadur, UN COPOUS statement.

<sup>36</sup> For many years, PAROS resolutions were regularly passed in the UN General Assembly, often with only a handful of opposing votes (significantly, however, the United States never supported these resolutions and either voted against PAROS or abstained). However, recent discussions in the General Assembly and other UN bodies on preventing the “weaponization” of outer space have shifted attention to the Russian-Chinese PPWT or other proposals.

however, of endorsing the Russian-Chinese Treaty on Prevention of the Placement of Weapons in Outer Space (PPWT) draft accord, which these two countries view as rooted within the PAROS resolutions.<sup>37</sup> In addition, the Indian government has not taken an official position for or against the International Code of Conduct for Outer Space Activities (ICoC), the multilateral successor to earlier attempts by the European Union to develop a space Code of Conduct. In a March 2013 statement to the CD, India said it was working with the EU and other parties on new space TCBMs, while also reiterating its view that states should negotiate a new, legally binding treaty to address concerns about the possible future placement of weapons in space.<sup>38</sup>

A number of Indian press and think-tank reports in 2011, however, stated that New Delhi was unhappy with its lack of engagement in the EU CoC drafting process and objected to several key tenets of the proposed code.<sup>39</sup> For example, in a series of articles in foreign publications (including *Strategic Studies Quarterly*) and presentations to international audiences in 2012, Rajeswari Pillai Rajagopalan, Ph.D., of the Observer Research Foundation, a New Delhi think-tank, argued the EU fundamentally erred in failing to directly involve India and other non-European states in developing the text of the draft Code of

Conduct.<sup>40</sup> In her assessment, the document broadly failed to address the concerns of India, other emerging space powers in Asia, or developing states struggling to gain access to space. She also criticized the draft code's lack of enforcement mechanisms and argued that its request that states share information on national space policies and space defense strategies was wholly unrealistic – noting, for example, that this latter provision was flatly rejected by China.<sup>41</sup>

Other Indian commentators agreed with Rajagopalan, stating the EU should have consulted India in drafting the Code of Conduct and accusing the organization of taking a Western-centric approach to outer space that, if implemented, would restrict the ability of India and developing states to use space.<sup>42</sup> However, with the Code representing a voluntary, politically-binding agreement, these criticisms likely reflected a general concern that major space powers might overlook (or deliberately ignore) India's views on space rather than specific objections to provisions in its text. In response to these and other critiques that it did not include enough states in its earlier dialogues on the EU

<sup>37</sup> Ambassador Sujata Mehta, UN CD Plenary statement, June 5, 2012.

<sup>38</sup> United Nations Office at Geneva, "Conference on Disarmament Discusses Prevention of an Arms Race in Outer Space," press release, March 19, 2013, [http://www.unog.ch/unog/website/news\\_media.nsf/\(httpNewsByYear\\_en\)/F7710AF326D7979CC1257B3300500C9D?OpenDocument](http://www.unog.ch/unog/website/news_media.nsf/(httpNewsByYear_en)/F7710AF326D7979CC1257B3300500C9D?OpenDocument) (accessed April 23, 2012).

<sup>39</sup> Micah Zenko, Council on Foreign Relations, *CFR Policy Innovation Memorandum* #10, November 2011; Rajeswari Pillai Rajagopalan, "Debate on a Space Code of Conduct: An Indian Perspective," Briefing to Space Security Conference 2012, [http://www.unidir.ch/files/conferences/pdfs/11\\_raji\\_os\\_12\\_29-30mar12.pdf](http://www.unidir.ch/files/conferences/pdfs/11_raji_os_12_29-30mar12.pdf) (accessed April 23, 2013); Bharath Gopalswamy and Gaurav Kampani, "Governing Space: Rule Makers, Rule Takers and Spoilers," *Spacenews*, December 14, 2011, <http://www.spacenews.com/article/governing-space-rule-makers-rule-takers-and-spoilers#.UXnYq44gKQI> (accessed April 23, 2013); Victoria Samson, "India and Space Security."

<sup>40</sup> "Code of Conduct on Space: Why India Should Lead the Way," Observer Research Foundation Report, May 31, 2011,

<http://www.observerindia.com/cms/sites/orfonline/modules/report/ReportDetail.html?cmaid=23591&mmacmaid=23592> (accessed April 23, 2013) and Rajeswari Pillai Rajagopalan, *Spacenews*, January 23, 2012, <http://www.spacenews.com/commentaries/writing-the-rules-space-why-inclusion-matters.html> (accessed April 23, 2012).

<sup>41</sup> Rajeswari Pillai Rajagopalan, "The Space Code of Conduct Debate: A View From Delhi," *Strategic Studies Quarterly* (Spring 2012):142-145; "Code of Conduct on Space," Observer Research Foundation Report; "Establishing Rules of the Road in Space: Issues and Challenges," Observer Research Foundation Analysis, May 6, 2011, <http://www.orfonline.org/cms/sites/orfonline/modules/analysis/AnalysisDetail.html?cmaid=23052&mmacmaid=23053>; "Asia and a Space Code," *The Diplomat*, January 4, 2012, [thediplomat.com/flashpoints-blog/2012/01/04/asia-and-a-space-code/](http://thediplomat.com/flashpoints-blog/2012/01/04/asia-and-a-space-code/) (accessed May 2, 2013).

<sup>42</sup> Victoria Samson, "India and Space Security."

CoC, the EU invited other space-faring nations, including India, to actively participate in the International Code of Conduct multilateral discussions.

In official statements, however, Indian diplomatic representatives have offered little detail regarding the standards or mechanisms it would include within a new space arms control or space use treaty. Rather than put forward its own initiatives on space, India may prefer to have key space-faring nations solicit its opinion and court its vote on future multilateral accords. As a country that continues to achieve important milestones with its national space program and is not afraid to openly discuss the development of a deterrent capability that can match or exceed the capabilities fielded by other space-faring nations, New Delhi may calculate it can afford to take a wait-and-see approach to ongoing discussions and debates between the traditional space powers on matters such as the military use of space. Projecting confidence in its ability to develop and defend space assets necessary for 21<sup>st</sup> century national security needs, but cautious and cagey with regard to the military space programs of other states, it is likely to support future multilateral space TCBM agreements – so long as the major space-faring states agree to fully participate.

## BRAZIL

### *Civilian and Military Space Programs*

From the 1960s to the present day, Brazilian leaders have viewed the development of a national space program as an important part of broader efforts to solidify its status as a major geopolitical and economic power. Its current space program, however, embodies the significant challenges faced by many emerging space powers in attempting to develop a scientific, technical, and industrial base capable of designing, testing, and building space launch vehicles and satellites, and sustaining the infrastructure necessary to support and control them.

In the past, Brazil has realized important achievements in space – a Brazilian astronaut, for example, has served as part of the multinational crew manning the International Space Station.

Today, however, it remains heavily reliant on foreign states for key space capabilities such as launch vehicles. Its dreams of breaking into the first ranks of space powers will require the country to make significant progress in improving its national space capabilities in the near future or risk falling behind other emerging space powers. In the words of Jose Raimundo Braga Coelho, president of Agencia Espacial Brasileira (AEB), Brazil's national space agency: “[T]he truth is, in terms of space, we need to take a leap. A qualitative leap. A transforming leap. And with all possible haste.”<sup>43</sup>

Brazil's views on space and security are rooted in the belief that its national defense, economic, and space goals are closely intertwined. For example, the country has a large, diverse geography that includes extensive areas, such as the Amazon rainforest, that are difficult to monitor or traverse from the ground. This complicates efforts by Brazil's military and security forces to protect its borders and, in turn, its extensive and highly valuable natural resources.

This places a premium on national development of space platforms capable of performing data and imagery monitoring and reporting functions. Brazil does not at present have any dedicated military assets in outer space, but the development of a Geostationary Defense and Strategic Communications Satellite (SGDC), a system designed to provide the country with its first space platform for secure communications, is a current priority for the country's national space program.<sup>44</sup> The SGDC represents a critical capability for realizing a number of goals contained within *National Strategy of Defense*, Brazil's most recent (December 2008) national defense guidance document. The *National Strategy* discusses space as one of three “strategic sectors” (in addition to cyber and nuclear) that are critical to the country's national security.<sup>45</sup> It advocates for the development of a range of monitoring technologies, to include satellites in

<sup>43</sup> Government of Brazil, Brazilian Space Agency (AEB), *National Program of Space Activities: 2012-2021 (PNAE)*, 2012: 5.

<sup>44</sup> *PNAE*, 9, 24.

<sup>45</sup> Government of Brazil Ministry of Defense, *National Strategy of Defense*, 2008: 32.

space, that do not rely on foreign assistance, arguing that the country can never view jointly developed capabilities as fully secure.<sup>46</sup> Brazil's military also hopes the SGDC will improve its command-and-control capabilities, facilitate future joint operations, and boost the ability of its forces to monitor and defend the country's land borders, airspace, and waterways.<sup>47</sup>

Brazil's views on the relationship between space and economic development also reflect the government's determination to leverage the country's existing economic strengths and diversify its goods and services to address the demands of a high-technology 21<sup>st</sup> century marketplace. Brazil, for example, is a major producer and exporter of agricultural products. Information provided by, and communications supported by, space assets are vital to protecting this critical part of the country's economy and the country's population from natural disasters.<sup>48</sup> As summarized by Marco Antonio Chapman, an administrator at Brazil's National Institute for Space Research, Brazil's space policy is aimed at "mastering space technology to solve major national problems ... When we look at global warming, pollution, [and] deforestation, we see that there are a number of important issues that have direct impact on Brazilian society."<sup>49</sup>

In addition, Brazil views its space program – and associated science and technical programs – as critical to diversifying its economy and equipping its population for success in the Information Age. It wants to become a provider of high-technology products (to include those related to space) and grant its entrepreneurs access to communications

and information services allowing them to successfully navigate the global information economy. Brasilia has concluded that the infrastructure of a domestic space industry (e.g., launch facility, satellite control center, communication links) and the platforms required for cell phones, broadband services, and other important contemporary tools of communication and business all point to the need for a robust national space program.<sup>50</sup>

Brazil's conviction that the realization of important national security and economic goals requires space systems underlines the importance of satellites such as the SGDC that, by providing secure communications to the country's government, is viewed as critical to a number of important state civil and military functions. Brazil believes its "national strategy of defense is inseparable from [our] national strategy of development" and views a truly independent national space program as important to both defending its national sovereignty and realizing future economic growth.

While Brasilia envisions a future where the country is a self-sufficient space power marketing a broad range of space goods and services to an international market, many observers believe it is not close to becoming a fully sufficient space power.<sup>51</sup> The country experienced early success in building its Sonda series of sounding rockets, with successful launches of Sonda I in 1967 and Sonda II in 1969.<sup>52</sup> In 1979, the country announced its ambitions to become a first-tier space power, unveiling plans to develop its own

<sup>50</sup> PNAE, 9-10.

<sup>51</sup> One Brazilian critic of the program, for example, has stated it is "on a downward spiral" in part due to the country's failure to develop robust public-private partnerships leading to the development of a technological base capable of providing space goods and services to Brazil and other countries. Gilberto Costa, "Brazil's Space Program Goes on Out of Step with Times and World," *Brazzil* (June 2011) <http://www.brazzilmag.com/component/content/article/99-june-2011/12606-brazils-space-program-goes-on-out-of-step-with-times-and-world.html> (accessed May 2, 2013).

<sup>52</sup> AEB, "Linha Do Tempo," n.d., [http://site.aeb.gov.br/index.php?secao=linha\\_do\\_tempo](http://site.aeb.gov.br/index.php?secao=linha_do_tempo) (April 25, 2012).

<sup>46</sup> Government of Brazil Ministry of Defense, *National Strategy of Defense*, 2008: 11-12.

<sup>47</sup> Government of Brazil, Ministry of Defense, *National Strategy of Defense*, 2008: 8, 11, 25 and W. Alex Sanchez, "Latin America's Space Programs in 2012," *The Space Review*, August 27, 2012, <http://www.thespaceview.com/article/2143/1> (accessed April 25, 2012).

<sup>48</sup> PNAE, 8.

<sup>49</sup> AEB, "Brazil to Begin Testing of Indigenous Rocket in 2012," press release, April 5, 2012, <http://www.parabolicarc.com/2010/04/05/brazil-testing-indigenous-rocket-2012/> (accessed April 25, 2012).

satellites, launch vehicles, and spaceport.<sup>53</sup> Recognizing the value of constructing the spaceport near the equator, the country began construction of its Alcantara Launch Center in 1982 and hosted a successful Sonda-2 launch in 1990.<sup>54</sup>

A series of setbacks for its domestic rocket programs, however, followed this initial progress. Brazil's efforts to construct a larger rocket – titled the Veículo Lançador de Satélites [Satellite Launch Vehicle] (VLS) – resulted in three failures, in 1997, 1999, and 2003, with the third exploding on its launch pad and causing the deaths of 21 technicians.<sup>55</sup> The accident highlighted a number of problems with the country's efforts to develop space capabilities, including general problems with funding (which came in fits and starts from Brasilia) and tensions between civilian and military elements of the country's space program.<sup>56</sup> The accident led to efforts to better synchronize Brazil's scientific, military, and industry players involved in space matters and confirmed a process, already underway, of

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<sup>53</sup> Frank Dirceau Braun, "Romancing the Skies," *Brazzil* (October 2002), <http://www.brazzil.com/cvroct02.htm> (accessed April 25, 2012) and Lt Col Robert D. Newberry, USAF "Latin American Countries with Space Programs: Colleagues or Competitors?" *Air and Space Power Journal* (Fall 2003): 41-42.

<sup>54</sup> Earlier launches took place at a smaller facility at Barreira do Inferno. Obozrevatel, "Ukraine's Cyclone-4 to be Launched from Alcantara Space Center," press release, October 25, 2011, <http://eng.obozrevatel.com/ukraine-and-the-world/ukraines-cyclone-4-to-be-launched-from-alcantara-space-center-in-2013.htm> (accessed April 25, 2013).

<sup>55</sup> CNN, "Brazil's First Space Rocket Falls into Sea," November 3, 1997, <http://www.cnn.com/TECH/9711/03/brazil.rocket/> (accessed April 25, 2013); AFP, "Brazilian Rocket Explodes on Pad," August 23, 2003, <http://www.spacedaily.com/news/rocketscience-03zu.html> (accessed April 25, 2013); Stephen Clark, "Brazilian Rocket Explodes on Launch Pad," *Spaceflight Now*, August 22, 2003, <http://www.spaceflightnow.com/news/n0308/22vls/> (accessed April 25, 2013).

<sup>56</sup> Larry Rohter, "Brazil's Soaring Space-Age Ambitions are Shy of Cash and Sapped by Calamity," *New York Times*, January 23, 2004.

consolidating most of Brazil's space activities under the civilian control of the Agência Espacial Brasileira (AEB).

The failures forced Brazil to shelve plans to send satellites into space aboard Brazilian launch vehicles and accelerated efforts to seek foreign partnerships in building a range of rockets and satellites.<sup>57</sup> This led Brazil to forge a close relationship on space matters with China. The two countries first signed a bilateral space cooperation agreement in 1988 and worked closely together on developing the China-Brazil Earth Resource Satellite (CBERS) satellite series, described by AEB as "medium resolution remote sensing satellites" with "agribusiness, environment (and) defense" applications.<sup>58</sup> This ongoing collaboration between Brazil's National Institute for Space Research (the country's lead civilian space research body), AEB, the Chinese Academy for Space Technology, and the China National Space Administration has produced three satellites: CBERS-1 in 1999, CBERS-2 in 2003, and CBERS-2B in 2007. All three were launched into space aboard Chinese rockets; while the most recent launch (December 2013) failed, additional launches are planned for 2014.<sup>59</sup>

Significantly, CBERS-1 was the first imaging satellite put into orbit by both countries that did not rely on technology or assistance from other space powers, reflecting the importance both capitals placed in this collaborative effort (and the state of technological advancement of their respective programs in 1999).<sup>60</sup> In addition, both states have viewed the CBERS satellites as platforms for international diplomacy, voluntarily

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<sup>57</sup> Eligar Sadeh, *The Politics of Space: A Survey* (Taylor & Francis: London, 2010): 85-86.

<sup>58</sup> *PNAE*, 21.

<sup>59</sup> Government of Brazil, "Space Program," n.d., <http://www.brasil.gov.br/sobre/science-and-technology/space-program-1/inpe> (accessed April 25, 2013); Instituto Nacional de Pesquisas Espaciales (INPE), "CBERS 1 Launching," n.d., [http://www.cbers.inpe.br/ingles/satellites/launching\\_cbers1.php](http://www.cbers.inpe.br/ingles/satellites/launching_cbers1.php) (accessed April 25, 2013); INPE, CBERS 2 Launching," n.d., [http://www.cbers.inpe.br/ingles/satellites/launching\\_cbers2.php](http://www.cbers.inpe.br/ingles/satellites/launching_cbers2.php) (accessed April 25, 2013).

<sup>60</sup> Sadeh, 87.

making images taken by CBERS-2B publicly available online to developing nations. In doing so, the two countries state that nations in Africa and around the world that currently lack their own satellites can freely use this data for disaster planning, agriculture, and other purposes.<sup>61</sup>

Brazil has also established separate partnerships with Ukraine and Russia in order to develop space launch vehicles.<sup>62</sup> Brazil and Ukraine are developing a three-stage liquid-fueled rocket, based on the latter's proven Cyclone rocket series, designed to place 1,600 kg payloads in geostationary orbit.<sup>63</sup> Although the project has experienced a number of delays, the first launch from Alcantara is planned for late 2014.<sup>64</sup> The Brazilian-Russian project is focused on helping the troubled VLS program by using technology from Russia's Angara rocket series, although this collaboration – initially featuring five types of launch vehicles – is now restricted to two rockets

(VLS-Alpha and VLS-Beta), possibly due to budget concerns.<sup>65</sup>

Brazil's civilian space program thus has close ties with China's space program and working relationships with Ukraine and Russia. Its relationship with the United States on space matters has proven more complex due to U.S. efforts to protect American space technology and halt the proliferation of ballistic missiles, efforts that extend to include a range of dual-use goods, services, and relevant scientific and technical knowledge.<sup>66</sup> In the past, these efforts have represented a source of friction between the two countries. In 2000, for example, a number of Brazilian politicians objected to the U.S. government's insistence Brazil sign a space Technology Safeguards Agreement (TSA) as a precursor to cooperation between their respective space programs, strongly criticizing Brasilia for initially accepting this request. During the subsequent ratification debate within Brazil's Congress, opponents of the agreement charged the executive branch with "essentially ceding part of Brazil's national territory to be used as a restricted American base of operations."<sup>67</sup> The government failed to assemble enough votes in favor of ratification, complicating bilateral initiatives between the two countries' space programs, and questions raised during the congressional debate left many Brazilians wary of working with the United States on space issues.<sup>68</sup> Cooperation appears to have improved since 2010, however, with NASA and AEB agreeing to collaborate on the multi-national Global Precipitation

<sup>61</sup> INPE, "Image Catalogue," n.d., <http://www.dgi.inpe.br/CDSR/> (accessed April 25, 2013); Hu Yanan, "Next Sino-Brazilian Satellite Nearly Ready for Launch," *China Daily*, June 15, 2007, [http://www.chinadaily.com.cn/china/2007-06/15/content\\_894795.htm](http://www.chinadaily.com.cn/china/2007-06/15/content_894795.htm) (accessed April 25, 2013); "China to Monitor Global Disasters through Satellite," January 25, 2008, *People's Daily Online*, <http://english.people.com.cn/90001/90781/90876/6345281.html> (accessed July 25, 2013).

<sup>62</sup> Yur Zaitsev, "Russia Begins Elbowing Ukraine Out From Brazil's Space Program," *RIA Novosti*, September 18, 2008, [http://www.spacedaily.com/reports/Russia\\_Begins\\_Elbowing\\_Ukraine\\_Out\\_From\\_Brazil\\_Space\\_Program\\_999.html](http://www.spacedaily.com/reports/Russia_Begins_Elbowing_Ukraine_Out_From_Brazil_Space_Program_999.html) (accessed July 25, 2013).

<sup>63</sup> PNAE, 32; State Space Agency of Ukraine, "Cyclone-4 Project," n.d., <http://www.nkau.gov.ua/nsau/catalogNEW.nsf/proectR/2D357C5C6B8786B2C3256BF8004C1C4D?OpenDocument&Lang=E> (accessed July 25, 2013); Yuzhnoye, "Cyclone-4," n.d., [http://www.yuzhnoye.com/?id=127&path=Aerospace%20Technology/Launch%20Vehicles/cyclone/cyclone-4/cyclone-4\\_e&lang=en](http://www.yuzhnoye.com/?id=127&path=Aerospace%20Technology/Launch%20Vehicles/cyclone/cyclone-4/cyclone-4_e&lang=en) (accessed July 25, 2013).

<sup>64</sup> Interfax-Ukraine, "Ukraine's Space Agency," *Kyiv Post*, <http://www.kyivpost.com/content/ukraine/ukraines-space-agency-first-launch-of-cyclone-4-rocket-planned-for-end-of-2014-323136.html> (accessed July 25, 2013).

<sup>65</sup> Douglas Messier, "Brazil Scales Back Launch Vehicle Plans," *Parabolic Arc*, February 10, 2013, <http://www.parabolicarc.com/2013/02/10/brazil-scales-back-launch-vehicle-plans/> (accessed April 25, 2013); "Russia-Brazil Space Cooperation Memorandum," *RIA Novosti*, November 23, 2004.

<sup>66</sup> Gary Milhollin and Gerard White, "The Brazilian Bomb" *The New Republic*, August 13, 1990: 10-11; Brian Chow, *Emerging National Space Launch Programs: Economics and Safeguards* (RAND: Santa Monica, CA, 1993): 1-4, 7-12; Wyn Bowen, "Report: Brazil's Accession to the MTCR," *Nonproliferation Review* (Spring-Summer 1996): 86-88.

<sup>67</sup> Braun, "Romancing the Skies."

<sup>68</sup> Newberry, 41-42.

Measurement Mission and a future ozone study.<sup>69</sup> The two countries also held a Space Security dialogue in April 2012.<sup>70</sup>

***Views on Proposed Space Agreements, Military Use of Space, and Space Arms Control***

Brazil has sought a role in international negotiations on the state use of space, including military space and space arms control issues. It views itself as a key player in disarmament debates, citing its generally peaceful history, lack of military enemies, and long support for a range of arms reduction and weapon-ban initiatives (both in terms of nuclear arms and weapons in outer space) at the UN General Assembly and the UN CD.<sup>71</sup> As both a developing country and a space power, Brazil believes it can speak to the concerns of a broad range of current and future space actors.<sup>72</sup> The Brazilian government states that protecting outer space as a peaceful environment free of weapons and armed conflict is essential for developing states, who increasingly rely on space systems (particularly satellites) for economic growth but lack the capabilities to protect these systems from the actions or conflicts of major space powers.<sup>73</sup> It has sounded the alarm in international negotiating forums regarding what it fears is the impending militarization of space, with its representative to the UN CD stating in October 2012,

The use of outer space for military purposes is firmly underway. The international community must work hard and united in order to prevent the next step: the placement of weapons [in space].<sup>74</sup>

Brazil warns that a failure to make progress on space arms control courts disaster, stating a future conflict involving space systems could lead to a total “global black-out” of modern communications systems.<sup>75</sup>

In surveying the current state of international space law, Brazil believes discussions within UN forums have revealed “the need of a multilateral legal instrument to plug the loopholes remaining in International Law on the matter of preventing an arms race in outer space.”<sup>76</sup> It presses for negotiation within the UN CD of a multilateral, legally binding treaty to ban the threat or use of force against space systems or the placement of any kind of weapon in outer space.<sup>77</sup>

Brazil welcomed Russia and China’s introduction of the PPWT in 2008 and praised the draft treaty as a “constructive and concrete contribution” to diplomatic discussions addressing the issue of weapons in space. It also noted, however, that “in its present wording [the PPWT] is still a schematic framework” requiring “more precise language” before becoming a comprehensive treaty fully addressing the concerns of Brazil and like-minded states.<sup>78</sup> However, Brazil preferred the PPWT’s approach to the EU’s Code of Conduct, which it believed too broad in its language and, as a politically binding agreement, too weak to address near-term challenges in

<sup>69</sup> U.S. Department of State, “U.S.-Brazilian Space Cooperation,” fact sheet, April 9, 2012. Brazil is one of several international partners participating in the GPM project, which is led by NASA and the Japanese Aerospace Exploration Agency. Luis Machado of Brazil’s Instituto Nacional De Pesquisas Espaciais is a member of the GPM’s Precipitation Measurement Mission Science Team. See Precipitation Measurement Missions Website, NASA Goddard Flight Center, <http://pmm.nasa.gov/PMM-science-team> (accessed November 19, 2013)

<sup>70</sup> Ibid.

<sup>71</sup> Ambassador Luiz Felipe de Macedo Soares, statement, UN First Committee, November 2, 2009, <http://www.un.int/brazil/speech/09d-Ifms-icommittee-cluster3-0211.html> (accessed April 26, 2012).

<sup>72</sup> Eduardo Da Costa Farias, statement, UN COPUOS 618th meeting (COPUOS/T.618): 7.

<sup>73</sup> Ibid.

<sup>74</sup> Antonio Guerreiro, statement, UN First Committee, October 23, 2012, <http://www.un.org/disarmament/special/meetings/firstcommittee/67/pdfs/Thematic/23%20Oct%20TD%20Cluster%203%20Brazil.pdf> (accessed April 26, 2013).

<sup>75</sup> Ambassador Soares, statement, UN CD, February 8, 2011, [http://www.unog.ch/80256EDD006B8954/\(httpAssets\)/BED19C219E8CD9DFC1257831004C0729/\\$file/1203\\_Brasil.pdf](http://www.unog.ch/80256EDD006B8954/(httpAssets)/BED19C219E8CD9DFC1257831004C0729/$file/1203_Brasil.pdf) (accessed April 26, 2012).

<sup>76</sup> Ambassador Soares, statement, UN First Committee, November 2, 2009.

<sup>77</sup> Ibid.

