

[H.A.S.C. No. 117-29]

**CREATING A FRAMEWORK FOR RULES-
BASED ORDER IN SPACE**

JOINT HEARING

BEFORE THE

SUBCOMMITTEE ON STRATEGIC FORCES

OF THE

COMMITTEE ON ARMED SERVICES

MEETING JOINTLY WITH THE

SUBCOMMITTEE ON INTERNATIONAL DEVELOPMENT,

INTERNATIONAL ORGANIZATIONS AND GLOBAL

CORPORATE SOCIAL IMPACT

OF THE

COMMITTEE ON FOREIGN AFFAIRS

[Serial No. 117-32]

HOUSE OF REPRESENTATIVES

ONE HUNDRED SEVENTEENTH CONGRESS

FIRST SESSION

HEARING HELD

MAY 5, 2021



U.S. GOVERNMENT PUBLISHING OFFICE

46-721

WASHINGTON : 2022

COMMITTEE ON ARMED SERVICES
SUBCOMMITTEE ON STRATEGIC FORCES

JIM COOPER, Tennessee, *Chairman*

JAMES R. LANGEVIN, Rhode Island	MICHAEL R. TURNER, Ohio
JOHN GARAMENDI, California	JOE WILSON, South Carolina
SETH MOULTON, Massachusetts	DOUG LAMBORN, Colorado
SALUD O. CARBAJAL, California, <i>Vice Chair</i>	MO BROOKS, Alabama
RO KHANNA, California	ELISE M. STEFANIK, New York
JOSEPH D. MORELLE, New York	SCOTT DESJARLAIS, Tennessee
JIMMY PANETTA, California	LIZ CHENEY, Wyoming
<i>Vacancy</i>	MICHAEL WALTZ, Florida

MARIA VASTOLA, *Professional Staff Member*
WHITNEY VERRETT, *Professional Staff Member*
ZACH TAYLOR, *Clerk*

COMMITTEE ON FOREIGN AFFAIRS
SUBCOMMITTEE ON INTERNATIONAL DEVELOPMENT, INTERNATIONAL
ORGANIZATIONS AND GLOBAL CORPORATE SOCIAL IMPACT

JOAQUIN CASTRO, Texas, *Chairman*

CONOR LAMB, Pennsylvania	NICOLE MALLIOTAKIS, Florida, <i>Ranking</i>
MIKE LEVIN, California	<i>Member</i>
ANTHONY BRINDISI, New York	AMATA COLEMAN RADEWAGEN, American
MAX ROSE, New York	Samoa
GIL CISNEROS, California	ANDY BARR, Kentucky
COLIN PETERSON, Minnesota	DAN MEUSER, Pennsylvania
	GREG STEUBE, Florida

SOPHIA LAFARGUE, *Staff Director*
BRENDON SHIELDS, *Staff Director*

CONTENTS

	Page
STATEMENTS PRESENTED BY MEMBERS OF CONGRESS	
Castro, Hon. Joaquin, a Representative from Texas, Chairman, Subcommittee on International Development, International Organizations and Global Corporate Social Impact, Committee on Foreign Affairs	3
Cooper, Hon. Jim, a Representative from Tennessee, Chairman, Subcommittee on Strategic Forces, Committee on Armed Services	1
Lamborn, Hon. Doug, a Representative from Colorado, Subcommittee on Strategic Forces, Committee on Armed Services	2
Malliotakis, Hon. Nicole, a Representative from New York, Ranking Member, Subcommittee on International Development, International Organizations and Global Corporate Social Impact, Committee on Foreign Affairs	5
WITNESSES	
Hill, John D., Performing the Duties of Assistant Secretary of Defense for Space Policy, U.S. Department of Defense	6
Moore, Jonathan M., Principal Deputy Assistant Secretary, Bureau of Oceans and International Environmental and Scientific Affairs, U.S. Department of State	9
Turner, Bruce I., Senior Bureau Official, Bureau of Arms Control, Verification and Compliance, U.S. Department of State	11
Whiting, Lt Gen Stephen N., USSF, Commander, Space Operations Command, United States Space Force	7
APPENDIX	
PREPARED STATEMENTS:	
Cooper, Hon. Jim	37
Hill, John D.	38
Moore, Jonathan M.	51
Turner, Bruce I.	58
Whiting, Lt Gen Stephen N.	44
DOCUMENTS SUBMITTED FOR THE RECORD:	
United States of America National Submission to the United Nations Secretary General Pursuant to UN General Assembly Resolution 75/36, Reducing space threats through norms, rules and principles of responsible behaviours	65
WITNESS RESPONSES TO QUESTIONS ASKED DURING THE HEARING: [There were no Questions submitted during the hearing.]	
QUESTIONS SUBMITTED BY MEMBERS POST HEARING:	
Mr. Morelle	78
Mr. Waltz	77

CREATING A FRAMEWORK FOR RULES-BASED ORDER IN SPACE

HOUSE OF REPRESENTATIVES, COMMITTEE ON ARMED SERVICES, SUBCOMMITTEE ON STRATEGIC FORCES, JOINT WITH THE COMMITTEE ON FOREIGN AFFAIRS, SUBCOMMITTEE ON INTERNATIONAL DEVELOPMENT, INTERNATIONAL ORGANIZATIONS AND GLOBAL CORPORATE SOCIAL IMPACT, WASHINGTON, DC, WEDNESDAY, MAY 5, 2021.

The subcommittee met, pursuant to call, at 3:08 p.m., via Webex, Hon. Jim Cooper (chairman of the Subcommittee on Strategic Forces) presiding.

OPENING STATEMENT OF HON. JIM COOPER, A REPRESENTATIVE FROM TENNESSEE, CHAIRMAN, SUBCOMMITTEE ON STRATEGIC FORCES, COMMITTEE ON ARMED SERVICES

Mr. COOPER. The hearing will come to order.

I would like to start by thanking my colleagues, Representative Castro, the chairman of the House Foreign Affairs Subcommittee on International Development, International Organizations and Global Social Impact, as well as his ranking member, Representative Malliotakis. We thank them for joining the Strategic Forces Subcommittee of HASC [House Armed Services Committee] to discuss this incredibly important and timely topic. I welcome our distinguished panel of witnesses, both from the Departments of Defense and State, as we dive into the issues surrounding the lack of specific, verifiable international norms for behavior in space. First, we have Mr. John D. Hill, performing the duties of Assistant Secretary of Defense for Space Policy; Lieutenant [General] Stephen Whiting, Commander, Space Operations Command, United States Space Force; Mr. Jonathan M. Moore, Principal Deputy Assistant Secretary of State, Bureau of Oceans and International Environmental and Scientific Affairs; and Mr. Bruce Turner, Senior Bureau Official, Bureau of Arms Control, Verification and Compliance.

Thank you all for participating in today's hearing, and I ask you as well as the members, including the chair and ranking, to keep your remarks brief and to no more than for 5 minutes so that we can have ample time for the number of members who are on the call to ask questions.

Space has captured human imagination since the beginning of time. But it is still a long, long way from being understood by our political leaders, diplomats, and lawyers, at least in a way that the many nations of Earth can agree upon. Now scientists have made great progress in helping us reach, explore, and even briefly in-

habit the harsh domain above us, but the rest of us are much slower to follow or even understand where the scientists are enabling us to travel.

Many nations and even some corporations are exploring high above the Earth's atmosphere, testing the infinite number of ways that mastering space can help the 7.6 billion of us who live down here on the Earth. The Space Age is about 70 years old, and the foundational Outer Space Treaty [OST] is just over 50 years old. That should tell us something. Unfortunately, precious little has happened since the OST to organize human efforts in the inhuman space domain.

Space is in danger of becoming the Wild Wild West, where every satellite, astronaut, cosmonaut, or taikonaut has to defend itself. From their testimony, I see that our State Department experts are giving up on the concept of a law-abiding, rules-based space and settling for something less, like a suggestions-based space or probably even a hint-based space. Perhaps that is the best we can do, but I think that we should try harder for better. Can't we at least agree on agreements on space traffic management, on the size of safety zones around satellites or capsules, to ban debris at least from ASATs [anti-satellite weapons], or to have compatible docking latches? There must be a consensus somewhere on Earth for the sensible.

I look forward to the discussion with our witnesses.

And I turn to today's honorary Strategic Forces ranking member, Mr. Doug Lamborn, for any opening remarks that he may have. Doug.

[The prepared statement of Mr. Cooper can be found in the Appendix on page 37.]

**STATEMENT OF HON. DOUG LAMBORN, A REPRESENTATIVE
FROM COLORADO, SUBCOMMITTEE ON STRATEGIC FORCES,
COMMITTEE ON ARMED SERVICES**

Mr. LAMBORN. Thank you, Mr. Chairman. Can you hear me okay?

Mr. COOPER. Yes.

Mr. LAMBORN. And I want to thank you, Chairman Castro and Ranking Member Malliotakis.

Additionally, I want to thank our witnesses for joining us today to discuss this important issue.

As this subcommittee has highlighted again and again, space is a vital component of our national security now more than ever. Not only that, but our global economy is totally dependent on access to space. Space, like the air and sea domains, is a common good that we all benefit from regardless of country of origin. But unlike those other domains, space is more likely to suffer a tragedy of the commons outcome as a result of bad actors.

The physics of space leaves it susceptible to long-term damage from debris created by collisions, poorly conducted anti-satellite weapons and testing, and simply poor planning.

The foundation of international laws and norms that we are currently operating under were developed under the cloud of Cold War when only the two great powers could access space. As a result, the Outer Space Treaty doesn't account for the congested operations of

space we see today. This treaty was also written with very broad language and phrases that are open to wide interpretation by signatories to the agreement.

I do not believe China and Russia are operating in good faith when it comes to their proposals as evidenced by the Treaty on Prevention of the Placement of Weapons in Outer Space, sometimes referred to as the No First Placement Treaty. This treaty proposed to ban weapons in outer space but lacked any mechanism for verification and also was silent on space debris caused by ASAT testing and rendezvous and proximity operations.

Most notably however, Russia and China are in many ways already weaponizing space, proposing a treaty upon which ratification they would already be in violation of. I was glad to see that the U.K. [United Kingdom] submitted a U.N. [United Nations] resolution to, quote, reduce space threats through norms, rules, and principles of responsible behaviors, unquote, to be considered by the U.N. General Assembly this summer in a drive to make space safer and more sustainable. What I don't want is another international treaty that would tie our hands while others blatantly ignore its limitations, like the late Intermediate-Range Nuclear Forces Treaty. I also don't want to see a treaty where the U.S. receives almost no benefits while our adversaries do, like the now dead Open Skies Treaty.

So I appreciate the continued service that you all provide to the Nation. And I look forward to our discussion today.

Thank you, Mr. Chairman. And I yield back.

Mr. COOPER. Thank you, Mr. Lamborn. Now I turn to Chairman Castro for his opening remarks.

STATEMENT OF HON. JOAQUIN CASTRO, A REPRESENTATIVE FROM TEXAS, CHAIRMAN, SUBCOMMITTEE ON INTERNATIONAL DEVELOPMENT, INTERNATIONAL ORGANIZATIONS AND GLOBAL CORPORATE SOCIAL IMPACT, COMMITTEE ON FOREIGN AFFAIRS

Mr. CASTRO. Well, thank you, Mr. Chairman. And thank you all. It is an honor to be here today with my colleagues from both committees to discuss one of the long-term challenges we face, not just as a nation but as a species: space, specifically, the rules that will govern humanity's exploration, commerce, and other activity within space, both by the private sector and nation-states.

I give special thanks to the chairman and Congressman Jim Cooper—he is chairman of the Subcommittee on Strategic Forces, which oversees many of our Nation's space programs—for working together with the House Foreign Affairs Committee and my staff on this important and historic joint hearing.

In the long run, the peaceful exploration of space can be one of the most significant and unifying projects that our Nation and our world has ever undertaken. As President Kennedy said of the Moon mission, America's journeys to space, quote, will serve to organize and measure the best of our energy and skills. In short, space-faring can bring out the best in us, leading to cutting-edge technologies, creating new jobs, making significant scientific discoveries, and perhaps, above all, uniting our divided Nation behind a common purpose once more.

I commend the Biden administration for pledging to continue ongoing plans to return Americans to the Moon and making clear part of this mission will be to land the first woman and person of color on the lunar surface, ensuring that this Moon landing will be seen by Americans and the world as an accomplishment on behalf of all Americans. Yet, despite the goal of peaceful coexistence among the stars, space is not immune to the realities of international relations at a time of rising authoritarian powers or the global trend of increased inequality and lack of corporate accountability. This hearing will serve to assess the current and future state of human activity in space and to inform a new American strategy for preserving the rule of law, peace, and international cooperation in the most hostile environment humanity inhabits.

This is new territory of course for all of us. There has never been this many state and private actors all operating in space at once with multiple different priorities and growing risks of clashes, both intentional and not. In many ways the challenge in space is unlike any that humanity has faced before. It took centuries to shape the law of the sea, drawing upon thousands of years of human seafaring. We don't have 100 years to set the rules for space, nor do we have traditions to draw upon that fall beyond living memory. The reality is that space is already critical to the military capabilities of the United States, our allies, our partners, and our adversaries. The question is how we and other states will respond and whether we will be able to develop a set of rules to manage disputes and develop a set of rules that will also work for all of us.

The United States has engaged in these critical issues for decades at the United Nations and in other international organizations. The accelerating pace of human activities in space raises the urgency of re-engaging with our partners and establishing norms and rules.

Earlier this week, the United States made a public declaration of what our Nation's interests are in space, what threats we face, and how we will engage with the international community to establish norms of behavior. This is a critical task. We rely on space for almost everything we do as a society, to include navigation, accurate timekeeping, global communications, and weather. The number of satellites in space, from both government and private actors, will increase nearly tenfold in the next decade. Countries, including China, are developing the capabilities to disable or destroy satellites in space through missiles, other satellites, cyber attacks, or electronic warfare. And as the United States plans our return to the Moon, that also raises the importance of minimizing the risk to astronauts in space. Congress must pay careful attention to all these issues and determine where the United States will stand on these crucial questions for space governance.

This hearing will be one of the Foreign Affairs Committee's first significant opportunities to address these issues and hear directly from the administration on what we are doing to build an international rules-based order to govern space that can meet the challenges of humanity's second spacefaring century.

With that, I yield back, Chair.

Mr. COOPER. Thank you so much, Chairman Castro. Now we turn to Ranking Member Malliotakis for her remarks.

STATEMENT OF HON. NICOLE MALLIOTAKIS, A REPRESENTATIVE FROM NEW YORK, RANKING MEMBER, SUBCOMMITTEE ON INTERNATIONAL DEVELOPMENT, INTERNATIONAL ORGANIZATIONS AND GLOBAL CORPORATE SOCIAL IMPACT, COMMITTEE ON FOREIGN AFFAIRS

Ms. MALLIOTAKIS. Thank you, Chairman Cooper. As we set out to contribute to the development of a framework of a rules-based order in space that serves American interests, there are two primary areas I wish to explore with our panel of government witnesses from the Department of Defense and State.

First, my distinguished colleagues have already made reference to the impact of the 1967 Outer Space Treaty. But it is the common heritage of the humankind principle captured in the second preambular paragraph of the treaty, quote, recognizing the common interest of all humankind in the progress of the exploration and use of outer space for purposes, unquote, that I wish to highlight.

This principle of international law holds that, just as we are to treat our seas on Earth, outer space should be free for exploration and use for the benefit of all and shall be the province of all humankind. Further, it means outer space should be free from exploitation from any nation-state or private corporation. I draw this out because we have seen this principle in practice under the U.N. Convention on the Law of the Sea, also known as UNCLOS.

It was established to set out a comprehensive legal regime for the world's oceans. Despite being a party to this convention, China has acted without regard to its terms, even going so far as to ignore an international tribunal ruling that rejected the legality of China's maritime claims and behaviors from 2016. Yet, nearly 5 years later, there has been no punitive action taken against China, and so still China continues to act in contravention to the Law of the Sea Convention.

Last month, the Office of Director of National Intelligence issued its annual report of worldwide threats to U.S. national security, which includes sections on the threat of Russia and China's space programs. This report reflects the collective insights of the U.S. intelligence community and focuses on the most direct, serious threats to the United States during the next year.

The report identifies China and Russia's anti-satellite weapons programs and the threat these programs pose to U.S. terrestrial forces that rely on satellite-based communications. I share in the concerns conveyed by my Armed Services colleagues on threats posed by China's and Russia's space technology to the principle of common heritage of all humankind. Both nations' track records on the Earth's surface give more than sufficient reason to expect that their malign behavior will extend into orbit.

The second aspect I wish to highlight is the commercial exploration of space. I marvel and join with my colleagues in enthusiastically supporting the participation between NASA [National Aeronautics and Space Administration] and commercial space exploration. The April 23rd launch of the SpaceX Falcon 9 rocket from NASA's Kennedy Space Center, which propelled an international team of astronauts, Crew Dragon, in the Endeavor to the International Space Station, is a perfect illustration of just how far

we have come in space exploration. As was the safe return of the Crew-1 astronauts on May 2nd.

While the U.S. Government builds partnerships with private industry, for China and Russia there is no distinction between that which the state owns and that which is privately owned, as their respective space programs are all state-owned. By extension, their programs serve both civil and military purposes. We have seen this script before in the Pacific waterways, where commercial fishing vessels are also used by China as maritime militia.

I am focused on these two areas, the principle of the common heritage of humankind and commercial space exploration, because, on the one hand, they offer up opportunities to abiding nation-states and future generations, but, on the other, they represent dangerous risks resulting from nation-states unwilling to be bound by a rules-based order in pursuing space technologies that poses a direct threat to our Nation's security.

In our discussion, we must not cast aside these realities. When world leaders negotiated the terms of the Outer Space Treaty in the days of the original Star Trek series, maintaining stasis was attainable. But, today, as our global leaders pursue international norms, rules, and principles of responsible behavior in outer space, stasis is now a fiction. The U.S. and other nation-states may abide by international norms, rules, and principles of responsible behavior, but our competition acts with indifference to a rules-based order. This is our current operating environment, and we must pursue a space policy that brings together our interests but also addresses the challenges in space exploration.

I welcome our esteemed panel of government experts and yield the remainder of my time. I suppose I ran out.

Mr. COOPER. Thank you so much, Representative Malliotakis.

First, let me say that everyone should be muted except for the witnesses that I call on. So let me repeat: Everyone should be muted. There is way too much background noise here, so please mute yourself.

Our first witness for his 5-minute statement will be Mr. John Hill.

Now, Mr. Hill.

STATEMENT OF JOHN D. HILL, PERFORMING THE DUTIES OF ASSISTANT SECRETARY OF DEFENSE FOR SPACE POLICY, U.S. DEPARTMENT OF DEFENSE

Mr. HILL. Thank you, Chairman Cooper, Ranking Member Lamborn, Chairman Castro, and Ranking Member Malliotakis, distinguished members of the subcommittees. It is an honor to testify before you today along with my distinguished colleagues. You have my full written statement. And, with your permission, I ask that it be included in the record. I will briefly summarize it.

Mr. COOPER. Without objection, so ordered.

Mr. HILL. The U.S. Government's efforts to foster a rules-based international order in outer space are focused on establishing voluntary, non-legally binding measures derived from current technical and operational best practices. As one of the world's most experienced space operators, the Department of Defense actively supports and partners with the Department of State in developing U.S.

proposals within international venues in order to shape the strategic environment toward an agreed upon model for safe, responsible, and professional behavior.

There are many benefits to having common guidelines for space operations. Among these are a safer, more sustainable, more stable, and more predictable space operating environment for all space operators. Importantly for DOD [Department of Defense], such an operating environment can also facilitate indications and warnings of hostile intentions and hostile acts. DOD policies and practices often serve as the basis for international measures. DOD models responsible behavior through our routine space operations. And DOD works carefully to ensure that our space operations are consistent with international measures the United States supports and with relevant domestic and international law, including the law of armed conflict and the inherent right of self-defense.

For example, not only are DOD operations fully consistent with the 2007 Space Debris Mitigation Guidelines of the United Nations Committee on the Peaceful Uses of Outer Space, but DOD practices also served as a source of the more rigorous standards adopted in the November 2019 United States Government Orbital Debris Mitigation Standard Practices. Likewise, for 10 years, the Department of Defense provided one of the lead U.S. delegates to the negotiations on the Committee on the Peaceful Uses of Outer Space that produced the 2019 guidelines for the long-term sustainability of outer space activities.

This participation ensured consistency with DOD practices and greatly facilitated implementation of these guidelines. Most recently, DOD has supported the drafting of the United States national submission in response to the 2020 United Nations General Assembly resolution on reducing space threats through norms, rules, and principles of responsible behaviors.

From the DOD perspective, United States leadership and the development of a rules-based order for space activities reaps benefit for U.S. civil, commercial, scientific, and national security space operators. As space activities worldwide become more prolific and more varied, voluntary and nonbinding international norms, standards, and guidelines of responsible behavior can benefit U.S. national security and foster a conducive environment for growing global space activities.

