Securing Space Assets for Peace and Future Conflict

Marshall Hall, Rm 155
November 30th, 2010

Securing Space Assets for Peace and Future Conflict

A Forces Transformation and Resources Seminar
Marshall Hall, Room 155, Fort Lesley J. McNair, Washington, DC
November 30th, 2010

Tuesday, November 30th

0750-0800 Welcome
Dr. James M. Keagle, Director, Transforming National Security Seminar Series, Center for Technology and National Security Policy, NDU

0800-0845 White House Perspective
Mr. Chirag Parikh, Director of Space Policy, National Security Council

0845-0930 Strategic Assessment
Ambassador Gregory L. Schulte, Deputy Assistant Secretary of Defense for Space Policy, Office of the Under Secretary of Defense for Policy, Department of Defense

0930-0945 Break

0945-1045 The Peace Dividend: Space Assets in Peacetime
Mr. Marc J. Berkowitz, Vice President, Strategic Planning, Lockheed Martin Corporation
Mr. Michael Krepon, Co-founder, Stimson Center
Lt Col David Meteyer, Deputy Chief, Space Operations Division, USAF

1045-1100 Break

1100-1215 Threats to Peace
Dr. Richard Andres, Senior Fellow & Energy and Environment Chair, Institute for National Strategic Studies, National Defense University
Lt Col Timothy J. Cox, Chief of Headquarters Air Force Space Control Division, US Air Force
Dr. Peter D. Klupar, Engineering Director, NASA AMES Research Center
Mr. Steve Stigall, Dept. of Security Studies, National War College

1215-1315 Lunch

1315-1415 Afternoon Keynote
Mr. Frank A. Rose, Deputy Assistant Secretary, U.S. Department of State

1415-1430 Break

1430-1515 The Contested Regime: Space in Conflict
Mr. Thomas Behling, Former Deputy Undersecretary for Intelligence, U.S. Department of Defense
Mr. Hal Hagemeier, Deputy Director, National Security Space Office
LTC Victoria Miralda, Deputy Director of Space Forces, CENTCOM

1515- 1630 International Perspectives on a New Domain

Mr. Hiroshi OE, Director General for International Affairs, Ministry of Defense, Government of Japan

Dr. Juergen Drescher, Head DLR Washington, D.C. Office, German Aerospace Center (DLR)

Mr. Vaveen Srivastava, Political Counselor, Embassy of India

Mr. Alexander Trofimov, First Secretary, Political-Military Section, Embassy of the Russian Federation

SPEAKER BIOGRAPHIES

Dr. Richard Andres

Richard B. Andres is a professor of national security strategy at the National War College and Chair of the Energy and Environmental Security Policy program at INSS. Before coming to National Defense University, Dr. Andres held a number of senior advisory position including Special Advisor to the Secretary of the Air Force and Special Advisor to the Commander of Air University. His current work focuses on cyber security policy and particularly issues surrounding electric grid security. Dr. Andres has published widely in academic and policy journals and books on issues related to national security.

Mr. Tom Behling

Mr. Behling joined Edge Consulting in March 2009 as Senior Vice President. He has 40 years of professional experience across the Intelligence Community and DoD. Most recently, Mr. Behling served as Deputy Under Secretary of Defense for Intelligence (Preparation and Warning). In that capacity, Tom was a key advocate for development of new airborne persistent reconnaissance capabilities, Human Terrain Team programs, and other systems in support of counter-insurgency needs. Mr. Behling has also served as Chief of Plans and Evaluation, Systems Engineering and Acquisition Office (SEAO) in CIA's Directorate of Science and Technology, and as Associate Deputy Director for National Support at the National Reconnaissance Office. Tom also was Deputy Director of the NRO's Office of Plans and Analysis. Mr. Behling was a member of the 1992 Woolsey Panel review of NRO systems. In 2001, Mr. Behling served as Staff Director of the Remote Sensing Strategy Panel, commissioned by the DCI and the Secretary of Defense. In 2003, Tom led the Transformational Space and Airborne Project core team on behalf of the ADCI/C and the USD(I). Mr. Behling is the recipient of the CIA Distinguished Career Intelligence Medal, the SEAO Founders Award, the DDS&T Slate Award, the NRO Medal of Distinguished Performance, and Senior Executive Service Meritorious Awards. He also has served on the CIA's editorial board for Studies in Intelligence. Mr. Behling received a B.A. in Physics from Dartmouth College in 1966 and an M.A. in Chinese Area Studies from Washington University in 1969.