<sup>78</sup> Ambassador Soares, statement, UN CD, February 8, 2011.

regard to the militarization of space. It has specifically criticized the code's express reference to a state's inherent right of self-defense to defend its space assets, arguing this "could be interpreted in a way that justifies the use of force in outer space. That is a scenario we cannot afford to contemplate, not even in theory."<sup>79</sup>

Brazil has also disparaged – without naming any specific state – governments that support negotiation of a politically binding, rather than a legally binding, agreement on space security issues, dismissing their arguments as "not sustainable" in the long-term and "impossible" for most of the international community to understand. States that delay participation in diplomatic talks aimed at preventing a future arms race in space, it argues, are ultimately responsible for the "increased mistrust" between them and space-faring nations supportive of drafting a comprehensive space arms control treaty.<sup>80</sup> This advocacy on behalf of a legally binding approach to the military use of space has led Brazil to issue a publicly ambivalent statement on the UN GGE's pursuit of politically binding TCBMs, saying it "does not refuse intermediate measures" that can build trust and increase transparency between space-faring states, so long as these are recognized as an interim step preceding future multilateral talks on a new space treaty.<sup>81</sup> However, Brazil has contributed an expert to the GGE, and this involvement may lead to support for the group's future recommendations.

<sup>79</sup> Antonio Guerreiro, statement, UN First Committee, October 23, 2012. The language on self-defense is found in paragraph 4.2 of the EU CoC. Council of the European Union, Revised Draft Code of Conduct for Outer Space Activities, October 11, 2010 (14455/10): 4.2.

<sup>80</sup> Ambassador Soares, statement, UN CD, February 12, 2009, [http://www.unog.ch/80256EDD006B8954/\(httpAssets\)/8C916F97D58BB171C125755B003E1BEF/\\$file/1123\\_Brazil.pdf](http://www.unog.ch/80256EDD006B8954/(httpAssets)/8C916F97D58BB171C125755B003E1BEF/$file/1123_Brazil.pdf) (accessed April 26, 2013); Ambassador Soares, statement, UN First Committee, November 2, 2009; United Nations Office for Disarmament Affairs, "Conference on Disarmament Hears Address from Foreign Minister of Georgia and Observes International Women's Day," press release, March 8, 2011.

<sup>81</sup> Ambassador Soares, statement, UN CD, February 8, 2011.

Brazil remains committed to its vision of becoming a major space power, and it has realized a number of important goals for its national space program. With a civilian space program that remains dependent on other states for key forms of assistance and a military deeply interested in using space but waiting for its first (shared) satellite, Brazil is a good example of an emerging space power that recognizes and aspires to the broad, networked civilian and military capabilities available to space-faring nations such as the United States and China. But Brazil faces challenging near-term decisions on national resources and bilateral cooperation that may determine whether it can keep pace with countries such as India or fall back into the growing pack of countries that can build satellites but not launch them into space.

Brazil is an emerging space power and over the course of a generation has realized impressive achievements in aviation and aerospace engineering and manufacturing. It is also aware, however, of the difficulties, hazards, and costs of sending objects into space, and of the distance that continues to separate it from the civilian and military programs of major space-faring nations. As a result, its views on military space reflect both an interest in developing its own capabilities contributing to tasks such as border defense and a concern that major powers such as the United States will take steps – whether direct or indirect – jeopardizing the safety and security of smaller space-faring nations.

## SOUTH AFRICA

### *Civilian and Military Space Programs*

South Africa boasts a long history of involvement in efforts to observe and explore outer space. Its location in the Southern Hemisphere has proven ideal for charting stars and the course of human-made satellites. The first South African space observatory was built in 1820 in Cape Town, and the English astronomer Sir John Herschel conducted much of his research (including his observation of Halley's Comet in

1835) while living in the country.<sup>82</sup> South Africa also has a long-standing relationship with NASA. During the first Space Age, the United States partnered with South Africa to design and manufacture a satellite that was launched on a NASA Delta II rocket, and the space agency also constructed and operated key satellite tracking facilities within the country.<sup>83</sup> This cooperation was later suspended due to congressional opposition to Pretoria's apartheid policies, but restarted in the 1990s following the election of President Nelson Mandela.<sup>84</sup> In 1999, for example, South Africa's first satellite, the Stellenbosch University Satellite (SUNSAT), was launched from Vandenberg Air Force Base.

Into the 21<sup>st</sup> century, South Africa has remained an important partner of the United States and other space-faring nations. In 2011, for example, it was selected by NASA as a key provider of tracking data for the *Curiosity* Mars Rover mission, and in 2012 it was chosen (along with Australia) as the host of installations associated with the Square Kilometre Array, which upon completion will represent the world's largest radio telescope.<sup>85</sup> It has also taken a lead role in

working with fellow African states to advance regional space initiatives. South Africa is a key member of the African Resource Management Constellation (ARMC), a four-state coalition (together with Algeria, Nigeria, and Kenya) building a satellite network that aims to "make space technology more accessible to African end-users in areas such as environmental monitoring, land use, water management, and public health."<sup>86</sup>

South Africa has devoted considerable political and economic capital to building up its national space program. The country's 2008 National Space Policy recognizes that "in the 21<sup>st</sup> century, countries capable of utilizing space systems will enjoy considerable advantage over those who do not" and notes the country is already "critically reliant on space science and technology."<sup>87</sup> In an effort to consolidate and advance the country's efforts to boost its involvement in outer space, South African President Jacob Zuma signed the National Space Agency Act in 2009, bringing together all of the country's space programs and missions under one unified agency -- the South African National Space Agency (SANSA).<sup>88</sup> National legislation directs SANSA to

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<sup>82</sup> Ambassador Xolisa Mabhongo, statement, UN COPUOS, June 1, 2011, [http://www.sacsa.gov.za/COPUOS/STATEMENT\\_A\\_MBASSADOR\\_XOLISA\\_MABHONGO.pdf](http://www.sacsa.gov.za/COPUOS/STATEMENT_A_MBASSADOR_XOLISA_MABHONGO.pdf) (accessed April 26, 2013) and "Sir John Herschel, 1<sup>st</sup> Baronet," *Encyclopedia Britannica*, <http://www.britannica.com/EBchecked/topic/263809/Sir-John-Herschel-1st-Baronet> (accessed April 26, 2013).

<sup>83</sup> In 1965, for example, an 85-foot-wide dish antenna located in Johannesburg tracked NASA's Mariner 4 Mars Satellite. Walter Sullivan, "Mariner 4 Makes Flight Past Mars," *New York Times*, July 14, 1965. <http://www.nytimes.com/learning/general/onthisday/big/0714.html#article>. South Africa was the site of a NASA Deep Space Network antenna, associated tracking station, and also a separate Spaceflight Tracking Data Network (STDN) station. NASA, *SP-4012 NASA Historical Data Book: Volume III, "Programs and Projects 1969-1978,"* <http://history.nasa.gov/SP-4012/vol3/ch6.htm> (accessed April 26, 2013).

<sup>84</sup> NASA, *SP-4012*.

<sup>85</sup> "South Africa to Assist NASA Mars Mission," *SouthAfrica.info*, November 18, 2011, <http://www.southafrica.info/about/science/samars-181111.htm#.UVRedmdpYrs> (accessed April 26,

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2013) and SKA, "Dual Site Agreed for Square Kilometre Array Telescope," May 25, 2012, <http://www.skatelescope.org/news/dual-site-agreed-square-kilometre-array-telescope/> (accessed April 26, 2013).

<sup>86</sup> Ambassador Xolisa Mabhongo, statement, UN COPUOS, June 1, 2011.

<sup>87</sup> Republic of South Africa, Department of Trade and Industry, *National Space Policy*, "2. Executive Summary" and "7.4 Developing and Fostering National Space Infrastructure" December 2008, <http://www.oosa.unvienna.org/pdf/spacelaw/national/safrica/nat-policyE.pdf> (accessed April 26, 2013). See also SANSA Corporate six-panel brochure, March 18, 2011: "A decade from now, South Africa will be an important contributor to the global space arena." South African National Space Agency" (SANSA), brochure, March 18, 2011, [http://www.sansa.org.za/images/resource\\_centre/brochures/6-Panel%20brochure%202011.pdf](http://www.sansa.org.za/images/resource_centre/brochures/6-Panel%20brochure%202011.pdf) (accessed April 26, 2013).

<sup>88</sup> Government of South Africa, "South African National Space Agency Act," *Government Gazette* Vol. 522, no. 31729, December 15, 2009, <http://www.info.gov.za/view/DownloadFileAction?id=94358> (accessed April 26, 2013).

Provide for the promotion and use of space and co-operation in space-related activities, foster research in Space Science, advance scientific engineering through human capital, support the creation of an environment conducive to industrial development in space technologies within the framework of national government policy.<sup>89</sup>

The agency's current strategic plan focuses on four missions: (1) Earth observation (2) space operations (3) space science and (4) space engineering.<sup>90</sup> While recognizing it cannot compete at the same level as the major space powers, South Africa believes current investments in its space program and in the development of human capital in space-supporting fields will allow it to "capture a global market share for small to medium sized space systems" within a decade.<sup>91</sup> Pretoria believes that becoming a vendor within the growing international space market will help the country realize its goal of increasingly shifting to a modern knowledge-based economy.<sup>92</sup>

The country also views investments in space programs and capabilities as critical to its security—with "security" encompassing both traditional national security issues (such as protecting national borders) and human security matters (such as responding to natural disasters or addressing water shortages affecting the health of people and crops).<sup>93</sup> South Africa does not have a dedicated military space program, but recognizes

the importance of space assets to national defense (including tasks such as border control), regional security initiatives, and arms control verification, stating that it will develop space assets capable of supporting "defense, peacekeeping, and treaty monitoring" initiatives.<sup>94</sup>

#### ***Views on Proposed Space Agreements, Military Use of Space, and Space Arms Control***

South Africa's determination to become an important player amongst emerging space powers has led the country to devote domestic political capital to developing its national space program and international diplomatic capital to gaining recognition as a key participant within negotiating forums on space treaties and agreements.<sup>95</sup> It became the first African member of the UN Committee on the Peaceful Uses of Outer Space (COPUOS) in 1994 and is currently one of the most active states within the committee. In regard to international space law, in 2011 it established a national registry of space objects as part of its effort to accede to the 1976 Convention on the Registration of Objects Launched into Outer Space, and in 2012 it completed ratification of the 1972 Convention on International Liability for Damage Caused by Space Objects.<sup>96</sup>

<sup>89</sup> SANSA, *SANSA Strategic Plan, 2011/13-2013/14*, February 2011:8, [http://www.dut.ac.za/sites/default/files/space\\_science/SANSA%20Strategy.pdf](http://www.dut.ac.za/sites/default/files/space_science/SANSA%20Strategy.pdf) (accessed April 26, 2013).

<sup>90</sup> SANSA, *SANSA Strategic Plan, 2012-2017*, March 2013: 8-10: [http://www.sansa.org.za/images/resource\\_centre/publications/SANSA%20Strategic%20Plan.pdf](http://www.sansa.org.za/images/resource_centre/publications/SANSA%20Strategic%20Plan.pdf) (accessed April 26, 2013).

<sup>91</sup> SANSA, *SANSA Strategic Plan, 2011/13-2013/14*: 9.

<sup>92</sup> Ibid.

<sup>93</sup> Ambassador Mabhongo, statement, UN COPUOS, February 15, 2013, [http://www.sacsa.gov.za/COPUOS/UNCOPUOS\\_February2013\\_Agenda\\_item3.pdf](http://www.sacsa.gov.za/COPUOS/UNCOPUOS_February2013_Agenda_item3.pdf) (accessed April 26, 2013) and SANSA, *SANSA Strategic Plan, 2011/13-2013/14*: 20-21.

<sup>94</sup> V Munsami, "Formalising South Africa's National Space Programme," presentation, UN COPUOS Scientific and Technical Subcommittee, February 18, 2010, Vienna, Austria and SANSA, *SANSA Strategic Plan, 2011/13-2013/14*: 20.

<sup>95</sup> Mothibi Ramusi, "South African Space Affairs," presentation November 22, 2005 <http://www.unoosa.org/pdf/sap/2005/nigeria/splawproc05.pdf> in United Nations Office for Outer Space Affairs, *Meeting International Responsibilities and Addressing Domestic Needs*, workshop proceedings (United Nations: Vienna, 2006): 198-225 and Ambassador Mabhongo, statement, Special Committee on Decolonization, October 13, 2010, [http://www.southafrica-newyork.net/speeches\\_pmun/view\\_speech.php?speech=5864139](http://www.southafrica-newyork.net/speeches_pmun/view_speech.php?speech=5864139) (accessed April 26, 2012).

<sup>96</sup> Ratifying and implementing these two treaties is viewed by many space-faring states as important signals that an emerging space power plans to follow treaty and customary international law in its use of outer space. South African Council for Space Affairs, "South Africa now Party to Two United Nations Conventions on Outer Space," press release, February

“As an emerging space actor,” explained South African diplomat Megan Govendar in an October 19, 2012 General Assembly address on outer space issues, “South Africa wishes to contribute to the orderly, peaceful and safe utilisation of the space environment, for the benefit of all nations.”<sup>97</sup> Pretoria believes these contributions are best made through the United Nations system, viewing bodies such as COPUOS as the best means for negotiating and implementing accords that will address challenges associated with the 3 C’s and protect the interests of emerging space powers.<sup>98</sup> South Africa believes it is important to support “the development of international norms for the use of outer space,” with these norms grounded in “principles of fairness, equal access and non-discrimination” that protect space – and the “benefits” derived from it – for all states, including those that are not yet space-faring nations.<sup>99</sup>

South Africa has also indicated, however, that it believes an international agreement or mechanism attempting to address space sustainability “need[s] to take into account the different circumstances, particularly each State’s contribution to the evolution of a particular problem and its ability to prevent, reduce and control the extent of that problem.”<sup>100</sup> This echoes the language of other emerging space powers (such as India), who believe that, while all current space powers must act responsibly in space, major space powers bear an additional responsibility for clearing debris and otherwise taking steps to resolve problems created by their past use of space.

In the past, South Africa has supported multilateral initiatives aimed at negotiating an international legal framework for limiting or banning armaments from outer space. It has regularly supported PAROS resolutions at the UN General Assembly, for example.<sup>101</sup> It has also argued at the UN CD that the international community must take steps to prevent the deployment of weapons in space, with South African representative Michael Combrink stating in February 2011, “If we wait for space to become weaponized before we take action, it will not be long before we have to find yet another cure for something that could have been prevented—the proliferation of weapons in outer space.”<sup>102</sup>

Beyond PAROS, however, Pretoria has stopped short of directly endorsing a new international space draft treaty or agreement.<sup>103</sup> Within his February 2011 statement, for example, Combrink stated that South Africa “particularly appreciates the efforts of the Chinese and Russian delegations and their ideas on moving the process forward,” but did not expressly support the PPWT. South Africa, he continued, supported the CD “negotiating an international instrument” on preventing arms competitions in space.<sup>104</sup> The use of general terms such as “ideas” and “instrument” (the latter could refer to a legally binding treaty or politically binding agreement) within his statement likely reflects Pretoria’s interest in participating in future space arms control talks without tipping its hand regarding what type of diplomatic agreement it is prepared to support.

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3, 2012, [http://www.sacsa.gov.za/news\\_from\\_sacsa/](http://www.sacsa.gov.za/news_from_sacsa/) (accessed April 26, 2012).

<sup>97</sup> Magen Govendar, statement, UN First Committee, October 19, 2012, [http://www.southafrica-newyork.net/speeches\\_pmun/view\\_speech.php?speech=5706622](http://www.southafrica-newyork.net/speeches_pmun/view_speech.php?speech=5706622) (accessed April 26, 2012).

<sup>98</sup> Magen Govendar, statement, UN First Committee, October 19, 2012 and Ambassador Mabhongo, statement, Special Committee on Decolonization, October 13, 2010.

<sup>99</sup> Ambassador Mabhongo, statement, Special Committee on Decolonization, October 13, 2010.

<sup>100</sup> Val Munsami, statement, UN COPUOS, February 18, 2013, [http://www.sacsa.gov.za/COPUOS/UNCOPUOS\\_February2013\\_Agenda\\_item\\_13.pdf](http://www.sacsa.gov.za/COPUOS/UNCOPUOS_February2013_Agenda_item_13.pdf) (accessed April 26, 2013).

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<sup>101</sup> South Africa, for example, supported the last three PAROS resolutions in the General Assembly (2005-07).

<sup>102</sup> UN CD, “Final Record of the One Thousand Two Hundred and Third Plenary Meeting,” February 8, 2011 (CD/PV.1203).

<sup>103</sup> South Africa, for example, did not issue a statement supporting or opposing the EU Code of Conduct, although it was one of several space-faring states consulted in 2009 by the Czech Republic (which held the EU presidency at the time) in an effort to build consensus for the draft text. Wolfgang Rathgeber, Nina-Louisa Remuss, and Kai-Uwe Schrogl, “Space Security and the European Union Code of Conduct for Outer Space Activities,” *UNIDIR Disarmament Forum* no. 4 (2009): 38.

<sup>104</sup> UN CD (CD/PV. 1203): 21-22.

South Africa's current engagement with international efforts to address the 3 C's is through a scientific and technical expert: Peter Martinez, Ph.D., Chair of South Africa's Council on Space Affairs. At present, he is the Chair of COPUOS' Working Group on the Long Term Sustainability of Outer Space Activities and is also a member of the UN GGE.<sup>105</sup> The Working Group will report its findings to the United Nations in 2014, with the final text prepared by Martinez.<sup>106</sup> South Africa's national delegation at COPUOS firmly backs the efforts of Martinez and his colleagues on both expert committees.<sup>107</sup>

Although not tasked with addressing the military use of space, the work of the Sustainability Working Group may produce findings and recommendations that are relevant to ongoing international debates on national security and outer space. The group is currently investigating possible "best practices" for addressing current threats to the safety of space operations (such as space debris) and assessing current regulatory frameworks (at both national and international levels) governing or guiding the use of space, with an eye toward identifying general "technical standards" and "guidance" that could serve as possible benchmarks for all space actors.<sup>108</sup> Martinez' views on addressing the challenge of maintaining the "sustainability" of space may reflect South Africa's experience as a partner of both established and emerging space powers. He has noted, for example, that major powers are primarily concerned with enhancing space "security" (in order to protect their current operations and assets in space), while emerging powers with few space assets worry more about

preserving space accessibility for future potential operations and assets. The latter thus oppose any measures making it more difficult or expensive to place or operate objects in space and are generally wary of major powers endorsing measures that act as "double standards" preserving their use of space at the expense of others.<sup>109</sup>

South Africa is an emerging space power that recognizes the potential benefits of space assets for the security of its citizens, whether in terms of securing its borders or protecting its population from natural disasters. It is interested in the future development of a military space program, although it would likely initially pursue systems with dual civilian/military uses – a path Brazil is pursuing and not dissimilar to the EU's approach to developing satellites with capabilities that will be shared by civilian agencies and military services.<sup>110</sup> Civilian science and commercial programs, however, come first for South Africa – and many emerging space powers – due to limits on resources and an interest in strategic investment in capabilities that will either generate future revenue (allowing a country to capture a niche in the international space market) or save costs (by improving use of water and other scarce resources). This focus on civilian applications, and recognition that South Africa will not possess space defense/deterrence capabilities in the near future, leads Pretoria to preach caution on issues surrounding the military use of space and urge all states to protect outer space as an open, peaceful environment. However, as a state that, on space issues, is outside of the complex dynamics driving competition between some of the larger space powers, South Africa – and the country's space

<sup>105</sup> United Nations General Assembly, Resolution 65/68, January 13, 2011 (A/RES/65/68).

<sup>106</sup> UN COPUOS, "Progress Report for the Working Group on Long-Term Sustainability of Outer Space Activities: 2011-2012," chairman's report, February 8, 2012 (A/AC.105/C.1/2013/CRP.10): 5.

<sup>107</sup> Val Munsami, statement, UN COPUOS, February 18, 2013.

<sup>108</sup> Richard H. Bunneke, "Space Diplomatic Efforts Update," presentation, October 14, 2011, [http://www.faa.gov/about/office\\_org/headquarters\\_offices/ast/advisory\\_committee/meeting\\_news/media/2011/oct/Bunneke%20COMSTAC%20STOWG%2014%20Oct%202011.pdf](http://www.faa.gov/about/office_org/headquarters_offices/ast/advisory_committee/meeting_news/media/2011/oct/Bunneke%20COMSTAC%20STOWG%2014%20Oct%202011.pdf) (accessed April 26, 2013).

<sup>109</sup> Peter Martinez, "The UN COPUOS Working Group on the Long-Term Sustainability of Outer Space Activities," presentation, UNIDIR conference "The Role of Norms of Behaviour in African Outer Space Activities," March 8, 2013 and "Current International Space Security (Sustainability) Activities and Initiatives," 2010, <http://swfound.org/media/31123/Martinez-Space%20Security%20initiatives.pdf> (accessed April 26, 2013).

<sup>110</sup> For a summary of the EU approach, see Walter Conrad, Justin Anderson, and Sarah Jacobs, "Arms Control in the Third Space Age," *Space and Defense* (Fall 2012): 4-21, esp. p. 12.

experts, such as Martinez – can play an important role in exploring avenues of potential cooperation, to include possible confidence-building measures, for all space-faring nations.

### **UNITED STATES AND EMERGING SPACE POWERS: POTENTIAL AREAS OF AGREEMENT AND ISSUES TO ADDRESS**

What conclusions can we draw from this survey of the civilian and military space programs of these three emerging space powers and their views on the military use of space and space arms control?

#### **1. The United States must continue to patiently and persistently counter statements from other states regarding the possible near-term or “imminent” weaponization of space and/or the likelihood of major powers initiating an arms race within space.**

The United States represents the world’s only current superpower, both on Earth and in outer space. Of importance, even a rising space power such as India, which claims it can quickly assemble an ASAT, currently only possesses a nascent and relatively limited military space program (whether measured in terms of personnel or capabilities). Brazil’s military is still waiting for its first satellite, and South Africa recognizes the defense applications of a military space program but currently devotes all of its resources to civilian space assets. As a military space power with dedicated constellations of military satellites, an air force major command devoted to space, and military space assets and operations fully integrated across critical mission areas, the United States remains far ahead of the military space programs of even the most capable emerging space powers.

As a result of this imbalance, many emerging space powers – including those on friendly terms with the United States – are wary of U.S. military space programs and future U.S. intentions regarding the development of new military capabilities for space. Moreover, they have observed the United States consistently voting against PAROS resolutions within the UN General Assembly – often as a minority of one –

and registering its opposition to initiatives seeking legally binding measures to ban weapons and conflict in outer space. Inasmuch as only a handful of space-faring states have fully supported draft texts such as the PPWT, many emerging space powers have communicated their concern that military competition in space, however realized, may make access to space too dangerous and costly for actors that cannot afford to develop or deploy sophisticated military space assets. These concerns are readily on display in the public statements made by emerging space powers at the UN First Committee, UN CD, UN COPOUS, and other diplomatic forums.

The prospects of a major power arms race in outer space are extremely remote. Significantly, during the Cold War, the United States and Soviet Union reached agreement on leaving the Moon and other celestial bodies free of military fortifications and banning nuclear weapons tests and deployments in outer space. Moreover, both countries voluntarily suspended their ASAT programs due in part to a realization these weapons, even if successful in destroying enemy satellites, would cause debris that could damage or destroy the attacking states’ own space systems. The large price tags associated with developing, placing, and operating weapons platforms in space are also likely to dissuade many governments from considering these types of systems.

In this context, warnings regarding possible arms races in space can appear curiously misplaced, a relic of the darker days of the Cold War. This is not to overlook the potential problems posed by China and India’s interest in ground-based ASATs, but these systems – while representing threats to space-based assets – are a far cry from the threat to space safety, security, and stability posed by an orbital weapons platform.

Fortunately, such a military system exists only in the realm of science fiction. Statements by emerging space powers on potential arms races in outer space, however, reflect a real fear that their space assets are highly vulnerable and that they cannot, for the foreseeable future, come close to the military space programs (however configured) of the established space powers. Left unaddressed, these concerns threaten to seriously complicate

efforts by the United States and its allies to focus attention on the 3 C's. They also increase the likelihood that emerging powers will support broad proposals seeking to limit military activities in space that the United States will oppose either due to their lack of verification measures or infringement upon the lawful use of space by U.S. military assets. The United States should continue to patiently and persistently reiterate in international negotiating forums – and bilaterals with emerging space powers – that it has no plans to build, test, or deploy space-based offensive weapons systems.

**2. Key emerging space powers will, however, increasingly distinguish between non-weaponized military space systems and “space weapons,” opening opportunities for direct dialogues and quiet diplomacy on military space matters.**

While a number of emerging space powers fear the possibility that major powers might place weapons in space, the increasing availability of satellite technology – and increasing importance of satellite communications and imagery – has also led several of these states to recognize the significant national security benefits of placing non-weaponized military satellites (or dual civilian-military satellites) in outer space. For example, of the three emerging space powers discussed in this analysis, Brazil represents the strongest proponent of a legally binding ban on weapons in outer space and is a vocal critic of states that have not agreed to discuss this type of ban within the CD. Brazil, however, also views the development of a military-civilian secure communications satellite as a top priority for its national space program. As discussed above, it recognizes that satellite imagery is vital to protecting its borders and natural resources from state and non-state actors.

Moreover, India, Brazil, and South Africa all seek synergy between national space policies, defense strategies, and economic development priorities. The increasing integration of defense, development, and space goals reflects their realization that having a presence in space – to include systems wholly or partly assigned to national security tasks – is critically important in a

globalized, networked, 21<sup>st</sup> century geopolitical environment.

These developments help create opportunities for positive dialogues between the United States and emerging space powers on the legitimate, peaceful use of space through the deployment of military assets. Many emerging space powers have either espoused – or been influenced by – negative arguments positing the military use of space as inherently dangerous and destabilizing. This dichotomy, however, appears to be breaking down; in its place, the United States is well-positioned to advocate on behalf of military systems using outer space in the same manner that the international community recognizes the right of military vessels to use the high seas. Furthermore, while the United States does not discuss the economic benefits of space in terms of “development,” the development/defense/space concept held by emerging space powers is similar to long-standing U.S. views that a robust military space program helps create the conditions for the free, open, and safe use of space by all responsible space actors – conditions that, in turn, are vital to peace and economic prosperity.

In short, the increasing normalization and regularization of military space systems to the national plans of emerging space powers will likely allow future bilateral discussions between the United States and these countries on the military use of space to focus on areas of agreement and perhaps even identify areas of future potential cooperation (such as activities related to verification of multilateral treaties).