Thank you for your time and attention. And I look forward to answering your questions.

[The prepared statement of Mr. Hill can be found in the Appendix on page 38.]

Mr. COOPER. Thank you very much, Mr. Hill. I appreciate that.

And I ask members one more time to please mute your microphones. There is still some background noise.

Now we will hear from General Whiting.

STATEMENT OF LT GEN STEPHEN N. WHITING, USSF, COMMANDER, SPACE OPERATIONS COMMAND, UNITED STATES SPACE FORCE

General WHITING. Chairman Cooper, Chairman Castro, Ranking Member Lamborn, Ranking Member Malliotakis, and members of the committee, thank you for the opportunity to testify today in my

capacity as Commander, Space Operations Command, on the U.S. Space Force perspectives toward creating a framework for rules-based order in space.

I am honored today to join Mr. Hill and our partners at the State Department, Mr. Turner and Mr. Moore, whose leadership and insights greatly contribute toward ensuring the safety, security, stability, and long-term sustainability of U.S. space activities.

I have the distinct privilege to lead and represent guardians and airmen of Space Operations Command, providing combat-ready, ISR [intelligence, surveillance, and reconnaissance]-led cyber secure space and combat support forces to the joint force. It is from the perspective of our role to generate, present, and sustain these forces that I testify here before you today.

Now aligned under our Nation's newest service, our mission is to protect America and our allies in, from, and to space now and into the future. As U.S. Space Command's Space Force service component, we accomplish this mission through our headquarters' generate, present, and sustain tasks, along with SpOC [Space Operations Command] West, a headquarters we present to U.S. Space Command at Vandenberg Air Force Base in California, who plan, integrate, conduct, and assess global space operations. Our mission execution benefits from decades of experience operating in space while demonstrating safe, professional, and responsible behavior. In fact, given our imperative to help keep the domain safe, our command, in partnership with what was our combatant command at the time, U.S. Strategic Command—and today is U.S. Space Command—has for many years, with the support of Congress, been providing orbital conjunction assessments to any space owner and operator around the globe, while also making available SpaceTrack.Org to foster openness and transparency in the tracking of tens of thousands of objects on orbit.

As more actors come to space, the domain is changing. With an increased risk of collisions, as well as miscalculations or misunderstandings, it is incumbent on the Department to continue space leadership through demonstrating and acknowledging responsible behavior in space, such as the widespread sharing of space situational awareness information.

Today, we support the shift of nonmilitary space traffic management to the Department of Commerce, thus allowing the Department of Defense to focus on directed military functions in our protect and defend mission.

Nevertheless, the U.S. Space Force will collaborate with the Department of Commerce by providing the authoritative space catalogue and in identifying and analyzing specific behaviors to ensure safe, professional, and sustainable operations on orbit while further enhancing trust with allies and establishing new bonds with emerging spacefaring nations.

However, we have long understood that our Nation is strongest economically, militarily, and diplomatically when we have freedom of operation in a secure, stable, and accessible space domain. It is the position of the U.S. Space Force that the voluntary, non-legally binding transparency and confidence-building measures, guidelines, and norms on responsible behavior, to include an understanding of what constitutes safe and professional conduct, would be immense-

ly helpful toward our mission to protect the U.S. and our allies in, from, and to space.

In concert with the Secretary of State's leadership of the whole-of-government approach to establish norms, the U.S. Space Force provides Department of Defense a capability to both model that behavior and promote internationally accepted standards.

I thank you for your support. And I look forward to working with Congress as we continue to transform our national security space posture. Again, I am privileged to be here with my distinguished colleagues and look forward to your questions.

[The prepared statement of General Whiting can be found in the Appendix on page 44.]

Mr. COOPER. Thank you so much, General Whiting.

Now we will hear from Mr. Moore.

STATEMENT OF JONATHAN M. MOORE, PRINCIPAL DEPUTY ASSISTANT SECRETARY, BUREAU OF OCEANS AND INTERNATIONAL ENVIRONMENTAL AND SCIENTIFIC AFFAIRS, U.S. DEPARTMENT OF STATE

Mr. MOORE. Thank you very much, Chairman Cooper, Ranking Member Lamborn, Chairman Castro, and Ranking Member Malliotakis, distinguished members of the subcommittees. I am very honored to join you and my colleagues from the Pentagon's Space Command and the State Department to discuss American leadership in outer space.

You have my full written testimony, which I would ask if you would kindly submit for the record. And, of course, I will keep my remarks to less than 5 minutes, Mr. Chairman.

Mr. COOPER. Without objection, so ordered.

Mr. MOORE. Thank you again, Mr. Chairman.

So thank you very much for the impressive senior bipartisan interest in this vastly important issue. As we all know and many of you have noted, human activity in outer space is changing rapidly and is of both interest and importance to the American people.

In 1990, only about 20 countries were active in space. Today it is more than 70. The United States leads the world in new commercial space ventures. For the first time in nearly a decade—and this is a tremendous and inspiring success and thanks to the private sector—Americans are traveling to the International Space Station on American-made space launch vehicles. The success of our national space program increasingly depends on international engagement and therefore depends on diplomacy.

The Bureau of Oceans and International Environmental and Scientific Affairs [OIES], together with the Bureau of Arms Control, Verification, and Compliance, conducts diplomatic efforts to ensure that the behavior across all space sectors is consistent with U.S. policy and practice, as well as with the 1967 Outer Space Treaty, which a number of you have cited, and associated conventions and agreements.

The Biden-Harris administration has charged us to explore and use outer space to the benefit of humanity and ensure the safety, stability, and security of outer space activities. This includes expanding and leveling the global playing field for the American space industry. We work directly with partners and through U.N.

bodies and other multilateral fora to advance these principles. Key among these are the U.N. Committee for the Peaceful Uses of Outer Space, mentioned before, COPUOS, as well as the U.N. Office for Outer Space Affairs. For over 60 years, we have worked through those organizations to build support for the United States space policies as well as for our vision to expand human presence in space and promote the responsible use of space.

As Chairman Castro noted, in February the Biden administration endorsed NASA's Artemis program, an ambitious effort to land the first woman and first person of color on the Moon and establish a long-term human presence there, as well as develop and demonstrate new technologies, capabilities, and business approaches needed for future exploration activities, and go on to Mars.

Decades ago, the Apollo missions galvanized world attention, but the costs were borne by the American taxpayer. Now, through cooperation with international partners and private industry, we share both the burden and the rewards.

The Artemis Accords created by the Department of State and NASA in consultation with some of our close spacefaring partner nations are this generation's recommitment to the principles of the Outer Space Treaty, envisioning a safe and transparent, peaceful and prosperous environment which facilitates exploration, science, and commercial activities in space.

As my fellow panelists have testified, there will be major geopolitical challenges as other countries advance their own space exploration objectives. Some countries will work with us to establish and adhere to standards of safe and responsible behavior; others will not.

Our bureau, OES, keeps a very close eye on Russian and Chinese space activities. Together with the interagency, we engage directly with them on space flight safety and responsible behavior while countering actions inconsistent with those principles. U.S. cooperation with Russia is based on a governmental agreement on cooperation in the exploration and use of outer space for peaceful purposes, which was recently extended through December 31, 2030. This arrangement provides a legal framework for cooperation on the International Space Station and limited space, science, and robotics space exploration missions.

With regard to China, we maintain our engagement through a variety of means in order to understand their space, science, and exploration programs, and encourage mutually beneficial open exchange of scientific data from civil space missions. Please just let me underline: American diplomatic leadership is establishing international frameworks and facilitating norms of behavior based on United States policy and practice. Advancing peaceful norms and responsible behaviors in outer space is critical to protecting American national security, commercial, and research interests.

The Department of State, in coordination with the interagency and National Space Council as well as in close consultation with Congress, will continue to utilize multilateral venues, initiatives such as the Artemis Accords, as well as bilateral consultations to support U.S. interests in commercial space activity, responsible behavior in outer space, and space exploration.

Thank you again for inviting us to testify. I welcome your questions.

[The prepared statement of Mr. Moore can be found in the Appendix on page 51.]

Mr. COOPER. Thank you very much, Mr. Moore.

And now Mr. Turner.

STATEMENT OF BRUCE I. TURNER, SENIOR BUREAU OFFICIAL, BUREAU OF ARMS CONTROL, VERIFICATION AND COMPLIANCE, U.S. DEPARTMENT OF STATE

Mr. TURNER. Chairman Castro, Chairman Cooper, Ranking Member Malliotakis, and Ranking Member Lamborn, thank you for the opportunity to testify today on the rules-based space order.

I am grateful for the opportunity to testify along John Hill, Lieutenant General Stephen Whiting, Jonathan Moore. Like others, I have submitted a longer statement for the record.

It is incredibly appropriate that we are meeting on May 5th, the 60th anniversary of astronaut Alan Shepard's flight on Freedom 7. This suborbital flight was the first step that gradually led to American astronauts orbiting the Earth, landing on the Moon, and today traveling in continuous orbit around our planet. This flight took place in a time when there were only two countries placing satellites and humans in orbit. It also took place in a time when the legal regime regarding outer space was just beginning to be developed.

The development and implementation of arms control agreements is one of the main concerns of the State Department's Bureau of Arms Control, Verification and Compliance, known as AVC, which I am representing today. In that capacity, along with our State and DOD colleagues, we are leading efforts for the development and implementation of voluntary, non-legally binding measures to enhance the safety and security of outer space.

In general, consistent with longstanding bipartisan policy and as reflected most recently in the 2020 National Space Policy, the United States will consider proposals and concepts for arms control measures if they are equitable, effectively verifiable, and enhance the national security of the United States and its allies.

Unfortunately, for many years, the international community has been focused on a number of flawed, legally binding arms control proposals, including most recently the 2014 Russo-Chinese draft Treaty on the Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Outer Space Objects, known as PPWT.

The draft PPWT fails the test laid out in the U.S. National Space Policy, and the State Department has a long record of enumerating its many flaws. In light of these shortcomings, the 2020 National Space Policy directs the United States Government, and I quote, to lead the enhancement of safety, stability, security, and long-term sustainability in space by promoting a framework for responsible behavior in outer space, including the pursuit and effective implementation of best practices, standards, and norms of behavior, end quote.

President Biden's 2021 Interim Strategic National Security Guidance also affirms that the United States will lead in promoting

shared norms and in forging new agreements in outer space. The United States believes that the development and implementation of norms of behavior can reduce risks to international security and stability through increasing predictability, enhancing operational safety, and reducing risks of misperceptions, thereby contributing to the prevention of conflict. That is why, in 2020, the United States worked with our close allies to advance a new United Nations General Assembly resolution titled “Reducing Space Threats through Norms, Rules, and Principles of Responsible Behaviors.” We believe this resolution can serve as the first step of a process to describe the threats to space systems, to develop ideas for responsible behaviors designed to manage perceived threats and risks to space systems, and to consider the establishment of channels for direct communications to manage perceptions. As such, it provides a pragmatic alternative to flawed Russian and Chinese arms control proposals, and many agree with that approach.

The resolution was adopted by the U.N. General Assembly this last fall with 164 votes for and only 12 against, among them Russia, China, Iran, Syria, North Korea, Cuba, and Venezuela. On May 3, 2021, pursuant to the resolution’s call for reports on proposed next steps, the State Department submitted our government’s views to the U.N. Secretary General.

Mr. Chairman, for many years the international community has been focused on flawed legally binding space arms control proposals at a time when the outer space environment has grown in complexity and become contested. It is time for a new approach, primarily focused, at least for now, upon voluntary, non-legally binding norms, rules, and principles of responsible behavior in space. Developing and implementing these sorts of measures help create a safer, more stable, and predictable space environment for all space actors.

Thank you very much. And I look forward to the committee’s questions.

[The prepared statement of Mr. Turner can be found in the Appendix on page 58.]

Mr. COOPER. Thank you very much, Mr. Turner. I would like to thank all the witnesses.

And now we will turn to member questions. I will begin with myself, but I only have two questions. And I would encourage all members to keep this as brief as possible because we have a large number of members on the Webex call today.

First question, you ended your statement, Mr. Turner, but all the witnesses seconded this theme of voluntary, non-legally binding efforts in this regard. So it seems like we have given up the idea of ropes or any punishment, but we are just going for spider webs instead. So is that the best we can do? Is that a way to get people to be in a more cooperative frame of mind? Or do we need more than that?

Mr. TURNER. Thank you, sir, for that question. I think we are trying to make the best out of what is possible at this given moment in time. Certainly we do not exclude the possibility of legally binding treaties down the road, but that is not where we are, given the kinds of competition posed by Russia and China, as has been discussed by some of the speakers. So we are starting with the ap-

proach where you can maybe start building with like-minded countries to develop these norms, get them to practice these norms, create peer pressure so that these norms will also be respected by others, and maybe over time develop more far-reaching measures. Thank you.

Mr. COOPER. Thank you.

My next question will be for General Whiting. We have talked about transferring space traffic management out of the Air Force for some time. It seems to have taken years. I am hopeful that the Space Force will get it done on a more timely basis because I don't want the spacefaring nations to turn to other nations for their clear guidance on possible collisions that might take place. So how quickly can we get the Department of Commerce to pick up this ball and run with it?

General WHITING. Mr. Chairman, thank you for that question. Of course, we are eager to work with the Department of Commerce. And we have found them to be an organization that is eager to take this work on. And so we are working diligently to do that because we do care deeply about the safety and security of the domain, which is why we made Space-Track.Org available, as we have over the years.

So my understanding is now that they have received resources to work toward this goal, we are working with them over the next couple of years to transfer that work. They have been partnered with us at our operating location, such as at Vandenberg Air Force Base, and we look forward to continuing that. I can't speak to exactly what their timeline is, but we are eager to get this transferred in the next couple of years.

Mr. COOPER. Thank you very much.

I will now turn to Mr. Lamborn.

Mr. LAMBORN. Thank you, Mr. Chairman.

Mr. Hill—excuse me Mr. Whiting, in your opinion, has space already been weaponized by countries like China and Japan? And what do you make of the satellites that reportedly shadow other satellites?

General WHITING. Congressman Lamborn, yes, we have seen a weaponization of space from China and Russia. If we point back to 2007, really the inflection point in the 21st century where, from the fall of the Berlin Wall and the dissolution of the Soviet Union around 1990 until 2007, many of those threats that had come up in space in the Cold War had gone fallow. But in 2007, we saw the Chinese conduct a very irresponsible test. We continue to have about 3,000 pieces of debris on orbit that we continue to track. That is about 10 percent of the total amount of objects that we track on orbit still from that test 14 years ago.

We continue to see the Chinese building satellites like the Shijian 17, which is a Chinese satellite with a robotic arm that could be used to grapple U.S. or allied satellites. We know they have multiple ground laser systems which could blind or damage our satellite systems. In addition, Russia has several ground-based lasers that could jam or blind our satellites, and it is probable they will field more later this decade. We know the Russians have probable prototype anti-satellite weapons on board, including our own orbit—pardon me, including Cosmos 2519, which is a Russian on-

orbit weapon system which has birthed out a subsequent inspector satellite. And then we have seen a subsequent third—or second object, so three total come out of that Cosmos 2519. And we believe that second object is a projectile. And then we saw Cosmos 2542, which was launched in late 2019, which appears to be a similar prototype weapon to Cosmos 2519, which was synchronized in its orbit with the United States Government satellite. And when the United States Government moved our satellite, the Russian Cosmos 2542 resynchronized its orbit.

Russia is a sophisticated space actor, so they must have known what they were doing. And, obviously, we do not support weapons tests near our satellites.

And then, finally, Russia has a Nudol ground-based missile designed to destroy satellites in low Earth orbit. But let me be clear: Even with this weaponization of space, we do not want a war to extend into space, and we want to do everything possible to deter that.

Mr. LAMBORN. Thank you. I appreciate that, General Whiting.

Mr. Turner, I am going to finish with you. In late 2019—and we have already touched on this—Russia launched a satellite that then deployed a sub-satellite that proceeded to synchronize its orbit with a U.S. Government satellite. And it is not the first time the Russians have done this. Have the Russians been told that this behavior is unacceptable? And if so, what was their response?

Mr. Turner.

Mr. TURNER. Yes, sorry. It took me a second to turn my sound button on.

Yes, we have met with the Russians about some of these issues. Most of the discussions we have are less than satisfactory. Sometimes the Russians do not even want to acknowledge that certain activities are indeed taking place. We have done our best to bring experts, our military and diplomatic experts, to some of these meetings to discuss these issues, but, thus far, the Russians really have not engaged in a satisfactory way.

Mr. LAMBORN. Finally, have there been any other international discussions with the Russians and Chinese or others defining standards of behavior for rendezvous and proximity operations?

Mr. Turner.

Mr. TURNER. I don't—no, not to my knowledge actually. I mean, as we were saying, all of us I think in our statements, we are just at the beginning of this process to start to define what some of these norms of behavior are, which would, we hope, define such things as how much space to leave between bodies out in space and how one might approach them. There would be communications. There would be notifications, a number of things like that. But we are just at the beginning of this process now.

Mr. LAMBORN. So no direct communication with the Chinese on this, even though there have been some preliminary discussions with the Russians.

Mr. TURNER. I would urge you to—I think our DOD colleagues would have a better fix on that kind of a question, sir.

Mr. LAMBORN. General Whiting, very quickly, my time is almost gone.

General WHITING. Mr. Congressman, I am not aware of any discussion with the Chinese, but I certainly would defer to Mr. Hill.

Mr. HILL. Congressman, if you like, we do not in the Department of Defense have direct engagements with China regarding space. There are some very clear statutory limitations on DOD's interaction with China, as with Russia these days.

Mr. LAMBORN. Thank you, Mr. Chairman. I yield back.

Mr. MOORE. I apologize. This is Jonathan Moore at State. I have a bit more of an answer for the ranking member, if I may offer it, Mr. Chairman.

Mr. COOPER. Okay. Go ahead.

Mr. MOORE. We do engage with China on outer space through both bilateral and multilateral channels. Our primary goal is to ensure space flight safety and responsible behavior in outer space. We have been working to try to encourage China to improve communications between our respective satellite operators to avoid potential collisions in orbit. As an example of this, we have been coordinating with China to ensure that their navigation satellite system, BeiDou, does not cause radio frequency interference with our GPS [Global Positioning System] satellites. And we are trying to encourage interoperability for several users.

We do have discussions. China is not part of the Artemis Accords. We do, however, expect them to follow the norms and standards. We have been clear with them about that, as has been referred to in a different context by my colleague Bruce Turner. The results have certainly not been consistent or satisfactory.

Mr. LAMBORN. Thank you. I yield back.

Mr. COOPER. Thank you, Mr. Moore. Now Chairman Castro.

Mr. CASTRO. Thank you, Chairman.

I have a question about the Artemis Accords for the panel. The Artemis Accords negotiated by the last administration and endorsed by the Biden administration represent a significant step forward in shaping norms of behavior in space and then bringing our allies and partners to work with us on the return to the Moon. It is also the first time since the Apollo programs where a new administration maintained the goals of the previous administration, a sign of continuity that raises the chances the Artemis program succeeds.

So are the accords intended to exceed preexisting agreements and treaties? In practicality, what is the binding effect of these accords for their signatories? What role would the Artemis Accords play as a vehicle for establishing norms for behavior in space? And then, finally, so far, nine countries have signed the Artemis Accords, including Canada, the U.K., Australia, Japan, Italy, Ukraine, and the UAE [United Arab Emirates]. Do you expect other countries to join? And what steps is the administration taking to expand support for the accords?

Mr. MOORE. Mr. Chairman, thank you very much for that question. When we first started working with our colleagues in NASA and in the previous administration on the concept of Artemis Accords, there was some discussion about making them legally binding. As that discussion continued, particularly with our spacefaring partners, it became clear that legally binding arrangements would also require parliamentary ratification and could take an extremely

long time to negotiate. So the Artemis Accords, instead, as previously drawn up and very much endorsed by the Biden-Harris administration, as you have stated, are not legally binding. They are mutual statements of values and vision for cooperation in space, are neither legally binding nor for that matter do they have direct financial implications.

With regard to who has signed on to the Artemis Accords, you are exactly right, Mr. Chairman, nine countries have signed on to them so far. We are engaged in active discussions with a number of other countries that are quite interested in signing on throughout the world. This is a project that in fact every continent where there are populations, many countries, whether they are long-term allies or new friends and partners, are very interested in joining us in a transparent effort to set values and standards in space.

Mr. CASTRO. All right. Anyone else? No? Okay.

I yield back, Chairman.

Mr. COOPER. Thank you, Chairman.
Ranking Member Malliotakis.

Ms. MALLIOTAKIS. Thank very much.