Mr. Marc Berkowitz

Marc Berkowitz leads the development of strategies, plans, and advanced concepts for integrated space, intelligence, and cyber mission solutions as a Vice President for Strategic Planning at Lockheed Martin Corporation. Prior to joining Lockheed Martin in 2003, Mr. Berkowitz served as a career senior executive in the positions of Assistant Deputy Under Secretary of Defense and Director for Space Policy where he was responsible for leading the analysis, formulation, coordination, and oversight of U.S. Government and Defense Department policy guidance for the conduct of national security space programs and activities. He previously worked in executive, policy, and intelligence analytical positions

at National Security Research, Inc., SRI International, the Congressional Research Service, and the State Department. Since leaving federal service, he has also served as a consultant to DoD and the Intelligence Community. He is currently on a Defense Science Board Task Force addressing intelligence, surveillance, and reconnaissance support for counterinsurgency operations, is a senior advisor for the Air Force's Schriever war game series, and was the National Security Advisor at the Schriever 10 war game. Mr. Berkowitz was awarded DoD's highest civilian award, the Defense Distinguished Civilian Service Award, twice. His other awards include the National Reconnaissance Office's Medal for Distinguished Service, National Imagery and Mapping Agency's Medal for Distinguished Service, Presidential Rank of Meritorious Executive, Defense Meritorious Civilian Service Award, OSD Exceptional Civilian Service Award, and the OSD Award for Excellence. In addition, he received the National Space Club's Historical Essay Award and Lockheed Martin's Washington Award. Mr. Berkowitz received a Bachelors of Arts degree from George Washington University and a Master of Arts degree from Georgetown University. He has authored numerous publications on national security, defense, space, and cyber policy and strategy.

Lt Col Timothy Cox

Lieutenant Colonel Timothy J. Cox is Chief, Space Control Division at Headquarters U.S. Air Force in the Pentagon where he leads the Air Staff organization providing direction for Air Force space control capabilities, operations and plans. Prior to taking his current position- first as Deputy and then Chief of Space Control Division, Lt. Col Cox devoted a 16 service career to developing U.S. missile and space capabilities. He has served at home and abroad in broad range of prestigious commands, including the Joint Space Control Center, U.S. Space Command, Cheyenne Mountain Air Station, Co.; Prince Sultan Air Base, KSA; Peterson AFB, CO; and U.S. Pacific Command, Camp H.M. Smith, Hi. He was commissioned through the ROTC program at California State University, Sacramento, and has earned a Master of Science in Space Studies from American Military University, in Manassas, VA.

Dr. Juergen Drescher

Dr. Juergen Drescher has been the Head of the Washington, DC Office for the German Aerospace Center DLR since 2004. DLR Washington, DC Office is a MFGO and the interface between NASA, worldwide space agencies, U.S. Federal agencies, universities, industries and governmental organizations in the field of Aerospace, Energy and Transportation research. Prior to this posting, Dr. Drescher has worked extensively on Aerospace Medicine and physiology in an international framework. Dr. Drescher was the principle investigator on a number of medical experiments carried out on German and ESA spaceflight mission including the NASA Space Shuttle and Russian MIR space station

experiments. He was actively involved in joint studies with the French space agency CNES and the Russian Cosmonaut Training Center "Juri Gagarin" as part of the framework for international cooperation established by DLR. Dr. Drescher has both a Medical Diploma, as well as a Doctoral degree in medicine. He is a member of the International Academy of Astronautics and Academician of the Tsiolkovsky Space Academy, Russia.