**3. Emerging powers support exploring new transparency and confidence-building measures (TCBMs) to address some or all of the 3 C's and also support the UN GGE approach to developing these proposals.**

Emerging space powers are broadly supportive of greater transparency between national space programs, welcoming exchanges of information on space policies and activities. Many believe efforts to improve space security are hampered by the major powers' reluctance to share more information about their space activities. States such as Brazil and South Africa, for example, do not believe they currently face any military

adversaries in space. As such, they do not anticipate any risks in sharing information on their space programs with foreign states.

Emerging powers also welcome discussion of new TCBMs for state activities in outer space. India, for example, despite its concerns regarding China's potential military space capabilities, has indicated it can support TCBMs as an interim step toward a future legally binding agreement on space. India may calculate that helping overcome Beijing's general reluctance to share information on its military space- or ground-based ASAT programs provides greater long-term benefits than the costs of sharing some information on its own (relatively limited) military space program.

In addition, it appears that a number of emerging space powers have joined established space-faring states in concluding that the PPWT and ICoC approaches to addressing elements of the 3 C's both failed to garner a broad base of support across the community of space-faring nations. For many states, TCBMs to ameliorate specific problems such as space traffic management or kinetic energy ASAT testing represent a potential third way to break this impasse. While states such as Brazil and India have stated that TCBMs are not a substitute for a legally binding treaty addressing space security issues, they have also stated that these measures could represent either catalysts or building blocks for a future accord.

Furthermore, the inclusion of experts from a range of space-faring nations within the UN GGE addresses the emerging space power concern that they are often shut out of major power discussions on important space issues. The participation of Brazilian and South African experts in the GGE increases the likelihood these states will support the recommendations of the group on proposals for new space TCBMs. With both states viewing themselves as bearing a responsibility to speak on behalf of the community of emerging space powers, these experts bring a broad perspective to space security and stability issues that will help the GGE develop TCBMs that can gain the approval of a broad range of space-faring states.

### **CONCLUSION: CONFRONTING THE 3 C's WITH EMERGING SPACE POWERS WHILE PROTECTING THE LEGITIMATE MILITARY USE OF SPACE**

Emerging space powers share many of the same concerns as the United States on the 3 C's. This raises the prospect of future cooperation in addressing these challenges—cooperation that could include efforts to negotiate future international space agreements.

In discussing, drafting, or reviewing these agreements, however, the United States must ensure it protects its critical military operations and assets in outer space. In working with emerging powers, the United States should recognize that many of these states lack robust military space programs, are uncertain of the future military space plans of the United States, and are deeply concerned that major space powers may undertake military actions that, whether directly or indirectly, severely limit or prevent their own access to space. As a result, their efforts to address aspects of the 3 C's may include inequitable, unverifiable, or simply unworkable proposals with the potential to negatively impact the U.S. military's legitimate use of space. However, emerging powers increasingly recognize their economies and populations can reap significant benefits from national or shared space assets and, moreover, that military space operations can play a key role in enabling and protecting these systems within an insecure space environment.

As a result, the United States will likely find it increasingly possible to have useful dialogues with these countries on a broad range of TCBMs or other multilateral space accords that approach the military use of space as a potential "force multiplier" for the public good—and help them protect their limited, valuable space assets that have dual national security/civilian applications. Building bridges between established and emerging space powers will help the United States find partners in ongoing efforts to improve the safety, security, and stability of outer space and will also protect the U.S. military's ability to continue the responsible, legal use of space to enable critical missions around the globe and across the "high frontier."

## International Commercial Avenues to Complement Deterrence Actions

Jonty Kasku-Jackson

The world relies heavily on services provided by satellite assets, but ensuring the safety and security of those assets is extremely difficult.<sup>1</sup> Classic deterrence approaches rely almost exclusively on the threat of force to dissuade one state from acting against the interests of another. Although classic deterrence was arguably successful against a single adversary during the Cold War, it seems insufficient in the current multipolar strategic environment. In addition to state actors, the strategic environment is complicated by a number of non-state players in space. Some scholars present a theory in which a state could dominate earth if it could only achieve military control of space.<sup>2</sup> This article does not address that approach nor does it address weaponization although it does touch on dual use of space. Instead, it addresses whether it may be time to examine additional, complementary actions that could supplement classic deterrence actions. Specifically, this paper examines the potential to use international arbitration and litigation mechanisms to complement classic deterrence actions.

### *The Current Space Strategic Environment*

The global economic and security arenas rapidly are becoming information based. States increasingly rely on space capabilities to send and receive information they must have to pursue their security interests. Under some current economic

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<sup>2</sup> Everett C. Dolman, *Astropolitik: Classical Geopolitics in the Space Age*, (London:Frank Cass Publishers, 2002), Chapter 6.

theories, information is also an essential element that impacts a state's economy.<sup>3</sup> While there are a number of ways to move information from place to place, commercial space capabilities play a critical role in transporting that information. That role is reflected in the growth in the commercial space industry.

In 2012, the global space industry (commercial space revenues and government space spending together) was assessed to be \$304.31B. Commercial space products and services accounted for \$115.97B. The market for satellite communications (SATCOM), assessed to be \$113.61B, is expected to continue to increase. Some research assesses there will be 220 million homes in 80 countries that receive Direct-to-Home Television (DHT) services by 2017.<sup>4</sup> While some might not consider DHT information services essential to a state, they are used for tele-education and telemedicine, which are important state interests. The DHT market also reflects the growing individual and business interest in SATCOM.

In 2012 revenue for the SATCOM sector was assessed to be \$19.32B, and approximately half of those revenues were generated by only four providers - Intelsat, SES, Eutelsat, and Telsat. The growing market for space capabilities to support state and non-state players indicates the vested interest both users and providers of space services have in ensuring satellites transporting critical information remain untouched. Because SATCOM makes up such a large portion of the space industry, it will serve as a good context to examine whether international dispute resolution

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<sup>3</sup> Robert Gilpin, *Global Political Economy, Understanding the International Economic Order*, (Princeton:Princeton University Press, 2001), discussing his "New Economic Theories."

<sup>4</sup> *The Space Report The Authoritative Guide to Global Space Activity*, The Space Foundation (2013), 31.

mechanisms (arbitration and litigation) could be suitable complements to deterrence.

### *Deterrence Then and Now*

It is useful to examine the development of classic deterrence and consider its weakness before examining international dispute resolution mechanisms. Deterrence strategy was developed by U.S. policy makers during the Cold War and was intended to prevent two superpowers with nuclear weapons from using those weapons. Each superpower attempted to influence the other to prevent an undesired behavior. Each state weighed the potential cost of its proposed action against the potential benefit of that action. Three elements were, and still are, required for deterrence to work. First, the state wishing to dissuade the other must have the capability for coercion. Second, it must be perceived to have the intent to use that capability. Finally, it must clearly communicate that intent to the state it wishes to deter. As deterrence strategy matured during the Cold War, two aspects developed. One aspect, general deterrence, is based on current power relationships and attempts to prevent an adversary from seriously considering *any kind* of military challenge because of expected adverse consequences.<sup>5</sup> [Emphasis added]. The second aspect, immediate deterrence, has been described as “specific” and it attempts to forestall an anticipated challenge to a *well-defined and publicized commitment*. It is practiced when general deterrence is thought to be failing.<sup>6</sup> [Emphasis added]. It is essential to note that deterrence has been developed as a way to prevent undesired action between *states* and not nationals or corporations within the state.

A primary weakness with classic deterrence is that it was developed to focus on a single state in a bipolar environment. According to Avery

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<sup>5</sup> Richard Ned Lebow, “Deterrence” (New York: Routledge Handbook of Security Studies, 2010), 397, quoting P.M. Morgan’s *Deterrence: A Conceptual Analysis*, 2<sup>nd</sup> Edition (Thousand Oaks, CA: Sage Publications, 1983).

<sup>6</sup> Avery Goldstein, *Deterrence and Security in the 21<sup>st</sup> Century, China, Britain, France, and the Enduring Legacy of the Nuclear Revolution*, (Stanford CA: Stanford University Press, 2000), 22-24.

Goldstein, a state must not only consider what an opposing state believes, it must also consider allies and partners in its calculations.<sup>7</sup> This was not a problem during the Cold War when there were only two players but it is now in the current multipolar environment. He also asserts a large state may not act against smaller states with impunity or its reputation might be damaged and that it must protect smaller partners from undesired actions of others in order to preserve its own reputation.<sup>8</sup> In space there are a handful of major space players but numerous smaller players and each has its own interests to protect. This environment provides many opportunities for complications and misunderstandings. Applying deterrence to that environment is problematic.

Another weakness of deterrence is that it assumes each state’s definition of “rational” is the same. As Keith Payne points out, a key assumption of nuclear deterrence between the United States and the Union of Soviet Socialist Republics (USSR) was that each state was rational. During the Cold War the United States believed the USSR was a rational actor as the United States defined “rational.” According to U.S. calculations both states were assessed to be mutually vulnerable to the other’s nuclear arsenal. Therefore neither would initiate a nuclear war since it would lead to the mutual destruction of both. The United States believed this ability to mutually destroy each other created stability. It appears however that the U.S. and USSR definitions of “rational” differed considerably. The United States considered nuclear war to be unthinkable and assumed the USSR believed the same. Evidence now shows that USSR war plans actually included use of nuclear weapons in Western Europe during the very early stages of a war. The USSR expectation of the United States appeared to be shaped more by ideology than by Western deterrence theory.<sup>9</sup> This most basic misunderstanding seems to be exacerbated by the fact that the personal interests

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<sup>7</sup> Goldstein, *Deterrence and Security*, 22-24.

<sup>8</sup> *Ibid.*

<sup>9</sup> Keith B. Payne, *The Fallacies of Cold War Deterrence and a New Direction*, (Kentucky, The University Press of Kentucky, 2001), 18-26.

and beliefs of a state leader may significantly influence what a state considers to be rational.<sup>10</sup>

### *Difficulties with “Space Deterrence”*

There have been a number of recent attempts to adapt classic deterrence theory into “space deterrence.” Under space deterrence, as in classic deterrence, relative dominance between states is very important. Deterrence will likely be less effective if there is little relative difference between the players since a significantly weaker power, such as North Korea, has little to lose and much to gain. Although the major spacefaring nations may be competing to dominate the space medium, numerous other states have a limited presence in space or aspire to have a presence in space. While the prestige associated with a presence in space is great, small or aspiring states rely very little on space to directly secure their national interests. This leads to a situation where a handful of major actors, heavily reliant on space, are disproportionately vulnerable to many small states. The stability previously promised by mutually assured destruction between two major states is lost. It may therefore be dangerous to extrapolate classic nuclear deterrence into space deterrence.

Another key weakness in applying classic deterrence to space is the difficulty in attributing *interference* with a satellite to a specific actor. There is general agreement that interference ranges from temporary and non-destructive to complete destruction. However, there appears to be no specific, generally accepted definition of “interference”. The Outer Space Treaty<sup>11</sup> does not specifically define interference although it requires parties to undertake appropriate consultations if their activities in outer space “would cause potential harmful interference with

<sup>10</sup> Ibid., 40-46. For example, Saddam Hussein was said to glorify war; Mao Zedong viewed himself as god-like and unaccountable; and Syria’s Defense Minister Mustafa Tlas was greatly fond of an Italian film star and ordered his forces to not harm Italian soldiers during a truck bombing.

<sup>11</sup> *Treaty on Principles Governing the Activities of States in the Exploration and use of Outer Space, Including the Moon and Other Celestial Bodies*, 27 January 1967.

activities of other States Parties...”<sup>12</sup> The proposed Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force Against Outer Space Objects uses the terms “use of force” and “threat of force”<sup>13</sup> instead. The proposed Code of Conduct<sup>14</sup> defines anti-satellite weapons and space weapons but not interference.

Since treaties do not define interference, states are free to interpret as they see fit. The U.S. National Space Policy specifically mentions both interference and attack.<sup>15</sup> Japan’s Basic Plan on Space Policy uses the term interference only in the context of navigation satellites being susceptible to “interference from other radio stations.”<sup>16</sup> The English translation of the Whitepaper on China’s Space Activities in 2011 does not even use the term “interference”.<sup>17</sup> The absence of a clear definition of interference may provide a great amount of flexibility to the states to protect their interests. It also may provide the greatest amount of instability as states are uncertain what activities would be considered interference and therefore likely to provoke a response.

Assuming an interfering actor could be identified, it is highly unlikely a state would retaliate due to

<sup>12</sup> *Treaty on Principles Governing the Activities of States in the Exploration and use of Outer Space, Including the Moon and Other Celestial Bodies*, 27 January 1967. Article IX.

<sup>13</sup> The Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force Against Outer Space Objects. Article I(e). [http://www.in.mid.ru/brp\\_4.nsf/0/0D6E0C64D34F8CFAC32573EE002D082A](http://www.in.mid.ru/brp_4.nsf/0/0D6E0C64D34F8CFAC32573EE002D082A).

<sup>14</sup> Model Code of Conduct for the Prevention of Incidents and Dangerous Military Practices in Outer Space. [http://www.space-library.com/0407HLSC\\_CodeOfConduct.pdf](http://www.space-library.com/0407HLSC_CodeOfConduct.pdf). Article I 5,6.

<sup>15</sup> National Space Policy of the United States of America, 28 June 2010. “Principles.” [http://www.whitehouse.gov/sites/default/files/national\\_space\\_policy\\_6-28-10.pdf](http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf).

<sup>16</sup> Basic Plan on Space Policy, Strategic Headquarters for Space Policy, Government of Japan. 25 January 2013.

<sup>17</sup> China’s Space Activities in 2011, Information Office of the State Council, The People’s Republic of China, Beijing, December 2011.

intentional much less accidental inference. There is too high a chance that retaliation could escalate a conflict out of control.<sup>18</sup> It would also be very difficult for a state to meaningfully retaliate against the interfering actor—especially if it had little or no presence in space. In addition to the technological limitations associated with identifying who is interfering with a satellite, there are other political and legal factors to consider. Goldstein points out that a state must not only consider what an opposing state believes, but must also consider allies and partners in its calculations. Furthermore, he asserts a large state may not act against smaller states with impunity or its reputation might be tarnished. Conversely it must protect smaller partners from undesired actions of others in order to preserve its reputation.<sup>19</sup>

In space there are only a handful of major players but there are numerous smaller players that must be considered. Payne posits a framework that focuses on identifying potential challengers and building a profile of each to develop deterrence actions.<sup>20</sup> A framework that profiles each small state challenger is almost essential to conduct cost benefit analyses. However, this approach, tailored to specific challengers, would require significant resources. Practical application also would be daunting as developing and considering profiles of 60 or more states would complicate calculations to the point of uselessness. Additionally, a state would need to consider any unintended consequences to each state for every action it takes.

In contrast to Payne, Forest E. Morgan examines a first-strike capability in which two or more states are mutually deterred not to attack first, thus creating stability. It focuses on each side's force posture and the balance of capabilities and vulnerabilities that could make a crisis unstable should a confrontation occur.<sup>21</sup> Although nuclear

weapons are not involved, Morgan sees a number of parallels to a first-strike capability in space. He notes that satellites are difficult to defend and that it could be very costly if deterrence fails.

Additionally he asserts that both nuclear and space deterrence have significant thresholds which could lead to reprisal and escalation if they are crossed.<sup>22</sup> Morgan seems to extend the fundamental tenets of nuclear deterrence to space deterrence.

However, he also asserts that thresholds of deterrence would differ depending on the specific space system involved and the level of war. Reversible attacks would be less severely punished while destructive attacks that create debris would be more severely attacked. Nuclear detonations in space, for example, would be most severely punished.<sup>23</sup> Morgan's approach also assumes that space deterrence would become a function of escalation and that "a savvy adversary might continue to abstain from destroying U.S. satellites in a limited war for fears of escalating the conflict..."<sup>24</sup> However, he also notes there are some circumstances in which an adversary might not be deterred from using any level of destructive force in space, particularly if the state feels an existential threat or if it believes it can absorb the punishment necessary to benefit from its actions.<sup>25</sup> For example, North Korea insists it needs nuclear capabilities to protect itself from being annihilated by the U.S. However its reliance on space is virtually non-existent. Therefore, it is very unlikely it would be deterred from using any level of force in space. There is also the underlying problem that Payne identifies where a leader's personal beliefs will impact the definition of "savvy" and any cost benefit analysis conducted. Furthermore, it complicates attempts to deny an adversary the benefits of its actions, and Morgan

<sup>18</sup> Damon Coletta, "Space and Deterrence", *Astropolitics: The International Journal of Space Politics & Policy* (November 2009).

<sup>19</sup> Goldstein, *Deterrence and Security in the 21<sup>st</sup> Century*, 22-24.

<sup>20</sup> Payne, *Fallacies of Cold War Deterrence*, 104-114.

<sup>21</sup> Forest E. Morgan, *Deterrence and First-Strike Stability, A Preliminary Assessment* (Santa

Monica: RAND Corporation, 2010), 2, citing Glenn A. Kent and David E. Thaler, *First-Strike Stability: A Method for Evaluating Strategic Forces* (Santa Monica, CA: RAND Corporation, 1989).

<sup>22</sup> *Ibid.*, 2.

<sup>23</sup> *Ibid.*, 17.

<sup>24</sup> *Ibid.*, 18.

<sup>25</sup> *Ibid.*, 20-21, 26.

suggests emphasizing resilience of space systems to mitigate that issue.<sup>26</sup>

Jay Finch and Shawne Steene continue the line of reasoning laid out by Morgan. Unlike Morgan, they assert critical differences between space systems and nuclear weapons necessarily change how deterrence theory would be applied. Similar to Morgan they base their analysis on the assumption that counterspace weapons range from those that cause reversible damage to a target to those that permanently destroy a target.<sup>27</sup> Finch and Steene assert that because of this, space deterrence should work on two levels. On one level, deterrence threats should discourage actions that cause either reversible or permanent harm to a satellite system. On a second level, stability in space must also be considered in a broader deterrence relationship between potential adversaries.<sup>28</sup> They point to developing international norms as a means to condition adversaries as to what is acceptable and what is not.<sup>29</sup>

Norms are common understandings, accepted by most participants. Given the difficulty of getting the major space players to agree on a set of norms regarding activities in space, it is unlikely that those who don't agree with the norms would be deterred. The authors do examine enhancing resilience, augmentation, and the ability to operate in a degraded environment, and they recommend tailoring specific approaches to specific situations.<sup>30</sup> There seems to be broad recognition of difficulties with extrapolating classic deterrence into space. It is particularly difficult in the event of interference with a consortium-owned, commercial satellite.

The practical difficulties in applying classic deterrence to space seem to argue for additional complementary non-deterrence actions to dissuade interference with satellites. Karl

<sup>26</sup> Ibid., 31.

<sup>27</sup> Jay Finch and Shawn Steene, "Finding Space in Deterrence, Toward a General Framework for 'Space Deterrence'," *Strategic Studies Quarterly* (Winter 2011).

<sup>28</sup> Ibid.

<sup>29</sup> Ibid.

<sup>30</sup> Ibid.

Mueller includes a "rewards and reassurance" aspect to his discussion of deterrence in which a state "seeks to make aggression or escalation less attractive by making the status quo look more beneficial or less dangerous to the potential adversary."<sup>31</sup> Using international dispute resolution mechanisms could contribute to increasing the appeal of the status quo, thus contributing to Mueller's "rewards and reassurance" subset of deterrence. Because dispute resolution is not state specific, it is considered to be a contributor to deterrence and not a subset of deterrence. Actions that are not state-focused might be useful when commercial entities are involved.

Determining what is commercial, however, is difficult since the terms of the space treaties do not determine whether activities are for national security, civil, or commercial purposes. Often, security-civil and commercial space activities blend together into dual use. This is exacerbated by the way in which states organize their space programs. For example the U.S. has a civil sector, a defense/intelligence sector and a commercial sector. The commercial sector includes corporations whose primary customers are the civil and defense/intelligence sectors. However, they are still considered commercial. China does not differentiate between its sectors and the exact role played by the military, the corporations and the different academic institutions is unclear.<sup>32</sup> Many of its corporations are state owned but are still arguably commercial since they are not an official state agency.

Since it is possible to define commercial to include entities with significant state involvement, the option to use dispute resolution channels may be available. Commercial satellite service providers sell a wide variety of services to an

<sup>31</sup> Karl P. Mueller, "The Absolute Weapon and the Ultimate High Ground: Why Nuclear Deterrence and Space Deterrence are Strikingly Similar – Yet Profoundly Different," in *Anti-satellite Weapons, Deterrence and Sino-American Space Relations*, Michael Krepon & Julia Thompson, eds. (Stimson, September 2013), 44.

<sup>32</sup> Laurence Nardon, "Developed Space Programmes", in *The Politics of Space A Survey*, ed. by Eligar Sadeh, (NY: Routledge, 2011), 69.

extensive clientele that may or may not be states. Due to that wide clientele and their relative monopoly on satellite services, commercial satellite providers seem to wield increasing influence in the current global economic environment. Deterrence, as previously discussed, applies to states not individuals. It is worthwhile, then, to examine different concepts of state sovereignty as they could influence any course of action chosen.

Deterrence approaches assume the current Westphalian definition of sovereignty, which delineates a clear relationship between sovereignty, territory, and the state.<sup>33</sup> This poses some difficulty when discussing activities in space since the Outer Space Treaty forbids claims of sovereignty.<sup>34</sup> Jill Stuart argues for an alternative concept of sovereignty in which outer space has been delinked or “unbundled” from territory.<sup>35</sup> Her idea of cosmopolitan sovereignty would treat outer space as an issue-area, inherently transnational, which contributes to its greater sense of global community.<sup>36</sup> Under this new formulation individuals are the primary political agents,<sup>37</sup> which would seem to support using systems designed to be used by individuals rather than states.

However, it is unclear whether cosmopolitan sovereignty is achievable or desired. Even if space is considered to be inherently transnational, there will almost certainly be actions or effects within inter-state politics. Some sort of dispute resolution mechanisms would still need to be developed. Rather than attempting to change the current sovereignty definitions and concepts, it would be simpler and more achievable to use current dispute resolution processes. Using international dispute resolution mechanisms,

<sup>33</sup> Jill Stuart, “Unbundling Sovereignty, Territory and the State in Outer Space, Two Approaches”, in *Securing Outer Space*, Natalie Bormann and Michael Sheehan, eds. (NY: Routledge, 2009), 8.

<sup>34</sup> *Treaty on Principles Governing the Activities of States in the Exploration and use of Outer Space, Including the Moon and Other Celestial Bodies*, 27 January 1967. Article II.

<sup>35</sup> Stuart, “Unbundling Sovereignty,” 8-9.

<sup>36</sup> *Ibid.*, 11-16.

<sup>37</sup> *Ibid.*, 15, discussing David Held’s work.

available to both nationals of a state and the states themselves, would preclude neither Westphalian sovereignty nor the cosmopolitan concept of sovereignty. Indeed, agents within this regime collectively could support traditional Westphalian sovereignty or construct cosmopolitan sovereignty as desired.

### ***International Business Interests and Dispute Resolution Processes***

Although applying deterrence alone within the current strategic space environment may be insufficient, using a complementary, non-deterrence approach could be useful. Such an approach would not be based on the international space treaties but would be based on international dispute resolution laws and processes. Since the world today is dependent on information in a way not historically seen, the focus of any actions should be on protecting that information. Rather than focusing on the threat of force, let the U.S. consider leveraging economic entanglement between commercial space providers and the states.

Commercial space providers supply invaluable global information transportation capabilities. States, individuals, nongovernmental organizations, and businesses all contract for space services. Arguably, commercial space providers may be seen as having a disproportionate amount of economic and political influence due to their near monopoly of the market. Since there are very few providers of a particular space service, a provider may choose not to sell services to a customer it deems a risk to future revenues. A provider could also charge a higher price for one customer than another regardless of whether the customer is a state, an individual, or another non-state entity. Because of this, it seems sensible to look at international business interests and dispute-resolution processes.

International business practices, dispute resolution processes, and enforcement mechanisms are fairly well documented and accepted. There are a number of international business norms and international legal regimes designed to regulate and enforce contractual obligations among

international business organizations.<sup>38</sup> Using established dispute resolution processes sidesteps the political sensitivities associated with deterrence and its focus on use of force. Using both dispute resolution and deterrence are possible since, in general, both states and businesses are concerned with two foundational interests.

Both are concerned with security and prosperity in one form or another. Commercial entities appear to be interested in profit and secure markets. States are concerned with national security and prosperity. Both commercial and state interests are inextricably intertwined. In order for a state to be secure, it must have sufficient resources, labor, and technology to defend itself from external threats and care for its domestic population. Traditionally, resources are considered to be physical materials that reside within a state's borders. In the context of this article, the primary resource in question is information that routinely crosses state borders. Secondary resources are considered to be the commercial SATCOM satellites transporting that information. The states have an interest in protecting both the information and the SATCOM satellites themselves. However, in order for the commercial SATCOM providers to transport the information states require, the providers must be profitable and stable. To be profitable, commercial SATCOM providers need a stable environment in which they can conduct business. They seek to establish a reputation for reliability that will facilitate an expanded customer base and secure long term markets. The responsibility of the state is to provide that stable environment. However, the state needs information to inform and shape the actions it needs to take to ensure that stability. States and commercial providers, therefore, are mutually reliant on the other.

In some cases, immediate or short-term interests may conflict. For example, a state might have a

security requirement that requires it to remain technologically more advanced than its neighbors. If the state chooses to satisfy that need by strictly regulating technology, it may adversely affect the commercial providers it relies on. If the controls are too onerous, then commercial SATCOM providers may lose the opportunity to partner with other commercial providers or might not even be allowed to provide services to other parties. The result could be commercial providers are no longer able to compete in the international market, threatening short-term profitability and long-term markets. In one sense, the state is more secure because the flow of technology has been reduced, allowing it to stay ahead of other states. In another sense the state's security is actually reduced because information it needs to pursue its security interests is no longer available from commercial providers. In some cases, states become primary customers for SATCOM services, regardless of a politically stable environment, simply to ensure that commercial providers survive.<sup>39</sup>

Given the importance states place on the information they receive from commercial providers, entanglement of interests is unsurprising. It is also unsurprising because states typically desire to protect technological advantages developed by the commercial space sector. Scott Pace asserts dual-use space technologies "have a great potential to shape which national capabilities actually occur and whether American interests are advanced or harmed as they are adopted in global markets."<sup>40</sup> Adoption of technology that shapes the ways a state pursues its national interests is important, and the information provided by that technology is as important.