I have a more general question. I am just curious to know how the State Department and Department of Defense coordinate on space-related activities, particularly when it relates to our partners, allies, and adversaries. It is more of a broad question, but I was just looking for more insight.

Mr. TURNER. I don't mind starting this ball rolling. You know, of course the State Department has the lead role in basically in foreign policy outreach. In the case of the AVC Bureau, we are very active in a number of multilateral organizations where we will present our views because we have to do that competitively with others, for instance in the U.N. framework or in the Conference on Disarmament or any number of other fora. And we have of course regular consultations with our NATO [North Atlantic Treaty Organization] allies, with our Asian allies. And this is what our job is basically about, is to go around and talk to people and build support for the way we want to do things.

And the United States is very fortunate to have a very broad network of allies, which allows us to leverage our efforts and multiply them in a way that is generally not available to countries such as Russia and China. So that is where the United States has a distinct advantage. And that is where consulting with our allies and building support for everything we do is really one of the most effective ways that the United States can achieve the kinds of goals that we have been talking about today.

And, of course, every step we take is, even though we may have the lead on these foreign policy issues, the only other thing that I would like to say is that all of these activities, especially involving arms control and some of these issues, security issues, are what we do is the result of a very intensive interagency process that brings in all the different players—the intelligence community, Joint Staffs, OSD [Office of the Secretary of Defense], et cetera, NASA—depending on what is being discussed and what is at stake. So it is quite an intensive process.

Ms. MALLIOTAKIS. And the Department of Defense end?

Mr. HILL. Yes, Representative Malliotakis. I will be glad to give you some concrete examples of how DOD really—we are typically supporting State Department in these cases because we are talking here mainly about diplomacy of the Nation, and that is State Department's lead. But, for example, Mr. Turner mentioned the talks, the civil space talks that his office has with China, and he mentioned the example of the Global Positioning System. So we will provide a DOD technical expert to support them because, of course, the Department of Defense operates the Global Positioning System. And we will provide that technical expert to support talks related to spectrum and deconfliction and so forth in that respect.

Another example would be last summer the United States and Russia met in Vienna in the context of a space security exchange there. This was related to some other talks that were going on. Of course, the State Department led and organized it, but the Department of Defense, we sent one of General Whiting's colleagues; General Shaw was there from the operational side. I participated from the policy side. And we were able to present Defense perspectives and State diplomatic perspectives relative to the positions Russia was taking and some of the Russian behavior that we find problematic.

Third example would be this United Kingdom resolution that passed in the General Assembly and the United States response to it. Again, we cooperated very closely in how the United States would put together the position. So State Department can be confident that what they were carrying forward was something that was good for national security from our perspective here, as well as good from the broader perspectives that they have to represent across the breadth of the government.

Ms. MALLIOTAKIS. Great. I am running out of time, but if you can fit it in, I am just curious, any thoughts the Russia and China announcing their intentions to jointly develop a research station on the Moon and any concerns that Congress should be aware of on that end?

Mr. HILL. I will comment that we will keep a close eye on that. And that is probably the most I can comment at this point. Thank you.

Ms. MALLIOTAKIS. Understood. Thank you.

Mr. COOPER. The gentlelady's time has almost expired.

Ms. MALLIOTAKIS. I yield back. Thank you.

Mr. COOPER. Thank you.

The order of questioning for the next four members will be Mr. Langevin, Mr. Wilson, Mr. Garamendi, and Mr. Issa.

Mr. Langevin.

Mr. LANGEVIN. Thank you, Mr. Chairman.

I want to thank our witnesses for testifying today. I appreciate your contributions to the discussion.

Let me begin, several think tanks have already noted that cyber, electric magnetic spectrum, and directed energy attacks are growing threats for space-based assets.

Mr. Turner and Mr. Moore, to what extent have these topics been discussed regarding standards of responsible space-based behaviors?

Mr. Turner, I will start with you.

Mr. TURNER. What we have done in the report that we just sent to the United Nations, some of the issues—no, that is not it—we have listed a number of the different kinds of threats that—to space. And to date, there are no standards for those threats at all. I mean, these systems are being developed. There are no international rules to govern them. But as part of our contribution, we had a whole section describing the kinds of threats that are out there, you know, ground to space, space to space, ground to ground, space to ground. And we talked about radio frequency interference; directed energy weapons; cyber threats to command and control; attacks on terrestrial space infrastructure; ASAT missiles, which were discussed earlier; robotics; et cetera. So we are at the stage of the process where we are identifying the kinds of threats that are out there. And then, eventually, this will lead then to principles of behavior for how nations should behave in space. But there are no formal agreements covering a number of these issues.

Mr. LANGEVIN. Mr. Moore, any comment from you? You are on mute, I think.

Mr. MOORE. Thank you, Congressman Langevin. Bruce Turner's team in AVC focuses more on the security side. We focus more on the civilian side of trying to set the standards and enforce U.S. interests. So I apologize. I do not have more for you on that.

Mr. LANGEVIN. Well, let me ask you this, with respect to cyber, we already have norms related to the targeting of critical infrastructure. I would be curious to hear quickly from all of the witnesses, would you support designating space as a critical infrastructure sector? And I ask this because DHS [Department of Homeland Security] is currently doing a congressionally mandated review of critical infrastructure sectors.

Mr. HILL. I could step in here briefly. And, first, I would like to clean up something I said previously. I referenced the civil talks; that is Mr. Moore's office, of course, not Mr. Turner's. I misspoke previously.

On this one, with respect to the critical infrastructure question, my understanding is that space has been included as a critical infrastructure in the homeland security context. There are individual defense assets that may be also included as defense critical infrastructure.

Mr. LANGEVIN. I wasn't aware of that designation, but we will take that one and double-check on.

Mr. HILL. We will too.

Mr. LANGEVIN. I think it certainly should be designated as critical infrastructure.

So understanding that you have to be able to adequately monitor the environment to enforce responsible behavior, General Whiting, how would you assess our space situational awareness and attribution capabilities?

And, actually, before I go to that, do any of the witnesses have other thoughts on designating space as critical infrastructure? I would assume you would agree?

Mr. MOORE. Congressman, if I may offer a view. That is worth taking a more deeper look at. I am not certain that space has been designated as a critical infrastructure sector. Obviously, the question of cybersecurity is of paramount interest to the Biden-Harris

administration. And many of us at the State Department are working on that, perhaps our bureau somewhat more peripherally. But in terms of space as a critical infrastructure sector, we would have to review that and get back to you.

Mr. LANGEVIN. Fair enough. I see my time is about to expire. Anything else from the other witnesses on critical infrastructure?

Mr. HILL. Mr. Congressman, nothing on the critical infrastructure piece, but if you would like, I will briefly talk about our space situational awareness or, as we call, space domain awareness capabilities. We have the best in the world. And that is why we make available so much of that information through Space-Track.Org to promote a safe, stable, and secure space domain.

But with the growing threats that I spoke to earlier, we need to improve that domain awareness capability so that we could help to know when any future norms are being violated and certainly, from our perspective, watch for threats and give good indications and warning of potential bad actors in space.

Mr. LANGEVIN. Very good.

Mr. COOPER. The gentleman's time has expired.

Mr. LANGEVIN. Thank you, Mr. Chairman.

Mr. COOPER. Mr. Wilson.

Mr. WILSON. Thank you very much, Chairman Jim Cooper and Ranking Member Doug Lamborn, for coordinating this very important joint hearing.

Additionally, I would like to thank the four witnesses. Each one of you have come across as very impressive, and your service to our country is very, very much appreciated.

In terms of questions, General Whiting, what progress has been made in operationalizing our international space partnerships through the Combined Space Operations Center?

General WHITING. Mr. Congressman, thank you for that question. We have made some substantial progress through the Combined Space Operations Initiative. We now have allied personnel across many of our formations to include the Combined Space Operations Center [CSpOC] at Vandenberg.

And U.S. Space Command, our combatant command, in fact, now has a named operation, Operation Olympic Defender, which some of those countries have signed up to, which means we operate day-to-day in space with them. And our CSpOC at Vandenberg works with their national military operation—space operations centers on a daily basis. So that unique pairing of countries that we are blessed to have, that is really an advantage for the United States, and we are excited about that progress.

Mr. WILSON. I share your view about being blessed. And in regard to that, what are the leading countries that are cooperating?

General WHITING. It is some of our closest allies, Mr. Congressman, like Canada, the United Kingdom, Australia, and others.

Mr. WILSON. Well, again, best wishes on that.

And, Mr. Hill, expanding commercial space infrastructure is a uniquely American solution to increasing our capability of resilience. I am impressed with the ingenuity of the private sector to augment government efforts to keep space accessible and stable. What is the appropriate level of government oversight necessary to ensure commercial entities are well integrated into a comprehen-

sive rules-based framework? How should the administration incorporate them into a future defense space strategy?

Mr. HILL. Thank you, Congressman Wilson. On the commercial space, there is a number of [inaudible] going on. First of all, with respect to—your question kind of touched on regulation in one respect. And there is a major overhaul of commercial remote sensing regulation that took place in the past year, which DOD worked very closely to really bring us out of the 2006 era of the old regulation into the 2020s era, where we have much more prolific commercial capabilities, and we need to let that competitive sector compete around the world. And the Defense Department benefits from having that strong commercial sector, so a big change in the philosophy there.

We also, of course, leverage U.S. commercial space innovation. Our space launches off of commercial launch service providers, for example. There is growing commercial space situational awareness capabilities that we interlead with our own capabilities. And so, depending on the sector, we use more or less. There are some areas where commercial doesn't find a great market, so we have to put more government investment. Other places like satellite communications, tremendous opportunity to leverage commercial.

Mr. WILSON. Well, it is exciting to see the mutual benefit.

And, Mr. Turner, the June 2020 Defense Space Strategy includes several lines of effort, one of which is to better inform international and public audiences of the growing adversarial threats in space. What can Congress do to ensure that our constituents understand the benefits of an accessible stable space?

Mr. TURNER. Sorry. I am sometimes a little—I forget to unmute. Today's hearing is one such step, I think, because this is available on live streaming, so presumably others besides all of us can hear what is going on. I think Americans need to be made aware of how much they actually depend on space for their—not only for their security but also for their prosperity.

We do a certain amount of outreach as well, which is very effective in that regard. And, of course, I think one of the things that ensures that this will reach the right audiences is that, thus far, our efforts in space have been supported by a bipartisan consensus in Congress, and it is sort of like, you know, the old saying that domestic policy ends on America's shores. I think it also needs to end where we start to leave the atmosphere and get into outer space. So I will leave it at that for right now.

Mr. WILSON. No, thank you very much. And, indeed, Chairman Cooper is leading the bipartisanship.

I yield back.

Mr. COOPER. I thank the gentleman.

Now, Mr. Garamendi, are you still us with? Mr. Garamendi?

If not, Mr. Issa? Are you still with us?

We will—

Mr. ISSA. I am with you.

Mr. COOPER. Okay.

Mr. ISSA. Thank you.

Mr. COOPER. Darrell, go for it.

Mr. ISSA. I think I am going to continue pretty much with the same line of questioning that we have been doing, but I will change it up a little bit.

General, I think maybe you can handle this sort of as a joint representative. In the domains that we have operated on during your career—sea, land, air—we have international rules and conventions, and they are broadly agreed to and signed on by all the parties that we have mentioned here today. Would you say that is fair to say?

General WHITING. Yes, sir, I would.

Mr. ISSA. And as we sit here today, we will have today, tomorrow, or certainly last week and in the next 3 weeks, we will have Iranian gunboats that will enter our space and endanger ships. We may or may not have another taking of our maritime folks. And, of course, China is building islands and, in complete violation of right-of-way for countries throughout that region, is beginning to encroach or to not allow people to have what has been hundreds of years of free travel.

So would you say that, as we look to space, is there any special reason not to believe that all of the factors that affect air, land, and sea around our hemisphere, that any of those will be significantly different? In other words, can we not expect at least similar activities as we have similar bad actors or the same bad actors who are already in space, such as China and Russia?

General WHITING. Mr. Congressman, thank you for the question. Certainly, I think those analogies are useful, but if we push them too far, of course, analogies will start to break down because there is sovereign maritime space. There is sovereign airspace. There is no sovereign space-space in space, and so there are some differences that we will work through.

But we certainly believe, in Space Force, that the establishment of voluntary, non-legally binding norms of responsible behavior will help us to identify when others are acting outside of those norms and when they are acting irresponsibly. Much like when we are on the interstate and everyone is following the rules, you can quickly see those that are dangerous and not following the rules. So we do think that would be a very positive step for the space domain.

Mr. ISSA. And I agree with you. And as a follow-up, and I do agree that there is certainly sovereign space, but using the 2007, in which China demonstrated its ability to destroy a satellite in deep space, albeit its own, but for the purpose of showing us that there but for their good graces that could have been one of our satellites or a number of them, that activity certainly was outside of any reasonable interpretation of their sovereign rights. Wouldn't you agree?

General WHITING. Well, certainly, it was irresponsible, Mr. Congressman. With 3,000 pieces of debris left on orbit that we continue to track 14 years after the fact, 10 percent of all the trackable objects on orbit. I can't imagine what led them to do that and to continue to pollute the domain and put us all at risk.

Mr. ISSA. So the history of our planet being at relative peace for the last half of the last century was primarily through a combination of, you know, international agreements and a degree of enforcement that the United States and its allies, notably NATO and

others, enforced with a periodic enforcement by the United Nations.

So, in my remaining time, if you could answer sort of one of those great questions for all time, isn't it fair to say that we must go forward and establish those international rules, draw in as many convention signers, including potential bad actors, as possible, but also form those alliances that would mimic in space, if necessary, the same sort of alliances that have, in fact, kept us relatively peaceful for the last 70-plus years?

Don't we sort of have to do all of them, produce the U.N., produce the agreements, but also build those alliances with the expectation that, just as in the past, the future, there will be those who will not respect the very agreements that they have signed?

General WHITING. Mr. Congressman, we have certainly seen NATO recognize space as a warfighting domain in just the last couple of years, and so we see many like-minded countries that we operate with putting more and more interest and concern on space. And that I think accrues to our benefit because we can now coalesce around these norms of responsible behavior, and as those begin to establish, then our State Department colleagues can maybe work further agreements down the road. But I think it is only goodness to bring more and more allies and partners into these discussions.

Mr. ISSA. Thank you.

Thank you, Mr. Chairman. I yield back.

Mr. COOPER. The gentleman's time is expired.

I would like to give General Whiting the opportunity to clarify something. I think you may have left the impression that so far there is not much that is sovereign in space. I mean, I would say that each individual nation's capsules or astronauts are, in fact, sovereign entities even though they are traveling through space.

General WHITING. Thank you, Mr. Chairman. I was specifically referring to the physical space itself, which is in the outer space domain, not to manmade objects that are put on space, so thank you for that clarification.

Mr. COOPER. Thank you.

Mr. GARAMENDI.

Mr. GARAMENDI. Thank you, Mr. Cooper. Indeed, I stepped away for a moment.

Clearly, we have a situation in which on the military side of it, space is a domain for war, and, unfortunately, we are all, not just the United States, China, and Russia, but others, rapidly militarizing space with the anticipation that there could be trouble in the future. And it happens to create an extraordinary risk when all of our countries are depending upon space for early knowledge of what the other may be doing.

I am going to leave that aside. Mr. Issa went into it in some detail. I want to deal with the commercial side of it. We have seen a very rapid evolution of commercial activity in space for many different reasons, almost so that our military no longer depends solely on itself for highly detailed photos of what is going on in the world, weather reporting, and on and on.

So let's talk about norms on the commercial side of the activity, putting aside for a moment the military side, for which I suspect

the norm is he who is strongest will win at the end of the process, and we will all be dead. But let's go ahead for a moment on the commercial side. Start wherever you want. Let's go with DOD. What is your interest in the commercial? And then to the other two witnesses, ending up with the State Department.

Mr. HILL. Congressman Garamendi, very much interested in that. I think a good example of DOD and the commercial community working with respect to norms has been the sponsorship that the Defense Advanced Research Projects Agency did with the group. The acronym was CONFERS [Consortium for Execution of Rendezvous and Servicing Operations Program]. I am sorry; I forget the name of the acronym. But it described a body bringing together commercial people with government to talk about how to do on-orbit servicing and remote rendezvous and proximity operations and figuring out, what are the proper ways to do this? When do you need to have permission?

It is a user community interest group. And if you think back, long time in history, the International Telecommunications Union kind of started out in that same way, community of interest coming together on it. I think it is sort of pulling off on its own. The commercial community will probably be taking more of the lead in that. But that is the kind of example where we will partner with the commercial community to figure out, how do we encourage the stakeholders to take on the public, the interest of the commons?

Mr. GARAMENDI. Thank you very much.

Mr. MOORE. Congresswoman Garamendi, if I may jump in as well—

Mr. GARAMENDI. Please.

Mr. MOORE [continuing]. Just to say, as has been mentioned earlier in the hearing today, one of the difficulties we face is that, of course, with Russia and China, they really aren't commercial activities. They are state-run, state-supported activities.

When it comes to the United States, where we have such amazing commercial partners like SpaceX and Blue Origin, exactly the ones that have allowed us to get to the ISS [International Space Station] without having to rely on Russia, they operate at very high standards, and we support those standards. They help set the standards for the rest of the world. And, of course, again, through the—Artemis Accords, working with those values, that vision, and those standards, other countries and their potential commercial space operators are very interested in joining part of that process.

One of the problems with the COPUOS process is that there are over 90 countries in it, and it does all of its work by consensus. So, unless everyone agrees, nothing gets done. When it comes to commercial space operators, the United States sets the standard, and we are working very actively, bilaterally and in broader fora to make that the standard for the world.

Mr. GARAMENDI. Thank you. Anybody else want to jump in on this?

Mr. TURNER. Just briefly. Again, this is Bruce Turner again. Just to say, building on what Jonathan Moore just said, I mean, there are opportunities there, of course. When our commercial sector leads, you start to set these standards. Those become the tacit standards for everyone, and then countries such as Russia and

China are maybe forced to sort of deal with those standards as well and then would apply them to their own efforts. So that, again, is one of the advantages of developing these systems of norms.

Mr. GARAMENDI. Thank you. I will just end in 20 seconds. It seems to me that, on the military side, we are not going to get very far. It is always good to talk, and more talk is better. On the commercial side, building on what Mr. Issa said about allies on the military side, working to fuse our current leadership and develop a commercial set of standards and then allow the others to join would be very, very fruitful.

Mr. Cooper, I yield back.

Mr. COOPER. Thank you. The gentleman's time has expired.

The next four questioners will be Mr. Moulton, Mr. Waltz, Mr. Carbajal, and Mr. Brooks.

So, now, Mr. Moulton.

Mr. MOULTON. Mr. Chairman, thank you very much.

I want to continue on a consistent theme throughout this hearing, which is on effective enforcement. Without effective enforcement, rules and norms obviously limit our own activity in space but do nothing to impede malign activity by our adversaries.

So let me be clear. I am not suggesting a rules-based order in space is not a goal worth pursuing, but I want to ensure that this is not an empty or symbolic endeavor. If we do not intend to enforce the, quote, voluntary, non-legally binding rules or expect our adversaries to abide by norms in space, what happens when they violate them?

We see this issue in cyberspace. We have got international actors who are still emboldened to attack and hack into U.S. networks without any fear of an effective penalty or retribution. And so, yeah, we can name and shame to a certain extent, but what are the real consequences of setting down rules that are then going to be ignored, and how do we actually respond and deal with this more effectively?

Mr. TURNER. Those are some very good questions. It is always a very complicated issue, compliance with whether it is legally binding obligations in the case of treaties or whether you are talking about politically binding, non-legally binding commitments in other areas. Each one has its advantages and its disadvantages.

The advantage of treaty is that it is a legal obligation so that, in some of the ways, you could argue that a violation is more straightforward, except if you have ever worked with a lawyer, you would know one of the things that you get into is you get into these very, very difficult and complicated interpretations of what the treaty actually says. And that can be also a very long process.

One of the advantages of—just because it is not a legally binding norm does not mean that it is not a norm and does not mean that you cannot call somebody out for violating that norm, nor does it mean that you can't take potential action if an actor is not complying with that particular norm. In some cases, you may even have more flexibility to react in those kinds of situations precisely because it is not a legally binding agreement.

And then, lastly, I would just add that with all of these kinds of norms, even when certain actors violate those norms they often pay a price for doing so. And in today's social media environment or

media environment, whatever you want to call it, where so much depends on the narrative of who is doing the right thing and who is not doing the right thing, that can still be useful—a useful way to put diplomatic and public pressure on malign actors.

Mr. MOULTON. I mean, I am actually, Mr. Turner, one of the few Members of Congress who is not a lawyer, but it seems to me that this just has to be a lot more clear. And, you know, hoping that one of our adversaries will get shamed on social media does not seem like an effective strategy here.