Mr. Hal Hagemeier

Hal E. Hagemeier is the Deputy Director of the National Security Space Office, Pentagon, Washington, DC. He is responsible to the Director for ensuring that NSSO products and processes create strategic focus and unity of effort for national security space. The NSSO is responsible for promoting synergy and integrating interagency space policy, strategy, acquisition, launch, planning, programming, and technology development. Mr. Hagemeier retired from the United States Air Force in 2001 after a 29 year career. He had assignments at Strategic Air Command in Nebraska; Air Force Systems Command in Ohio; the General Defense Intelligence Program, the Office of the Secretary of the Air Force, and the Ballistic Missile Defense Organization in the Pentagon; Air Force Space Command in Colorado; and the National Security Space Architect office in Virginia. Mr. Hagemeier has a Bachelor of Science degree with highest honors in Electrical Engineering from the University of Texas at Austin. He is also a Distinguished Graduate from the Air Force Institute of Technology at Wright Patterson Air Force Base, Dayton, Ohio, with a Master of Science in Electrical Engineering. His professional military education included Air Command and Staff College in Alabama and the National War College in Washington, DC. His military decorations include the Defense Superior Service Medal and Legion of Merit. Mr. Hagemeier is a registered Professional Engineer and a member of several professional and honorary organizations.

Dr. James Keagle

Dr. James M. Keagle is the Director of the Transforming National Security seminar series at the Center for Technology and National Security Policy at the National Defense University. Prior to this position, Dr. Keagle served for nine years as the National Defense University's Provost (effective 2004) and Vice President for Academic Affairs (effective 1999). Prior to these positions, he served as a professor of National Security Strategy at NDU. In that role Dr. Keagle worked as a research faculty member assisting with NDU's modeling and simulation and work with interagency education and training. Accepting an appointment to the U.S. Air Force Academy, he graduated 2nd academically in his class in June 1974. Following graduation, he went to the University of Pittsburgh to complete his Master's of Arts degree in political science and earned a graduate certificate in Latin American studies (1975). After a tour as a munitions maintenance officer, Dr. Keagle went on to become an assistant professor of political science at the U.S. Air Force Academy. In 1980, he went on

to Princeton University where he completed both a Master's of Arts degree (1981) and Ph.D. (1982) in politics. He proudly notes his honorary Ph.D from the Military Technical Academy of Romania--the only United States citizen so honored. Following his extensive education, Dr. Keagle's next six tours were political-military assignment that included direct access and interaction with Cabinet-level government officials on national security related matters. These assignments included work for two Combatant Commanders as a senior strategist; for the Office of Secretary of Defense pertaining to Cuba; Deputy Director, Office of the Secretary of Defense Bosnian Task Force; and for the Deputy Under Secretary of the Air Force in International Affairs as Senior Strategist. Military. For the last two years he has led multiple NATO and Defense Education Enhancement Teams to Georgia, Azerbaijan, and Montenegro. Medals include the Defense Superior Service Award, the Legion of Merit, and the Purple Heart. Since leaving military service, Dr. Keagle has held the position of adjunct professor at a number of institutions to include: Syracuse University, American University, Central Michigan University, Catholic University, University of Colorado, and Lake Superior State College. He also holds an honorary professorships with Transilvania University in Brasov, Romania, as well as the Mongolian Defense University--again, the only American so honored . Dr. Keagle and wife Kay are the proud parents of three adult children.

Dr. Peter Klupar

Mr. Klupar has worked in the aerospace industry for over 28 years. He is currently working at Ames Research Center for NASA as the Ames Engineering Director. At Ames he leads the engineering team in the development of advanced space systems. He has supported in all phases of the mission development from design through operations. Mr. Klupar has supported over 40 missions. Previously he was in the government service with Air Force Research Laboratory as the Mission Development Chief, where he led several national security missions from concept through launch and onto operations. Prior to this he worked at Spectrum Astro as Program Manager for Deep Space One and MSTI 2 and 3. Previous positions: Mr. Klupar was employed by McDonnell Douglas Helicopter managing the companies Independent Research and Development effort for the Apache Helicopter. His work was instrumental for the development of the Longbow Apache. Mr. Klupar started his career working for Hughes Aircraft performing various integration and test related activities on commercial and government space vehicles. He has earned a BSME UofA and MBA UofP