There is some concern about potential ramifications of commercial businesses providing space capabilities for an adversarial actor that

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<sup>38</sup> *New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards*, 21 UST, 2517 TIAS No. 6997, 330 UNTS 38, June 10 1958. *OECD Declaration on International Investment and Multinational Enterprises*, 15 ILM 967, 21 June 1976. *Convention on the Settlement of Investment Disputes Between States and Nationals of Other States*, 17 UST 1270, TIAS No 6090, 575 UNTS, 18 March 1965.

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<sup>39</sup> For example the U.S. military purchases approximately \$1B of commercial SATCOM services annually (about 80% of what it needs.) *The Space Report*, 139.

<sup>40</sup> Scott Pace, *Toward a Theory of Space Power: Selected Essays, Merchant and Guardian Challenges in Space Power* (Washington D.C.: National Defense University, 2011), 247.

might be unable to develop its own capabilities.<sup>41</sup> However, the number of states and commercial entities that can do this is extremely limited. Few have the monetary and intellectual capital necessary to develop, build, and operate any satellite system, much less sophisticated, expensive, communications satellites. Of more concern is the fact that commercial SATCOM providers are usually made up of a consortium of actors. These satellite communications companies are also often in partnership with each other. Commercial SATCOM providers effectively monopolize space capabilities states need to pursue their national interests giving them disproportionate influence in political and economic arenas. According to Robert Gilpin, even in democracies, a relatively elite group of players tend to determine national interest and foreign policy within a state.<sup>42</sup> Commercial space providers could be considered one such powerful elite. If their domination of the SATCOM market did not make them powerful actors in itself, then the states' heavy reliance on their services and technologies would.

#### ***International Commercial Business Interests***

As a powerful group, it would not be surprising if commercial space providers were to attempt to influence international markets to their advantage.<sup>43</sup> The commercial sector has already demonstrated its global influence when it created data associations in which satellite companies share data amongst themselves. The Space Data Association (SDA) was created in order to supplement or replace the data previously provided via state resources. In 2009, an Iridium satellite and an inactive Russian-owned Kosmos satellite collided.<sup>44</sup> In 2010, a communications

satellite with active transponders drifted from its assigned orbital slot. That satellite still had active transponders, creating potential interference with neighboring satellites. Both incidents illustrated the potential for severe harm to commercial SATCOM providers. In the first case, the providers lost all revenue generated by the Iridium satellite. In the second case, the potential for harm was significantly greater since the rogue satellite could have impacted up to 15 other communications satellites owned by SES, Telesat, and Satmex.<sup>45</sup> Intelsat would not only have lost revenue from its satellite but could also have been liable for interference with the other satellites.

In reaction to the latter Galaxy 15 incident, Inmarsat, Intelsat, and SES created the aforementioned Space Data Association (Eutelsat, the fourth member of the 'top four,' joined later).<sup>46</sup> The SDA was created to provide the necessary legal and technical framework to improve the accuracy of collision avoidance predictions, which could be seen as protecting and increasing revenue.<sup>47</sup> The technical framework facilitated the actual sharing of data among competitors. Data sharing minimizes the chance of collisions and interference between satellites, thereby minimizing potential loss of revenue by members. Importantly, the SDA legal framework is designed to enforce appropriate behavior of all

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February of 2009, Iridium 33 and Kosmos-2251 collided at high velocity, destroying both. Second, In April 2010, Intelsat lost control of its Galaxy 15 communications satellite which drifted away from its orbital slot with still active transponders, creating potential interference with neighboring satellites. Satellite control was reestablished on 23 December 2010.

<sup>45</sup>De Selding, "Intelsat Moving Recovered Galaxy," <http://www.spacenews.com/article/intelsat-moving-recovered-galaxy-15-test-location>.

<sup>46</sup>[http://www.space-data.org/sda/wp-content/uploads/downloads/2013/03/20130318\\_SDA\\_users\\_Mtg\\_p.m.\\_Session\\_FINAL.pdf](http://www.space-data.org/sda/wp-content/uploads/downloads/2013/03/20130318_SDA_users_Mtg_p.m._Session_FINAL.pdf). As of May 2013, fifteen operators, controlling a little over half (227) the geosynchronous satellites, participate in SDA. Another five operators controlling ninety-two low earth orbit satellites also participate (last accessed 23 July 2013).

<sup>47</sup>[http://www.space-data.org/sda/wp-content/uploads/downloads/2013/03/20130318\\_SDA\\_users\\_Mtg\\_p.m.\\_Session\\_FINAL.pdf](http://www.space-data.org/sda/wp-content/uploads/downloads/2013/03/20130318_SDA_users_Mtg_p.m._Session_FINAL.pdf) (last accessed 21 July 2013).

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<sup>41</sup> *Annals of Air and Space Law*, Vol. XXX-II, (Montreal:McGill University, 2005), 398.

<sup>42</sup> Gilpin, *Global Political Economy*, 18

<sup>43</sup> *Ibid.*, 78. Gilpin presumes that states, multinational corporations, and other powerful actors attempt to use their power to influence the nature of international regimes.

<sup>44</sup> Peter B. de Selding, "Intelsat Moving Recovered Galaxy 15 to Test Location", *Spacenews*, (7 January 2011), <http://www.spacenews.com/article/intelsat-moving-recovered-galaxy-15-test-location>. First, in

participants.<sup>48</sup> The legal framework protects each company's data, thus facilitating sharing of that data. Without that legal framework, the companies would probably not share their data with competitors regardless of their technological capability to do so. One could consider this visionary and well-designed framework as positive indication that the SDA is one of those "powerful organizations" identified by Gilpin.

Although the SDA could be a 'powerful organization', it cannot directly avail itself of current international space treaties. Among state actors, these treaties codify the importance of space. The International Telecommunication Union (ITU), for example, recognized the importance of SATCOM in its constitution and drafted provisions to coordinate efforts to eliminate harmful interference between different states. It also required members to operate in a manner that would not cause harmful interference to another state's telecommunications.<sup>49</sup> In another instance, the Outer Space Treaty (OST) assigned states international responsibility for national activities in outer space (Article VI). Since states are responsible for any interference to another state's space assets, they have incentive to regulate private entities within their jurisdiction. These regulatory regimes are intended to meet states' international legal liability obligations, not to facilitate business interests. Just as deterrence constraints only are effective if they are reciprocal among all major actors,<sup>50</sup> commercial agreements and regulations must also be mutually enforceable.

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<sup>48</sup> [http://www.space-data.org/sda/wp-content/uploads/downloads/2013/03/20130318\\_SDA\\_u\\_sers\\_Mtg\\_p.m\\_Session\\_FINAL.pdf](http://www.space-data.org/sda/wp-content/uploads/downloads/2013/03/20130318_SDA_u_sers_Mtg_p.m_Session_FINAL.pdf) (last accessed 21 July 2013).

<sup>49</sup> *Constitution of the International Telecommunication Union*, 22 December 1992, International Telecommunication Union's website, <http://www.itu.int/publications/chtml/const/art58.html>, Preamble and Article 45. However, under Article 34, the Constitution specifically reserved to its members the right to stop transmissions that are contrary to a state's laws, public order, or decency.

<sup>50</sup> Roger G Harrison, "Space and Verification, Volume I: Policy Implications", *Eisenhower Center for Space and Defense Studies* (February 2011), republished in this volume of *Space & Defense*.

In the SDA, the legal agreements are enforceable against all members of the SDA, in accordance with the domestic laws of the Isle of Man (where the SDA was established as a legal entity). This is consistent with current business practices and international laws. Like deterrence, some business norms and dispute resolution processes discourage bad actions with the threat of punishment. However, that punishment is by way of a financial penalty rather than forceful retaliation. Unlike deterrence, part of the goal of dispute resolution is to compensate the injured party as well as to punish the acting party. Also of note, under business practices, intent to harm does not always matter. Specific action, whether intentional or not, can be penalized. Therefore, financial penalties for both intentional and unintentional harm should create greater incentives to prevent accidental interference. That is an important aspect, since classic deterrence is not designed to discourage accidental behavior. Additionally, a company may be penalized for each instance of interference or may be repeatedly penalized for harmful activities. In this case, interference is treated as a private, individual issue rather than a state, security issue.

Much attention has been focused on the space treaties and their lack of enforcement mechanisms.<sup>51</sup> Many have called for creating new treaties or amending the current treaties. Others advocate a supranational organization with fully enforceable, absolute, legal authority over space activities.<sup>52</sup> Even if a supranational organization is the desired state, it will take significant time and significant changes in attitude before that occurs.

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<sup>51</sup> *Treaty on Principles Governing the Activities of States in the Exploration and use of Outer Space, Including the Moon and Other Celestial Bodies*, 27 January 1967. Article IX. States are required to "undertake appropriate international consultations" before conducting any activity that could potentially harmfully interfere with another state's activities in space.

<sup>52</sup> See Gerardine Meishan Goh, *Dispute Settlement in International Space Law, A Multi-Door Courthouse for Space* (Boston: Martinus Nijhoff Publishers, 2007). James Clay Moltz, *The Politics of Space Security, Strategic Restraint and the Pursuit of National Interests*, (Stanford: Stanford Security Studies, 2011).

Moving toward using already existing international commercial and contract enforcement mechanisms provides an alternative to the ineffectual space treaties but does not move toward a supranational, enforcement mechanism advocated by some<sup>53</sup> or toward less state-oriented sovereignty.<sup>54</sup> Although space treaties are generally considered ineffective at enforcing their provisions, they do recognize the importance of space and activities conducted in space. The treaties do not determine whether activities are for national security, civil, or commercial purposes. They simply require space activities to be for peaceful purposes. Although that provides a great deal of flexibility it can also cause complications since the same space assets may be dual use and used for both state and commercial purposes.

Many of the proposed treaties or amendments to current treaties focus on state liability obligations. However, Julian Hermida points out that current international space treaties and conventions are “not all together responsive to the needs of the private sector, especially with respect to the impossibility of making direct claims for compensation under the Liability Convention...”<sup>55</sup> Given the dual use nature of most space assets, a non-state, business avenue that provides for compensation seems called for.

It is possible the Liability Convention provides an initial avenue that does meet the needs of the private sector. Under Articles II and XI of the Liability Convention, a launching state is liable to *pay compensation* for damage caused by its space object [emphasis added].<sup>56</sup> The Convention allows for establishing a claims commission to determine the specific compensation to be paid. It also acknowledges a state’s right to pursue a claim

in a launching state’s courts, administrative tribunals, or agencies of that state.<sup>57</sup>

In 1982 a UN General Assembly Resolution, recognizing the significant impact of direct broadcasting via satellite systems, also recognized that domestic entities acting under the state’s jurisdiction might be primarily involved rather than the state itself.<sup>58</sup> The state does not have to be the primary participant in dispute resolution as would be the case under the space treaties. More specifically, the 2006 Convention on the Settlement of Investment Disputes between States and Nationals of other States specifically allows non-state parties into the dispute resolution process.<sup>59</sup> In order to take advantage of that, judgments and financial penalties must be enforceable across the states. Fortunately there are a number of international conventions and treaties that recognize the validity of domestic judgments and facilitate their enforcement internationally.<sup>60</sup>

<sup>57</sup> *Liability Convention*, Article XI.

<sup>58</sup> *Principles Governing the use by States of Artificial Earth Satellites for International Direct Television Broadcasting*, 1982, General Assembly Resolution 37/92, UN Docs. A/RES/37/92 a. *Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite*, International Bureau of World Intellectual Property Organization, 21 May 1974, (WIPS)’s website <http://www.wipo.int/treaties/en/ip/brussels/trtdocs-wo025.html>.

<sup>59</sup> *Convention on the Settlement of Investment Disputes Between States and Nationals of other States*. ICSID Convention, Regulations and Rules, ICSID/15, April 2006. “...In accordance with the provisions of the Convention, ICSID provides facilities for conciliation and arbitration of investment disputes between Contracting States and nationals of other Contracting States.”

<sup>60</sup> *New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards*, 21 usT, 2517 TIAS 6997, 330 UNTS 38, 10 June 1958. *OECD Declaration on International Investment and Multinational Enterprises*, 15 ILM 967, June 21, 1976. *Convention on the Settlement of Investment Disputes Between States and Nationals of Other States*, 17 usT 1270, TIAS 6090, 575 UNTS 159, March 18, 1965. *Principles Governing the use by States of Artificial Earth Satellites for International Direct Television*

<sup>53</sup> Goh, *Dispute Settlement* and Moltz, *The Politics of Space Security*.

<sup>54</sup> Jill Stuart, “Unbundling sovereignty.”

<sup>55</sup> Julian Hermida, *Legal Basis for a National Space Legislation*, (Norwell: Kluwer Academic Publishers, 2004), 178-179.

<sup>56</sup> *Convention on the International Liability for Damage Caused by Space Objects*, 24 usT 2380, TIAS 7762,961 UNTS 187, 29 March 1972.

There are two types of activities that interfere with the information transported via satellite. In the first case a contract may be breached; in the second a tort may have been conducted. (A tort is a wrongful action that results in the harm to another's person or property and for which a remedy may be obtained.) Determining whether an action is a breach of contract or a tort is important when deciding which international business mechanisms to use.

If the dispute is contractual and the parties to the contract have agreed to an arbitration clause then the matter is rather straightforward. Per the clause in the contract, the dispute is arbitrated in accordance with agreed upon rules of procedure, choice of law and by an agreed upon arbiter. Furthermore, parties agree the results are binding and awards from arbitration are enforceable between the parties. Arbitration is typically used in commercial contracts since it is generally considered to more efficient, confidential, and less expensive than litigation.<sup>61</sup> When parties agree to arbitration they give up their right to litigate in a state's legal system,<sup>62</sup> but this may not be desired

if there is little established law that pertains to the potential issues.

A drawback to arbitration is that the parties must have had the foresight to draft an appropriate arbitration clause to address an anticipated dispute. Foresight could be based on current laws and norms or might be based on some new or controversial issue. For example, the SDA might have had reason to insert an arbitration clause into its membership contract. That contract addresses misuse of members' data and allows members to enforce the terms of the contract directly against other members. It would not be unreasonable for the parties to insert an arbitration clause. Such an arbitration clause might require disputes via arbitration rather than via a particular state's legal system. In this case, resolving disputes via an arbitration clause could set precedence. Since arbitration results are binding and awards are enforceable, actors considering similar future actions could be dissuaded from taking those actions.

Although the SDA provides an example to examine the merits of arbitration, it does not provide a good example for examining the merits of litigation. However a context in which to examine litigation can be found in a case of intentional interference already observed. In 2010 Iran intentionally interfered with Voice of America broadcasts and collaterally interfered with the British BBC, German Deutsche Welle and Eutelsat, stopping television and radio broadcasts.<sup>63</sup> The harm done by Iran clearly impacted more than just one state. The VOA, BBC, and Deutsche Welle issued a joint statement condemning the action, pointing out Iranian authorities "are using the same satellite services to broadcast freely around the world including broadcasts in English and Arabic..." Had they chosen to, they could have brought suit against Iran.

Tort actions may be pursued through a state's domestic court system. Litigation is more

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*Broadcasting*, 1982, General Assembly Resolution 37/92, UN Docs. A/RES/37/92 a.

<sup>61</sup> Joseph Lookofsky and Ketilbjorn Hertz, *EU-PIL European Union Private International Law in Contract and Tort*, (Copenhagen:DJOF Publishing, 2009), 160.

<sup>62</sup> *Mitsubishi v Soler Chrysler-Plymouth*, 473us 614 (1985). A Japanese corporation that manufactured automobiles entered into a distribution and sales agreement with a Puerto Rico corporation. The agreement contained a clause providing for arbitration by the Japan Commercial Arbitration Association for all disputes arising out of certain articles of the agreement or the breach thereof. The Japanese corporation then brought an action in U.S. Federal District Court under the Federal Arbitration Act and the Convention on the Recognition and Enforcement of Foreign Arbitral Awards, seeking to compel arbitration of the disputes in accordance with the arbitration clause. The Puerto Rico corporation claimed that the federal antitrust issues raised in the case were inappropriate for enforcement through arbitration. The court held that the antitrust claims were arbitrable stating: "Concerns of international comity, respect for the capacities of foreign and transnational tribunals, and sensitivity to the need of the international commercial system for predictability in the resolution of disputes, all require enforcement of the arbitration

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clause in question even assuming that a contrary result would be forthcoming in a domestic context."

<sup>63</sup> "Voice of America, "EU Confronts Iran on Satellite Jamming," March 18 2010, <http://m.voanews.com/a/169839.html>.

complicated than arbitration since there is no agreed upon course of action and no agreed upon jurisdiction. An essential, but complicating, element of litigation is determining which state has jurisdiction over a dispute. Since domestic law varies from state to state, parties try to litigate their disputes in the jurisdictions with the laws most favorable to them. Jurisdiction is typically determined in three ways.

In the first, *lex loci delicti commissi*, jurisdiction is determined by where the harmful action (tort) occurred.<sup>64</sup> This could be problematic if the harmful action took place in space since, under the OST, there are no sovereignty claims to space itself. If the tort was conducted from the earth, then jurisdiction would be in the state where the interference was conducted. In the case of Iran's interference with Eutelsat's Hot Bird 8 satellite, jurisdiction would be in Iran. The second way to determine jurisdiction, *lex loci damni*, is determined by where the harm was experienced.<sup>65</sup> Depending on interpretation of the facts, one could argue the harm was done to a satellite in orbit. Since states claim jurisdiction over their satellites in accordance with the OST,<sup>66</sup> jurisdiction would then be in the state with jurisdiction and control of the satellite. Alternatively, the harm suffered could be considered to be in any state where information was disrupted. When Iran interfered with Hot Bird 8, the United States, Great Britain, and Germany all experienced disruption of their data. All three could therefore claim jurisdiction. In the third case, jurisdiction is based on the degree of

<sup>64</sup> *Latour v Guiraud* (1948) D. 375 (as summarized in Lookofsky and Hertz, EU-PIL). During the Spanish Civil War, a truck driven by an employee of a French firm collided with a Spanish railway engine in Spain. Another French driver from a different firm died due to the fire resulting from the collision. Even though both drivers were French residents, Spanish law was applied since the collision occurred in Spain.

<sup>65</sup> Regulation (EC) No 864/2007 Of the European Parliament and of the Council of 11 July 2007 on the law Applicable to non-contractual obligations (Rome II), Articles 16-19. Under the Rome II Regulation, the law of the country in which the damage occurs shall apply.

<sup>66</sup> Outer Space Treaty, Article VIII.

connection to the laws of the states.<sup>67</sup> In this case, since Eutelsat is based out of Paris France, one could argue that French jurisdiction should apply.<sup>68</sup> One could also argue that Italian jurisdiction should apply since Eutelsat has teleports in Italy.

It is a given that forecasting arbitration clauses to include in a contract is difficult. It is also very complicated and difficult to determine the jurisdiction to pursue a cause of action. However, since awards from arbitration<sup>69</sup> and judgments from domestic courts are enforceable,<sup>70</sup> the difficulty may be worthwhile. Awards or judgments from these venues seem to offer another set of actions that might help discourage interference with satellites. However, just as in deterrence, an actor such as North Korea with little to lose in the way of space assets or finances may very well not be dissuaded from interfering with a satellite. Financial penalties, enforceable across the states, might provide incentives to reconsider harmful interference with a satellite, lest they are similarly penalized. Also, litigation proceedings tend to be open to the public, and could focus unwanted attention on an actor. Finally, bad actors might have an incentive to refrain from interfering with space capabilities if

<sup>67</sup> *Roerig v Valiant Trawlers Ltd*, EWCA Civ 21, Case No: B2/3001/1501, (28<sup>th</sup> January 2002). This case concerned damages sought by the wife of a Dutch citizen killed in an accident with an English trawler. The factors considered by the court may be indicative of the types of connections that may be considered when determining which state's law should apply.

<sup>68</sup> Hermida, 246 noting that "French law applicable to space activities consists of a series of scattered contractual, administrative regional norms and arrangements which have been adopted for each space program as the needs arose." Pursuing an action in a French court could be overly complicated and uncertain.

<sup>69</sup> New York Convention, Article III, Brussels Convention, Article 26.

<sup>70</sup> EC Convention on Jurisdiction and the Environment of Judgments in Civil and Commercial Matters, European Union. 1968, <http://www.jus.uio.no/lm/ec.jurisdiction.enforcement.judgments.civil.commercial.matters.convention.brussels.1968/portrait.pdf>. Note this Convention is applicable to Europe but could expand or serve as a basis for a more encompassing treaty at a later date.

they believe they might be refused service or might be charged higher prices due to their past behavior that has required a provider to pay a penalty. Additionally, a state would not face a potentially unfavorable precedence in interpretation of one of the space treaties. Those two factors might make a state more willing to use the dispute resolution processes - especially if a state considers litigation and penalties a relative threat to its national security. In combination with deterrence actions, using the dispute resolution process could be a more effective way to discourage interference with commercial space capabilities.

### *Conclusion*

Classic deterrence strategy as developed during the Cold War seems insufficient when applied to the current multipolar space environment. There are too many actors to

consider when conducting deterrence calculations, and many of those actors are non-state, commercial entities. Very often the relationships between the states and the commercial providers are extremely entangled, and space capabilities have become largely dual use. Deterrence relies on force and was developed to dissuade states from acting in an unwanted manner and is largely insufficient to address business concerns.

Given the current complex environment, it seems an opportune time to explore additional avenues that might complement deterrent actions. Using commercial dispute resolution processes could create pressures to dissuade interference with space capabilities. In conjunction with deterrence actions, legal measures could create a more secure environment in which to operate space assets. This, most importantly, could in turn provide more protection for the valuable information carried via those space assets.

## Identifying America's Vital Interests

Adam Lowther  
Casey Lucius

As the Department of Defense (DoD) continues to shift its focus from Europe to the Asia-Pacific while also attempting to meet budgetary challenges, academics and analysts are examining the nation's difficult financial outlook and contemplating not only the kind of military the United States needs, but the kind it can afford.<sup>1</sup> Such considerations are, however, putting the cart before the horse. A much more basic challenge faces the country. Simply stated, the United States has no clearly defined and broadly accepted set of national interests. Instead, as one report noted, "Many find it difficult to distinguish between America's national interests and whatever interests them personally."<sup>2</sup> The call for clearly defined national interests has been a refrain of military and civilian leaders for many years and yet the lack of clearly articulated national interests has proven the bane of Republican and Democratic administrations. In 1947, George Kennan advised President Truman to distinguish between vital and peripheral interests. Kennan insisted that interests be used as the standard by which to evaluate threats, not the other way around. He argued that threats had no meaning unless in reference to interests.<sup>3</sup>

This article, rather than testing an existing theory or developing a new theory, focuses on a large policy issue that, in our view, has received too

little attention in the post-Cold War years—resulting in a poorly understood and defined concept of what is "the national interest." In arguing for a broader discussion of American interests, we suggest that it is time for the American people and their leaders to engage in an open dialogue that focuses attention on interests and values so that the country may reach a consensus, or as close to one as possible, concerning what comprises the United States' national interest. In doing so, it may be possible to provide decision-makers a clearly delineated set of preferences when evaluating possible foreign policy decisions.

The nation's strategic documents offer little clarification as to the composition of the national interest. The latest *National Security Strategy* (2010) is a case in point. It says, American interests are enduring. They are: The security of the United States, its citizens, and U.S. allies and partners; A strong, innovative, and growing U.S. economy in an open international economic system that promotes opportunity and prosperity; Respect for universal values at home and around the world; and An international order advanced by U.S. leadership that promotes peace, security, and opportunity through stronger cooperation to meet global challenges.<sup>4</sup>

The *National Security Strategy* is a broad document that represents an administration's view of the challenges facing the nation and its approach to addressing those challenges. It is fundamentally a political document of limited value in understanding American grand strategy.<sup>5</sup>

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<sup>2</sup> Commission on America's National Interest, *America's National Interest* (Cambridge, MA: Harvard University, 1997), 13.

<sup>3</sup> John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of American National Security Policy During the Cold War* (Oxford University Press, 2005), 31.

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<sup>4</sup> Barack Obama, *National Security Strategy* (Washington, DC: White House, 2010), 7.

<sup>5</sup> Although not specifically defined in formal government publications, grand strategy may best be thought of as the developing, applying, and coordinating of the instruments of national power to achieve objectives that contribute to national security—a concept derived from several definitions in

This shortcoming is unfortunate, because a lack of a clearly defined set of interests makes it difficult to craft an effective grand strategy that links national policy to all elements of national power—in order to secure the nation’s interests and objectives. Grand strategy can also refer to the nation’s overarching approach to international affairs such as isolationism, collective security, selective engagement, primacy, and so forth. Strategy implies a goal or goals, and establishes priorities. It is the role of policy makers to set goals, and in some cases these goals can limit strategic alternatives. In the 2010 NSS, readers should be able to identify how the President understands national interests in relation to security, and how he will prioritize and protect these interests.

Unfortunately, the description of the nation’s interests provided above is vague and serves limited utility in creating a clear understanding of what matters most to the United States and its citizens. American citizens deserve to know who we are, what we stand for, and why we undertake the policies we do. Planners, strategists, scholars, and military leaders are eager for such clarity, which does not exist currently. Such is necessary for the development of foreign policy and military strategy that are effective in protecting what matters most to the nation.

### **CONSTRUCTING THE NATIONAL INTEREST**

If, as is suggested, the lack of a clearly defined set of national interests has made it difficult to develop effective foreign policy, a central question must be addressed; what are the nation’s vital interests? Addressing a second question is also instructive; how should the nation’s vital interests be determined? In answering both of these questions, the remainder of this article advances a framework for understanding the key concepts under examination and offers an initial construction of vital American interests. After completing our analysis, it became clear that a robust dialogue between the American people and their elected

leaders is necessary if the nation is to successfully develop a widely accepted understanding of national interests.