General, I have got a question for you on this same theme. So a rules-based order in any domain requires a certain level of transparency and trust, and I understand that there is a current effort by U.S. Space Force in space policy to review potential declassification of satellites and activity in space to be more transparent and to publicly communicate about our space operations more easily.

How are you integrating with this effort to ensure that we have enough transparency to allow for verification of our own behavior while still protecting systems and activity that we are not prepared to share?

General WHITING. Yeah, thank you, Mr. Congressman, for that question. Certainly, I would say that I think we are the most transparent country when it comes to our activities in space through the website that I mentioned earlier, Space-Track.Org, that we make available to the world because we care about preserving the domain for our long-term operations there.

And we have had an effort ongoing for the last several years to continually even make more information available. Of course, just like in other domains we are not going to show exactly where our ships and airplanes are that are critical to the national defense—

Mr. MOULTON. General, if I may interrupt—

General WHITING. Yep.

Mr. MOULTON [continuing]. Do you think we have that balance right, or are we still on the side of too much of it being classified to be effective at, you know, using the transparency we need to promote enforcement?

General WHITING. Mr. Congressman, I would say it is not an end state; it is a journey. And so I think we are constantly working to get that balance exactly right. I think we made important strides and will continue to do those reviews to make as much information as possible to as many people as possible to ensure that domain is safe.

Mr. MOULTON. Well, thank you very much, Mr. Chairman. I yield back.

Mr. COOPER. I thank the gentleman for yielding.

Mr. Waltz, are you with us? Mr. Waltz? Calling Mr. Waltz.

If he is not, Mr. Carabajal?

Mr. CARBAJAL. Here I am.

Mr. COOPER. Now we can hear you.

Mr. CARBAJAL. I am having glitches here. Thank you, Mr. Chairman, and I apologize for the technical difficulties I was having.

One of the most pressing issues to be addressed is obviously debris mitigation. The Space Force is tracking about 30,000 pieces of debris with a half a million other objects in orbit too small to track. While the space debris mitigation guidelines of the United Nations

Committee on the Peaceful Uses of Outer Space was endorsed by the United Nations General Assembly in 2007, RAND [Corporation] recently reported that the voluntary guidelines lacked measures for accountability and that compliance with debris mitigation guidelines, and it is the biggest contributor to greater collision risk.

General Whiting, based on the current level of space debris and voluntary international policies, will there be a point where there will be an unacceptable risk posed by space debris to the United States space assets, including both national security and commercial operations?

General WHITING. Mr. Congressman, thank you for the question. I certainly want to communicate that we are concerned about the growing congestion in space, but I think certainly over the next several years we have plans and processes in place to make sure that we can continue to safely operate. But we do support intergovernmental measures that will reduce debris, and I will defer to my colleague, Mr. Hill, maybe to speak more about what the Department of Defense is doing in that regard.

Mr. CARBAJAL. Mr. Hill.

Mr. HILL. Yes. Sorry, there is a little noise. So, in 2019, the United States Government updated our orbital debris mitigation standard practices. They actually go well beyond what the United Nations practices are, and, in fact, they drew from a lot of Department of Defense and existing regulations providing much clearer statements of the hazard risks, more options for how to get debris out of orbit, particularly from higher orbits over time.

But there is absolutely, as General Whiting said, concern, and particularly in the low Earth orbit region where things get crowded in some of the polar orbits in particular, that debris mitigation is important. The emergence in the commercial sector and in some government support, some places of potentially active debris removal is encouraging, but I think there is a lot of work to be done in this respect.

Mr. CARBAJAL. Thank you very much.

General Whiting, in your testimony, you write that some discussions at the mil-to-mil [military-to-military] level can be challenging, but more often than not, there is agreement on what constitutes responsible behavior, the ability to demonstrate and message responsible behavior, and desire to call out irresponsible behavior. At the mil-to-mil level, what has been the biggest barrier to moving forward with creating an international accepted framework?

General WHITING. Mr. Congressman, each of the countries that we have mil-to-mil discussions with, and these are allied countries, they all have their own legal frameworks. They have their own policy traditions. And we work through those in forums like the Schriever Wargame tabletop exercise that we conduct every year. But through that, we find there is a coalescing around some generally accepted ways of operating that are responsible, safe, professional, and so those are—we think, through dialogue, we can work through those kinds of issues.

Mr. CARBAJAL. Thank you.

Mr. Turner, Mr. Moore, commercial companies are heavily investing in satellites and launch services. Space technology these

companies are developing has the propensity to be dual use, which creates new challenges. Is the Federal Government engaging with commercial actors as part of your discussions in developing rules and norms, and can you comment on how dual technology is being considered?

Mr. TURNER. I mean, I think I would defer to my colleague from OES on the commercial aspects of that. But, from a security standpoint, of course, this is one of the issues with developing rules of behavior. And one of the issues when you are talking about threats in space is we are very acutely aware of the fact that a number of things are dual use simply by nature, so they can either be—have benefits or they can potentially be used against satellites. So it is one of those issues that needs to be talked about and, again, why we are in favor of these rules of behavior.

Mr. HILL. Yes, Congressman Carbajal, Bruce touched exactly on some of the aspects of dual use. We are very much trying to support the development of the commercial sector, and, again, this is a place where companies in the United States are leading the way and setting the standard, helping again to return us to ISS so that we are not dependent on other countries for that.

But as part of the broader efforts, including through the Artemis Accords, to build partnerships and to share values and vision on space, again, we are very grateful for the strong endorsement of this administration for those goals—that is part of the discussion with the commercial sector.

Mr. CARBAJAL. Thank you very much. I am out of time. Mr. Chair, I yield back.

Mr. COOPER. Thank you. The gentleman is, in fact, out of time.

We tried to get Mr. Waltz earlier. He was not available. Mr. Brooks was next, and he has logged off. So I think the next questioner will be Mr. Lieu.

Mr. LIEU. Thank you, Chairman Cooper and Chairman Castro, for holding this important hearing.

I am very thankful for the expertise from all the panelists today. I previously served in Active Duty in the Air Force, and now I do my Reserve Duty at the Space and Missile Systems Center at Los Angeles Air Force Base. And I am thrilled that the United States Space Command has chosen to locate Space Systems Command, one of three major commands under the Space Force, at Los Angeles Air Force Base. And with every passing day, space becomes more important.

I also want to just clarify the critical infrastructure question that Congressman Langevin asked earlier. The reason there has been confusion is there is approximately 16 critical infrastructure sectors, such as the chemical sector, the communications sector, the energy sector. Space is not one of them.

However, if there is, for example, a space communications satellite, that would arguably be captured within the communications sector. That has been designated as critical infrastructure. To alleviate this confusion and to capture everything in space, I am working on legislation that would, in fact, designate space as an infrastructure sector, and that goes in line with both the former administration's and this administration's focus on space.

And so my first question is to Secretary Moore. I note, first of all, that you speak at least eight languages. I am super impressed by that. But I also note that your title doesn't include "space" anywhere in it. At the same time, the Department of Defense has created an entire Space Force dedicated just to space. Do you think it is a good idea, or shouldn't we have the State Department elevate space to a standalone bureau?

Mr. MOORE. Congresswoman Lieu, thank you very much for your service, both in uniform and in the House of Representatives, and thank you for an excellent question. I am very pleased to tell you that, across the list of endeavors in the Bureau of Oceans and International Environmental and Scientific Affairs, we have nine action offices. One is the Office of Space Affairs. It is staffed by a number of diplomats and professional experts with advanced degrees, including in astrophysics. It is the core team that coordinates diplomatic efforts on space with other countries in lockstep with the Pentagon, with Space Command, of course with NASA. And congratulations to Administrator Nelson on his recent confirmation.

We have a very distinguished team. The word "space" may not appear in our title, but because of the tasks that we have here in the bureau, which has a fairly long name as it stands, I can assure you that space is front and center. For all of these reasons, we are grateful for the opportunity to testify today and respond to not just your questions today but to work with you and your staff as we have done in the past and with many offices in Congress to help explain and gain information and guidance from you.

Mr. LIEU. Thank you. I just request that you and others at State Department consider having space not just as an office but as a separate bureau.

My next question goes to General Whiting. Thank you for your service as well, sir. So we have currently other countries, such as China and Russia, who don't necessarily follow norms, and as you know, China has done anti-satellite weapons tests. So we could have two possibilities: Either we allow all countries to do anti-satellite weapons testing or we allow no country to do it through a binding legal regime.

Do you have any preference for that from a defense perspective? Do you think the U.S. should be allowed to do anti-satellite tests as other countries do, or should no country be allowed to do that as a legal matter?

General WHITING. Thank you, Mr. Congressman, for the question. You know, from my perspective, the real danger with those tests—and we are talking about tests now—are the long-lived debris like the Chinese ASAT debris that we continue to have to operate around today. I think we do absolutely want to establish a norm that no actions in space, no country's action in space should create long-lived debris.

And, with that, sir, I would defer to Mr. Hill on questions of legality regarding ASAT tests.

Mr. HILL. Mr. Lieu, to pick up on from what General Whiting just said, in terms of tests, you are correct. There is no prohibition today on anti-satellite tests. There is quite a bit of scorn to be earned, as China earned in 2007 with their test.

The question, though, if you were to try and prohibit weapons in space, is what is the definition of a weapon, and when are these systems, which they are so inherently dual use—lasers can be used for communications; lasers can be used as weapons. And it goes on from there. So it is the practicality. It is the verifiability, enforceability of that. And so what we really have to focus on in the long run is reducing the benefits that people might seek to derive from employing capabilities as weapons. That goes to resilience and to mission assurance, which is a longer topic.

Mr. LIEU. Thank you.

And I yield back.

Mr. COOPER. The gentleman's time has expired.

I did not know that Mr. Moore was so multilingual, but I did notice from the video that he has the largest office of anyone on the call, so congratulations on that.

Mr. Waltz is back. So now it is Mr. Waltz' turn.

Mr. WALTZ. Thank you, Mr. Chairman.

And thank you, everyone.

Mr. Hill, as an OSD alum, it is great to see you in this capacity. It has been a long time. I want to ask you about thinking through how we establish deterrence in space. And, you know, as many of you have said and many of my colleagues have said, you know, our entire modern economy could be greatly adversely impacted should some of these assets be taken down.

As we are seeing the Chinese in particular increase their reliance as BeiDou comes online, their GPS system comes online, their military increasingly projects and is also becoming increasingly dependent, how do we establish deterrence in space?

I know the vice chairman is working on a declassification effort, but, you know, I want them to know what we can do and what we can't do and what we are willing to do as a deterrent measure, and what efforts are there along those lines. Mr. Hill, I will go to you first, but, anyone, feel free to answer.

Mr. HILL. Congresswoman Waltz, it is good to see you again—

Mr. WALTZ. Yeah.

Mr. HILL [continuing]. After many years. So deterrence in space, we spend quite a bit of focus on this, and as I started to mention in my previous response, for a nation that is highly dependent on space, both in our civil life, our daily commercial life, private lives, as well as in our military life, it is fundamentally important. It should be a norm to have reliability, mission assurance of capabilities at a level commensurate to the level in which we rely on those capabilities.

That was the case when we didn't have adversary threats in space and when systems were first designed. You had to design for the natural environment threats. You had to design for jamming, and you did that. But as these commercial—as these more modern conventional threats have emerged, we obviously have to transition our architectures, and this goes back to some of the commercial points earlier.

Leveraging the innovation that is coming out of the commercial sector and the significant cost reductions that we see in both launch and in the space capabilities themselves allows us to do entirely different architectural approaches. It takes time to transition

to that. So you have to protect what you have today, but you ultimately transition to architectures that are more inherently vulnerable. And, as in any other domain, you have the ability to accept and survive combat casualties.

Mr. WALTZ. Right.

Mr. HILL. That is a key part of denying the benefit of attack.

With respect to the other side of deterrence, the cost imposition side of things, that is one where you may be looking a lot more across domain types of activities. It may be that the place to impose costs on somebody for an unacceptable activity may not be in the space domain. It may be elsewhere.

Mr. WALTZ. Right.

Mr. HILL. So those are some of the things to think about with respect to—

Mr. WALTZ. Well, what I am trying to get at, and maybe your State Department colleagues are better to answer this, is what are we communicating that we are willing and capable to do? Because if—that is how misjudgments, miscalculations happen, and so that is—you know, to your State Department colleagues, what are we communicating now in terms of our capability and our will?

Mr. TURNER. Yeah, this is Bruce Turner from AVC again. One of the reasons we had a meeting in July with the Russians about space issues was to communicate very clearly to them the kinds of concerns that we have about things that they are doing. And this is for the same reason the Biden administration is interested in beginning a strategic stability dialogue with the Russians that will cover, you know, nuclear and other issues as well.

But the whole point is to explain very clearly to them, you know, what our concerns are, what we do not want them to do, and to try to iron out some of the rules of the road so that they know exactly what kinds of risks they are taking if they engage in certain kinds of behavior.

Mr. WALTZ. So, you know, one of the things that I am most concerned about is our nuclear command and control systems. And, you know, when we are talking about standards in terms of how close you can get, what types of activities you can do now that other countries are up in geosynchronous, I think we need to be very clear on our end but also make it clear on their end so we don't have those kind of catastrophic miscommunications.

Mr. Chairman, my time has expired, and I yield. Thank you.

Mr. COOPER. I appreciate the gentleman being so precise. Thank you.

We have completed, I think, the first round of questioning, and I was going to cut it off. We have been in session for about an hour and 45 minutes.

Are there any members who have a final question they would like to ask?

If not, then I want to thank the witnesses for their excellent testimony. I want to thank the members for showing up and posing such good questions, and I want to thank the staff for assembling all this. So it is hard to have a remote hearing, but this went very well. And it is certainly an important and, you know, possibly historic hearing that we had today to get these efforts underway, so thank you for being part of this historic effort.

VOICE. Thank you, Mr. Chairman.

Mr. COOPER. The hearing is now adjourned, with Chairman Castro's permission.

Mr. CASTOR. Absolutely. Thank you, everyone.

Mr. COOPER. Okay.

VOICE. Thank you.

Mr. COOPER. Thank you. The hearing is now adjourned.

[Whereupon, at 4:46 p.m., the subcommittees were adjourned.]

A P P E N D I X

MAY 5, 2021

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

MAY 5, 2021

Representative Jim Cooper
House Armed Services Committee – Strategic Forces Subcommittee
Opening Statement – 5 May 2021
Joint Hearing with HFAC IDOC –
“Creating a Framework for Rules-Based Order in Space”

This hearing will come to order. I would like to start by thanking my colleagues, Representative Castro, Chairman of the House Foreign Affairs Subcommittee on International Development, International Organizations, and Global Corporate Social Impact, and his Ranking Member Representative Malliotakis, for joining the Strategic Forces subcommittee to discuss this incredibly important, and timely topic.

I welcome our panel of esteemed witnesses from both the Departments of Defense and State as we dive into the issues surrounding the lack of specific and verifiable international norms for behavior in space - Mr. John D. Hill, Performing the Duties of Assistant Secretary of Defense for Space Policy, Lt Gen Stephen Whiting, Commander, Space Operations Command, United States Space Force, Mr. Jonathan M. Moore, Principal Deputy Assistant Secretary of State, Bureau of Oceans and International Environmental and Scientific Affairs, and Mr. Bruce Turner, Senior Bureau Official, Bureau of Arms Control, Verification and Compliance. Thank you all for participating in today’s hearing, and I ask that you keep your opening remarks brief, and to no more than 5 minutes so that we have ample time to get to questions.

Space has captured human imagination since the beginning of time, but it’s still a long, long way from being understood by our political leaders, diplomats and lawyers, at least in a way that the many nations of Earth can agree upon. Scientists have made great progress helping us reach, explore and briefly inhabit the harsh domain above us, but the rest of us are much slower to follow or even understand where they are enabling us to travel. Many nations and corporations are exploring high above the Earth’s atmosphere, testing the infinite number of ways that mastering space can help the 7.6 billion of us down here on the ground. The Space Age is only about 70 years-old and the foundational Outer Space Treaty is just over 50 years-old. Unfortunately, precious little has happened since to organize human efforts in that inhuman domain.

Space is in danger of becoming the Wild West where every satellite, astronaut, cosmonaut, or taikonaut has to defend itself. From their testimony, I see that our State Department experts are giving up on the concept of a law-abiding “rules-based space” and settling for “suggestions-based space.” Perhaps that is the best we can do, but I think we should try harder for better.

Can’t we at least agree on space traffic management, on the size of safety zones, to ban debris, to have compatible docking latches? There must be a consensus somewhere on Earth for the sensible.

I look forward to the discussion with our witnesses.

Statement of Mr. John D. Hill
Performing the Duties of Assistant Secretary of Defense for Space Policy
Before the
House Armed Services Committee – Subcommittee on Strategic Forces
and House Foreign Affairs Committee – Subcommittee on International Development,
International Organizations, and Global Corporate Social Impact
on “Creating a Framework for Rules-Based Order in Space”
May 5, 2021

Thank you, Chairman Cooper, Ranking Member Turner, Chairman Castro, Ranking Member Malliotakis, and distinguished Members of the Subcommittees. I am honored to testify today alongside my distinguished colleagues. There is a strong partnership between the Department of Defense (DoD) and the Department of State on space policy matters, including activities that we will address today to foster a rules-based international order for outer space activities.

U.S. Leadership in Promoting Responsible Space Activities

U.S. leadership in developing voluntary, non-legally binding norms, guidelines, and standards of responsible behavior for outer space activities, as an element of the overall rules-based international order built by the United States and its allies and partners, is a longstanding principle of U.S. policy. President Biden’s March 2021 “Interim National Security Strategic Guidance” states: “We will lead in promoting shared norms and forge new agreements on emerging technologies, space, cyber space, health and biological threats, climate and the environment, and human rights[;]” and “[w]e will explore and use outer space to the benefit of humanity, and ensure the safety, stability, and security of outer space activities.”

Similarly, the December 2020 National Space Policy directs U.S. Government departments and agencies to “[l]ead the enhancement of safety, stability, security, and long-term sustainability in space by promoting a framework for responsible behavior in outer space, including the pursuit and effective implementation of best practices, standards, and norms of behavior.” Additionally, the National Space Policy directs national security departments and agencies to communicate which space activities the United States considers undesirable or irresponsible, while promoting, demonstrating, and messaging responsible norms of behavior. This direction echoes guidance found in the 2010 National Space Policy, which established a goal of “Strengthen[ing] stability in space through: domestic and international measures to promote safe and responsible operations in space.”

DoD actively contributes to U.S. diplomatic efforts, led by the Department of State, to shape voluntary, non-legally binding standards and norms of responsible behavior in outer space. The June 2020 Defense Space Strategy directs the Department, working with U.S. allies, partners, and other U.S. Government departments and agencies, to: “Promote standards and norms of behavior favorable to U.S., allied, and partner interests” in order to shape the strategic environment. This language builds on earlier direction from the 2011 National Security Space

Strategy, which describes the interests of DoD and the Intelligence Community in, “a stable space environment in which nations exercise shared responsibility to act as stewards of the space domain and follow norms of behavior.” In conducting its space operations, DoD strives to act consistently with voluntary international measures the United States supports while complying with relevant domestic and international law, including the Charter of the United Nations (which reflects the inherent right of self-defense), and the 1967 *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies* (commonly known as the “Outer Space Treaty”).

Together, these policies and strategies highlight the longstanding and essential role of U.S. leadership in developing voluntary, non-legally binding norms, standards, and guidelines of responsible behavior, as well as voluntary transparency and confidence-building measures for outer space activities. Although current U.S. National Space Policy, similar to previous National Space Policies, allows for the United States to “[consider] proposals and concepts for arms control measures if they are equitable, effectively verifiable, and enhance the national security of the United States and its allies,” no current proposals for space arms control meet these criteria. Instead, as a more pragmatic means to manage an evolving strategic environment, U.S. Government efforts are focused on developing voluntary, non-binding measures derived from current technical and operational practices.

A Rapidly Evolving Space Domain

Space activities are changing rapidly, both quantitatively and qualitatively. Space is no longer the province of only a few government actors. In addition to efforts around the world to establish or grow national space programs for scientific, national security, or other government purposes, burgeoning domestic and international commercial sectors are multiplying the number of satellite operators worldwide. In some cases, these satellite operators are planning to launch hundreds – if not thousands – of new satellites into orbit. If even a fraction of these plans come to fruition, the number of satellites placed on-orbit over the next decade will eclipse the number of satellites launched into space since the beginning of the space age.

In addition to new commercial operators providing traditional space-based services such as communications and earth observation, many new commercial ventures are offering services and capabilities previously only available to governments. Emerging applications such as on-orbit satellite refueling and servicing, space-based radio-frequency mapping, and space tourism are fundamentally reshaping the character of commercial space activities.

The recognition of the utility of space for national security purposes is also driving some nations to develop counterspace capabilities. China and Russia, in particular, are fielding a wide range of weapons intended to deny the United States and its allies and partners the use of space-based capabilities in a crisis or conflict. Testing of such weapons – including testing on-orbit – may pose new challenges for the stability and security of the space domain.