As the former Commission on America’s National Interest wrote more than a decade ago, “For the decade ahead, the only sound foundation for a coherent, sustainable American foreign policy is a clear public sense of American interests.” That understanding is as important in a post-Iraq/Afghanistan era as it was in a post-Cold War era. Further, in advocating the development of a clear and consistent set of national interests that transcends administrations, the desire is to create a forcing function that makes it more difficult for presidential administrations to pursue foreign policies that stray beyond the nation’s identified interests. While some may disagree with efforts to constrain a president’s freedom of action in foreign policy or view such efforts as overly idealistic, setting a higher bar for presidents, before they exercise American power abroad, is consistent with congressional and constitutional intent and should be palatable to Americans across the political spectrum.<sup>6</sup>

To achieve such an objective, identifying the nation’s vital, major, and peripheral interests is central. The first step in such a process is offered by presenting a review of historical approaches to foreign policy development and international relations theory. Second, we offer to open the dialogue advocated by presenting six vital national interests that are likely to drive future foreign policy. In doing so, we argue for a transition from a value-focused foreign policy to an interest-focused foreign policy. Such a transition will provide the president and Congress with a clear set of enduring interests around which to build a stable foreign policy. Before continuing,

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<sup>6</sup> While there are certainly varying interpretations of the U.S. Constitution, the powers of Congress, enumerated in Article I, and the powers of the president, enumerated in Article II, were originally designed to create a more limited role for the executive in foreign policy. With the War Powers Act serving as an example of congressional effort to constrain the president’s ability to use military power, it is clear that new efforts to constrain the executive branch’s use of American power abroad are not without historical precedent.

it is important to clarify that our conception of “enduring vital interests” does not preclude vital interests from evolving over time. Rather, the term is used to underscore the relative stability and often gradual change that occurs to the nation’s interests as technological development occurs and the United States grows and changes. Admittedly, an interest focused foreign policy will constrain the aspirations of presidents on the left and right, but at a time when the nation is facing great economic and strategic challenges, it may be time to set aspirational goals aside and follow former Secretary of State Cordell Hull’s axiom. When asked why the United States was working with Dominican dictator Rafael Trujillo, Hull reportedly quipped, “He may be a son-of-a-bitch, but he’s our son-of-a-bitch.”<sup>7</sup> In short, it may be time for values to take a backseat to cold, hard interests.

### ***Methodology***

Given this article’s objective of providing useful policy guidance, Richard Kugler’s, *Policy Analysis in National Security Affairs: New Methods for a New Era*, provides a rigorous method for framing and analyzing policy oriented national security challenges.<sup>8</sup> While not appropriate for theory generation or testing, Kugler’s approach provides researchers a means to identify interests, goals, and policy options.

The first step in employing Kugler’s methodology requires the researcher determine whether the policy problem under examination is strategic, systemic (systems analysis), or operational (operational research) in nature.<sup>9</sup> We determined the problem discussed here to be strategic in nature, thus Kugler’s process of “strategic evaluation” is utilized. Broadly, this approach assists in determining American interests and how they are affected; strategic goals (desired end-state); and available policy options.

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<sup>7</sup> Robert D. Crasswell, *Trujillo: The Life and Times of a Caribbean Dictator* (New York: McMillan, 1966), 213.

<sup>8</sup> Richard Kugler, *Policy Analysis in National Security Affairs: New Methods for a New Era* (Washington, DC: National Defense University Press, 2006).

<sup>9</sup> *Ibid.*, 35-60.

The second step focuses on developing an analytical framework. For this purpose, Kugler provides a set of twenty-five framing questions that should be answered before completing the analysis and selecting a policy recommendation. They include such questions as; what are the expected effectiveness, benefits, and losses? What assumptions, uncertainties, and biases may affect the selected policy recommendation? What tradeoffs are made in the selection of a policy recommendation?<sup>10</sup> In answering each question, a more complete understanding of the variables at play is developed and the strengths and weaknesses of possible policy options come to light. As Kugler notes, “The analysis should begin by describing each option, including its rationale, aims, actions, and implementation strategy.”<sup>11</sup> The analysis then concludes with an appraisal of the likely effectiveness of the policy option recommended.

Step three focuses on the dissemination of the final product, which Kugler includes in his methodology because he considers this aspect of policy analysis is given short shrift all too often. Thus, he provides a more rigorous approach to determining how best to develop and present analytical results. For our purposes, steps one and two were of greatest utility. Kugler’s approach increased the rigor of this study and ensured a more comprehensive analysis of the affect potential variables could have on a policy recommendation. For the sake of clarity and succinctness, we do not discuss each of Kugler’s framing questions in the analysis. Rather we focus on the results of the larger analytical process and policy recommendations. Kugler’s approach does, however, leave room for further analysis of the six vital interests described below.

### ***Building on Previous Conceptions of the National Interest***

The literature on national interests is extensive and includes early classics from Morgenthau, Kennan, and Lippman, to more modern work from Steel, Waltz, Nye, and Jervis.

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<sup>10</sup> *Ibid.*, 43.

<sup>11</sup> *Ibid.*, 53.

This section will provide a brief review of the national interest literature and identify how this article contributes to the discourse on this important topic.

The most famous work on the national interest was generated by Hans Morgenthau in the early 1950s. His theory of political realism defines national interests in terms of power. Morgenthau suggested that interest is the essence of politics and should be unaffected by the circumstances of time and place.<sup>12</sup> His *In Defense of the National Interest* (1951) argued that the national interest must be the ultimate standard for developing policy. Morgenthau also took the opportunity to divorce morality from political action, suggesting that moral principles in the international sphere have no concrete universal meaning.<sup>13</sup> He encouraged statesmen to “distinguish with Lincoln between their ‘official duty,’ which is to think and act in terms of the national interest, and their ‘personal wish,’ which is to see their own moral values and political principles realized throughout the world.”<sup>14</sup>

In 1977, Morgenthau took up the topic again in, “Defining the National Interest—Again: Old Superstitions, New Realities.” Clearly frustrated by the partisan nature of politics, Morgenthau highlighted that the national interest must not be defined by the whim of a man or the partisanship of party, but rather must rest on an objective view and a rational application of foreign policy. He cited the Monroe Doctrine and the European and Asian balances of power as having guided U.S. foreign policy since the nation’s existence, and he encouraged political leaders to stay true to the realist path. Morgenthau warned that without consistency in American foreign policy, U.S. decision makers will simply demonize the enemy rather than recognize the real threat and the state’s real power. He also cautioned political leaders not to allow U.S. foreign policy to be determined by Soviet foreign policy, or any other nation or

movement for that matter—opposing a reactive foreign policy.<sup>15</sup> Morgenthau was careful to distinguish between political power and the use of force. He explained that an economic, territorial, or military policy may be undertaken for its own sake, because there are economic, territorial, or military advantages, but it is also possible that such policies would be pursued because they increase the power of the nation. In the development of foreign policy, what should be considered, Morgenthau argued, is the effect policies have on the power of the nation.<sup>16</sup>

George Kennan, like Morgenthau was a political realist. He believed in asking critical questions about U.S. intervention into world affairs and he encouraged decision makers to focus primarily on national interests. Kennan, through a series of essays, books, and lectures examined the political and intellectual motivations of American foreign policy. He concluded that when it came to U.S. intervention and war in particular, there lacked real deliberation and discussion of national interests. Speaking of the Spanish-American War, he noted, “As for the manner in which we employed our armed forces once we had launched ourselves in that war, I found that we were guided not by any very thoughtful concept of what it was we wanted to achieve, and why, but rather by popular moods, political pressures, and inner-governmental intrigue.”<sup>17</sup> Kennan acknowledged that in other interactions, especially with China and Japan, the United States tried to apply its own legal and moral standards rather than searching for a stable balance of power among the forces active in the region.

Kennan, like Morgenthau, argued for the need to separate morality from national interest, suggesting that World War I was a great moral cause in which the United States should not have been involved.<sup>18</sup> Kennan was also critical of U.S.

<sup>12</sup> Hans Morgenthau, revised by Kenneth Thompson, *Politics Among Nations: The Struggles for Power and Peace*, 6<sup>th</sup> ed. (New York: Alfred A Knopf, 1985), 10.

<sup>13</sup> From *In Defense of the National Interest* (New York: Alfred A. Knopf, 1951), chapters 1 and 8.

<sup>14</sup> Morgenthau, *Politics Among Nations*, 7.

<sup>15</sup> Hans Morgenthau, “Defining the National Interest – Again; Old Superstitions, New Realities,” in Kegley and Wittkopf, eds. *Perspectives on American Foreign Policy* (New York: St. Martin’s Press, 1983), 33-37.

<sup>16</sup> Morgenthau, *Politics Among Nations*, 36.

<sup>17</sup> George Kennan, *American Diplomacy* (University of Chicago Press, 1979), 159.

<sup>18</sup> *Ibid.*, 158.

intervention in the Second World War, the Korean War, and the Vietnam War. While Morgenthau emphasized America's demonological approach to foreign policy, Kennan supported that notion by highlighting America's need to search at all times for a single external center of evil, to which all our trouble could be attributed.<sup>19</sup>

In 1985 Kennan wrote in *Foreign Affairs* to clarify his position on national interests. He suggested the interests with which governments have to concern themselves are those of military security, the integrity of political life, and the well-being of the people.<sup>20</sup> Kennan was explicit that American interests must be distinct from political tastes. He reminded readers, just as he had advised previous presidents, that effectively using resources is also in America's interest, and it is essential to recognize the nation's limited resources and limited military power. Kennan argued that the United States should only interfere in the internal workings of other countries under two conditions: 1) if it is in our national interest, and 2) if we have the means to successfully intervene and we can afford the costs. Kennan was clear that foreign policy should be a reflection of U.S. national interests.<sup>21</sup>

Although less influential than Morgenthau and Kennan, Walter Lippman was one of the earliest to discuss these issues in *U.S. Foreign Policy: Shield of the Republic* (1943), which highlighted the need to return to the fundamental principle of foreign policy. He described this principle as bringing into balance, with a comfortable surplus of power, the nation's commitments and the nation's power.<sup>22</sup> Morgenthau and Kennan later called this simply "balance of power." Lippman argued that, from 1898 until his book was published, the United States chose a set of ideals over national security. He spoke to the ideals of disarmament and collective security, which

<sup>19</sup> Ibid., 164.

<sup>20</sup> George Kennan, "Morality and Foreign Policy" *Foreign Affairs*, Winter 1985/1986, 64, 002, p. 206.

<sup>21</sup> John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of American National Security Policy During the Cold War* (Oxford University Press, 2005), 96.

<sup>22</sup> Walter Lippman, *U.S. Foreign Policy: Shield of the Republic* (Boston: Little, Brown and Company, 1943), 9-10.

detracted from our most vital interest: national security.<sup>23</sup>

Lippman argued that the United States should not strive to achieve peace, but should instead focus on independence and security. He wrote, "A nation has security when it does not have to sacrifice its legitimate interests to avoid war and is able, if challenged, to maintain them by war."<sup>24</sup> Lippman rejected the Wilsonian notion of collective security because it assumed a certain unity among unequal states rather than accepting the evolution of a union from a nucleus of firmly allied strong states.<sup>25</sup> He charged that Wilson was trying to establish collective security without forming an alliance. Lippman concluded that from 1898 to 1941 the United States engaged in three wars without ever having formed a real foreign policy. He reminded readers that the measure of a policy is its soundness; if it is sound, it will prove acceptable to the American people.<sup>26</sup>

In defining vital national interests, Lippman stated clearly that the American people will fight and give their lives for what they regard as vital interests. The defense of American territory against foreign powers is an interest that has become nationally accepted, according to Lippman, and we need not make any apologies when putting this vital interest first.<sup>27</sup> In fact, Lippman argued that our allies and partners would benefit from an American foreign policy founded on our own national interests.

Lippman, Kennan, and Morgenthau were clear realists, and this article advocates a realignment of U.S. foreign policy and realist thinking. However, there are many authors who make strong and cogent arguments on this topic although it is not always clear as to which school of thought they belong. Somewhere between realism and liberalism is Samuel Huntington. He advocated the balance of power, national security, and an emphasis on interests, but he also left room for social and economic issues to influence foreign

<sup>23</sup> Ibid. 47-48.

<sup>24</sup> Ibid. 51.

<sup>25</sup> Ibid. 73.

<sup>26</sup> Ibid. 85.

<sup>27</sup> Ibid. 165.

policy. Huntington, unlike Morgenthau and Kennan, did not separate national interests and morality. Instead he understood national interests as a combination of security and material concerns on the one hand, and moral and ethical concerns on the other. Huntington explained that it is American identity and values that drives the use of and provides a purpose for American power. Huntington described a set of ideals and principles stemming from America's founding documents, which included liberty, equality, democracy, constitutionalism, liberalism, and limited government.<sup>28</sup>

While Huntington was open to including ideals in U.S. foreign policy, he also argued that American policy had been unduly influenced by economic and ethnic considerations. He admitted that ethnic groups have played active roles in politics throughout American history, also promoting American interests outside the United States. Huntington referenced former Secretary of Defense James Schlesinger who, at a 1997 Center for Strategic and International Studies lecture, said, "The United States has less of a foreign policy in a traditional sense of a great power than we have the stapling together of a series of goals put forth by domestic constituency groups....the result is that American foreign policy is incoherent."<sup>29</sup> Huntington called this "the domestication of foreign policy." While foreign policy should be driven by the interests of the state in a world of competing states, instead he suggested it is driven by economic and ethnic interests in American domestic politics.

Similarly, Robert Jervis also notes that the most vital interest of any country is security from invasion or attack. He argues that the second most vital interest is the ability to protect the state's closest allies, and a third interest is in economic prosperity.<sup>30</sup> Jervis acknowledges that there is always agreement that the protection of the

country comes first, but after that, consensus breaks down.<sup>31</sup> He makes the case that in the United States, foreign policy is heavily influenced by domestic economics, American democratic values, and ethnic considerations. Jervis admits that because the United States has a fragmented political system, no single interest, threat, or value will dominate the development of foreign policy.

### *Alternatives to Classical Realism*

Another author of national interest who falls into the liberalism school of thought is Joseph Nye. He writes, "In a democracy, the national interest is simply the set of shared priorities regarding relations with the rest of the world. It is broader than strategic interests, though they are part of it. It can include values such as human rights and democracy, if the public feels that those values are so important to its identity that it is willing to pay a price to promote them."<sup>32</sup> Nye also admits that the United States has an interest in maintaining international order. He notes that Americans want to influence distant governments and organizations on a variety of issues and, to do this, it needs hard power resources. While he recognizes the need to call upon the military to protect national interests, he also comingles interests and values. Nye argues that Americans want to see strong moral preferences in their foreign policy, which is why it has become acceptable to use the American military to support humanitarian interests abroad.<sup>33</sup>

<sup>28</sup> Samuel Huntington, "The Erosion of American National Interests," *Foreign Affairs*, Vol. 76, No. 5 (Sept/Oct 1997), 28-49.

<sup>29</sup> Ibid.

<sup>30</sup> R. Jervis, "U.S. Grand Strategy: Mission Impossible," *Naval War College Review*, Vol. 51, No. 3 (1998), 22-26.

<sup>31</sup> Ibid.

<sup>32</sup> Joseph Nye, "Redefining the National Interest," *Foreign Affairs*, Vol. 78, No. 4 (1999), 22-35.

<sup>33</sup> For a more complete discussion of international relations liberalism see Immanuel Kant, *Perpetual Peace: A Philosophical Essay* (Washington, DC: American Peace Society, 1897, c1795); Robert Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton: Princeton University Press, 1984); and Bruce Russett and John Oneal, *Triangulating Peace: Democracy, Independence and International Organizations* (New York: W.W. Norton, 2000). These works are among the most influential within the idealist/liberal approach. They reflect the transition liberalism has undergone.

Authors such as Ronald Steel point out that other elements including resource scarcity, population growth, urbanization, mass migration, environmental degradation, terrorism, and economic exploitation can and do threaten national security. He argues that there are interests impervious to borders, and therefore, we must be careful about devising policy based solely on a defined national interest.<sup>34</sup> Steel argues that the problem with realist notions of national security is that they assume that states are the primary actors which both *provide* security and *threaten* security. Instead, he promotes what he calls a new kind of realism. Steel identifies vital, secondary, and tertiary American interests, and submits that U.S. policy should primarily serve to protect the American homeland from destruction and preserve U.S. institutions and a democratic form of government, while still recognizing the various other elements that can impact policy making.<sup>35</sup>

Like Steel, neorealists such as Kenneth Waltz explain that states are not the only actors in the international system, and therefore developing foreign policy cannot be as simple as identifying a clear list of national interests that support the security of the state. Neorealists, liberals, constructivists, and radicals all accept other actors as playing an important role in foreign policy development. For neorealists like Waltz, however, the most important unit to analyze is the structure of the international system, namely the absence of overarching authority, and the distribution of capabilities among states.

Both realists and neorealists share the core principle of balance of power, but neorealists advance the idea that the balance of power is largely determined by the structure of the system.<sup>36</sup> Waltz accepts the idea of balance of power, but admits that it does not serve to explain the particulars of a state or its policies. He spends a great deal of time studying the roles of human behavior, society, the structure of states, and

emotion in international relations.<sup>37</sup> Waltz points out the hitch between national politics and the international political system, writing that national politics is consumed with authority, administration, and laws while international politics focuses on power, struggle, and accommodation.<sup>38</sup> Those statesmen charged with developing foreign policy must reconcile these differences to bring together the interests of the state within an international framework.

Those authors who fall into a liberal school of international relations leave room for new actors like multinational corporations, non-governmental organizations, and social groups to influence the making of foreign policy. Within international relations liberalism, there is also a growing view that not only do international organizations play an important role in establishing international norms and promoting peace, as Immanuel Kant theorized in the eighteenth century, but that democracies do not fight one another, thus the promotion of democracy and liberal values is central to ensuring the perpetual peace Kant sought.<sup>39</sup>

While authors like Jervis and Huntington may reject the basic premise of liberalism, they also recognize that the variables examined by the liberal school do influence the behavior of state actors. Jervis even includes cognitive dissonance as having a role in policy development, explaining that once foreign policy is developed and implemented; decision-makers will justify it even if it means rearranging their beliefs to gain increased support for the action taken.<sup>40</sup> This leads to inconsistency in policy and unpredictable political calculations.

Constructivism differs in that it promotes a normative view of national interests.

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<sup>34</sup> Ronald Steel, "A New Realism," *World Policy Journal* Vol. 12, No. 2 (1997), 1-9.

<sup>35</sup> *Ibid.*

<sup>36</sup> Kenneth N. Waltz, *Theory of International Politics* (Long Grove, IL: Waveland Press, 1979), 102-128.

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<sup>37</sup> See Kenneth Waltz, *Man the State and War* (New York: Columbia University Press, 1959), Intro.

<sup>38</sup> Kenneth Waltz, *Theory of International Politics* (New York: McGraw Hill, 1979), 113.

<sup>39</sup> See Immanuel Kant, *Perpetual Peace* and Bruce Russett and John O'Neal, *Triangulating Peace*.

<sup>40</sup> Robert Jervis, *Perception and Misperception in International Relations* (New Jersey: Princeton University Press, 1976), 382-387.

Constructivists like Alexander Wendt, support the promotion of democracy and human rights around the world, but they also recognize that these are ever-evolving concepts. For constructivists, national interests are not consistent, but rather they are social constructs that must be flexible to changing identities.<sup>41</sup> Individual elites are also important in constructivist thinking, assuming that major shifts in policy can be driven by one or two influential decision-makers, especially in times of crisis or political instability.

In response to the wide spectrum of views counter to classical realism, we argue that many of the propositions advocated by liberals, constructivists, and even neo-realists are both lofty and costly. Rather, we advocate the adoption of policies that take heed of the dangers authors like Lippman and Kennan warned of and the need to clearly articulate the nation's interests—developing a foreign policy that supports and protects those interests. Further we advocate a path that moves the United States away from the Wilsonian belief that there is a moral imperative to aid in the political regeneration of other nations.

### ENDURING VITAL INTERESTS

The American approach to foreign policy and national interest has shifted greatly from the nation's founding to the present. When President George Washington published his farewell address on 17 September 1796, he laid out a concept of foreign policy designed to preserve the national interest. Washington's recognition of interstate commerce's importance is exemplified in his famous statement: "The great rule of conduct for us, in regard to foreign nations, is, in extending our commercial relations, to have with them as little political connection as possible. So far as we have already formed engagements, let them be fulfilled with perfect good faith. Here let us stop." He went on to add that the United States should be a "friend to all and enemy of none" as the nation sought to "avoid the entangling

alliances of Europe."<sup>42</sup> A policy of commercial internationalism and military non-interventionism served the philosophical standard, if not always the operational standard, for American foreign policy until the 20<sup>th</sup> century.<sup>43</sup> During the half-century long Cold War, two generations of Americans grew to adulthood during a time in which the United States maintained an average of 535,000 troops overseas—a decided departure from Washington's ideal.<sup>44</sup>

With the Cold War's end, President Bill Clinton sought to redefine the national interest during the 1990s by combining commercial internationalism with the spread of democracy and international institutions. Many American troops returned to the United States, and the nation's reliance on decisive military action declined. Much like the approach to foreign policy and the national interest prior to the Cold War, President Clinton exploited the "peace dividend" and focused on expanding America's commercial ties and influence. With what Francis Fukuyama described as the "end of history," liberal internationalism attempted to unseat realism from its perch atop the foreign policy hierarchy.

Like his predecessor, George W. Bush was from the liberal internationalist school of thought. Where President Clinton sought to make the world safe for democracy through globalization, President Bush arguably sought to achieve similar objectives through the imposition of democracy. And with the United States exiting Iraq and Afghanistan while also undertaking an Asia-Pacific pivot, few are attempting to frame the debate surrounding these conflicts within the context of a well-defined national interest.

Contrary to the view of Joseph Nye, who argues that *the* national interest is, "simply what citizens,

<sup>41</sup> See Alexander Wendt, *Social Theory of International Politics* (Cambridge: Cambridge University Press, 1999), Intro.

<sup>42</sup> George Washington, "Farewell Address" (17 September 1796), <http://www.earlyamerica.com/earlyamerica/milestones/farewell/text.html>.

<sup>43</sup> Peter Trubowitz, *Defining the National Interest: Conflict and Change in American Foreign Policy* (Chicago: University of Chicago Press, 1998), Ch. 3.

<sup>44</sup> Tim Kane, *Global U.S. Troop Deployment, 1950–2003* (Washington: Heritage Foundation, 2004), 2.

after proper deliberation, say it is;”<sup>45</sup> we suggest the national interest and the interests (vital, major, and peripheral) that comprise it have developed over many years and endure across Republican and Democratic administrations. The national interest is not defined by a sitting president’s political agenda. It transcends short-term political objectives. In order to provide greater clarity as to the composition of the national interest, the following pages define the concept and offer a detailed examination of America’s vital interests.<sup>46</sup>

### *Levels of Interests*

While there are alternative conceptions of the national interest, Dennis Drew and Donald Snow offer a straightforward explanation of the concept.<sup>47</sup> They suggest the national interest has three components: vital, major, and peripheral interests. They define a vital interest by two basic characteristics. First, compromise of a vital interest is unacceptable to the state. Second, the resort to war is a legitimate, and likely, action in the defense of a vital interest.<sup>48</sup> Huntington held a similar view defining a vital interest as one that is worth expending “blood and treasure.”<sup>49</sup> As James Thomson suggests, “Vital interests arise from an enduring combination of the nation’s geographic

position, political culture, economy, and power.”<sup>50</sup> A third characteristic of vital interests is continuity over time. Rarely does a vital interest develop overnight nor is it common for the nature of a vital interest to fluctuate significantly. More commonly, interests are constant and enduring in their importance to the nation.

Historically, preservation of the nation’s commercial interests was seen as the *sine qua non* of vital interests because they were and are the foundation for economic prosperity, which serves as the foundation of the nation’s military strength. However, territorial integrity rose to prominence during the Cold War as the fear of nuclear war captured the national conscience. In the generation since the collapse of the Soviet Union, the United States has found no peer competitor capable of challenging its vital commercial or territorial interests. Neither Afghanistan nor Iraq posed an existential threat to the United States, just as al-Qaeda and its affiliates remain limited in their ability to threaten the nation and its citizens. Thus, the debate over vital interests has strayed beyond its traditional bounds.

Major and peripheral interests do not require a state to resort to war if threatened. Here an interest involves a situation where “a country’s political, economic, or social well-being may be adversely affected but where the use of armed force is deemed excessive to avoid adverse outcomes.”<sup>51</sup> Many interests fall into these two categories and can be addressed in a number of ways. The United States frequently employs diplomatic and economic tools to secure its major and peripheral interests. Without identifying the nation’s vital interests, we have no way of knowing when or how the nation should respond, and strategists and policy makers are forced to choose between action or inaction as options to declare what is important to national security.

Clarity, in many instances, only comes when an adversary acts provocatively, forcing decision-

<sup>45</sup> Joseph Nye, “The American National Interests and Global Public Goods,” *International Affairs* Vol. 78, No. 2 (Spring 2002), 237.

<sup>46</sup> One recent volume is dedicated to examining the various understandings of national interest within various schools of thought. Scott Burchill, *The National Interest in International Relations Theory* (New York: Palgrave Macmillan, 2005).

<sup>47</sup> The Commission on America’s National Interest offered four levels of U.S. national interest: vital interests, extremely important interests, just important interests, and less important interests. The Council on Foreign Relations has also polled its members periodically in an attempt to gauge consensus on national interests.

<sup>48</sup> Dennis M. Drew and Donald M. Snow, *Making Twenty-First-Century Strategy* (Maxwell AFB, AL: Air University Press, 2006), 32–35.

<sup>49</sup> Huntington, “Erosion of American National Interests,” 35.

<sup>50</sup> James Thomson, “US Interests and the Fate of the Alliance,” *Survival* Vol. 45, No. 4 (Winter 2003/04), 208.

<sup>51</sup> Drew and Snow, *Making Twenty-First-Century Strategy*, 34.

makers to weigh the costs and benefits of possible actions. For example, the American reaction to human rights atrocities in Darfur is a typical response to the violation of a peripheral interest. Although the United States expressed strong disapproval of what took place, neither the president nor Congress undertook strong economic sanctions or military action.<sup>52</sup> Such acts of inhumanity violate the cultural and moral norms of Americans, but they do not offend the nation enough to warrant a strong military response.

### *Six Vital American Interests*

After more than two centuries of independence, the United States' vital interests, in our evaluation, have largely remained consistent over long periods of time, with transformative technologies serving as the single greatest reason for change in American interests. In many respects, two centuries of growth and change only served to filter and clarify what is and is not in the national interest. By reinforcing the enduring nature of the nation's interest, events such as World War I & II, the Cold War, and the attacks of September 11, 2001 have not fundamentally reshaped what matters most. It is the propensity of Americans and their leaders to forget what matters that has long been the problem. What then are the nation's vital interests?