Taken individually, each of these changes would be notable. When viewed collectively, the evolving nature of global space activities has the potential to create significant challenges for the safety and security of space operations, as well as for the stability and sustainability of the space domain overall.

The Value of Voluntary, Non-Legally Binding Norms of Responsible Behavior in Outer Space

Developing a shared understanding among States of what constitutes safe and responsible space activities benefits all space operators, including DoD. Adherence to common guidelines for space operations creates a more stable and predictable space environment. Much as roadway traffic rules prevent accidents and reduce congestion, safety-focused “space traffic management” guidelines, such as limiting debris, avoiding collisions, and sharing space surveillance information, can reduce the likelihood of accidents and protect valuable orbital regimes from the deleterious effects of long-lived space debris. All who operate in space – including DoD, one of the single largest space operators in the world – benefit from a safer and more sustainable operating environment.

Common standards of behavior for space operations can also increase transparency and enhance security and stability in space because behaviors that are not consistent with those common standards will be more readily detectable by military, commercial, and civil operators alike. For DoD, a shared understanding of what constitutes responsible behavior in outer space by all space actors would enable indications and warning of potential threats to U.S. and allied and partner space activities by highlighting activities of potential concern. Whether a particular space operation follows such common standards would be one factor that commanders could consider when determining whether a behavior that appears “abnormal” is merely an aberration or is actually a demonstration of hostile intent or a hostile act.

Taking an active role in shaping norms of behavior benefits DoD. As one of the world’s most experienced space operators, with one of the largest satellite fleets, DoD strives to conduct space operations that can serve as a model for safe and professional behavior. DoD policies, procedures, and standards for mitigating risks, together with those of the National Aeronautics and Space Administration, function as both an important reference point for many space operators globally and a starting point for U.S. domestic policies on responsible space practices. These, in turn, form the basis for U.S. proposals for standards of behavior. Making concrete proposals within international venues negotiating such standards of behavior raises the likelihood that U.S. policies and practices will garner widespread support internationally and that, therefore, they will serve as a baseline for standards and guidelines that the international community ultimately implements.

International Activities

DoD works closely with the Department of State and other U.S. Government departments and agencies to promote U.S. views on responsible behavior. As a whole, the U.S. Government exercises leadership on this topic in international diplomatic fora, such as the United Nations

Committee on the Peaceful Uses of Outer Space (UNCOPUOS); through government-to-government and military-to-military bilateral and multilateral dialogues; and through engagement with civil society and the commercial space sector to develop and promulgate concepts for responsible space operations.

The United States has achieved multiple successes in the past fifteen years, starting with the “Space Debris Mitigation Guidelines of the United Nations Committee on the Peaceful Uses of Outer Space,” which were endorsed by the UN General Assembly in 2007. The international community now recognizes these non-binding guidelines, which were based largely upon U.S. standards established in the 2001 U.S. Government Orbital Debris Mitigation Standard Practices (ODMSP), as the definitive international guidelines for minimizing the creation of long-lived and harmful space debris.

Following adoption of the Space Debris Mitigation Guidelines, UNCOPUOS then embarked on developing a broad set of space sustainability guidelines covering topics ranging from space operations to international cooperation. In 2019, at the conclusion of ten years of difficult negotiations in which my office represented DoD and the U.S. Government, the UN General Assembly welcomed the adoption of a preamble and 21 “Guidelines for the Long-Term Sustainability of Outer Space Activities,” the first-ever set of comprehensive international best practices for space safety and sustainability. The United States – including both U.S. Government and commercial space operators – played an active role in these negotiations, proposing many of the guidelines that the Committee adopted and shaping the text of all guidelines for consistency with existing U.S. policy and practice.

More recently, DoD has been working with the Department of State and other U.S. Government departments and agencies to produce the U.S. national submission in response to a request contained in a 2020 UN General Assembly Resolution on “Reducing space threats through norms, rules, and principles of responsible behaviours.” That resolution, spearheaded by the United Kingdom, invites each UN Member State to “share ideas on threats, development and implementation of norms of behaviors, and on the reduction of the risk of misunderstanding and miscalculation.” Later this year, the UN Secretary General will compile Member State inputs, including those of the United States, into a report to apprise all UN Member States on the nature of threats facing space activities today and to inform future discussions on practical measures to enhance space stability and security.

Conclusion

The United States is continuing its longstanding leadership role in space operations by shaping voluntary, non-legally binding norms, standards, and guidelines of responsible behavior in space. Voluntary adherence to such norms and standard practices can create a safer and more stable and predictable space operating environment for all space actors and can facilitate indications and warnings of potentially hostile acts or hostile intent.

DoD policies and practices often serve as the basis for voluntary international measures, and DoD can model responsible behavior through its routine space operations. DoD works carefully to ensure that defense space operations are consistent with voluntary, non-legally binding international measures the United States supports and conducted in accordance with relevant domestic and international law, including the inherent right of self-defense.

U.S. leadership in the development of a rules-based international order for space activities reaps benefits for U.S. civil, commercial, and national security space operators. As space activities worldwide become more prolific and more varied, widespread implementation of voluntary, non-binding norms, standards, and guidelines of responsible behavior will benefit U.S. national security and foster a conducive environment for growing global space activities.

John D. Hill**Performing the Duties of Assistant Secretary of Defense for Space Policy**

Mr. John D. Hill is currently performing the duties of the Assistant Secretary of Defense for Space Policy with responsibilities for formulating and coordinating space-related national security and defense policies and strategies, including for the conduct of international space cooperation.

A Presidential Rank Award recipient and member of the career Senior Executive Service, Mr. Hill served as the Principal Director for Space Policy from 2013-2021 and has held a diverse variety of assignments in the Department of Defense (DoD) beyond the space portfolio. He was DoD's representative in negotiations with Afghanistan on the Security and Defense Cooperation Agreement that enabled a continuing presence of United States forces. Mr. Hill has held two prior Principal Director positions in DoD, overseeing defense policies and programs regarding Afghanistan, Pakistan, and Central Asia from 2010-2012, and holding similar responsibilities regarding the East Asia region from 2006-2010.

In previous assignments as the Director for Northeast Asia and as the Senior Country Director for Japan, Mr. Hill led DoD's management of U.S. alliance relationships with Japan and the Republic of Korea and oversaw security policies regarding the Korean Peninsula.

Mr. Hill's career includes extensive experience across a wide range of international negotiations encompassing defense posture, status of forces, nuclear non-proliferation, defense industrial collaboration, international trade, and host nation support agreements. His early career highlights included roles in developing the longstanding U.S. policy on offsets in military exports and development and implementation of the Gulf War program under which coalition partners contributed \$53 billion to defray U.S. costs.

As a member of the inaugural class of Mansfield Fellows, Mr. Hill served assignments on detail to the Japan Defense Agency, the Japan Federation of Economic Organizations (Keidanren), and Japan's Ministry of International Trade and Industry.

Mr. Hill joined DoD through selection to the Presidential Management Internship Program, serving assignments with the Army Security Assistance Command, the Office of Management and Budget, and the Office of the Secretary of Defense.

Mr. Hill received his Master of Arts in International Affairs from American University, and earned a Bachelor of Arts in Political Science at UCLA. He and his wife Lynn live in Fairfax, Virginia. They have three daughters who are embarked on their own professional careers.

NOT FOR PUBLICATION UNTIL RELEASED
BY THE SUBCOMMITTEE ON STRATEGIC
FORCES AND SUBCOMMITTEE ON INTERNATIONAL
DEVELOPMENT, INTERNATIONAL ORGANIZATIONS
AND GLOBAL CORPORATE SOCIAL IMPACT
UNITED STATES HOUSE OF REPRESENTATIVES

DEPARTMENT OF THE AIR FORCE
UNITED STATES SPACE FORCE

PRESENTATION TO THE
HOUSE ARMED SERVICES COMMITTEE & HOUSE FOREIGN AFFAIRS COMMITTEE
UNITED STATES HOUSE OF REPRESENTATIVES

SUBJECT: Creating a Framework for Rules-Based Order in Space

STATEMENT OF: Lieutenant General Stephen N. Whiting, United States Space Force
Commander, Space Operations Command

5 May 2021

NOT FOR PUBLICATION UNTIL RELEASED
BY THE SUBCOMMITTEE ON STRATEGIC FORCES AND SUBCOMMITTEE ON
INTERNATIONAL DEVELOPMENT, INTERNATIONAL ORGANIZATIONS AND GLOBAL
CORPORATE SOCIAL IMPACT
UNITED STATES HOUSE OF REPRESENTATIVES

INTRODUCTION

Chairman Cooper, Ranking Member Turner, Chairman Castro, Ranking Member Malliotakis, and distinguished members of the Committee. Thank you for the opportunity to testify today in my capacity as Commander, Space Operations Command (SpOC), on the U.S. Space Force (USSF) perspective towards creating a framework for a rules-based order in space and development of voluntary, non-legally binding norms and responsible behavior in the space domain.

The United States is a space-faring nation. We have long understood that our nation is strongest economically, militarily, and diplomatically when we have access to, and freedom of operation in space. Consistent with the 1967 Outer Space Treaty, the policy of the United States is that “[a]ll nations have the right to explore and to use space for peaceful purposes and for the benefit of all humanity.” In that regard, the United States believes that is the shared interest of all nations to act responsibly in space to ensure the safety, stability, security, and long-term sustainability of space activities.

Unfortunately, potential adversaries have taken note of the enormous civil and military benefits the United States and other nations are now deriving from the peaceful use of outer space and they are developing capabilities aimed at denying access to and freedom of action in space. We now acknowledge we can no longer take this vital national interest for granted; it must be secured. The rapid advancements of potential adversaries’ capabilities to threaten the freedom of operation in space for the United States as well as our allies and partners, must be countered with immediate improvements to our space defense architecture and capabilities. Adversaries like the People’s Republic of China and the Russian Federation are aggressively developing weapons to deny or destroy our nation’s space capabilities in a crisis or conflict. Both Russia and China have ground-based laser and electronic warfare systems capable of temporarily dazzling, permanently blinding, or jamming our satellite systems. China has invested in satellite grappling technologies, like the Shijian-17 satellite’s robotic arm, which could be used in future conflicts. Russian systems like the COSMOS 2519 and COSMOS 2542 satellites provide on-orbit weapons system designed to kill satellites kinetically in low-Earth orbit. The United States would prefer that conflict not begin in, nor extend to space, but we will be prepared to protect United States interests in space, just as we do in all domains.

The USSF was established to organize, train, and equip space forces to preserve freedom of action, enable joint lethality and effectiveness, and provide independent options to U.S. national leadership, allies, and the Joint Force capable of achieving national objectives. Our responsibilities include developing Guardians, acquiring military space systems, maturing the military doctrine for space power, and organizing space forces to present to our Combatant Commands as we ensure freedom of operation in space. United States space capabilities coupled with international partnerships have become a cornerstone of deterrence, not just in space, but in every domain. Without freedom to maneuver in space, our deployed forces, our homeland, and our allies across the globe are at greater risk.

It is important to note that while the USSF provides capabilities and resources, it is U.S. Space Command (USSPACECOM) who executes missions in the space area of responsibility. To that end, SpOC is the primary force provider of space forces and capabilities for USSPACECOM, other Combatant Commands and the Joint Force, and we provide significant capabilities to international partners and the U.S. Interagency. This is accomplished through eight mission-oriented Space Mission Deltas that prepare and present combat-ready forces across a variety of mission sets. Space Delta 5 represents the USSF command and control organization within SpOC that is presented to USSPACECOM and the Combined Force Space Component Command (CFSCC) to accomplish the Combined Space Operations Center (CSpOC) mission. The CSpOC, based at Vandenberg Air Force Base, California, reports to the CFSCC and executes the operational command and control of joint space forces to achieve theater and global objectives. Under the leadership of Major General DeAnna Burt, the Deputy SpOC Commander is dual-

hatted as Commander of USSPACECOM's CFSCC. It is in this role CFSCC plans and executes space operations through four distinct and geographically dispersed operations centers, including the CSpOC; the Missile Warning Center at Cheyenne Mountain Air Force Station, Colorado; the Joint Overhead Persistent Infrared Center at Buckley AFB, Colorado; and the Joint Navigation Warfare Center located at Kirtland AFB, New Mexico.

Through CFSCC, we enable USSPACECOM's ability to provide support to terrestrial forces and integrate with commercial partners, while supporting defense of the domain against real and perceived aggression. While it is not in the purview of USSPACECOM or the USSF to lead in international venues in the development of voluntary norms of responsible behavior, our collective role in this regard remains unchanged: we have always – and will continue to – operate all of our satellites of various constellations in a safe, professional, and responsible manner, and have for decades. As a global partner to our sister Services, interagency partners, allies, academia, and commercial entities, the USSF is committed to being a good teammate with all our stakeholders. We are determined at SpOC to lead by example through the forces we organize, train, and equip. We support the Department of State's whole-of-government approach to the development of a framework for responsible behavior in outer space, and as that framework continues to develop, will smartly fall in line.

THE IMPORTANCE OF NORMS IN THE SPACE DOMAIN

The absence of features equivalent to national borders in space means there is no sovereign territory separating forces. While separation of terrestrial forces creates opportunity for early warning, defense by maneuver, and deterrence by credible escalation capabilities, the current lack of equivalent separation in space allows actors to operate at any location in the domain and at any distance from other spacecraft. This may allow a potential attacker to maneuver close to other space assets, from where they can execute a "first mover" surprise attack. This creates a potentially destabilizing "use it or lose it" dilemma that accelerates escalation. This risk could be mitigated by shared understandings among space actors, including through voluntary, non-legally binding best practices, standards, and norms of responsible behavior.

Every interaction in space, whether it is driven by military, government, civil, or commercial entities, creates a pattern of behavior that can communicate intent, which can be evaluated against a behavioral baseline built on best practices, standards, and norms. USSF space domain awareness capabilities allow the Joint Force to execute the mission of determining intent as communicated by words and behaviors. Alignment between what an actor claims to be doing and what we observe, such as who initiates movement into closer proximity with another spacecraft, or who does – or does not – respond to warnings in safe, professional, and responsible manner, refines our understanding of an actor's intent. As a participant in Department of Defense (DoD) Responsible Behaviors Working Group, the USSF will actively use interactions, consistent with applicable law and policy, to shape and exemplify responsible behaviors that enhance national security and reduce opportunity for a competitor or potential adversary to misinterpret our intent.

THE DEPARTMENT OF DEFENSE IS FOCUSING ON RESPONSIBLE BEHAVIOR

In 2020, the Department of Defense (DoD) established the Responsible Behaviors Operational Planning Team, a cross-functional team gathering space stakeholders across the Department, to include several divisions of the USSF. Under the leadership of the Under Secretary of Defense for Policy, the USSF has and USSPACECOM have participated in a review of military space operations during peacetime. Drawing from these well-established practices, the team is in the process of developing and documenting a set of DoD-focused responsible behaviors with which the DoD is and intends to remain consistent during the conduct of space operations. After this initial set of broad responsible behaviors is

developed, the USSF anticipates collaborating with USSPACECOM to create and coordinate specific implementation guidance. While still in development, it is our hope that these foundational concepts on responsible behavior will eventually guide the development of some voluntary, non-legally-binding transparency and confidence-building measures or guidelines of responsible behavior in space during peacetime, and ultimately form the foundation for establishing norms of responsible behavior. For our part, the USSF will actively use our on-orbit interactions, consistent with applicable law and policy, to exemplify peacetime responsible behaviors that enhance national security, support stability, and reduce the opportunity for a competitor or potential adversary to misperceive or misinterpret our intent in a way that could create the opportunity for escalation.

USSF STRATEGIC APPROACH

The Defense Space Strategy, approved by the Secretary of Defense in June 2020, calls for promotion of standards and norms of behavior in space favorable to U.S., allied, and partner interests. Furthermore, the 2020 National Space Policy made significant strides in specifying Department of State (DOS) responsibilities toward strengthening the United States leadership in space. The 2021 Interim National Security Strategic Guidance affirms that the United States will lead in promoting shared norms and forge new agreements on outer space. It is in this context, and in collaboration with DOS, that the DoD plays a critical role in preserving the safety, stability, security, and long-term sustainability of space activities. As a military organization, we do not have a primary role in international fora in the development of a framework for responsible behavior in space; however, it is the position of the USSF that rules on safe and professional conduct would be immensely helpful toward our mission to protect the U.S. and our allies in, from, and to space.

Under the leadership of the Secretary of State, the USSF will continue to support DoD's participation in the whole-of-government approach to develop preferred voluntary, non-legally binding norms of responsible behavior in space through our efforts at SpOC. We anticipate such norms contributing to the safety of the domain by reducing the risk of accidents and mishaps, contributing to the sustainability of the domain, and promoting freedom to operate in space. Finally, norms must contribute to the stability of the domain by providing enhanced indications and warnings and informing Commanders' decisions regarding an actor's hostile intent.

When space was less congested, collaboration with foreign partners was not a prerequisite of security. Today, evolution of the security environment requires greater interoperability with partners and allies, many of whom have already integrated with U.S. combat capability in other domains. The USSF also supports a multi-national approach by partnering with allies and other like-minded space faring nations to encourage stability in the space domain. We are already working with like-minded allies and space-faring nations through organizations such as the CSpOC to discuss and review how we can align our operations in space to develop and promulgate concepts for responsible space operations. We also use efforts such as the Schriever Wargame Series to test these principles in the face of rapid changes in technology helping to ensure the practices we would like to see adopted as guiding principles will endure in the coming years and decades. Some of these discussions at the military-to-military level can be challenging as we work with different actors with varying capabilities and differing interpretations of international law, including space law. Yet we are finding that, collectively, we more often than not can agree on what constitutes responsible behavior, demonstrate and message responsible behavior, and boldly 'call out' irresponsible behavior. Leveraging multilateral efforts to internationalize U.S. preferred norms of behavior will only strengthen our position on the global stage.

THE WAY AHEAD

The Department of Defense has been the leader in military space operations since the dawn of the space age. Throughout its history, the Department pursued its space mission while ensuring and maintaining the safety, security, stability, and sustainability of the domain. In fact, seeing a need to help keep space safe, the former Air Force Space Command (now U.S. Space Force) has partnered with U.S. Strategic Command (now U.S. Space Command), for many years, with the support of Congress, to provide orbital conjunction assessments to any space owner/operator around the globe who provides their contact information, while also making available spacetrack.org to create transparency in the tracking of tens of thousands of objects on orbit. As more actors come to space, the domain is changing, with an increased risk of collisions, as well as miscalculations or misunderstandings. It is incumbent on the Department to continue space leadership through demonstrating and acknowledging responsible behavior in space.

In support of DoD and with our teammates across the federal government, the USSF will continue to promote and inform on how we establish, partner, shape, and leverage responsible behavior in space. Our Service's inception brings the unprecedented opportunity to integrate organizational design while creating new military options with the Joint Force, interagency, industry, and especially our allies and partners. Communicating and demonstrating responsible behavior will be a part of such a strategy.

I thank Congress for your leadership and support. We are eager to work with your respective committees on a Rules-Based Order in space needed to secure our Nation's vital interests.

Lieutenant General Stephen N. Whiting
Commander, Space Operations Command, Peterson Air Force Base, Colorado

Space Operations Command is a Field Command of the U.S. Space Force, comprising thousands of Space Professionals and Airmen worldwide. As Commander, Lt. Gen Whiting leads the preparation, generation, and sustainment of combat-ready intelligence, cyber, space and combat support forces and serves as the U.S. Space Force Service Component to U.S. Space Command.

Lt. Gen. Whiting is a 1989 distinguished graduate of the U.S. Air Force Academy with a degree in aeronautical engineering. He is a space operations officer and has commanded the 13th Space Warning Squadron; the 614th Air and Space Operations Center and Joint Space Operations Center; the 21st Space Wing; and the Combined Force Space Component Command and 14th Air Force.

Lt. Gen. Whiting's staff assignments include positions at Headquarters U.S. Air Force; U.S. Space Command; U.S. Strategic Command; the Chief of Naval Operations' Strategic Studies Group; the Office of the Deputy Secretary of Defense; Headquarters Air Force Space Command; and Headquarters U.S. Space Force.

EDUCATION

1989 Distinguished Graduate, Bachelor of Science, Aeronautical Engineering, U.S. Air Force Academy, Colo.

1990 Top Graduate and Distinguished Graduate, Undergraduate Space Training, Lowry Air Force Base, Colo.

1993 Distinguished Graduate, Squadron Officer School, Maxwell AFB, Ala.

1997 Master of Arts, Administrative Sciences (Organizational Management), The George Washington University, Washington, D.C.

2001 Top Graduate (tied) and Distinguished Graduate, Master of Arts, Military Operational Arts and Sciences, Air Command and Staff College, Maxwell AFB, Ala.

2002 Master of Arts, Airpower Strategy, School of Advanced Air and Space Studies, Maxwell AFB, Ala.

2008 Joint Forces Staff College, Norfolk, Va.

2017 Senior Executives in National and International Security, John F. Kennedy School of Government at Harvard University, Executive Education, Cambridge, Mass.

ASSIGNMENTS

July 1989–November 1990, Student, 14th Student Squadron, Columbus Air Force Base, Miss.

November 1990–November 1993, Crew Commander, Deputy Chief of Training, and Chief of Standardization and Evaluation, 6th Space Warning Squadron, Cape Cod Air Force Station, Mass.

November 1993–December 1994, Radar Systems Officer, 21st Operations Support Squadron, Peterson AFB, Colo.

December 1994–July 1995, Executive Officer, 21st Operations Group, Peterson AFB, Colo.

August 1995–May 1997, Air Force Intern, Headquarters U.S. Air Force, the Pentagon, Arlington, Va. and The George Washington University, Washington, D.C.

August 1997–June 1999, Ultra High Frequency Follow-On (UFO F/O) Satellite Vehicle Operator, Crew Commander, and Operations Flight Commander, 3rd Space Operations Squadron, Schriever AFB, Colo.

June 1999–July 2000, Operations Officer, 22d Space Operations Squadron, Schriever AFB, Colo.

August 2000–June 2001, Student, Air Command and Staff College, Maxwell AFB, Ala.

July 2001–June 2002, Student, School of Advanced Air and Space Studies, Maxwell AFB, Ala.

July 2002–June 2003, Regional Policy Officer, Headquarters U.S. Space Command and U.S. Strategic Command West, Peterson AFB, Colo.

June 2003–June 2004, Special Assistant to the Commander, Headquarters U.S. Strategic Command, Offutt AFB, Neb.

July 2004–July 2005, Commander, 13th Space Warning Squadron, Clear AFS, Alaska

July 2005–May 2006, Air Force Fellow, RAND Corporation, Santa Monica, Calif.

June 2006–June 2008, Commander, 614th Air and Space Operations Center and Director, Joint Space Operations Center, Vandenberg AFB, Calif.

September 2008–August 2009, Chief of Staff U.S. Air Force Fellow, with duty at the Chief of Naval Operations' Strategic Studies Group, Newport, R.I.
 August 2009–June 2011, Commander, 21st Space Wing, Peterson AFB, Colo.
 July 2011–July 2013, Military Assistant and Acting Senior Military Assistant to the Deputy Secretary of Defense, Washington, D.C.
 July 2013–July 2015, Vice Commander, U.S. Air Force Warfare Center, Nellis AFB, Nev.
 July 2015–October 2015, Space Enterprise Vision Team Lead, Headquarters Air Force Space Command, Peterson AFB, Colo.
 November 2015–August 2017, Director of Integrated Air, Space, Cyberspace and Intelligence, Surveillance and Reconnaissance Operations, Headquarters Air Force Space Command, Peterson AFB, Colo.
 August 2017–November 2017, Joint Force Space Component Command Integration Team Lead, Headquarters Air Force Space Command, Peterson AFB, Colo.
 December 2017–August 2019, Commander, 14th Air Force, Air Force Space Command, and Deputy Joint Force Space Component Commander, U.S. Strategic Command, Vandenberg AFB, Calif.
 August 2019–November 2019, Combined Force Space Component Commander, U.S. Space Command, and Commander, 14th Air Force, Air Force Space Command, Vandenberg AFB, Calif.
 November 2019–December 2019, Deputy Commander, Air Force Space Command, Peterson AFB, Colo.
 December 2019–October 2020, Deputy Commander, Headquarters U.S. Space Force, Peterson AFB, Colo.
 October 2020–present, Commander, Space Operations Command, Peterson AFB, Colo.

SUMMARY OF JOINT ASSIGNMENTS

July 2002–June 2003, Regional Policy Officer, Headquarters U.S. Space Command and U.S. Strategic Command West, Peterson Air Force Base, Colo., as a lieutenant colonel
 June 2003–June 2004, Special Assistant to the Commander, Headquarters U.S. Strategic Command, Offutt AFB, Neb., as a lieutenant colonel
 June 2006–June 2008, Director, Joint Space Operations Center, Vandenberg AFB, Calif., as a colonel
 July 2011–July 2013, Military Assistant and Acting Senior Military Assistant to the Deputy Secretary of Defense, Washington, D.C., as a colonel
 December 2017–August 2019, Deputy Joint Force Space Component Commander, U.S. Strategic Command, Vandenberg AFB, Calif., as a major general
 August 2019–November 2019, Combined Force Space Component Commander, U.S. Space Command, Vandenberg AFB, Calif., as a major general

MAJOR AWARDS AND DECORATIONS

Distinguished Service Medal with oak leaf cluster
 Defense Superior Service Medal
 Legion of Merit with two oak leaf clusters
 Defense Meritorious Service Medal
 Meritorious Service Medal with oak leaf cluster
 Air Force Commendation Medal with oak leaf cluster
 Air Force Achievement Medal
 Combat Readiness Medal
 National Defense Service Medal

DATES OF PROMOTIONS

Second Lieutenant May 31, 1989
 First Lieutenant May 31, 1991
 Captain May 31, 1993
 Major July 1, 1999
 Lieutenant Colonel March 1, 2002
 Colonel March 1, 2006
 Brigadier General July 8, 2013
 Major General May 2, 2017
 Lieutenant General Oct. 21, 2020

(Current as of October 2020)

Statement of Mr. Jonathan M. Moore
Principal Deputy Assistant Secretary
Bureau of Oceans and International Environmental and Scientific Affairs
U.S. Department of State
Before the
House Armed Services Committee – Subcommittee on Strategic Forces
and House Foreign Affairs Committee – Subcommittee on International Development,
International Organizations, and Global Corporate Social Impact
on “Rules-Based Space Order”
May 5, 2021

Thank you, Chairman Cooper, Ranking Member Turner, Chairman Castro, Ranking Member Malliotakis, and distinguished Members of the Subcommittees. I am honored to testify today alongside my distinguished colleagues. It is my pleasure to be here to discuss the promotion of responsible behavior in outer space focused on the civil and commercial sectors of the overall space enterprise.

My bureau, the Bureau of Oceans and International Environmental and Scientific Affairs, or OES, engages with other nations on civil and commercial space activities, and this will be my focus. With the Bureau of Arms Control, Verification and Compliance, we share responsibility for diplomacy aimed at ensuring all actors across all space sectors are behaving in a manner that is consistent with the international regime established by the 1967 Outer Space Treaty and associated conventions and agreements.

National Space Policy Guidance on Responsible Behavior

Our Executive branch policy guidance on promoting responsible behavior in outer space activities is clear. The Biden Administration’s March 2021 Interim National Security Strategic Guidance states that: “We will explore and use outer space to the benefit of humanity, and ensure the safety, stability, and security of outer space activities.” That guidance goes on to say that “We will lead in promoting shared norms and forge new agreements on emerging technologies, [including] space.” Encouraging and facilitating responsible behavior in space is also a major principle of the 2020 National Space Policy. Consistent with previous policy, a guiding principle is that it is in the shared interest of all nations to act responsibly in space to ensure the safety, stability, security, and long-term sustainability of space activities.

Throughout the detailed guidance in the 2020 policy, departments and agencies, in collaboration with the Secretary of State, are charged with actions to promote a framework for responsible behavior in outer space that includes the international adoption of U.S. space regulatory practices, interoperability among space systems, services, and data, and facilitating new market opportunities for United States commercial space capabilities and services, to name a few. The 2020 National Space Policy calls for cooperation with likeminded international partners to establish standards of safe and responsible behavior, including openness, transparency, and predictability, to facilitate the detection, identification, and attribution of actions in space that are inconsistent with the safety, stability, security, and long-term sustainability of space activities.

The Committee on the Peaceful Uses of Outer Space and Long-term Sustainability Guidelines

The United States has successfully utilized the United Nations Committee on the Peaceful Uses of Outer Space, or COPUOS, for over 60 years to build international support for United States space policies and our vision for expanding human presence in space and promoting the responsible use of space. Since its inception in 1958, COPUOS, as the preeminent international forum for advancing the peaceful exploration and use of outer space, has promoted international cooperation in space activities and has fostered information exchange among developed and developing countries on the latest advances in space exploration and applications and their beneficial results for humanity.

The United States actively engages with the United Nations Office for Outer Space Affairs (UNOOSA), which serves as the Secretariat for COPUOS and for the International Committee on Global Navigation Satellite Systems (ICG). UNOOSA is the key UN office responsible for facilitating international collaboration and promoting transparency in outer space activities through the Registration of Objects Launched into Outer Space. UNOOSA also helps countries use space data and technologies, such as satellite imagery, to prevent disasters through the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) and manages a broader space application program focused on capacity building in developing nations. The United States will continue its productive relationship with UNOOSA and its distinguished director, Simonetta Di Pippo, as we look to ensure that all countries exercise safe and responsible behavior in space.

COPUOS accomplishes its work through a consensus decision-making process involving two subcommittees: the Scientific and Technical Subcommittee (STSC) and the Legal Subcommittee (LSC). The STSC meets annually and provides technical expertise to inform the work of the Committee and considers new technical challenges in outer space activities as they arise. The U.S. delegation to the STSC is led each year by NASA, as our lead civil space technical agency, and includes representation from across the Executive branch, including the Department of Defense (DoD). We also include industry representatives as private sector advisers to our delegation, and we consult with additional non-governmental stakeholders to gain a better understanding of their perspective on issues under discussion. This whole-of-government, whole-of-America approach helps ensure that the United States considers a broad range of equities as it advances our objectives through COPUOS and its subcommittees.

The Legal Subcommittee also meets annually and examines legal issues related to the peaceful uses of outer space as they may arise. This includes discussions regarding the existing international legal framework for outer space activities, which includes the Outer Space Treaty, the Registration Convention, the Agreement on the Rescue and Return of Astronauts, the Liability Convention, and for some nations, the Moon Treaty. This legal framework has helped ensure safe operations for the United States government and industry space activities that have advanced technological capabilities, scientific understanding, and improved the quality of life around the world. The U.S. delegation to the LSC is led by the space law experts in State's Office of the Legal Adviser and includes space attorneys and policymakers from other departments and agencies, again, including DoD.

The decisions of the committee and its two subcommittees are taken by consensus. All participating member states must agree on any conclusions or actions to be reported to the UN General Assembly in New York. The historically consensus-based negotiations process of the Vienna-based UN institutions, known as the so-called “Vienna spirit” has itself been an important U.S. priority, due to the real and long-lasting impact on avoiding bad outcomes and cooperatively advancing U.S. objectives related to nuclear energy, crime prevention, and criminal justice as well as outer space.

While some COPUOS Member States over the years have sought new treaties to govern outer space activities through other UN fora, we have used COPUOS to develop best practices, based on U.S. space operations experience, to help countries with their national approaches to their own domestic oversight of outer space activities. The most recent example is the adoption in 2019, through the Fourth Committee of the United Nations General Assembly, of 21 Long-Term Sustainability (LTS) guidelines developed by consensus of the COPUOS member states, and heavily influenced by U.S. best practices and commercial approaches to space operations.

These guidelines, while voluntary and non-legally binding, nevertheless establish a widely accepted international framework that focuses on ensuring a sustainable outer space environment that is accessible to future generations. The guidelines address key U.S. objectives such as guidance on national-level policy and regulatory frameworks for space activities, safety of space operations, scientific research and development, international cooperation, and capacity-building to ensure that developing nations can establish conducive national policies for safe space operations.

Within the working-group structure of the STSC, COPUOS member states agreed to continue the Long-term Sustainability Working Group with a five-year mandate to support implementation of the guidelines; strengthen capacity-building for emerging space-faring nations in their implementation of the guidelines; and study implementation challenges as a basis for possible new guidelines. In the meantime, the United States remains focused on our own implementation of the guidelines, assisting other nations in implementing the guidelines, and encouraging other nations to report on their implementation, all in pursuit of sustainable space activities and responsible behavior in outer space.

U.S. Leadership in Space Exploration: The Artemis Accords

In February, the Biden Administration endorsed NASA’s Artemis program, an ambitious effort to land the first woman and the first person of color on the Moon, and in cooperation with international partners and private industry, develop infrastructure and services to go onward to Mars and beyond. This goal has galvanized international attention and reinforces U.S. space exploration leadership. NASA’s overarching lunar program, Artemis, is intended to establish long-term human presence on the lunar surface to develop and demonstrate new technologies, capabilities, and business approaches needed for future exploration activities.

As part of broader U.S. efforts to promote a rules-based international order, and to ensure consistency in application among our partners, State and NASA, in consultation with some of

our closest spacefaring partner nations, have developed the Artemis Accords to provide answers to some of the most critical governance issues in space exploration activities beyond Earth's orbit. On October 13, 2020, the following countries joined the United States in signing the landmark Artemis Accords: Australia, Canada, Italy, Japan, Luxembourg, the United Arab Emirates, and the United Kingdom. Ukraine followed as a signatory in November and, in December, Brazil and NASA signed a joint statement of intent noting Brazil's intention to contribute to the Artemis program and to sign the Accords.

The Accords provide non-legally binding implementation guidance for the Outer Space Treaty of 1967, reinforce obligations under the Registration Convention and the Agreement on the Rescue of Astronauts, and establish norms of behavior such as the full, free, open, and timely release of scientific information. The Accords are intended to create a safe and transparent, peaceful and prosperous environment which facilitates exploration, science, and commercial activities in space for all of humanity to enjoy.

As a government-to-government political commitment, the Artemis Accords only directly apply to government civil space programs and activities, as well as commercial contractors working directly on behalf of government for civil activities. However, SpaceX, Blue Origin, and other U.S. commercial space companies support the Accords because they help clarify norms of behavior which can guide the activities of all commercial space actors in a fair and non-discriminatory manner. Therefore, it is the State Department's intention to engage in robust discussions with our space exploration partners on applying the principles of the Accords not just to our government space programs and activities, but also to our respective commercial sectors through national oversight required of all spacefaring nations under the Outer Space Treaty, taking into account appropriate differences between civil and commercial actors.

The UN Office for Outer Space Affairs has highlighted the Artemis Accords publicly, and at our request in January, the United Nations Secretary-General circulated the Artemis Accords to all UN Member States. The Accords extend our pursuit of responsible behavior in outer space beyond Earth's orbit to the Moon, Mars, our solar system, and perhaps beyond. Therefore, we are excited to engage a diverse set of potential signatories ready to affirm the principles identified within the Artemis Accords, make contributions to the Artemis program, and join us in a shared vision of sustainable space exploration and peaceful and responsible use of outer space that enable scientific discovery, brings economic benefit to our citizens, and maintains global peace and security.

One near-term component of NASA's Artemis program is the Gateway, which will be assembled in orbit around the moon and will be approximately 1/6th the size of the International Space Station. Gateway will be the enabling platform for missions to the lunar surface, and may provide support for missions to other destinations in the future. In November 2019, NASA received authority to negotiate, jointly with the State Department, binding MOUs with International Space Station partners concerning cooperation on the Gateway. Late last year, we concluded MOUs with Japan, the European Space Agency (ESA) and Canada. We have not entered into negotiation with Russia's State Space Corporation (ROSCOSMOS).

Reflecting on our current exploration commitments, the U.S. has maintained a continuous presence on the International Space Station (ISS) for over 20 years, together with Canada, the European Space Agency, Japan, and the Russian Federation. 2020 was a landmark year for U.S. ISS operations, the SpaceX Crew Dragon Demo-2 test flight to the ISS in May was the first human space mission to launch from the United States since the end of the Space Shuttle program in 2011. The test flight was followed by the first commercial crew rotational flight to the station in November, and then the second in April of 2021. We are aware of reports that Russia is evaluating future participation in the ISS. However, the ISS partners, including Russia, have confirmed their participation in the Program through at least 2024, and are assessing extension. The ISS Intergovernmental Agreement (IGA), signed by each of these parties, is the legal framework for this cooperation.

The legal framework for U.S. civil space cooperation with Russia in non-ISS affairs is the government-to-government agreement on cooperation in the exploration and use of outer space for peaceful purposes, which was recently extended through December 31, 2030. NASA uses this agreement to enable the provision of Russian instruments on NASA missions currently in orbit around the Moon and Mars and, in one instance, on the surface of Mars. There are also several multilateral venues for cooperation on important satellite-based applications, such as ensuring interoperability of the various GPS systems through the International Committee on GNSS (Global Navigation Satellite Systems), exchanging data and information through the Committee on Earth Observation Satellites (CEOS), and facilitating search and rescue through the International Satellite-based Search and Rescue Program (COSPAS-SARSAT).

Bilateral/Multi-Country Civil/Commercial Space Dialogues

As previously noted, the commercial sector seeks a predictable and transparent framework for the oversight of private sector outer space activities. This is true for existing space applications markets, such as satellite-based remote sensing and navigation, and for newer ventures, such as on-orbit satellite servicing, space tourism and space exploration and resource utilization beyond Earth's orbit. State, in coordination with the interagency and through bilateral and multi-country engagement, is building a coalition of like-minded countries to put in place nationally-implemented oversight of outer space that promotes scientific discovery and economic growth and innovation in the U.S. commercial space sector, as well as responsible behavior from commercial actors.

In addition to the multilateral activities mentioned, we also advance the goal of growing the space economy in a safe and responsible manner through bilateral dialogues with international partners, including: Australia, Canada, China, India, Indonesia, Israel, Japan, the Republic of Korea, Thailand, Vietnam, the UAE; and the European Union (EU). We have initiated discussions with our closest allies, Australia, Canada, New Zealand, and the United Kingdom, to align respective national oversight practices for commercial space activities to avoid dual regulation and maximize innovation and entrepreneurship, while simultaneously ensuring adequate authorization and continuing supervision to promote responsible behavior.

In the specific case of China, the primary goal of U.S. engagement on outer space issues is to ensure spaceflight safety and responsible behavior in outer space. To that end, it is important

that we gain a better understanding of China's space science and exploration program goals and activities, exchange guidelines and best practices for safe and responsible commercial space activities, and encourage mutually beneficial open exchange of scientific data from civil space missions. Maintaining this engagement means that we have a framework to work with China to avoid, for example, potential collisions in orbit or radio frequency interference with the U.S. Global Positioning System (GPS). We expect that China will follow principles for outer space exploration and utilization that are grounded in the Outer Space Treaty.

This diplomacy is conducted in coordination with our domestic regulators such as the Federal Aviation Administration (FAA) for launch, the Federal Communications Commission for spectrum and communications, and the Department of Commerce, National Oceanic and Atmospheric Administration for commercial remote sensing. As an example, we have had extensive discussions with New Zealand, in partnership with the FAA, on launching state responsibilities related to the company Rocket Lab, which routinely launches from both New Zealand and the United States and is licensed by the FAA.

Conclusion

Establishing international frameworks and developing and implementing voluntary, non-legally binding norms of behavior based on United States policy and best practices will aid American companies in developing transformational technologies and business models that reinforce leadership in the civil, commercial, and national security space sectors, both domestically and abroad. The Department of State, in coordination with the interagency, will continue to utilize multilateral venues, multi-country initiatives such as the Artemis Accords, and bilateral consultations with other spacefaring nations to build and expand a coalition of like-minded nations to support U.S. goals for commercial space activity, responsible behavior in outer space, and space exploration endeavors beyond low-Earth orbit.

Jonathan Moore
Principal Deputy Assistant Secretary
Bureau of Oceans and International Environmental and Scientific Affairs
January 20, 2021 - Present

Jonathan Moore is a member of the Senior Foreign Service with the rank of Minister-Counselor and joined the Bureau of Oceans and International Environmental and Scientific Affairs in March 2020. He has served in the bureau as Acting Assistant Secretary and Senior Bureau Official and is currently the Principal Deputy Assistant Secretary. He was the Principal Deputy Assistant Secretary and Acting Assistant Secretary for International Organization Affairs, where he oversaw policy regarding the United Nations and UN agencies – including on health, environment, science, and technology – between November 2018 and March 2020. Previously, he served as Ambassador and Head of the Mission to Bosnia and Herzegovina for the Organization for Security and Co-operation in Europe.

Mr. Moore has also served as Chargé d’Affaires at the U.S. Embassy to Belarus and as Deputy Chief of Mission at U.S. embassies in Namibia, Belarus, and Bosnia and Herzegovina. At the State Department, he has been Director of the Office of South Central European Affairs, and both Deputy and Acting Director of the Office of Russian Affairs.

In addition to his diplomatic assignments, Mr. Moore has undertaken fellowships in the Policy Office of the Speaker of the U.S. House of Representatives and at Stanford University’s Hoover Institution. He has received the State Department’s Distinguished Honor Award, Superior and Meritorious Honor Awards, the Sinclair Award for language proficiency, and state awards from Albania and Lithuania. He speaks Bosnian, Serbian, Croatian, and Lithuanian, and is conversant in Danish, German, and Russian.