#### *Trade and Economic Prosperity*

Since the earliest days of the republic, commercial or economic interests have never ceased to serve as the lifeblood of the nation. Originally built on the export of raw materials and the import of manufactured goods, the United States was successful because the nation focused almost exclusively on economic growth. Challenges to the nation's commercial interests came first from the Barbary Pirates and then from the British Navy.<sup>53</sup> In both instances the nation went to war.

<sup>52</sup> Bureau of Public Affairs, *The United States Response to the Darfur Crisis* (Washington, DC: Department of State, 2008).

<sup>53</sup> Donald R. Hickey, *The War of 1812: A Forgotten Conflict* (Urbana-Champaign: University of Illinois Press, 1990), 5–29, 159–81; and Frank Lambert, *The*

Soon after entering the industrial age the United States would become the world's largest economy and a net exporter—well before World War II. During the twentieth century, the Soviet Union presented the clearest threat to American economic interests, as two competing economic systems engaged in an epic struggle for supremacy.<sup>54</sup> With the Soviet Union's collapse, capitalism prevailed. America's "unipolar moment" did not, however, completely shift the focus from commercial interests.<sup>55</sup> Since 1991 every national security strategy has devoted significant discourse to the president's grand strategy for defense of the nation's economic interests—albeit through policies that often do not survive to the succeeding administration.

#### *Energy Supply*

Some argue that the history of U.S. foreign policy—since at least the Cold War—is the history of America's thirst for oil.<sup>56</sup> Although meant as a condemnation of the American way of life, it is a reality that the world—advanced and developing—is dependent on hydrocarbons derived from such sources as coal, natural gas, and petroleum.<sup>57</sup> These resources drive the economy and the American way of life. Cutting the nation's or its trading partner's energy supply would cause the economy to grind to a halt. No other natural resource is as pervasive in its impact on society.

While many Americans find the idea of waging war to secure the nation's energy supply unacceptable, no president, Democrat or

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*Barbary Wars: American Independence in the Atlantic World* (New York: Hill and Wang, 2007).

<sup>54</sup> For an early understanding of the underlying differences in the two systems see Ludwig von Mises, "Die Wirtschaftsrechnung im Sozialistischen Gemeinwesen" ["Economic Statement in the Socialist Community"], *Archiv für Sozialwissenschaft und Sozialpolitik* 47 (1920), 86–121.

<sup>55</sup> Charles Krauthammer, "The Unipolar Moment," *Foreign Affairs* Vol. 70, No. 1 (Winter 1990/1991), 23–33.

<sup>56</sup> Stephen Randall, *United States Foreign Oil Policy since World War I: For Profits and Security* (Montreal: McGill-Queen's University Press, 2007).

<sup>57</sup> Daniel Yergin, *The Prize: The Epic Quest for Oil, Money, and Power* (New York: Free Press, 2008).

Republican, is willing to place the nation's energy supply at risk. Few would disagree that the first Gulf War sought to protect Middle East oil supplies from an aggressive despot.<sup>58</sup> Some also claim that the second Iraq war was a bolder attempt to secure America's oil supply.<sup>59</sup> What most policy-makers will agree on is the importance of hydrocarbons to the continued success of the U.S. economy.

By 2030 global energy demand is estimated to be 50 percent higher than today.<sup>60</sup> Absent a technological breakthrough in renewable energy, a transformational increase in domestic drilling (like hydraulic fracturing), or a turn to nuclear power, energy will play an increasingly important role in economic and security policy. The need for critical resources has a long history of generating conflicts.<sup>61</sup> Oil and natural gas have the greatest potential to be the resources over which much blood is spilled in the coming years.<sup>62</sup>

#### *Freedom of the Seas*

In addition to economic and energy security, freedom of movement is a vital national interest and America's military works to ensure freedom of navigation, not just for the United States, but for all nations. When Mahan wrote *The Influence of Sea Power upon History* (1890), he was the first to develop a unified thesis linking supremacy of the seas to national greatness. His study of British and French maritime strategy convinced Mahan that Britain's control of the transoceanic

lines of commerce and communication enabled an island nation (Britain) to become an empire. If America were to take its rightful place among the great powers, it too must master the seas. As Mahan noted early in his work, "The profound influence of sea commerce upon the wealth and strength of countries was clearly seen long before the true principles which governed its growth and prosperity were detected."<sup>63</sup>

In previous centuries, "supremacy" enabled countries to restrict interstate commerce, but the United States saw the benefits of open trade enabled by secure trade routes. As the single largest economy in the world for nearly a century, no other nation has derived greater benefit from the U.S. Navy's maintenance of secure oceans. With more than 6.76 billion tons of goods moving by sea each year (90 percent of all interstate trade), a loss of such freedom would adversely affect the national interest in ways that are complex and difficult to accurately calculate.<sup>64</sup>

Freedom of action at sea also ensures that the lines of communication remain open. Currently, undersea cables carry more than seven trillion bytes per second of information across more than 150,000 kilometers of fiber optic cable.<sup>65</sup> If they were cut, the United States' ability to communicate and conduct commerce with the world would be greatly degraded.

Over the next generation, trade will continue to flow across oceans and undersea cables will continue to carry large quantities of data. While the United States' *relative* position in the international system is likely to decline as countries such as China, India, and Brazil grow, maintaining American freedom of action at sea will remain a vital interest. Defending the global

<sup>58</sup> William Head and Earl Tilford, eds., *The Eagle in the Desert: Looking Back on U. S. Involvement in the Persian Gulf War* (Westport, CT: Praeger, 1996).

<sup>59</sup> Stephen Pelletière, *America's Oil Wars* (Westport, CT: Praeger, 2004); and Lawrence Kaplan and William Kristol, *The War over Iraq: Saddam's Tyranny and America's Mission* (New York: Encounter Books, 2003).

<sup>60</sup> Joint Futures Group (J59), *Joint Operating Environment 2010* (Suffolk, VA: Joint Forces Command, 2010), 24.

<sup>61</sup> Michael Ross, "How Do Natural Resources Influence Civil War? Lessons from Thirteen Cases," *International Organization* Vol. 58, No. 1 (Winter 2004), 35-67.

<sup>62</sup> See Ivan Eland, *No War for Oil: U.S. Dependency and the Middle East* (Oakland, CA: Independent Institute Press, 2011).

<sup>63</sup> Alfred Mahan, *The Influence of Sea Power Upon History, 1660-1783* (NY: Dover Publications, 1987), 1.

<sup>64</sup> *International Shipping and World Trade: Facts and Figures* (London: International Maritime Organization, 2006), 4-7, [http://www.imo.org/includes/blastDataOnly.asp/data\\_id%3D13865/InternationalShippingandWorldTrade-factsandfigures.pdf](http://www.imo.org/includes/blastDataOnly.asp/data_id%3D13865/InternationalShippingandWorldTrade-factsandfigures.pdf).

<sup>65</sup> "The Internet's Undersea World," *Guardian* (UK) (February 2008), 1.

commons will not diminish in its importance to the nation.<sup>66</sup>

### *Space Access*

The United States also seeks freedom of action in space. A 2012 Department of Defense directive correctly notes, “The sustainability and stability of the space environment, as well as free access to and use of space, are vital to U.S. national interests.”<sup>67</sup> Space plays a critical role in communications (strategic and commercial), intelligence (imagery and electronic), navigation (commercial and military), and early warning.<sup>68</sup> One recent look at a theoretical loss of commercial and military access to space from attack paints a plausible picture that demonstrates the United States’ susceptibility to such an attack and the devastation it could wreak.<sup>69</sup>

The years and decades ahead will see space-related technology mature and spread, making space accessible to friend and foe alike while also increasing American reliance on space assets. According to the 2011 *National Security Space Strategy*, as many as 9,000 satellite communications transponders are expected to be in orbit by 2015. As the demand for bandwidth increases and more transponders are placed in service, there will be greater likelihood of radio frequency interference and increased strain on government resources to minimize that

<sup>66</sup> *Conference Report: Cooperation and Conflict in the Global Commons* (Norfolk, VA: US Joint Forces Command, 2010).

<sup>67</sup> Department of Defense Directive: Space Policy. DoDD 3100.10, October 18, 2012. Available at <http://www.dtic.mil/whs/directives/corres/pdf/310010p.pdf>. The 2010 *National Space Policy* reaches a similar conclusion.

<sup>68</sup> “Space as a Vital National Interest,” *Marshall Institute Policy Outlook* (Washington: George C. Marshall Institute, August 2005), 2, <http://www.marshall.org/pdf/materials/315.pdf>. See also, Department of Defense, *National Security Space Strategy* (Washington, DC: Government Printing Office, 2011).

<sup>69</sup> Will B. Scott, Michael J. Coumatos, and William J. Birnes, *Space Wars: The First Six Hours of World War III* (New York: Forge Books, 2007).

interference—along with potential threats posed by adversaries.<sup>70</sup>

Absent some unforeseen shift in policy and technological development, the nation will increasingly rely on space in the decades ahead. If space is weaponized, as is frequently suggested, it will play an even greater role in national defense.<sup>71</sup> Thus, space is likely to increase rather than decrease in its importance to the national interest.

### *Cyber Security*

Similarly, cyber security has grown over the past sixty years from a new technology—with early computers that helped the United States and Britain decrypt Nazi messages—to what is arguably the most pervasive and economically relevant technology of the present and future.<sup>72</sup> Thus, with its rise to prominence over the 20<sup>th</sup> and early 21<sup>st</sup> centuries it is now possible to definitively call cyber security a vital interest. In its opening paragraph the *Cyberspace Policy Review* (2009) notes, “The globally interconnected digital information and communications infrastructure known as ‘cyberspace’ underpins almost every facet of modern society and provides critical support for the U.S. economy, civil infrastructure, public safety, and national security.”<sup>73</sup>

As recently as a decade ago, suggesting that cyber security was a vital interest would have drawn harsh criticism. Technological developments, however, have deepened the nation’s reliance on cyberspace over that time. Currently, every economic sector and government agency is dependent on cyberspace for the transmission of

<sup>70</sup> *National Security Space Strategy*, Unclassified Summary, (Washington, D.C., Office of the Director of National Intelligence, January 2011), 2.

<sup>71</sup> Joan Johnson-Freese, *Space as a Strategic Asset* (New York: Columbia University Press, 2007), 82–105.

<sup>72</sup> Cyber expert Pano Yannakogeorgos has argued that cyber space, which includes the electromagnetic spectrum, is not a recent development at all, but very old and long in use by mankind.

<sup>73</sup> *Cyberspace Policy Review: Assuring a Trusted and Resilient Information and Communications Infrastructure* (Washington: White House, 2009), 1.

data.<sup>74</sup> Disrupting that flow would have serious consequences for the United States. As technology advances in the coming years, cyberdependence will grow. Thus, maintaining freedom of action in cyberspace is an increasingly important vital interest, even as it illustrates Huntington's claim that specific interests do indeed evolve and develop, with cyberspace serving as the single best example of a rapid rise in importance.

#### *Homeland Security*

With an exact definition of "homeland security" remaining elusive as the Department of Homeland Security and U.S. Northern Command engage in a wide range of security and emergency management activities, this is perhaps the most amorphous and expansive vital interest. A look at homeland security literature offers at least seven definitions of the term, ranging from an emphasis on terrorism to jurisdictional hazards to quality of life. When fifty practitioners of homeland security were asked what the term meant to them, 14 percent said "terrorism," 18 percent said "all hazards," and 38 percent admitted that homeland security is undefined.<sup>75</sup> While there is no consensus on how homeland security is defined, most Americans would likely agree that protection of territorial sovereignty and integrity is indeed a vital interest.

According to the 2012 *Defense Strategic Guidance*, "U.S. forces will continue to defend U.S. territory from direct attack by state and non-state actors."<sup>76</sup> In his 2010 *National Security Strategy*, President Obama dedicates a section to strengthening security and resilience at home and

<sup>74</sup> See General Accounting Office, *Cybersecurity for Critical Infrastructure Protection* (Washington: GAO, 2004); and Brian Cashell, William D. Jackson, Mark Jickling, and Baird Webel, *The Economic Impact of Cyber-Attacks*, (Washington: Congressional Research Service [CRS], 2004).

<sup>75</sup> Christopher Bellavita, "Changing Homeland Security: What is Homeland Security?" *Homeland Security Affairs* (Monterey, CA) Vol. IV, No. 2 (June 2008), available at <http://www.hsaj.org/?fullarticle=4.2.1>.

<sup>76</sup> Department of Defense, "Sustaining U.S. Global Leadership: Priorities for 21<sup>st</sup> Century Defense," January 2012, 5.

acknowledges he has no greater responsibility than to protect the American people and the homeland.<sup>77</sup> Similarly, the Department of Homeland Security, which was established for this very purpose, published a *Quadrennial Homeland Security Review* in 2010, noting, "A safe and secure homeland must mean more than preventing terrorist attacks from being carried out. It must also ensure that the liberties of all Americans are assured, privacy is protected, and the means by which we interchange with the world—through travel, lawful immigration, trade, commerce, and exchange—are secured."<sup>78</sup>

Regardless of how it is defined, defense of the homeland is the primary vital interest focused on what Morgenthau considered the second area of vital interest—sovereignty or territorial integrity.

#### *The Role of Values in Foreign Policy*

While we have argued for a shift away from a values-based foreign policy, the role of values in American political life is of great significance. In the nation's external actions, the departments of State and Defense have long sought to advance civil rights and liberties—a laudable desire. In establishing the United States, the Founding Fathers developed a model of government that would guarantee liberty—a central value at the founding—for the nation's citizens. Confident in the success of the American experiment, President Eisenhower, on a world goodwill tour in 1959, told the people of India, "We believe freedom ultimately will be won everywhere." In Athens, he defined freedom as a state "...in which, under the rule of law, every human will have the right and a fair chance to live his own life, to choose his own path, to work out his own destiny."<sup>79</sup>

<sup>77</sup> The White House, *National Security Strategy* (Washington, D.C.: USG, May 2010), 17-19.

<sup>78</sup> *Quadrennial Homeland Security Review*, Executive Summary (Washington D.C.: USG, February 2010), 1, available at <http://www.dhs.gov/quadrennial-homeland-security-review-qhsr>.

<sup>79</sup> Luther Smith, *Basic American Ideals* (Washington D.C.: Supreme Council 33, 1967), 5.

Consistent with Eisenhower's view of America's role in advancing liberty, we advocate a policy where the United States serves primarily as a "shining city upon a hill," setting an example in the exercise of virtue at home, rather than, as John Quincy Adams warned against, going abroad "...in search of monsters to destroy."<sup>80</sup> Admittedly, much of U.S. foreign policy over the past two decades has centered on maintaining a liberal social order in parts of the world where one-party regimes oppose liberal democratic ideas and practices. Francis Fukuyama's early thesis centered on whether it was America's proper task to promote global democratization, that is, to "make the world safe for democracy."<sup>81</sup> Most realists believe American foreign policy has been prone to a naïve belief in American "exceptionalism." They suggest Lord Palmerston offered sage and timeless advice when, in 1856, he said of Britain, "We have no eternal allies, and we have no perpetual enemies. Our interests are eternal and perpetual, and those interests it is our duty to follow."

This is not to suggest that realists reject the role of values. Morgenthau argued that the nation derives its identity from its dedication to certain universal truths about men, including respect for the fundamental and natural liberties and rights delineated in the Declaration of Independence.<sup>82</sup> However, realists such as Morgenthau and Kennan would argue that America's foreign policy and military intervention should not be driven by attempts to promote global democratization. Rather, they suggest that liberal values and foreign policy can and should be separated.

Post-Cold War presidential administrations, Republican and Democrat, have developed foreign policy based on a political tradition that places emphasis on the defense of human liberty. The current *National Security Strategy* states:

The United States believes certain values are universal and will work to promote them worldwide. These include an individual's freedom to speak their mind, assemble without fear, worship as they please, and choose their own leaders; they also include dignity, tolerance, and equality among all people, and the fair and equitable administration of justice. The United States was founded upon a belief in these values....And nations that embrace these values for their citizens are ultimately more successful—and friendly to the United States – than those that do not.<sup>83</sup>

A wide acceptance among policy makers of the "democratic peace theory" and empirical evidence that democracies and countries with strong trade relations do not fight one another has fostered a renewed interest in the promotion of democracy, liberal economic regimes, and globalization.<sup>84</sup> Although the means by which the United States furthers its promotion of liberal economic and political systems will likely change in the decades ahead, it will remain a priority for the nation.<sup>85</sup>

While the post-Cold War period has seen a significant move toward free markets and democratic political systems, there is some reason to believe that "autocratic capitalism" may become more prominent in the decades ahead. With political systems that are less free, these regimes will maintain stronger control over their populations while continuing to promote market oriented policies. Not all scholars agree, however.<sup>86</sup>

<sup>80</sup> John Quincy Adams, *Independence Day Address* (4 July 1821).

<sup>81</sup> Daniel Mahoney, "The Future of American Foreign Policy," in Peter Augustine Lawler and Robert Martin Schaefer, eds., *The American Experiment* (Lanham, MD: Rowman and Littlefield, 1994), 332.

<sup>82</sup> *Ibid.*, 334-335.

<sup>83</sup> *National Security Strategy* (2010), 35.

<sup>84</sup> Russett and Oneal, *Triangulating Peace*.

<sup>85</sup> Both Presidents Bill Clinton and George W. Bush were adherents to the tenets of democratic peace theory. They did, however, seek to implement it in very different ways. Such may be the case in the future.

<sup>86</sup> Daniel Deudney and G. John Ikenberry, "The Myth of the Autocratic Revival: Why Liberal Democracy Will Prevail" *Foreign Affairs* Vol. 88, No. 1 (January/February 2009), 77-95.

In the course of dialogue regarding the national interest, it is important to remember the historical debate surrounding distinctions between American values versus vital interests, and the benefits and dangers associated with developing foreign policy and military strategy that focus on amorphous values at the expense of concrete interests. We argue American values present a range of issues for governments to address, but they do not necessarily represent America's vital national interests. It is the nation's interest that must drive foreign policy, not abstract notions of values and morality, which clearly are defined differently by different administrations.

### POLICY RECOMMENDATIONS

While some readers may question the specific interests discussed above, they are likely to agree that a vigorous debate concerning the national interest is a necessary undertaking for a free and open society. Although the *National Security Strategy* purports to describe the national interest, it is more accurately described as a partisan political document designed to describe a sitting president's foreign policy agenda. To better establish a broadly accepted conceptualization of America's national interest, we recommend the President and Congress jointly re-establish a Commission on America's National Interests. Much like the one established in 1996, it should be composed of respected persons from both political parties and with a diversity of experience. Its purpose should be to reach a broad consensus on the nation's vital interests. While we have suggested six vital interests in the preceding pages, such a commission may develop an alternative set of vital interests.

We also recommend a shift in the focus of American foreign policy from one based on the advancement of values to one based on the advancement of concrete interests. Such a policy would, in many ways, raise the bar for the use of military force, much like the Weinberger-Powell Doctrine was designed to do. The objective of such a shift is both to de-politicize foreign policy and ensure that American foreign policy is more closely tied to the nation's material interests. Absent such an effort, American foreign policy will continue to vacillate between presidential

administrations and serve as a point of division amongst Americans.

We do not suggest that recommendations provided here can be implemented merely through a simple exercise to agree upon vital national interests. One of the most daunting obstacles to this undertaking will be accounting for organizational interests. There are many agencies and individuals within the federal government and within society that prefer ambiguity on this topic. Once the nation agrees upon a specific set of vital interests and seeks to prioritize and protect those interests, organizations and interests may see their favored cause fall from prominence. Over the last several decades, for example, the nation has seen the growing role of cyberspace rise above other interests in the level of resources dedicated toward its protection. This is to be expected as the nation's interests slowly evolve over time.<sup>87</sup>

Another challenge for any administration seeking an interest-based approach to foreign policy is that it serves to hold decision-makers accountable for actions taken in the international arena. Ambiguity not only serves organizational interests, it can also serve personal political interests, giving policy makers the flexibility to make popular decisions on a whim, rather than making difficult, consistent decisions that require thoughtful deliberation and explanation. Nevertheless, we continue to recommend that as a global leader and representative democracy, America's allies and citizens deserve more than ambiguity and populism. It is time for courageous leadership to speak out on this important topic because the choice between interests and values is great, but the implications for the future of American foreign policy are greater.

Finally, we acknowledge that while a clean list of constant enduring vital interests is preferable, there are also evolving interests that can develop as a result of both technology and international commitments. The important concept to

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<sup>87</sup> While we believe vital interests are largely enduring in nature, this does not mean that there is never change. Instead, we suggest that vital interests are not simply whatever a sitting president deems them to be. Stability does not require an absence of all change.

remember in regard to such evolution of interests is to anticipate and accept these new interests, not because they have emerged from economic benefit or popular opinion, but because the nation's own innovation has allowed for new interests to develop. Similarly, some actions may be driven by international treaties or allied commitments, but these too must be approached with thoughtful deliberation—with U.S. national interests always in mind.

It is essential for the United States to clearly articulate its own vital interests in order to continue to serve as a global leader. Such an undertaking will serve both America's allies and the nation's national security. If the United States does not play this role, either because Americans cannot reach a consensus or refuse to identify vital national interests, other rising powers will step into the void. It is very likely that Americans will not like the results.

## Space Verification

### Eisenhower Center for Space and Defense Studies

The purpose of this study is twofold: first, to determine to what extent multilateral agreements to limit disruptive actions in space and/or establish norms of behavior are verifiable; second, to consider under what circumstances space verification serves U.S. interests.

#### INTRODUCTION

It is commonly said, especially by military spokesmen, that space is becoming more congested, contested, and competitive. These trends are predicted to have increasingly negative consequences for national security. If this is the case, three alternatives present themselves for policy makers: do nothing, in which case the negative trends presumably will continue until all of space becomes more dangerous and some of it un-useable; hope that a rough order emerges as independent players attempt to maximize their interests—an “invisible hand” solution; or take positive steps to create order out of the emerging chaos. This last alternative will probably require that all major actors accept some inhibition on freedom of action in space, as has been clear for some time regarding mitigation of space debris. In an increasingly congested and contested environment, it may become true of other activities as well. But no sovereign actor will accept such limitations unless it can be assured of the compliance of others. Hence, verification becomes a key factor.

#### *Definitions*

Verification is any process designed to demonstrate a party's compliance or non-compliance with an agreement or treaty. For our purposes, verification is relevant to all agreements that place constraints on *specific and observable actions* in space or directed at space, including deployment, testing and/or maneuvers of weapons or other systems as well as physical or electromagnetic interference with the operation of

satellites. It therefore differs from monitoring, which is the technical ability to observe activity.

*Intentions* are not verifiable, although an effective verification regime can detect patterns of activity from which intent may be inferred. The same is true of unilateral declarations of good faith, best behavior or resolve to promote various laudatory outcomes in space. Multilateral agreement on norms of behavior represents a gray area. Those expectations that grow over time to create political inhibitions against certain actions in space may be a proper subject for verification, and knowledge of behavior in space created by verification regimes may help in building the case that such norms exist. But this applies only to norms against *specific and observable* behaviors and may be more apparent than real. It can be argued, for example, that a norm against kinetic ASAT tests in space existed for more than two decades after the mid-1980s, when both the U.S. and the USSR ceased testing. As the Chinese ASAT test of 2007 showed, however, one nation's norm may be another's target of opportunity.

Verification does not apply to rogue actors whose intent is to disrupt the system and whose actions can only be monitored. A verifiable regime among major actors does not, therefore, eliminate the possibility of disruptive actions in space. It does, however, create a common interest among the most influential space powers to isolate outliers and bring international pressure to bear against such behavior.

Both arms control and verification of compliance can contribute to strengthening deterrence, since well-conceived measures make it more difficult for an adversary to test and deploy offensive weapon systems, and may enhance warning of potential threat. It should be emphasized that such measures limit behavior in peacetime, but not in war. If deterrence fails, only those agreements specifically applicable to hostilities (like the Geneva and Hague Conventions)

continue legally to apply. Accordingly, arms control, norms, rules of the road and other schemes to foster a stable and predictable environment in space do not limit war-time options, any more than laws of peaceful transit at sea or in the air limit freedom of action if hostilities occur.<sup>1</sup>

### *Premises*

- Any regime in space requiring U.S. self-restraint can only be sustained politically over time if the U.S. can be assured of the compliance of others. This includes systems of “norms,” “best practices,” and “codes of conduct” as well as treaty restraints.
- Accordingly, U.S. policy on specific proposals for normative measures in space whether of the “hard” or “soft” variety should be based from the outset on consideration of whether or not compliance can be verified within reasonable limits.
- No major space actor is likely to accept meaningful constraints on its freedom of action in space unless it can verify independently the compliance of others. The capability of verification by the least capable major actor will therefore define the limits of agreed constraints.<sup>2</sup>

What are “reasonable limits”? All agree that verification can never be exact. Even in the

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<sup>1</sup> On this point, see *inter alia*, Jonty Kasku-Jackson and Elizabeth Waldrop, “Understanding Space Law,” in the Eisenhower Center’s book, *Space and Defense Policy*, (London: Routledge Publishing, 2009), p. 65.

<sup>2</sup> Hays describes how nuclear limitations “could only be as precise as could be ‘seen’ by national technical means” in Peter L. Hays, *United States Military Space: Into the Twenty-First Century*, INSS Occasional paper #42, (Maxwell AFB, AL: Air University Press, September 2002), p. 57. Hence, according to Hays’ account, limitations of nuclear testing in space only became possible with the deployment by the United States of the Vela Hotel satellite series that allowed such activity to be detected. The assertion here, in short, is that neither the U.S. nor other major actors would rely on data from potential adversaries affecting real national security interest.

absence of intention to evade (which cannot, of course, be discounted) there can be non-compliance at the margins, viz., operator mistakes, disputes about how agreements apply in particular circumstances,<sup>3</sup> or ambiguity in the terms of the agreements themselves.<sup>4</sup> Parties may push the edges of the interpretive envelope or probe the capabilities of the others’ sensors. The term of art is “circumvention” and refers to “exploitation of imprecise treaty language, loopholes, omissions or ambiguities” that may have military significance.<sup>5</sup> The question is: when does such behavior cross the boundary from nuisance, or the normal friction of competitive relationships, to become a concern for national security?

For the purposes of this analysis, verification within “reasonable limits” means the ability to detect non-compliance that alters or might in future alter the relative strategic position of the United States in space, with sufficient warning time to respond appropriately. This includes restrictions on the orbiting of certain types of satellites, the use of certain critical orbits, the maneuvering of satellites, and the testing of either ground based or space based ASAT capability.

A verification regime that met this standard might not detect individual instances of non-compliant behavior. But the contention here is that the constellation involved in U.S. security space, both government and commercial satellites, has expanded to the point that it presents a dispersed and difficult target for any would be attacker. Weakening the relative strategic position of the United States in space by attacks on satellites would therefore require patterns of behavior over

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<sup>3</sup> On this point, Chayes and Chayes argue nations may simply not have enough information to comply. *The New Sovereignty: Compliance with International Regulatory Agreements*, (Cambridge: Harvard University Press, 1995).

<sup>4</sup> For a discussion of the negative impact of ambiguity on verification of arms control agreements, see “Verification and Compliance,” in Albert Carnesale and Richard Haass, eds., *Superpower Arms Control* (Cambridge: Ballinger Publishing, 1987), Chapter 11, where Haass argues that pressure to achieve agreement may result in purposeful ambiguities in language which are then reflected in disputes about verification.

<sup>5</sup> *Ibid.*, 304.

protracted periods of time and directed at space.<sup>6</sup> Such patterns would create opportunities for detection and make the larger effort visible. Many claim that this process is currently underway. Supposing this analysis is based on fact, it underlines the conclusion that the problem is not detection, but concerting action both nationally and internationally to respond.

### SPACE AS A DOMAIN FOR VERIFICATION

From the point of view of verification, the most obvious attribute of space is also the most relevant: space is transparent.<sup>7</sup> Moreover, space is a medium and long-term environment where the process of research, development, and deployment is measured in decades. The provision that the U.S. be aware of significant changes “in time to respond” is therefore less stringent, especially since the appropriate response may be in domains other than space.

Technology has sometimes held out the hope (or the threat) of making space less transparent as a way of bestowing unilateral strategic advantage. This would be the effect, for example, of “stealth” technology in space. There are reports in open sources of programs to create stealthy satellites, as well as reports that such programs proved technologically infeasible and have been abandoned. Such technologies would obviously pose challenges for verification; indeed, the proliferation of stealth technology might well hasten the trend toward congested and contested space, with no obvious remedy. The unilateral possession of stealth technology (or its equivalent)

by the United States could well provide military advantage.

But history teaches that such a technological edge—from tanks to ballistic missiles to nuclear weapons to SLBMs to MIRV’s—is usually short-lived. The general proliferation of stealth technology in orbit would make establishing a stable environment much more difficult, if not impossible, and would be very disadvantageous to the United States as the predominate player. It would, by definition, defeat efforts for constraints on specific and *observable* behaviors and would necessarily degrade situational awareness for all actors.

There are also stealth implications in the recent trend toward miniaturization of satellites. Small satellites could in theory be used as co-orbiting kinetic kill or close proximity explosive devices (the euphemism is “non-cooperative rendezvous”) and in this guise would be, in effect, intelligent space mines. They might not be too small to see, but conceivably too small to track and therefore to counter. There is no restriction in international law against orbiting a space mine in proximity to military satellites. It has been technologically feasible since the advent of maneuverable satellites, but the option—though explored by the Soviets in the 1970s—has not been pursued.<sup>8</sup>

Making such devices small in size would, in theory, also make them deployable in larger numbers at lower cost. Still, a *program* significant enough to meet our threshold of verifiability “within reasonable limits” would have to be extensive and involve launch, command and control, and testing activities that would potentially leave signatures observable in a variety of domains, including the electromagnetic spectrum. If very small satellites do represent a potentially undetectable threat, they would fall into the category of those things—like bans on laboratory-based research and development—which are neither observable nor verifiable and therefore fall out of the realm of any regime of reciprocal constraints. This is a judgment for

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<sup>6</sup> As distinguished from denying space services to a particular battlefield at a particular time, a capability which military planners should assume potential adversaries have or will soon have.

<sup>7</sup> The contrast is with the terrestrial arms race, where crucial behavior was often opaque. The United States had no physical description of the Soviet SS-20 MRBM (which changed the strategic balance in Europe) until it was deployed, and no imagines of it until the INF treaty was signed. Chemical and biological weapon production can, and has been, successfully disguised. There is no direct analogue in space.

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<sup>8</sup> Nicholas Johnson, *Soviet Military Strategy in Space* (London: Jane’s Publishing Company, 1987), p. 172.

others with better access to information about actual programs.

### *A Short History of Verification and of Space Arms Control*

All treaties that contain binding obligations are subject to verification, whether or not the treaty language includes verification provisions.<sup>9</sup> The Limited Test Ban Treaty (1963)—the first arms control agreement that mentions space—contained no reference to verification. Verification had been a central issue in negotiations, but distrust between the two sides, and the closed society that was the Soviet Union, made cooperative measures impossible, and space reconnaissance was still in its infancy.

The Soviets took the position that both sides possessed adequate means to verify compliance without intrusive measures like on-site inspection, and that compliance would be compelled by the pressure of international public opinion. President Eisenhower responded that only the largest tests could be detected with certainty and that an effective test ban would therefore require “inspection and control”—i.e., that adequate verification would require a combination of unilateral, cooperative, and multilateral measures, including seismic monitoring stations and a multilateral control commission empowered to make on-site inspections on demand.

In the end, the scope of the treaty was limited to nuclear explosions in the atmosphere, in outer space, and under water—i.e., the scope of constraint was reduced to what the parties were confident each could verify unilaterally without the more intrusive verification measures that more extensive constraints would have required. In the aftermath, each of the superpowers made considerable effort to monitor compliance, and each raised compliance issues with the other, although there is no evidence that either side was ever in violation. For our purposes, the LTBT was both the first agreement constraining activities in space, and the first Cold War example

of the practice of limiting constraints to those that could be verified unilaterally by the parties.<sup>10</sup>

That practice continued through the nuclear arms negotiations of the following decades; viz., as national technical means improved, counting rules evolved from counting launchers to counting warheads, the key being, as Hays comments, “what could be seen.” An exception to this pattern was the Biological Weapons Convention (1972) which, like the LTBT, contained no verification regime, but, unlike the LTBT, constrained activities (the production of biological weapons) that were inherently undetectable by outside observers.

The BWC was the last agreement in the Cold War era that did not include specific verification measures. The trend beginning with bilateral U.S./Soviet nuclear limitation agreements in the 1970’s was to incorporate verification measures of increasing complexity and intrusiveness in treaty language, including a variety of “cooperative measures” by which the parties were obliged to take steps to enhance the visibility of their programs. Generally speaking, the extent and intrusiveness of verification measures depended on:

- The “transparency” of the domain involved, i.e., the inherent ease of disguising or difficulty in observing non-complaint behaviors;
- The “criticality” of agreed constraints, i.e., whether small changes in the existing balance of forces might be difficult to detect and have disproportionately serious consequences;
- The general state of relations or “trust factor” between the parties, and therefore the possibility of cooperative verification measures to increase transparency.

Verification also became more prominent in the negotiations of arms control as skepticism grew,

<sup>9</sup> By the same token, voluntary or declaratory measures that are not specific and not binding cannot be verified in the sense the term is used here.

<sup>10</sup>Clay Moltz argues that the LTBT, and the subsequent agreement (General Assembly Resolution 1884) not to deploy weapons of mass destruction in space were “critical” to allowing the further development of space for satellite reconnaissance and manned missions. See Moltz, *Politics of Space Security*, p. 141.

particularly in the U.S. Senate, about the reliability of the Soviets as a partner, and the benefit of arms control regimes in general. This trend is well illustrated by the detailed on-site, on-demand inspection regime of the last of the Cold War treaties, that dealing with chemical weapons, but it had already been evident in the treaty eliminating intermediate range nuclear forces in Europe (INF).

#### *The Outer Space Treaty*

The Outer Space Treaty contains only one provision that might be said to have the purpose of verification: a provision that all parties with facilities on the moon allow reciprocal visits by others with similar facilities (Article VII). The background was fear of the strategic value of the moon both as a base for nuclear attack and for the surreptitious testing of nuclear weapons. Such fears proved unfounded. Otherwise, the OST was silent on the issue of verification, although it contains several provisions that impose constraints on freedom of action in space.

The most prominent example is the stationing of nuclear weapons or other weapons of mass destruction in space, on the moon, or on other celestial bodies (Article IV). But states parties are also enjoined to carry on their activities “with due regard to the corresponding interests of all other States Parties to the Treaty” and to avoid “harmful contamination” of the space environment (Article IX), provisions that might be interpreted to apply to debris-causing ASAT tests in space. The OST also obligates parties to consult with others when they have reason to believe their activities in space will cause “harmful interference” with the space operations of other parties (Article IX), a provision that Hays interprets as forbidding jamming, blinding, or otherwise disrupting space activities without prior consultation.<sup>11</sup>

<sup>11</sup> The range of possible activities requiring prior consultation are described by Hays as, “should not jam, blind, or otherwise disrupt unless required for self-defense or during hostilities.” See Hays, *United States Military Space*, p. 51. Hays also points out that the International Telecommunications Convention prohibits “jamming or disruption” except in self-defense or war.

The absence of verification provisions reflected U.S. confidence that it possessed the independent means to verify satisfactorily the constraints contained in the Outer Space Treaty. The absence of verification measures was also a function of limited superpower interest in undertaking banned activities and U.S. desire to minimize focus on its NTM capabilities or expose them to international scrutiny.

During ratification hearings for the OST in the Senate, Administration witnesses argued that although the U.S. national technical means (NTM) could not verify the purpose or content of any particular object in space, it could detect mass deployments before they became “militarily significant.” Chairman of the Joint Chiefs Wheeler also said the United States would prefer using its own resources for verification rather than relying on any international on-site inspection regime, and Secretary of State Rusk claimed that the United States was confident of its ability to detect any deployment of nuclear or weapons of mass destruction in space.<sup>12</sup>

#### *ASAT Negotiations*

The Carter Administration undertook ASAT limitation negotiations with the Soviet Union beginning in 1978. Three sessions were held, but the results were inconclusive. The United States opened with a proposal for a complete prohibition on anti-satellite weapons. The Soviets seemed to have been without specific instructions but generally opposed an outright ban. The Soviets alleged that the Space Shuttle could be viewed as a potential ASAT weapon. They also argued that certain satellite operations by third parties could threaten state sovereignty and anti-satellite capability was a legitimate means of self-defense;<sup>13</sup> the Soviets had begun to consider the threat posed by Chinese space capability, against which their ASAT program was also directed.<sup>14</sup>

<sup>12</sup> Hays, p. 70 describes the Administration arguments on verification during the Senate debate on ratification of the OST. General Wheeler elsewhere noted for the record that the “Joint Chiefs of Staff remain concerned about the assurance of verification capability with regards to weapons in orbit,” quoted in Stares, p. 104.

<sup>13</sup> Carnesale and Haass, pp.144-145.

<sup>14</sup> Ibid.

Verification was a subject of concern, but other factors were more important, among them asymmetry in capability.<sup>15</sup> By 1978, the Soviets had an operational ASAT system, which they refused to dismantle; the U.S. capability was in development, but a conventional system had not yet been tested or deployed. The Pentagon was also concerned about the vulnerability of the U.S. security space constellation, which at this point was still relatively small. According to John Wertheimer, OSD and JCS preferred to rely on U.S. technological superiority rather than arms control to address what they saw as a dangerous ASAT imbalance.<sup>16</sup>

In response to DoD concerns, President Carter adopted a “two-track” policy, i.e., continuation of ASAT development while negotiations on banning ASAT continued. Like most “two-track” approaches (the INF negotiations of the 1980’s are another example) the tactic was intended as much to assuage differences of opinion within the Administration as to impress the Soviets with U.S. resolve. Given fears about Soviet plans to deploy systems in space to launch or facilitate attacks in the atmosphere—particularly satellites to enable targeting of carrier battle groups—there was also reluctance to give up U.S. offensive ASAT options.

In terms of our analysis, none of the variables conducive to agreement on verification were optimized. Rudimentary capability of space situational awareness meant that space, though inherently transparent, was not practically so. Because the United States relied on a very small number of military satellites, small changes in the balance had potentially disproportionate consequences. And trust between the parties was very low.

Stares, who conducted a number of interviews with U.S. negotiators, reported fundamental disagreement between key players on the U.S.

side. The State Department and Arms Control and Disarmament Agency pressed for comprehensive ASAT restrictions; DoD coalesced around a non-use/non-interference ban. The Soviets were unwilling to discuss a non-use ban extending beyond the two superpowers; the U.S. wanted to extend coverage to its allies. This mutual recalcitrance and the failure of the U.S. to agree on a unified position (rather than concerns about verifiability) were the chief impediments to agreement. With the Soviet invasion of Afghanistan, the climate for arms control deteriorated, and after adjournment the ASAT talks were never resumed.<sup>17</sup>

In the intervening thirty years, some of the projected threats to, and military uses of, satellites have proved illusory.<sup>18</sup> Weapon platforms in space continue to have proponents, but vulnerability issues have not been resolved, and feasibility has not been proven. Predictions that armadas of orbiting ASAT vehicles were inevitable if negotiations failed proved unfounded. Formal arms control limitations aimed at space were replaced by tacit agreement between the superpowers. Of this tacit approach it might be said that the two sides decided independently that an arms race in an offense-dominant environment like space would be technologically challenging, ultimately futile, and meanwhile would divert vital resources in large amounts from more immediate security needs. Research continued; testing and deployment did not.

<sup>15</sup> Stares claims that DoD concerns focused not on verification difficulties but on limitations to U.S. freedom of action. See Paul B. Stares, *Militarization of Space* (Ithaca: Cornell University Press, 1985), p. 197.

<sup>16</sup> Carnesale and Haass, p. 146-147.

<sup>17</sup> This account is taken from Stares who also claims that a draft non-use agreement was prepared, seemed to represent “common ground” but was not concluded. Regarding the two-track strategy, he comments: “But like all bargaining chip arguments, the two-track policy could be maintained so long as the question of what the US wanted to prohibit, or put differently, what it was willing to forego, did not need to be addressed. Once negotiations with the Soviets began in earnest, the basic incompatibility of goals within the administration made conflict inevitable.” See Stares, p. 200.

<sup>18</sup> A High Frontier civilian panel noted “strong indications” in the early 1980’s that the Soviet Union was going to deploy “power directed energy weapons” in space and thereby “alter the balance of world power” (RAND, p. 14).

### *Categories of Arms Control and Normative Restrictions*

Because the general nature of threats to satellites has been well understood for decades, the categories of possible arms control and limitation agreements is also well known. These include limitations on orbiting in proximity to certain satellites (so-called “keep out zones”),<sup>19</sup> operations in transfer orbits or other critical regions of space, the testing or deployment of dedicated ASAT weapons (whether in space or within the atmosphere) or of other systems such as BMD “in ASAT mode,” and on electro-magnetic or other interference with satellites. The last of these is arguably already prohibited by the OST and the International Telecommunication Convention.<sup>20</sup>

The verification requirements of various regimes would differ in intrusiveness depending on the inherent visibility of prohibited actions; verification of bans on some categories of weapons, viz., ground-based laser generators, might require on-site inspections. Other constraints—for example, bans on kinetic ASAT testing—could be verified with less intrusive measures.<sup>21</sup> Activities grouped under the general heading of research and development are inherently ambiguous and therefore probably outside any regime of mutual constraint.

<sup>19</sup> Keep out zones might be challenged as violations of the OST prohibition on claims of sovereignty in space (Article 11)

<sup>20</sup> There is an obvious overlap in capability between air defense, ballistic missile defense, and anti-satellite weapons. The distinction comes not so much in the capability as in the testing of such weapons and is based on the assumption that no country will rely on a system which has not been tested in its intended role. The use of this approach as a means of distinguishing SAM and ABM interceptors during ABM negotiations is discussed in Johnson, pp. 184-185.

<sup>21</sup> It has been argued that a viable kinetic kill ASAT capability could be tested via near encounters without impact and the resultant, and highly visible, debris field. This argues for equipping satellites with sensors to detect activity within the neighborhood of their orbits. Deploying a system to threaten a significant portion of U.S. satellites with this sort of single encounter, hit-to-kill capability would be an extensive and time-consuming effort.

Probably for this reason, no ban on research and development has been proposed by any responsible player.

A prohibition on stationing of weapons of any nature in orbit or on celestial bodies (although not of potential ASAT devices on the surface) is the central feature of the Chinese/Russian “Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects” (PPWT). The sixth article of that draft treaty does not so much deal with as dismiss the question of verification, putting it off to “possible future protocols.”

### *Verification and the Current Regulatory Regimes in Space*

Characterizing space as the “last frontier” may blind us to the fact that it is already, at least in theory, a highly regulated environment.<sup>22</sup> Requirements for and constraints on behavior in space are subject to a variety of administrative requirements, U.N. resolutions, and treaty law, including, most prominently, the Outer Space Treaty of 1967. The OST grew out of a UN “Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space” (1962) and had the effect, as described by William Durch, of “(transforming) a nonbinding, international consensus on the political/military conduct of space into legal obligations.”<sup>23</sup> But the Treaty was perhaps less foundational than often described, in part because it placed specific constraints on activities (such as the stationing of nuclear weapons in orbit or on celestial bodies, or creation of military installations on the moon) that the only two

<sup>22</sup> A full description of the regulatory regime in space can be found in Kasku-Jackson and Waldrop, Chapter 4 of *Space and Defense Policy* (op cit).

<sup>23</sup> Durch, William J. *National Interests and the Military Use of Space* (Ballinger Publishing, 1984), p. 176. Hays and others argue that the OST provided reassurance to U.S. policy makers that space would not be an arena of strategic completion, and sent the message that the U.S. itself did not see space as having ‘a great deal of military utility’ (see Hays, p. 71).

significant space powers had already decided not to pursue.

Even in areas of Treaty-imposed constraint that remained pertinent, particularly the prohibitions against “interfering with other states’ space-related activities” and “damaging the space environment,” the OST had less than decisive impact—not because of an inability to verify but an unwillingness to enforce. This unwillingness apparently stemmed from concern about disclosing sources and methods, and a reluctance to contribute to the establishment of norms that might limit freedom of action.

For example, although there have been numerous cases in the last forty years of heedless creation of debris and crowding of spectra, none of the major space actors has ever accused another of violating the Treaty. Even in the case of the most flagrant recent example of “damage” to the space environment—the debris created by the 2007 Chinese ASAT test—only the Japanese protested on the basis of the Outer Space Treaty. While the OST can reasonably be read as prohibiting “jamming, blinding or otherwise disrupting unless required for self-defense or during hostilities,”<sup>24</sup> it has not been interpreted by any major party to prohibit the sorts of activities that have led officials to describe space as increasingly “contested.” Indeed, far from strengthening verifiable norms of behavior in space, lack of enforcement of the OST has arguably weakened them—to the point the authors of the European Code of Conduct thought it appropriate to include a highly qualified and voluntary pledge to refrain from intentional interference, even though most nations are already bound to such a provision in the OST as a matter of treaty law.

Why is this? Moltz comments on the *modus operandi* that arose between the Soviet Union and the United States during the Cold War that each side appeared to value its own assets more than it valued the ability to destroy the assets of its adversaries.<sup>25</sup> So it might be said of the parties to the OST that all seem to value their own freedom

of action in space more than they value constraining the freedom of action of others.

Another agreement from the Cold War era not to interfere with “national technical means of verification” (NTM), on the other hand, had considerable—though generally unacknowledged—effect on ordering the space environment. Non-interference with NTM was a key element in the verification regimes of nuclear arms control. It appeared in successive strategic arms limitation and reduction agreements and in the INF agreement of 1987.<sup>26</sup> Because neither of the two Cold War superpowers wished to specify which of its satellites were engaged in verifying compliance, both extended the general ban on non-interference to the entire national security space constellation of the other.

It can be argued that restrictions on interference with NTM reflected rather than caused the *modus operandi* in space between the United States and Soviet Union that began in the 1970s and continues to our day. What is clear is that such a *modus operandi* did emerge. Despite a period of extended development and testing in the 1970s and early 1980s, both sides eventually abandoned kinetic ASAT programs. Some ASAT weapons imagined in the 1960s like rail guns and directed-energy weapons were not pursued. There was no offensive arms race in space, and neither side made space a primary focus of either offensive or defensive action in the case of hostilities. There were also technical, political, and budgetary reasons for this of course. But, as Moltz argues, both sides saw the benefits in mutual restraint, and constantly improving NTM technology meant increasing confidence that restraint was reciprocated and not a source of strategic disadvantage. The nuclear sanctuary in space fostered by the LTBT provided further assurance of stability, and therefore encouragement to exploit the domain for both military and civil purposes.

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<sup>24</sup> Hays, p. 51.

<sup>25</sup> Moltz, p. 50.

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<sup>26</sup> A discussion of arms control treaties and their relationship to NTM is found in Jonty Kasku-Jackson and Elizabeth Waldrop, “Understanding Space Law,” *Space and Defense Policy*, p. 73 as well as Pete Hays, “Space and the Military,” *ibid.*, pp. 56-59.

### *A Typology of Verification Regimes*

This brief history leads to the conclusion that verification and enforcement are inextricably linked. It is not enough to detect non-compliance; it must also have negative consequences for the perpetrator. That requires both publicizing violation and concerting international efforts to respond. Some verification regimes are more likely to be effective in this regard than others, and combinations of several types might solve what emerge from our analysis as the twin problems of detection, on the one hand, and deterrence on the other.

We have identified four categories of verification regimes, three of which have been well studied in the past, and one of which (at least in its emerging form) is new. These are:

- **Unilateral Verification:** This includes National Technical Means (NTM) discussed above, but can also include other forms of reconnaissance, intelligence, and surveillance carried out by assets under U.S. control or that of trusted partners.
- **Cooperative Verification:** Cooperative verification requires that participants agree to forego certain measures to disguise behavior, and/or take other steps to enhance transparency. Verification “regimes” in arms control agreements are usually composed of such cooperative measures. For example, the INF Treaty required the parties to allow on-site observation of destruction of the systems by means specified in the treaty. Non-interference with means of verification is an essential element in any cooperative regime. Cooperative measures are also useful as early indicators that one or more parties may have decided that an agreed regime is no longer in its interest, i.e., that the equilibrium sought in the agreement is no longer applicable. In that case, friction may arise in the system as cooperative measures become *less* cooperative.
- **Multilateral Verification.** Multilateral verification is usually accomplished through on-site inspection by groups of international observers. The principal example is the nuclear non-proliferation regime incorporated in the Non-Proliferation Treaty and overseen by the International Atomic Energy Agency. Multilateral verification has the advantage of allowing concerted international action for enforcement of violations. It can also create new norms or strengthen existing ones. It has the disadvantage of requiring agreement between multiple international actors who may have differing interests or interpretations of events.
- **“Open” Verification:** With regard to space, open verification is a new concept, leveraging the increasing transparency of space to private observers. A precedent was established in the 1970s by the spontaneous organization of “Helsinki Watch Groups” to monitor Soviet compliance with the human rights provisions of the Helsinki Agreement on European Cooperation and Security (CSCE). The reports of these groups were both more detailed and more credible than information other CSCE member nations had been able or willing to provide. The groups were enabled by the mandatory publication in all CSCE member states of the provisions of the CSCE agreement, and by the existence of new (albeit still rudimentary) channels for communicating their findings to the West. The potential of “open” verification increases enormously because of instant and worldwide cyber connectivity, as was graphically demonstrated in the recent past by DARPA and its Network Challenge experiment.<sup>27</sup> It also increases

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<sup>27</sup> In brief, DARPA tethered ten, eight-foot diameter, red balloons at random spots on public land throughout the contiguous 48 states and issued an open challenge to find them, offering a \$20,000 prize. The winning team from MIT offered \$1,000 to anyone who could refer them to someone with information about the balloons, and \$1000 to the person with that information. The challenge quickly went viral on the web, and all ten balloons were found in under nine

with the volume and accuracy of orbital information made available by governments. With regard to space, an “open” verification regime would be based on the worldwide private space observer community. This community already collects volumes of information about the behavior of objects in space and discusses it over the web, noting anomalies to include spotting satellites not registered as required by international agreement, the United Nations’ Registration Convention. If international “norms” for behavior in space, such as those suggested by private groups and the European Union, are to be adopted, open verification is the obvious, and perhaps the only, verification method that would be applicable. It might provide a vehicle for calling attention to aberrant behavior in space without compromising sources and methods. But open verification lacks any enforcement component except for “public pressure,” and might therefore create more obstacles for open, democratic societies where public pressure can be brought to bear than in closed societies where it has little relevance.

These categories of verification are obviously not mutually exclusive. Generally speaking, all treaties or agreements of any kind that require nations to engage in or forego specified activities are subject to verification by unilateral means. The fact that SALT and other nuclear arms treaties specified that verification was to be by “national technical means of verification” did not create a *new* right for countries to verify in that way; the innovation was in mutual recognition that the ability to verify was in the strategic interest of both parties. In effect, the parties agreed that strategic stability required not only self-restraint but transparency. This would not have been possible without a minimal level of trust. But as President Reagan often emphasized, the requirement was to “trust but verify,”

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hours. Details can be found at <https://networkchallenge.darpa.mil/ProjectReport.pdf>.

reflecting the melding of cooperation with the independent ability to confirm compliance.<sup>28</sup>

### *Implications for Policy Makers*

This foregoing analysis points to the central (and familiar) dilemma for U.S. policy. Any measure that affects U.S. freedom of action in space imposes a cost. This includes not just measures to restrict certain behaviors, but verification measures that make U.S. space operations more visible to potentially unfriendly or disruptive observers. The question is whether this short-term cost is offset by longer-term benefits to the United States of a more stable and predictable space environment.