UNCLASSIFIED

Statement of Mr. Bruce I. Turner
Senior Bureau Official in the Bureau of Arms Control, Verification and Compliance
Before the
House Armed Services Committee – Subcommittee on Strategic Forces
and House Foreign Affairs Committee – Subcommittee on International Development,
International Organizations, and Global Corporate Social Impact
on “Creating a Framework for Rules Based Order in Space”
May 5, 2021

Chairman Castro, Chairman Cooper, Ranking Member Malliotakis, and Ranking Member Turner, thank you for the opportunity to testify today on the Rules Based Space Order. I am grateful for the opportunity to testify alongside Mr. John Hill who is Performing the Duties Of the Assistant Secretary of Defense for Space Policy, Lieutenant General Stephen Whiting, the Commander of Space Operations Command, and Principal Deputy Assistant Secretary of State Jonathan Moore from the Bureau of Oceans, International Environmental and Scientific Affairs (OES).

It is incredibly appropriate that we are meeting on May 5, the 60th anniversary of Astronaut Alan Shepard’s flight in Freedom 7. This suborbital flight was the first step that eventually led to American astronauts orbiting the Earth and landing on the moon, to today, where we have astronauts in continuous orbit around our planet.

This flight took place in a time when there were only two countries placing satellites and humans in orbit. It also took place in a time when the legal regime regarding outer space was just starting to be developed. By 1963, the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space, and Under Water, which is sometimes called the Limited Test Ban Treaty (LTBT), took the first step in extending legally-binding arms control to outer space. The LTBT, which remains in force, includes a prohibition on any nuclear weapon test explosion, or any other nuclear explosion, beyond the limits of the atmosphere, including outer space. Several years later, in 1967, the Outer Space Treaty, formally known as the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, was signed, recognizing the common interest of all humankind in the use of outer space for peaceful purposes and establishing the fundamental principles that outer space shall be free for exploration and use by all nations without discrimination, and that such exploration and use will be done in accordance with international law. The Outer Space Treaty also includes provisions on arms control, including a prohibition on placing nuclear weapons or any other kinds of weapons of mass destruction in orbit around the Earth, installing such weapons on celestial bodies, or stationing them in outer space in any other manner.

Arms Control Tools for Addressing Competition in Outer Space

The development and implementation of arms control agreements is one of the main concerns of the Arms Control, Verification and Compliance Bureau, which I am representing today. AVC is responsible for deterring conflict and enhancing strategic stability using arms control tools, including legally-binding treaties. We develop ideas for arms control agreements and monitor other countries’ compliance with and adherence to arms control agreements and commitments.

UNCLASSIFIED

UNCLASSIFIED

-2-

We have a keen appreciation for the importance of space to U.S. national security, as we rely upon information collected by the Intelligence Community to monitor compliance. We are also responsible for leading U.S. Government efforts for the development and implementation of voluntary, non-legally binding measures to enhance the safety and security of outer space, such as transparency and confidence building measures.

For many years, the international narrative on space security has been focused on a number of flawed proposals, including legally-binding ones like the 2014 Russian and Chinese-sponsored draft Treaty on the Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Outer Space Objects, which is known as the PPWT. With specific regard to outer space arms control, consistent with longstanding bipartisan policy, which is reflected in the 2020 National Space Policy, the United States will consider proposals and concepts for arms control measures if they are equitable, effectively verifiable, and enhance the national security of the United States and its allies.

The draft PPWT fails this test. The State Department has a long record of enumerating the many flaws of this draft treaty, and we have worked over the years to explain those flaws at the Conference on Disarmament, at the UN First Committee, and directly with allies and partners. We have made clear the failure of its attempt to define what constitutes a “weapon in outer space,” and the likelihood that the inherent difficulties of articulating such a definition will hinder promising technologies such as on-orbit servicing or active debris removal systems. We have noted the draft PPWT’s lack of any verification provisions, its unworkable call for a verification protocol at a later date, and the challenges inherent in establishing any effective verification measures. Russia and China have themselves acknowledged at the Conference on Disarmament that their proposal could not be effectively verified using currently available technology. Further, the draft PPWT does not clearly address ground-based systems, like the ground-based anti-satellite missile system China tested in 2007 and a similar missile which Russia tested twice last year. In addition to the significant deficiencies that we have highlighted in the draft text, Russia and China’s continued development and deployment of these systems, as well as the two weapons tests that Russia has conducted in outer space since 2018, all accomplished while they continue to promote the draft PPWT, lay bare the hollow and hypocritical nature of these efforts.

Responsible Behavior

Given the challenges associated with outer space arms control, the U.S. Government has been focused on the development and promotion of a framework for responsible behavior in outer space, in line with the goal set out in the 2020 National Space Policy that the United States “[c]reate a safe, stable, secure, and sustainable environment for space activities, in collaboration with industry and international partners.”

In furtherance of this goal, the National Space Policy also directs heads of agencies, in collaboration with the Secretary of State, to “[l]ead the enhancement of safety, stability, security, and long-term sustainability in space by promoting a framework for responsible behavior in outer space, including the pursuit and effective implementation of best practices, standards, and norms of behavior.”

UNCLASSIFIED

UNCLASSIFIED

-3-

President Biden's 2021 Interim Strategic National Security Guidance also affirms that the United States will lead in promoting shared norms and forge new agreements on outer space.

The United States believes that the development and implementation of "norms, rules or principles of responsible behavior" can reduce risks to international security and stability, including by playing an important role in increasing predictability, enhancing operational safety, and reducing risks of misperceptions, thus contributing to the prevention of conflict. There are clear advantages to focusing on voluntary, non-legally binding measures with respect to outer space. For example, a non-legally binding arrangement affords flexibility throughout the process of development and implementation. It can take effect as soon as discussions are concluded, and participants decide to commence cooperation, and it can become effective for additional states as soon as they sign up; in that way, the benefits of the commitments can be immediately realized. Such measures can also be modified more easily, which can provide the ability to adapt quickly to changing circumstances or technologies, allowing new and novel uses of space to be explored. Additionally, such measures can provide for a greater role for civil society and commercial operators in both their development and implementation.

UN General Assembly Resolution 75/36

That is why in 2020, the AVC Bureau worked closely with the U.S. interagency, including colleagues from the Department of Defense and Intelligence Community, and with our close allies, to advance a new United Nations General Assembly (UNGA) resolution. This resolution was presented in UNGA's First Committee, which is responsible for all disarmament and international security issues in the United Nations. The intention behind this new resolution was to establish an inclusive, international process through the UNGA First Committee that can enhance the safety and security of operations in outer space.

The new resolution, introduced as Resolution 75/36 and titled "Reducing space threats through norms, rules and principles of responsible behaviors," is a constructive step to provide UN Member States a pragmatic and productive alternative to stalled and flawed Russian and Chinese arms control proposals. It was adopted by the UN General Assembly with overwhelming support, with only twelve countries voting against this resolution, including Russia, China, Iran, Syria, North Korea, Cuba and Venezuela.

Resolution 75/36 can serve as the first step of a process to describe the threats to space systems, then develop ideas for responsible behaviors designed to manage perceived threats and risks to space systems, as well as to consider the establishment of channels for direct communications to manage perceptions.

Specifically, operative paragraph 5 of the resolution:

"Encourages Member States to study existing and potential threats and security risks to space systems, including those arising from actions, activities or systems in outer space or on Earth, characterize actions and activities that could be considered responsible, irresponsible or threatening and their potential impact on

UNCLASSIFIED

UNCLASSIFIED

-4-

international security, and share their ideas on the further development and implementation of norms, rules and principles of responsible behaviors and on the reduction of the risks of misunderstanding and miscalculations with respect to outer space;”

On May 3, 2021, the State Department submitted the U.S. views to the UN Secretary General. We have provided Committee Staff with copies of this report, so I will not get into detail about it now but would be happy to discuss it during the question and answer session. Later this year, the Secretary General will provide member states with a summary of all Member State submissions. We look forward to that report, which will help inform our discussion with our interagency colleagues and with our close allies on next steps.

Conclusion

For many years, the international community has been focused on flawed legally-binding space arms control proposals touted as the only way to address space security matters. The United States and our allies recognize the many fundamental challenges of such an approach, including difficulties in defining what constitutes a weapon in outer space and developing practical and effective means of verification. At the same time, the outer space environment has grown in complexity with new operators and new systems that provide many benefits to the United States and to countries around the world. Space is also contested, with Russia and China developing anti-satellite weapons designed to disrupt the United States’ freedom to use space.

That is why the Department of State will continue to lead in the development and implementation of a framework for responsible behavior in outer space, primarily focused upon voluntary, non-legally binding norms, rules, and principles of responsible behavior in space. Developing and implementing these sorts of measures can help create a safer, more stable and predictable space environment for all space actors. In coordination with the interagency, we will work with other countries to advance these initiatives in ways that will benefit U.S. national security.

UNCLASSIFIED

Bruce Turner
Senior Bureau Official
Bureau of Arms Control, Verification and Compliance
January 20, 2021 - Present

Bruce Turner, a career member of the Senior Foreign Service of the U.S. State Department, is currently the Senior Bureau Official for the Bureau of Arms Control, Verification and Compliance (AVC), where he has been a Deputy Assistant Secretary since 2015 following a short stint as Director of the Human Resources Bureau's Office of Recruitment, Examination, and Employment.

Before then he was U.S. Consul General in St. Petersburg and spent a year at the U.S. Embassy in Kabul as Director of the Office of International Narcotics and Law Enforcement (INL) affairs. From 2008 to 2011 he served in Washington as Principal Deputy and Director of the European and Eurasian Bureau's Office of Security and Political Affairs (EUR/RPM), dealing with NATO, the OSCE, NATO-Russia relations, and conventional arms control.

Other work abroad included assignments to Paris, Moscow, Vienna at the U.S. Mission to the OSCE, Brussels at the U.S. Mission to NATO, and Ankara. In Washington he worked on North Korean as well as German and Turkish affairs. Mr. Turner speaks German, French, and Russian.

DOCUMENTS SUBMITTED FOR THE RECORD

MAY 5, 2021

United States of America
National Submission to the United Nations Secretary General
Pursuant to UN General Assembly Resolution 75/36
Reducing space threats through norms, rules and principles of responsible behaviours

“Encourages Member States to study existing and potential threats and security risks to space systems, including those arising from actions, activities or systems in outer space or on Earth, characterize actions and activities that could be considered responsible, irresponsible or threatening and their potential impact on international security, and share their ideas on the further development and implementation of norms, rules and principles of responsible behaviours and on the reduction of the risks of misunderstanding and miscalculations with respect to outer space;”

Introduction

Outer space provides many benefits to humanity, and space-based capabilities are integral to modern life in the United States and to countries around the world. Space activities provide national benefits, with new technologies and services creating new economic opportunities in established and emerging markets. Space exploration has brought benefits to humankind from basic science research to greater understanding of the Earth, the solar system and the universe. On Earth, space systems are relied upon for critical missions like communications, weather prediction, navigation, ocean monitoring, and climate modeling. Space systems are also used for early warning and situational awareness to preserve international peace and security. For decades, States Parties to arms control treaties, including the recently extended New Strategic Arms Reduction Treaty (New START), have relied on space-based national technical means of verification to monitor compliance.

The December 2020 U.S. National Space Policy states that it is the policy of the United States that “[a]ll nations have the right to explore and to use space for peaceful purposes and for the benefit of all humanity, in accordance with applicable law.” In that regard, the United States believes that it is in the shared interest of all nations and all space actors to act responsibly in space to ensure the safety, stability, security, and long-term sustainability of outer space activities. Responsible space actors operate with openness, transparency, and predictability to maintain the benefits of space for all humanity. The National Space Policy further directs us to “[l]ead the enhancement of safety, stability, security, and long-term sustainability in space by promoting a framework for responsible behavior in outer space, including the pursuit and effective implementation of best practices, standards, and norms of behavior.” As such, the Interim National Security Strategic Guidance, issued by President Biden in March 2021, affirms that the United States will lead in promoting shared norms and forge new agreements on outer space.

I. Existing and Potential Threats and Security Risks to Space Systems

Space is a naturally hazardous environment and is increasingly congested, contested, and competitive. Space assets face many threats, both natural and man-made. Natural threats to satellites include solar activity, radiation, and natural orbital debris, whereas examples of man-

made threats include satellite launch debris, radiofrequency interference, malicious cyber activity, and anti-satellite (ASAT) weapons such as directed energy systems, or direct-ascent missiles.

Some States are developing, operationalizing, and stockpiling a variety of ASAT weapons that could be used to, or have the potential to, deny, disrupt, degrade, or destroy civil, commercial, or national security space capabilities and services. Some of these anti-satellite weapons could be used to deny or disrupt space services temporarily, while others are designed to permanently degrade or destroy satellites.

These threats against satellites and their supporting systems can generally be divided into four categories: 1) ground-space; 2) space-space; 3) ground-ground; and 4) space-ground. Within these categories, the threats can be described as 1) reversible, which include temporary effects such as interference with radiofrequency signals or dazzling of remote sensing systems, or 2) irreversible, which include measures that degrade or destroy a satellite. The consequences of all categories of threats could include loss of mission data; decreased lifespan or capability of space systems or constellations; the loss of positive control of space vehicles, potentially resulting in collisions that could impair systems or generate harmful orbital debris; or damage to or destruction of the space system.

Ground-Space: In this category, an anti-satellite weapon is based terrestrially, either on the ground, in the air, or on the sea, and is designed to be used against objects in orbit. This vector has seen the greatest proliferation of anti-satellite capabilities as a result of the ease of access to mature technology and the significant advantages that accrue to systems based on the ground, such as line-of-sight access to multiple overhead targets.

Space-to-Space: In this category, an anti-satellite weapon is based in outer space and is designed to be used against other objects in orbit. Unlike ground-based systems, there is no easy access to the systems once they are launched, there are limits to the power that can be generated by the satellite; and size and weight are a factor that must be taken into account in order to launch a satellite into orbit. Anti-satellite weapons placed in orbit must be able to maneuver into position relatively close to their target to conduct their mission and such systems have a finite operating lifetime while in orbit.

Ground-Ground: In this category, weapons are terrestrially based and are designed to be used for attacks against the terrestrial infrastructure that supports satellite operations or the user segment. These types of attacks can include malicious cyber activity or physical strikes on ground systems such as command and control (C2) systems, data reception stations, or launch infrastructure. This category can also include threats to the user segment, which is also susceptible to spoofing, denial of service, or malware.

Space-Ground: In this category, weapons are based in orbit and are designed to be used against targets on the land, at sea, or in the air. Although there are many conceptual proposals for such space-to-ground weapons, this is one of the least developed areas in terms of actual capabilities.

Some examples of threats to space systems within these categories include, but are not limited to:

Radiofrequency Interference: Used to disrupt, deny, deceive, or degrade space services including satellite communications and positioning, navigation and timing (PNT) services. Purposeful interference may prevent users from receiving intended signals and can be accomplished by two primary methods: uplink jamming or downlink jamming. Uplink jamming is directed toward the satellite, and must operate at the same frequency and approximate power level as the target signals. Effects can be widespread. Downlink jamming is directed at users on the ground, and its effects are more localized.

Directed Energy Weapons (DEW): Anti-satellite DEWs are designed to produce reversible or non-reversible effects against space systems by emitting highly focused radiofrequency or laser energy. Types of DEWs could include lasers, microwaves, and particle beams. Reversible effects include temporarily blinding optical sensors, which may deny the ability to locate, monitor, and track objects. Non-reversible effects include permanently damaging or destroying sensors or other satellite components.

Cyber Threats to Satellite C2: Satellite command and data distribution networks could expose space systems, ground infrastructure, users, and the links connecting these segments to cyber threats. Malicious cyber activities from ground-based sites directed at satellite C2 links could range from disrupting data, or sending unauthorized commands to potentially take over operational control of a satellite or its payload from its authorized owner/operator.

Attacks on Terrestrial Space Infrastructure: Physical attacks against ground sites and infrastructure that support space operations, such as data centers, power plants or space launch sites, could also threaten satellite services.

ASAT Missiles: ASAT missiles could be launched from on-orbit spacecraft or from systems on the ground, in the air, or at sea for the purpose of degrading or destroying targeted satellites. ASAT missiles could use explosives, kinetic impact, or other means to degrade or destroy a satellite.

Robotics and Other In-Orbit Threats: Concepts for space-based anti-satellite systems vary widely and include designs that use satellites placed in Earth orbit to carry anti-satellite missiles (as noted above) or spacecraft subsystems capable of producing reversible and nonreversible counterspace effects. These capabilities could include space robotics systems, chemical sprayers, and other concepts.

Nuclear Detonations/Weapons Placement: Nuclear detonations in outer space could be used to directly damage or destroy satellites, and also could be used to create harmful electromagnetic effects that could also degrade and destroy satellites as well as damage terrestrial infrastructure. The 1963 Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water, which is sometimes called the Limited Test Ban Treaty (LTBT), already prohibits any nuclear weapon test explosion, or any other nuclear explosion, in outer space. Moreover, Article IV of the 1967 Outer Space Treaty prohibits placing nuclear weapons or other weapons of mass destruction in orbit around the Earth, installing such weapons on celestial bodies, or stationing

such weapons in outer space in any other manner. As such, nuclear weapons or other weapons of mass destruction are prohibited from being placed in orbit for any type of attack.

Dual-Use Challenge:

Many space capabilities and technologies are inherently dual-use, which presents both practical and conceptual problems when attempting to identify and respond to potential threats. All satellites with maneuvering capabilities, if launched into the proper orbit, could technically be used to attempt to collide with another satellite, even if not optimized to do so.

Currently, States and commercial entities are developing on-orbit servicing satellites and active debris removal capabilities. On-orbit servicing satellites could allow for the extension of the life of satellites, and in the future may be able to repair and build satellites in orbit. Active debris removal systems may have the ability to deorbit non-operational satellites, rocket bodies and other debris, thereby helping to preserve the outer space environment. Both on-orbit servicing and active debris removal satellites would require various mechanisms to grab or attach themselves to their target satellites. Some on-orbit demonstrations have included the use of a net, harpoon or magnet to accomplish this task. Robotic arms could also be used for this type of activity. This capability to grapple another satellite is inherently dual-use – such a capability could be used to repair or service another satellite, or to degrade or destroy another satellite.

Table 1 below summarizes the various types and capabilities that could be used as anti-satellite weapons, the threat categories, and whether that capability could potentially provide beneficial, dual-use functions. It also looks at whether the capability could be considered to create effects that are considered reversible, non-reversible or both. This is not meant as an exhaustive list, but as an example of how the threats, risks and challenges arising from these systems could be considered.

Table 1: Summary of Anti-Satellite Weapons Types or Weaponizable Capabilities

Capabilities	Category	Dual-Use	Damage Type
Kinetic ASAT	Space-Space, Ground-Space	No	Non-Reversible
Robotic Arm ASAT	Space-Space	Yes	Both
Radiofrequency Interference	Space-Space, Ground-Space	Yes	Reversible
DEW Low Power ASAT	Space-Space, Ground-Space	Yes	Reversible
DEW High Power ASAT	Space-Space, Space-Ground, Ground-Space	No	Non-Reversible
Nuclear Weapon	Ground-Space, Ground-Ground	No	Non-Reversible
Orbital Bombardment	Space-Ground	No	Non-Reversible
C2 Interference	Ground-Space, Ground-Ground	Accidental/non-malign possible	Both
On Orbit Servicer	Space-Space	Yes	Both
Active Debris Removal	Space-Space	Yes	Both

Malicious Cyber Activity	All	No	Both
--------------------------	-----	----	------

Distinguishing between the civil, commercial and/or national security uses of these systems -- combined with the challenge of discerning the operators' intent -- make it extremely difficult to craft a meaningful definition of what constitutes an "anti-satellite weapon." The way these systems are operated will be an important consideration in whether States perceive a threat from them. If the pattern of life of a satellite, for example, is consistent with that of its stated intent, then there will likely be less concern about its operations. However, even if a system is operated in ways consistent with the typical pattern of life for its stated mission, operating in a relatively transparent manner, or limiting its proximity operations to those requesting support, then such a system might still be perceived as a threat.

2. Categories of behaviors, efforts, or measures that could be considered during further development and implementation of norms, rules, and principles of responsible behaviors

States must be committed to maintaining a peaceful and secure outer space environment. In that regard, the United States offers a selection of general points and factors that could be considered or evaluated during further discussions of norms, rules and principles regarding national security-related activities in outer space.

Compliance with International Law: International law, including the law of armed conflict applies to activities in outer space. In particular, the Charter of the United Nations, the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (1967); the Agreement on the Rescue of Astronauts, the Return of Astronauts, and Return of Objects Launched into Outer Space (1968); the Convention on International Liability for Damage Caused by Space Objects (1972); and the Convention on Registration of Objects Launched into Outer Space (1975) provide the foundation of the space international legal framework for outer space.