There has always been a contradiction between the desire of the United States (and other major actors) for freedom of action in space, and a common interest in a well-regulated domain. This contradiction is not limited to space policy.<sup>29</sup> Until recently, that contradiction was overcome—for many U.S. theorists—by the prospect of space control, i.e., the notion that the United States would use its dominant position to *impose* order on the cosmos by enlisting willing collaborators on the one hand, and using superior force against

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<sup>28</sup> Similarly, an element of *cooperative* verification intruded into what was supposed to be a regime of multilateral verification by force majeure, i.e., the post-defeat inspection of Iraq for weapons of mass destruction. What was supposed to be a regime of anywhere-anytime surprise inspection became instead a process of negotiated access because the defeated party continued to control the facilities to be inspected.

<sup>29</sup> The Chief negotiator of the INF agreement with the Soviets commented with regard to the debate over INF limitations: “It was, and remains, difficult to find common ground between those who believe that, in general, the national security of the United States would be strengthened if no limits were placed on the weapons it could have, even if that would mean there would be no limits on the same type of Soviet (or some other adversaries) weapons, and those who believe the national security of the United States would be strengthened if limits were placed on the Soviet (or some other adversaries) weapon systems, even if it would mean limits on the same type of U.S. system.” Maynard Glitman, *The Last Battle of the Cold War*, (New York: Palgrave MacMillan, 2006), p. 229.

outliers on the other.<sup>30</sup> The model often cited is Mahan and the control of sea lines of communication; the underlying assumption is that space, as all other domains of human competition, will inevitably be a theater of conflict.<sup>31</sup> Space control remains an article of faith for many, but it has become a residual element in the Obama space policy. The dominant theme for the new Administration is the necessity of cooperation. In a congested and contested environment, a cooperative approach assumes a measure of trust. But as President Reagan pointed out in another context, trust is not sufficient in itself. There is a vital role as well for verification, i.e., our ability to assure that U.S. impulses to collaborative efforts in space, especially those involving U.S. self-restraint, will not be exploited by others to gain strategic advantage.

Improvements in U.S. space situational awareness will enhance the timeliness and certainty of verification. But these improvements are less likely to come in future from unilateral U.S. sources, if only because of constraints on spending. This is what some have identified as the “SSA challenge.” In a world of limited resources, the emphasis will have to be on improvements in SSA by other means, and in particular by exploiting the possibilities of the other three forms of verification, i.e., multilateral, cooperative, and ‘open’ verification. There is some reason to think that U.S. military services recognize this reality, and also the associated dilemma: taking full advantage of information exchanges, reciprocal measures to increase transparency (cooperative verification), and the potential of the internet-empowered observer

<sup>30</sup> See, for example, Everett C. Dolman, *Astropolitik: Classical Geopolitics in the Space Age*, and Steven Lambakis, *On the Edge of the Earth: The Future of American Space Power*, (Lexington: University Press of Kentucky, 2001).

<sup>31</sup> No one thinks conflict in space is inevitable this week or even this year. In that sort of timeframe, all would agree that conflict or its absence depends on decisions of policy makers. Inevitable conflict always takes place in what might be called “ideological time,” i.e. a time remote enough in the future that particular circumstances are necessarily unknown to us, and ideological preconceptions can therefore be liberated from the sobering influence of facts.

community means becoming ourselves more transparent. Where to draw the line?

To a degree, reality may make the choice for us. Some measures, particularly expanded exchanges of information, are already taking hold among commercial operators. There is pressure from the commercial community for expanded information exchanges with governments, combined with a willingness to facilitate improvements in SSA by hosting (albeit not funding) SSA payloads. As well, there are autonomous developments—facilitated by greater U.S. openness—which have potential both to aid detection of non-compliance and make such acts politically more consequential. These include what we identify as “open” verification, i.e., harnessing the power of the private observer community and the connectivity of the internet to monitor activities in space. Internet communities are good at finding things and identifying anomalies; they may also be credible in a way that national actors are not. The effectiveness of such programs depends on: 1) the existence of agreed, specific, and observable norms of behavior, and 2) the amount and nature of information governments are willing to make available.

Increasing the openness of space operations and the availability of SSA information inevitably involves inequity for the United States. Because we can see more and see further, others stand to gain more in the short run than we do. A political judgment will be needed as to whether the long term gain in stability and predictability outweighs this short term, relative disadvantage. One thing is certain; some operations will always be kept from public view, not just by the United States but by all major space-faring nations.

On the other hand, this aspect of the emerging situation—the trend, both intentional and autonomous—toward greater transparency also plays to U.S. strengths. What we call “open” verification is a new category, enabled by the greater availability of information on the one hand and internet connectivity on the other. In this “emerging networked world,” as Anne-Marie Slaughter has argued, “. . . the state with the most connections will be the central player, able to set

the global agenda.”<sup>32</sup> This raises the possibility of a system of public-private verification, drawing on public and government resources, which has both potentially positive and negative aspects, but may be—in our interconnected world—an inevitable next step. The advantage the United States has in connectivity, transparency, trust, and situational awareness makes it the nation best positioned to be the central player in space. It also makes possible extra-national capabilities for space awareness and verification that could not have been imagined in the Cold War.

### CONCLUSIONS AND RECOMMENDATIONS

The central conclusion of this analysis is that verification is not an obstacle to arms control or other agreements that include reciprocal restrictions on the freedom of action in space of the United States and other major players. This is not to say that all potentially disruptive activities in space are verifiable or proper subjects for arms control agreements; but means are available to increase predictability and stability in space by reciprocal constraints on disruptive actions, including certain maneuvers, operations in certain orbits and/or the testing of dedicated or other ASAT systems whether space based or surface based, that are observable and in regard to which compliance can be verified. A well-constructed verification regime will incorporate a necessary element of unilateral capability along with measures to make verification more certain and politically effective by making use of the inherent strengths (and limiting the potential costs) of international consensus, multilateral inspection regimes, and the credibility of public oversight of potentially non-compliant activity.

For those variables we have identified as affecting the scope and intrusiveness of verification measures, the transparency of the domain is much

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<sup>32</sup> Anne-Marie Slaughter, “America’s Edge,” *Foreign Affairs*, January/February 2009. Although she doesn’t deal specifically with space, Slaughter argues that “connectivity is power” in all realms of human endeavor. Slaughter manages to synthesize the sort of national dominance exemplified in space by the “space control” model, with the cooperative paradigm inherent in a world of connectivity. All will be connected; but the United States will be more connected than others.

greater than it was even five years ago, the criticality of small changes has diminished (as the number of satellites engaged in national security activities has multiplied many fold) and the trust between actors—though far from perfect—is nonetheless greater than it was in the Cold War.

Verification does not ensure against cheating, and neither norms nor treaties may apply in a wartime environment. But a well-constructed verification regime can make evidence of violation timely and less ambiguous, providing a stronger case for collective efforts to respond before a crisis becomes a conflict. An adversary seeking to exploit mutual constraint to gain unilateral advantage would have to mount a significant program over a protracted period of time that would leave signatures in a variety of domains. A broad spectrum of verification methods, from independent national capabilities, to multilateral or cooperative regimes, and even open approaches using private observers, will increase the probability of detection and give greater credibility and legitimacy to the analysis of disputed activity.

We conclude that the ability of the *least* competent *major* actor to verify compliance will define the outer boundaries of what is possible in arms control.<sup>33</sup> Our conclusion is based on the assessment that if meaningful strategic consequences are possible as the result of non-compliance, no strategic actor will rely for information from any source it does not control. For that reason, the *most* competent player is unlikely to be faced with international consensus for constraints that exceed its verification capabilities. The requirement independently to verify is less true of second tier space powers, who have limited independent space surveillance capability.

We predict the emergence of “trust groups” clustered around major countries that *do* have such capability. It follows that a possible locus for competition in space (which may already be taking place) is the competition among major actors to expand their trust groups, and therefore

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<sup>33</sup> By “*least* competent *major* actor” we mean the state with the most limited capability that is nevertheless critical to enforcement or implementation.

build international support for the interpretation of events in space that reflects and serves their individual interests.

In this competition, the nation with the most comprehensive, credible and available information—and the greatest willingness to share it—will have a decisive advantage. At the moment, and for the foreseeable future, that country is the United States. The United States, as the predominant player, also has the most at stake in regimes that limit freedom of action, and therefore the greatest interest in ensuring that, if such restrictions are put in play, they can be adequately verified, incorporated in binding agreements rather than amorphous systems of ‘norms’, and that non-compliance will be visible to a wide international community. Sharing information and opening space to greater public scrutiny is relevant to enforcement of restrictions on activities in space, since these may well be invisible to many international actors whose cooperation is necessary to make sanctions or other collective actions to punish non-compliance more effective. On the other hand, if public transparency does have such an inhibiting impact, that effect is likely to be greater in open societies than in those where both information and public opinion are tightly controlled.

Fortunately, the emphasis on verification plays to U.S. strengths.<sup>34</sup> The Chinese/Russian draft treaty prohibiting the stationing of weapons in space (PPWT) is precise on what should be limited but vague on verification. The Chinese in particular have presented this as a concession to U.S. sensitivities about its activities in space; but it may also reflect a relative weakness of capability and reluctance by the authors of the PPWT to make their own space programs more transparent. The United States is in a far different position regarding both openness and capability. It can therefore ensure its interests and capitalize on its strengths by taking precisely the opposite tack, i.e., by making verification the first rather than the last

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<sup>34</sup> This is, in essence, an extension to space of Slaughter’s argument that “In the twenty-first century, the United States’ exceptional capacity for connection, rather than splendid isolation or hegemonic domination, will renew its power and restore its global purpose.” (Slaughter, *ibid.*)

focus of international discussions on binding constraints in space. Since satellites themselves will play an increasing role in space situational awareness, non-interference with satellites will be both the objective for any new agreement as well as the standard by which compliance is measured.

Verification is not synonymous with enforcement. Indeed, verification without enforcement—as has been the case with the Outer Space Treaty—arguably weakens rather than strengthens the incentive for restraint. There is a tendency in any negotiation to use vague or ambiguous language to achieve consensus. Ambiguous norms provide the appearance of regulation without imposing specific constraints, and thereby may satisfy both those who favor greater structure in space and those who insist on freedom of action. But that ambiguity will be multiplied several times in the resulting verification regime, increasing uncertainty, suspicion, disagreement, and generally conducing to disorder rather than order.

Precision should therefore not be sacrificed to consensus in either the terms of agreements or the description of how compliance will be verified. Indeed, precision of language may be more important for establishing verifiable constraints on activities in space than the form such agreements take, i.e., whether voluntary norms or treaty language. Unfortunately, the trend seems to be precisely in the opposite direction, i.e., to transform the relatively precise obligations of the Outer Space Treaty into vaguely worded, highly qualified, and voluntary undertakings. This is true of the various schemes of “norms” for behavior in space. In short, verification is only potentially stabilizing if it establishes compliance with specific and observable rules (whether established by “hard” or “soft” law), and parties are willing to call others to account. Otherwise, such schemes may serve only to verify that no real agreed order exists.

We conclude that verification is a natural area for U.S. leadership and presents an opportunity to achieve objectives formerly couched in terms of being able physically to dominate space. The United States does have—and will likely maintain—information dominance. This presents policymakers with two options for continued

protection of U.S. space assets. The first is to maintain a “closed system,” keeping national security systems out of public catalogs and relying on its own capabilities to verify the activities of states that do the same. The disadvantages with this approach are twofold. It fosters suspicion about U.S. actions and intentions that cannot be publicly dispelled and hampers its ability to hold others accountable for disruptive activity since to do so would reveal the extent or limits of U.S. surveillance capability. A clever and dedicated adversary will be apt to push the limits of tolerance for disruptive actions, confident that leaders in Washington will choose to remain silent.

The alternative course of action would be to capitalize on the principle of non-interference with systems involved in verifying compliance with any agreement. This includes placement of sensors on a variety of space platforms, whether hosted on commercial systems or integrated into government vehicles (civil and military alike). It applies as well to those observation and analysis systems based on the ground involved in such work. There are two potential advantages: first, detection capabilities are improved through means that can be used *publicly* to hold disruptive actors accountable to international scrutiny while protecting sources or methods. A proliferation of government, commercial, multilateral and public observation mechanisms makes it more difficult for a disruptive actor to escape public exposure.<sup>35</sup> Second, by entangling an ever-increasing number of satellites in the verification regime the principle of non-interference is broadened to include a greater number of satellites. Non-interference is, in the end, a primary goal of any peacetime protection efforts and may

be achieved without formal negotiation of any new agreements or arms control, building on existing traditions as discussed above. Entanglement of government and commercial systems, both domestic and foreign, can also contribute to deterrence by complicating an adversary’s decision-making calculus.<sup>36</sup>

Shifting the focus to verification will help define the range of constraint and/or arms control measures that follow and will provide a basis for hope of their achieving broad international consensus and impact. More importantly, it will allow the United States to reassert leadership in an area of its relative strength, help fend off proposals by others designed solely for tactical diplomatic advantage, and set a practical agenda likely to have broad international appeal. This would be an appropriate initiative to take up in the Committee on Disarmament or any other international venue where the security and sustainability of the space domain is an issue.

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<sup>35</sup> Public scrutiny of space activities has increased significantly in its specificity in recent years, as exemplified by analysis of Chinese orbital rendezvous maneuvers concerning the *Shi Jian 12* and *Shi Jian 06F* satellites. See Brian Weeden, “Dancing in the Dark: The Orbital Rendezvous of SJ-12 and SJ-06F,” *The Space Review*, 30 August 2010, found at [www.thespacereview.com/article/1689/1](http://www.thespacereview.com/article/1689/1).

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<sup>36</sup> For a discussion of entanglement as a component of deterrence see the Eisenhower Center’s Space Deterrence Study, p. 20, found at [web.mac.com/rharrison5/Eisenhower\\_Center\\_for\\_Space\\_and\\_Defense\\_Studies/Space\\_Deterrence.html](http://web.mac.com/rharrison5/Eisenhower_Center_for_Space_and_Defense_Studies/Space_Deterrence.html).

## Publisher's Corner: Don't Call It Cyberspace

Roger G. Harrison

It is said of human beings that we are a pattern discerning species. We tend to search for or invent patterns even where none exist—hence the popularity of power point.<sup>1</sup> When we deal with something truly unprecedented, our tendency is nonetheless to find some precedent for it, or, failing that, to fall back on analogy, metaphor or simile, all tools the mind uses to confront the unknown future with the familiar—which is one reason that large organizations faced with unique challenges almost invariably get it wrong.

We are in danger of doing that again as we organize to deal with challenges to national security presented by the unique phenomenon of cyber, and do so based on comparisons between cyber and space—or, more radically, on the notion that these are, for practical purposes, aspects of the same thing. This is the synergy thesis, on the basis of which Air Force Space Command is now charged with the responsibility for cyber as well. Former Assistant Secretary of the Air Force Jeffrey Harris told a recent symposium at CSIS that in his view space and cyber were ‘merging and aligning.’

It isn't immediately clear what any of this means. How do you ‘merge’ a tangible, physical

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<sup>1</sup> It is a mark of the essential difference between cyber and space that the latter can be represented adequately on a power point slide (or more commonly a very large number of them) whereas the former cannot be. Power point is good at describing structure but very bad dealing with abstraction, and cyber is an abstraction, representing our efforts to imagine a universe compounded of billions of independent transactions from millions of sources, some known, some unknown, and some potentially generated by the environment itself. Such a phenomenon cannot be represented visually, which saves it (or should) from power point's intellectual death grip. Note that the cyber ‘cloud’ (itself a metaphor) is most often represented in power point presentations not by lengthy explanation, or by bulleted talking points, but by a drawing of a cartoon cloud.

environment like space, with an intangible, virtual environment like cyber? In what way do they align? How do we capitalize on the mutually reinforcing (synergistic?) characteristics of a domain like space where doctrine changes at the speed of bureaucracy, and a domain like cyber which is so much in flux that even the concept of doctrine doesn't seem to apply?

The thesis here is precisely the opposite, i.e., that cyber is something truly new and unique in human experience. Nothing like it has existed before. So we will have to do the tedious work of conceiving, *ab initio*, an entirely new approach to management, collaboration, procurement, organization, and strategy. And we will have to cultivate a new kind of strategic mind that can lead in this unique environment.

Defenders of the synergy thesis will point out in rebuttal the similarities between cyber and space. For example, attribution of attack is a problem for both space and cyber warriors; deterrence therefore presents some of the same problems in the two domains.<sup>2</sup> Satellites are one conduit (although only one) for cyber communication, and cyber is one possible vector for interfering with or disabling satellites. Both space and cyber depend on electromagnetic spectrum, and this dependence makes both vulnerable to attack from a variety of national and non-national actors with relatively limited resources.<sup>3</sup> Both are arguably offense-

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<sup>2</sup> The problems are much more difficult, and perhaps impossible, to resolve in cyber, another mark of essential difference between cyber and space. Both the Eisenhower Center and Rand Corporation published studies of how deterrence might apply in space, given the right combination of hardware and policies. The most prominent study of cyber deterrence concludes, on the contrary, that it is simply not possible.

<sup>3</sup> This mutual vulnerability is not symmetrical. An interruption of that portion of cyber communication carried by satellites would be a serious inconvenience; a compromised cyber network could render the

dominant environments, i.e., environments in which technology favors the attacker—particularly preemptive attack—over defense. And mission assurance in both domains is critical to national security.

Still, these “points of contact” are to some degree incidental<sup>4</sup> and in any case pale before the differences between the two domains. Indeed, space and cyber are not just different but essentially antithetical, and the real question is not how we combine their strengths (although we should when we can) but how we keep them safely distinct and prevent the culture of space—with its endless procurement cycles, hierarchical management structures, overlapping and mutually hostile bureaucracies, glacial response times, derivative strategic concepts, and aging, entrenched work force—from seeping over into the cyber environment.

Is antithetical too strong a word? It might be argued that some differences between the two domains are simply matters of degree. The most obvious example is the need in cyber for much greater speed in research, planning, procurement, and training. The problem—a problem inherent in the nature of the environment—is that the traditional bureaucratic space management structures are incapable of that kind of speed.<sup>5</sup> Because operating in space is so expensive, their emphasis is (properly) on redundancy and robustness of systems, adherence to proven protocols, and, above all, avoidance of mistakes. Cyber, on the other hand, changes so rapidly that yesterday's protocols may be obsolete today and self-defeating tomorrow. Because the cost of entry in cyber is low, the opportunity and reward for experimentation and innovation are correspondingly high. Space may be ‘contested,’

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information provided by satellites useless—or, at worst, malicious.

<sup>4</sup> Lists like this do not imply any existential connection between cyber and space. Similar lists could be constructed in relation to any two strategic domains, for example space and air, or space and undersea.

<sup>5</sup> The business plan of “new space” companies like SpaceX is based on bringing cyber management practices to traditional space operations, especially launch. Whether it will work or not is open to question.

but in relation to cyber it is truly a peaceable kingdom where the incidents of intentional interference are rare. Our cyber networks, by contrast, are attacked thousands of times every day. We may be surprised in space as potential adversaries attain capabilities more quickly than we had anticipated, but that evolution will likely measure in years and even decades. We can only vaguely discern the challenges that will face us in cyber a year from now; indeed, we are uncertain of our grasp on those we confront at present.<sup>6</sup>

These are not just differences in degree; they are differences in kind and will require different kinds of management structures, a different lexicon of terms, and a new sort of strategic mind. Applying the slow but certain model to cyber (treating it as we treat space) is not just inappropriate but potentially disastrous.

The commercial world provides a model of the sort of management structures that work. Companies that succeed in the cyber world tend—at least initially—to be small and entrepreneurial. Management structures are flat; talent is rewarded regardless of rank (and rank in the traditional sense is rare); innovation is favored; received wisdom is treated with skepticism; power is dispersed; doctrine is suspect; dogma is rejected. The atmosphere reminds many in the older generation of that which existed in the space community forty years ago. The problem for cyber companies is how to maintain those characteristics as they succeed, and therefore become larger and more bureaucratized, that is, more like government. This raises the question of whether government—and in particular the military—can run a successful cyber operation. How can it become more like these entrepreneurial companies? More of that below.

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<sup>6</sup> The Obama Administration Space policy refers to the possibilities of international agreements, including arms control, for space. Historically, arms control agreements only become possible when contending sides believe that they understand the terrain sufficiently to conclude that neither they nor their adversaries can achieve unilateral advantage at acceptable cost. This is, arguably, true of space, but not of cyber, where the terrain is so uncertain that even the parameters of theoretically stabilizing international agreements are far from clear.

In the meantime, it is likely that success in national security cyber will require an unprecedented level of cooperation with commercial operators, whose experience is vital and whose interests in cyber are essentially the same as those of government. The old divisions between government and industry, the public sector and the private, will have to be (and are being) re-drawn.<sup>7</sup>

The sort of new lexicon we will need is more difficult to describe. Perhaps the key here is to understand the state of mind we need rather than the concepts themselves, which are beyond the scope of this brief paper. This state of mind might be described as radical skepticism when it comes to the application to cyber of any concept (metaphor, analogy, or simile) developed in other domains for other purposes.

To resort to these will be the inevitable tendency, not because the concepts are applicable but because we are comfortable with them and because adopting them requires no new and painful bureaucratic consensus building. What constitutes offense and defense in cyber? What is meant—or can anything be meant—by deterrence, by escalation, by security and preemption in the cyber domain? It may be that some or all of these terms are useful, just as the concept of merging domains may be useful, but only if we can describe (and then agree on) what they mean in this unique new world, and only if cyber stabilizes sufficiently to ensure that they mean the same thing from one planning cycle to the next.

Finally, we will need a different kind of strategic mind, accustomed to irregularity, ready to make mistakes, free of doctrine, hostile to dogma, and alert to the principal thing (among many) that makes cyber as a strategic environment something new—that it is, in every sense, a product of our imagination. When we enter space we encounter what amounts to a toxic sea that erodes our bodies

and our machines; but space is indifferent to our presence and imposes the same limitations on all who operate there. When we enter cyber, we encounter ourselves—the human psyche electronically enhanced. Cyber exhibits all the virtues and vices of our species: it is creative, dynamic, perverse, innovative, evolutionary, elusive, and constantly evolving. We can (at least in theory) develop a doctrine for space and be reasonably certain that it will still be applicable a decade from now. Opponents can counter strategize, but they labor under the same physical limitations we do. In a sense, every punch will be telegraphed; whether we are agile enough to react, of course, is another issue.

There is no such assurance in cyber, where threats come from everywhere, opponents appear and disappear, motives other than greed can be obscure, and doctrine (if we have any) will have to be *ad hoc*, developed on the fly and discarded just as quickly. We are not on a level playing field in cyber; we are limited by law, others—freelance individuals or non-state networks—are not.

Which begs the previous question: where, aside from the commercial sector, will we find examples of how this threat can be countered, and the leaders to do it?

The answer, paradoxically enough, is: the military, or more specifically the Army and the Marine Corps under pressure of combat. The habits of mind that cyber requires are being developed at the moment in the conflict with insurgencies, particularly in Afghanistan. Brian O’Keefe described the phenomenon in a recent issue of “Fortune” magazine (March 22, 2010). Industry was, O’Keefe wrote, “skeptical of structure” and therefore looking to the military veterans of the wars in Iraq and Afghanistan for the kind of young leaders who are “comfortable with complexity,” and capable of “dealing with ambiguity” and “challenging paradigms.”

A former Army captain now at Google was quoted as saying this: “I think the people who are doing interesting stuff in the military are entrepreneurial in mindset. And they don’t look up for approval and permission to do stuff. They are just doing it, and then after a while, the chain

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<sup>7</sup> Large cyber companies like Google and Intel already operate as quasi-sovereign entities, as the recent contretemps between Google and China (a severing of relations, then partial rapprochement) demonstrate. This is also true, not incidentally, of supra-national commercial space operators like Intelsat, now headquartered in Luxembourg.

of command recognizes that what they're doing has value, and they kind of put a veneer of respectability around it." In other words, doctrine in fast developing environments like counter insurgency and cyber follows rather than informs tactics. Confusing that kind of world with the world of space—or, for that matter, the cyber challenge with any other we have faced in our history—is to mire ourselves in false analogy. There really is something new under the sun.

## Notes for Contributors to *Space & Defense*

*Space & Defense* seeks submissions that will contribute to the intellectual foundation for the integration of space policy into overall security studies. The collaboration of soldiers, scholars, and scientists studying nuclear deterrence in the 1950s led to a robust evolution of doctrine that shaped national and international policy for the succeeding forty years. Our goal as a Center is to create this same robust dialogue with a research agenda that focuses on the integration of space policy and security studies.

Indeed, the emergence of space as a unique and critical element in national security, economic security, homeland security, cyber security, environmental security, and even human security has persuaded us that this line of inquiry is vital to the future of international security.

Contributions are welcome from academic scholars and policy analysts at think tanks and research institutes; senior management and policy officials from international and governmental agencies and departments relevant to space and security issues; senior management and policy officials from organizations responsible for critical national and international infrastructures that rely upon space; major aerospace corporations; scientists and engineers interested or involved in space and security policy issues; military officers and operators in relevant units, commands, and in staff colleges and service academies.

The journal welcomes submissions of scholarly, independent research articles and viewpoint essays. There is no standard length for articles, but 7,500 to 10,000 words, including notes and references, is a useful target for research articles, and viewpoint essays should be in the range of 2,500 to 5,000 words. The opinions, conclusions, and recommendations expressed or implied within *Space & Defense* are those of the contributors and do not reflect those of the Eisenhower Center for Space and Defense Studies, the Air Force Academy, the Air Force, the Department of Defense, or any other agency of the United States Government.

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Details of the author's institutional affiliation, full address, and other contact information should be included in a separate file or cover sheet.

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Authors are responsible for ensuring that their manuscripts conform to the style of *Space & Defense*. The editors will not undertake retyping of manuscripts before publication. Please follow the Chicago Manual of Style.

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- Dates in the form: 1 January 2009.
- Headings (bold, ALL CAPS, title case and centered).
- Subheadings (bold, italic, title case and centered).
- Acronyms/abbreviations should always be spelled out in full on first use in the text.
- The 24-hour clock is used for time, e.g., 0800, 1300, 1800.
- Use percent rather than % except in figures and tables.
- For numbers, spell out numbers less than 10.
- Make use of 21<sup>st</sup> style where appropriate
- Keep capitalization to a minimum.
- Concise paragraphs and sentences are desirable.
- Avoid a paper that is just descriptive; rather engage in analytical rigor and assessment.
- Avoid policy recommendations in the analysis part of paper; leave this, if applicable, for a separate section at the end of the paper.
- Define all new terms used in paper.
- Avoid hyphenated words when possible (e.g. low Earth orbit).
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