Development and Implementation of Transparency and Confidence-building Measures (TCBMs): The international community has recognized the importance and usefulness of TCBMs, which can significantly contribute to the promotion of peace, security, and disarmament. According to the consensus report of the UN Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities (A/68/189), "States should implement TCBMs to the greatest extent practicable, consistent with their national interests and obligations." TCBMs can be developed and implemented by States and intergovernmental organizations unilaterally, bilaterally, regionally, and multilaterally.

Enhancement/Improvement of Communication: Developing or improving communications between satellite operators, especially national security satellite operators, facilitates efficient and timely sharing of information, consultations and coordination related to potentially urgent matters. Exchanging appropriate information about on-orbit spacecraft operations may facilitate effective responses to orbital collisions, orbital break-ups, and other events that may ultimately

pose a risk to human lives, property, and/or the environment. Such communications could contribute to risk reduction by helping to avoid misunderstandings and miscalculations.

Types of, Conduct of, and Actions Relevant to, Space Operations: Further work is needed by States with respect to elaborating best practices and responsible behaviors for security-related satellites and operations in peacetime. Key to this effort is the understanding of national security space actions or operations resulting in perceived threatening behavior, apparent interference, or attacks. The following is a non-exhaustive list of some space actions or operations that may warrant additional discussion.

- Conduct of Satellite Operations: How spacecraft interact with one another, including the degree to which their operations are transparent and predictable, affects the potential for misinterpretation and miscommunication. Unpredictable or non-transparent operations conducted in deliberate proximity to other spacecraft may be viewed as posing a safety risk or a threat, due to the potential for collisions or other interference.
- Radiofrequency Interference: Interference with radiofrequency transmissions of satellites by space-related information and communication technologies (ICTs) could disrupt services such as environmental monitoring, communications and positioning, navigation, and timing that support vital public safety functions. Moreover, the effects of jamming conducted against PNT satellites is unlikely to be localized within the borders of the State conducting the interference. States already have certain existing obligations to avoid harmful radiofrequency interference under the provisions of relevant treaties such as the Constitution and Convention of the International Telecommunication Union (ITU) (1992), as amended, and the Radio Regulations of the ITU (1979), as amended. The ITU has also further considered how ITU Member States may contribute to these efforts with regard to space-based radiocommunication services through Plenipotentiary Resolution 186, “Strengthening the role of the ITU with regard to transparency and confidence building measures in outer space activities,” (Resolution 186 (Rev. Dubai, 2018)).
- Interference with Security-related Space Systems: Security-related space systems can provide several important strategic functions: command and control of nuclear forces; strategic missile warning or attack assessment; and national technical means of verification. Each provides important early warning, intelligence, and situational awareness of terrestrial and space activities that can contribute to preventing conflicts, avoiding misperception and misunderstandings, and the reduction of tensions. Some of these capabilities, such as space-based national technical means, have underpinned the verification and credibility of successful implementation of generations of arms control treaties. Actions that interfere with these systems either temporarily or permanently could undermine efforts to maintain international peace and security.
- Interference with Command and Control: Activities that compromise the ability of space operators to issue commands and maintain control of on-orbit objects, for example, a satellite’s telemetry, tracking and control (TT&C) system, could result in the unrecoverable loss of control of another State’s spacecraft, and may constitute a hazard to the safety of space operations.

- Weapons Testing: Tests or simulations of attack of ASAT weapons in the direction of, or close proximity to, another State's satellite could cause misperceptions and misunderstandings and increase tensions or lead to conflict between States.
- Debris Generation: Failure to mitigate generation of space debris, especially long-lived space debris, during ASAT tests or other activities, would impact the outer space environment and could negatively affect the ability of States to use space for peaceful purposes.

3. Norms, Rules, and Principles of Responsible Behaviors With Respect to Outer Space

Voluntary, non-legally binding norms, rules, and principles of responsible State behavior with respect to outer space can reduce risks to international peace, security, and stability, including by playing an important role in increasing predictability, enhancing operational safety, and reducing risks of misperceptions, thus contributing to the prevention of conflict. All stakeholders should use space systems in a manner that does not endanger international peace and security. The United States believes it is possible to reduce the risk of conflict in outer space by cooperating in the development and implementation of voluntary, non-legally binding norms of responsible State behavior with respect to outer space that strengthen the stability and security of the outer space environment. The United States believes that States should examine and develop ideas for responsible behaviors that would maintain outer space as a safe, stable, secure, and sustainable environment.

The United States believes there are advantages to focusing on voluntary, non-legally binding norms of responsible behavior with respect to outer space, such as the ability to adapt quickly to changing circumstances or technologies, allow new and novel uses of space to be explored, and to allow civil and commercial operators to have more of a voice in their development. That does not mean that States should cease engaging on and discussing space security issues at the Conference on Disarmament or in other international fora. Taken progressively, these could be a first step to addressing mistrust arising from misunderstandings between States. As such, confidence building measures and "norms, rules, and principles," may lay the foundations for arrangements and agreements on outer space in the future.

In addition to the expectation that States will comply with their obligations under international law, the United States offers the following for consideration as a concise set of starting points toward developing more specific voluntary, non-legally binding "norms, rules and principles of responsible behavior" for space operations, intended to complement the existing international legal framework pertaining to national security space activities:

- Reaffirm commitment to international law, including the Charter of the United Nations and relevant outer space treaties.
- Communicate and make notifications to enhance the safety and stability of the outer space domain.

- Operate national security spacecraft with due regard to others and in a professional manner.
- Maintain safe separation and safe trajectory when operating national security spacecraft.
- Limit the purposeful generation of long-lived debris.

Table 2 below summarizes how the concepts discussed in this section can be applied to some of the areas for consideration in Section 2 of this submission, “Categories of behaviors, efforts, or measures that could be considered during further development and implementation of norms, rules, and principles of responsible behaviors.”

Table 2: Summary of concepts and areas for further consideration

Starting Point	Areas for Further Consideration
Respect for international law	States could reaffirm their commitment to complying with their obligations under international law, including the Charter of the United Nations and existing treaties relating to outer space activities to which they are parties.
Respect for international law	States could encourage efforts to promote respect for the application of international law in outer space, including efforts to encourage accession to and implementation of relevant outer space treaties.
Respect for international law	States could promote information sharing among States about State practice with regard to the implementation of international law in outer space.
Communicate and make notifications	States, along with intergovernmental organizations, could consider developing and implementing TCBMs, unilaterally, bilaterally, regionally, and multilaterally.
Communicate and make notifications	States could consider bilateral and multilateral exchanges of information on national security space activities and policies, or exchanges of information on national security space activities of specific concern.
Communicate and make notifications	States could consider developing best practices and responsible behaviors that enhance communications, especially regarding national security satellite operators.
Communicate and make notifications	States could consider developing common definitions and understandings of operational terms and concepts.
Operate with due regard and in a professional manner	States could consider elaborating best practices or responsible behaviors for the safe and professional operation of national security satellites, with due regard in order to avoid potential collisions or other harmful interference.
Operate with due regard and in a professional manner	States could consider elaborating best practices or responsible behaviors that avoid using ICTs in a manner that impacts space operations.

Operate with due regard and in a professional manner	States could consider elaborating best practices or responsible behaviors in order to avoid interference with security-related space systems.
Operate with due regard and in a professional manner	States could consider elaborating best practices or responsible behaviors that avoid purposeful interference with satellite command and control systems.
Maintain safe separation and safe trajectory	States could consider elaborating best practices or responsible behaviors that avoid simulating or testing ASAT weapons in the direction of, or in close proximity to, another State's satellite.
Limit the purposeful generation of long-lived debris	States could consider elaborating best practices or responsible behaviors for ASAT tests or other activities in order to avoid the purposeful creation of long-lived debris.

The United States reaffirms that the “norms, rules, or principles of responsible behavior” that are the subject of these discussions do not replace or alter States’ obligations or rights under international law, but rather provide additional specific considerations on what constitutes responsible State behavior related to outer space.

In addition, regular dialogue is critical to enhancing shared objectives of strengthening international peace and security and the prevention of conflicts in outer space. Regional, cross-regional and inter-organizational exchanges can establish new avenues for collaboration, cooperation, and mutual learning regarding space threats and responses to those threats.

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

MAY 5, 2021

QUESTIONS SUBMITTED BY MR. WALTZ

Mr. WALTZ. Do you agree that non-binding consensus-based standards and transparency and confidence building mechanisms are the ideal path to pursue a nascent field while also promoting responsible behavior?

Mr. HILL. I agree it is important to pursue non-binding standards and transparency and confidence-building mechanisms to promote responsible behavior in space. This preferred approach is consistent with the March 2021 Interim National Security Strategic Guidance and the December 2020 National Space Policy, the latter of which directs U.S. Government departments and agencies, in collaboration with the Secretary of State, to “[l]ead the enhancement of safety, stability, security, and long-term sustainability in space by promoting a framework for responsible behavior in outer space, including the pursuit and effective implementation of best practices, standards, and norms of behavior.” Department of Defense (DOD) policies and practices often serve as a basis for U.S. Government positions in international discussions, and DOD partners with the Department of State in efforts to develop voluntary, non-legally binding international standards and norms regarding safe, responsible, and professional behavior in space. U.S. proposals center upon voluntary, non-legally binding measures derived from current technical and operational best practices, and they provide practical, pragmatic, and inclusive opportunities to build shared interests among operators.

Mr. WALTZ. My understanding is DOD and State are authorized to enter into agreements that limit state action (i.e. weapons, ASAT, jamming/interference, proximity and rendezvous, and their own operations, etc) but not limitation on private activities. Do you agree that your respective agencies should only be talking about limitations on government activities and not the private sector?

Mr. HILL. Rather than focusing on the use of formal agreements in an effort to limit outer space activities, the U.S. Government focuses on enabling safe and sustainable space operations by developing voluntary, non-legally binding standards, guidelines, norms, and best practices for responsible space activities. The U.S. Government often does this in partnership with commercial and other non-governmental space operators. For example, the U.S. Government engaged commercial sector experts in developing guidelines on debris mitigation and space sustainability. Looking forward, the U.S. Government will continue to work closely with industry in developing guidelines on new activities, such as through the Consortium for Execution of Rendezvous and Servicing Operations (CONFERS) initiative, which advocates for voluntary, consensus-based technical and safety standards for on-orbit satellite maintenance, servicing, and rendezvous operations. DOD believes that a robust, innovative, and competitive commercial space sector is the source of continued progress and sustained American leadership in space. The United States remains committed to encouraging and facilitating the continued growth of a U.S. commercial space sector that supports U.S. interests, is globally competitive, and advances U.S. leadership in the generation of new markets and innovation-driven entrepreneurship.

Mr. WALTZ. Do you agree that non-binding consensus-based standards and transparency and confidence building mechanisms are the ideal path to pursue a nascent field while also promoting responsible behavior?

Mr. TURNER. U.S. policy is to promote a framework for responsible behavior in outer space, including the pursuit and effective implementation of best practices, standards, and norms of behavior. These processes may or may not be consensus-based. We are also pursuing bilateral and multilateral transparency and confidence-building measures to encourage responsible actions in, and the peaceful use of, outer space to strengthen the safety, stability, security, and long-term sustainability of space activities, and to increase predictability and reduce the risk of misunderstanding and inadvertent conflict escalation.

Mr. WALTZ. My understanding is DOD and State are authorized to enter into agreements that limit state action (i.e. weapons, ASAT, jamming/interference, proximity and rendezvous, and their own operations, etc) but not limitation on private activities. Do you agree that your respective agencies should only be talking about limitations on government activities and not the private sector?

Mr. TURNER. U.S. policy is focused on promoting a framework for responsible behavior in outer space. Such efforts are primarily focused on influencing states' behavior, but it is also important to consider the activities of non-state actors in space as well, particularly given the sheer number of satellites operated by private entities. Article VI of the 1967 Outer Space Treaty makes clear that "[t]he activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty." The State Department works closely with other Departments and agencies, including those with regulatory authority, to ensure that this obligation to oversee the activities of our private sector space actors is met, and to ensure U.S. commercial space interests are taken into full account in the development of U.S. government policies.

QUESTIONS SUBMITTED BY MR. MORELLE

Mr. MORELLE. How has the sheer increase in the number of spacefaring nations complicated efforts to establish international rules-based order? How does the rise of commercial actors—foreign and at home—figure into this discourse? Is the U.S. Government engaging with commercial actors as the government assesses and redevelops norms for conduct in space, works towards internationally accepted definitions?

Mr. HILL. The increase in the number of spacefaring nations and the total number of space operators—whether foreign or domestic, commercial or governmental—has fostered a shared recognition of the importance of establishing best practices and standards of responsible behavior in space. The U.S. Government efforts in this regard include working closely with commercial operators and other non-governmental operators in addressing this need. For example, in 2019, at the conclusion of almost a decade of negotiations, the UN General Assembly welcomed the adoption of a preamble and 21 "Guidelines for the Long-Term Sustainability of Outer Space Activities," the first-ever set of comprehensive international best practices for space safety and sustainability. Together with government and commercial operators from 95 countries, the U.S. Government and U.S. commercial operators played active roles in these negotiations through the UN Committee on the Peaceful Uses of Outer Space, proposing many of the guidelines that the Committee adopted, and shaping the text of all guidelines for consistency with existing U.S. policy and practice. The UN General Assembly's December 16, 2020, adoption of a United Kingdom-sponsored resolution, "Reducing space threats through norms, rules and principles of responsible behaviours," likewise reflected the growing international sense of the importance and value of this approach to establishing norms of conduct in space.

Mr. MORELLE. With the rise of satellite constellations numbering into the thousands and the tangible possibility of a significant Kessler syndrome occurring in LEO how active is the U.S. in ensuring collision avoidance? How important is verifiable and enforceable, international rules-based order to ensuring responsible parties are held accountable for satellite collision?

Mr. HILL. The United States is very active in supporting the safety of flight for all space operators. We combine the world's best space situational awareness (SSA) capabilities with a commitment to the safety of spaceflight rooted in longstanding law and policy. DOD distributes U.S. SSA information through tools such as space-track.org and SSA sharing arrangements and agreements with more than 125 commercial and international partners. However, the reality is that the more complex challenges of space traffic management—the issue at the heart of this question—should be addressed as a function of a civilian regulatory agency, rather than as a DOD function. With our civil agency counterparts in the Department of Commerce, DOD is prepared to work with Congress in addressing this important issue of space safety and sustainability for all space operators. With regard to accountability for satellite collisions, the United States is a State Party to the four core space treaties that form the framework of international space law. Those treaties include the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies ("Outer Space Treaty") and the 1972 Convention on International Liability for Damage Caused by Space Objects ("Liability Convention"). Both of these foundational treaties would apply to most cases of satellite collisions, in terms of determining jurisdiction, responsibility, and liability. As the development and expansion of governmental and commercial SSA capabilities progress—and as their precision and accuracy improve—these SSA capabilities may be able to provide valuable information that would help determine the facts in a collision, while international law would guide how to apportion obligations among the States Parties involved.

Mr. MORELLE. How has the sheer increase in the number of spacefaring nations complicated efforts to establish international rules-based order? How does the rise of commercial actors—foreign and at home—figure into this discourse? Is the U.S. Government engaging with commercial actors as the government assesses and redevelops norms for conduct in space, works towards internationally accepted definitions?

General WHITING. Space faring entities range from nation states, civil organizations, commercial entities—which often times are multi-national in nature—to academic institutions. As the space environment becomes more congested and contested, our access to, and freedom of operation in space becomes increasingly threatened. Access barriers such as cost have fallen while risks are on the rise and nations such as China and Russia have increased their counterspace weapons development. Anti-satellite weapon (ASAT) tests have caused long-lived debris fields, and uncontrolled re-entries—like with China’s Long March-5b vehicle—create uncertainty. These activities coupled with the increased risk of collisions, pose serious challenges to the stability and security of the space domain and increase the risk of miscalculations and misunderstandings. This is why securing an enduring advantage in space is a vital national interest—one that can no longer be taken for granted. The establishment of the U.S. Space Force as a separate Service has already provided greatly expanded opportunities for partnerships with civil and commercial space organizations. From a USSF perspective, the rise of commercial actors figure into this discourse as we work to expand cooperation with our partners. We integrate with allies and commercial partners through organizations such as the Combined Space Operations Center (CSpOC) to discuss and review how we can align our operations in space to develop and promulgate concepts for responsible space operations. Space traffic management and collision avoidance are two important issues that may inform the shaping of voluntary, non-legally binding norms, standards, and guidelines of responsible behavior in space. Through the Department of Defense, we continue to work hand-in-hand with the Department of Commerce as they ramp up to take on basic space traffic management and basic space situational awareness tasks as called for by the National Space Council.

Mr. MORELLE. With the rise of satellite constellations numbering into the thousands and the tangible possibility of a significant Kessler syndrome occurring in LEO how active is the U.S. in ensuring collision avoidance? How important is verifiable and enforceable, international rules-based order to ensuring responsible parties are held accountable for satellite collision?

General WHITING. Space Domain Awareness (SDA) is the cornerstone of all space operations and enhances all military operations. The 18th Space Control Squadron located at Vandenberg Space Force Base, California, performs conjunction assessment of all trackable objects and provides collision avoidance warning for all current active payloads. They are the only entity world-wide providing this service to every satellite owner/operator regardless of country of origin. Seeing a need to help keep space safe, the former Air Force Space Command (now U.S. Space Force) has partnered with U.S. Strategic Command (now U.S. Space Command), for many years, with the support of Congress, to provide orbital conjunction assessments to any space owner/operator around the globe who provides their contact information, while also maintaining the public website space-track.org to create transparency in the tracking of tens of thousands of objects on orbit. Today, we support the shift of non-military space traffic management to the Department of Commerce in the future, thus allowing the Department of Defense to focus on directed military functions in our protect and defend mission. The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Outer Space Treaty), makes States internationally responsible for national activities in space, whether such activities are carried on by governmental agencies or non-governmental entities. The Outer Space Treaty and the Convention on International Liability for Damage Caused by Space Objects provide for liability for damage caused to space objects in outer space. It is the position of the U.S. Space Force that voluntary, non-legally binding norms, standards, and guidelines of responsible behavior in space would be immensely helpful toward our mission to protect the U.S. and our allies in, from, and to space.

Mr. MORELLE. How has the sheer increase in the number of spacefaring nations complicated efforts to establish international rules-based order? How does the rise of commercial actors—foreign and at home—figure into this discourse? Is the U.S. Government engaging with commercial actors as the government assesses and redevelops norms for conduct in space, works towards internationally accepted definitions?

Mr. MOORE. The increasing utilization of space—including a significant increase in the volume and diversity of commercial activity—means all actors need to take

responsibility for maintaining outer space as a stable, safe, and sustainable environment. In the first decades of the space age, with a membership of less than 20 member states, the UN Committee on the Peaceful Uses of Outer Space (COPUOS) played a key role in establishing the four core outer space treaties. Although the roster of the consensus-based COPUOS has grown to 95 members, the United States maintains its leadership role, including efforts to use COPUOS to develop non-legally binding guidelines for the long-term sustainability of outer space activities, thereby reaffirming the value of the existing international legal regime and the importance of national-level implementation. We include industry representatives as private sector advisers to our delegation to COPUOS, and we consult with additional non-governmental stakeholders to gain a better understanding of their perspective on issues. This whole-of-government, whole-of-America approach helps ensure that the United States considers a broad range of equities as it advances our objectives.

Mr. MORELLE. How has the sheer increase in the number of spacefaring nations complicated efforts to establish international rules-based order? How does the rise of commercial actors—foreign and at home—figure into this discourse? Is the U.S. Government engaging with commercial actors as the government assesses and redevelops norms for conduct in space, works towards internationally accepted definitions?

Mr. TURNER. The increasing utilization of space—including a significant increase in the volume and diversity of commercial activity—means all actors need to take responsibility for maintaining outer space as a stable, safe, and sustainable environment. In the first decades of the space age, with a membership of less than 20 member states, the UN Committee on the Peaceful Uses of Outer Space (COPUOS) played a key role in establishing the four core outer space treaties, and the United States was a leader in the development of those treaties. Today, although the roster of the consensus-based COPUOS has grown to 95 members, the United States maintains its leadership role, including its successful efforts in the 2010s to use COPUOS to develop non-legally binding guidelines for the Long-Term Sustainability of outer space activities. In so doing, we have reaffirmed the value of the existing international legal regime and the importance of national-level implementation, as opposed to “top down,” one-size-fits-all processes. Regarding commercial engagement within COPUOS, we include industry representatives as private sector advisers to our delegation, and we consult with additional non-governmental stakeholders to gain a better understanding of their perspectives on issues under discussion. This whole-of-government, whole-of-America approach helps ensure that the United States takes into account a broad range of equities as it advances our objectives through COPUOS and its subcommittees.