Mr. Michael Krepon

Michael Krepon is Co-founder of the Henry L. Stimson Center and the author or editor of thirteen books and over 350 articles. Prior to co-founding the Stimson Center, Krepon worked at the Carnegie Endowment for International Peace, the US Arms Control and

Disarmament Agency during the Carter administration, and in the US House of Representatives, assisting Congressman Norm Dicks. He received an MA from the School of Advanced International Studies, Johns Hopkins University and a BA from Franklin & Marshall College. He also studied Arabic at the American University in Cairo, Egypt. Mr. Krepon divides his time between Stimson's South Asia and Space Security projects. The South Asia project concentrates on escalation control, nuclear risk reduction, confidence building, and peace making between India and Pakistan. This project entails field work, publications, and Washington-based programming, including a visiting fellowship program. The Space Security project seeks to promote a Code of Conduct for responsible space-faring nations and works toward stronger international norms for the peaceful uses of outer space. Mr. Krepon also teaches in the Politics Department at the University of Virginia.

Lt Col David Meteyer

Lieutenant Colonel David "Flat" Meteyer is the Deputy Chief, Space Operations Division, Headquarters US Air Force. Colonel Meteyer entered active duty in 1992 after graduating from Oregon State University. A career space and missile officer, he has served in multiple positions in support of STRATCOM, NORTHCOM, CENTCOM and PACOM operations. Before his current position he served as the Commander, 12th Space Warning Squadron, Thule Air Base, Greenland.

LTC Victoria Miralda

LTC Miralda is a U.S. Army Space Professional and U.S. Signal Corps Officer. She graduated with a Bachelor of Science degree from the United States Military Academy, has a Master of Science degree in Telecommunications from the University of Colorado at Boulder, and is a graduate of the U.S. Army Command and General Staff College and the 82nd Airborne Jumpmaster course. Her space education includes the FA40 Space Operations Officer Qualification Course, and National Security Space Institute's Counter-Space Planning and Integration Course, Space Executive Officer's Course, and Space 300 Course. LTC Miralda has over 20 years of satellite communications, radio communications, switching, and computer network defense experience. Her key duties include command of all XVIII Airborne Corps long-haul SATCOM and Tropospheric radio capabilities and service on a Joint Test and Evaluation (JT&E) team for Joint Space Control Operations during which time she was selected as the National Defense Industrial Association Military Tester of the year. Following her duty on the JT&E, she served as the Executive Officer to the USASMDC/ARSTRAT Deputy Commanding General for Operations and then as the 1st Space Brigade S-3 before deploying from November 2008 to December 2009 as the U.S. Central Command Deputy Director of Space Forces. LTC Miralda currently serves with USASMDC/ARSTRAT in the Future Warfare Center, Directorate of Combat Development and is currently a student at the Industrial College of the Armed Forces in Washington D.C.

SPEAKER BIOGRAPHIES

Mr. Hiroshi OE

Mr. Hiroshi OE is currently the Director Director-General for International Affairs, Bureau of Defense Policy, MOD, Government of Japan. His career spans 32 years of government service in a wide variety of positions, both domestically and abroad. He has worked in the Embassies of Japan in South Korea, Thailand, and the United States, and led the United Nations Policy Division as Director in the Japanese Foreign Policy Bureau. For two years beginning in 2005, Mr. Hiroshi also taught as a Professor of the Graduate School of Arts and Sciences at the University of Tokyo. In 2007, he re-entered government service as first the Director-General for Global Issues, and then the Director-General for International Affairs, MOD. Mr. Hiroshi holds a degree in Economics from Tokyo University, where he graduated in1979.

Mr. Chirag Parikh

Chirag Parikh serves as the Director of Space Policy at the National Security Council (NSC). As Director of Space Policy, Mr. Parikh is responsible for reviewing and writing White House space policies and coordinating their implementation. Prior to serving as the Director of Space Policy, Mr. Parikh served as the Deputy National Intelligence Office for Science and Technology at the National Intelligence Council (NIC), Office of the Director of National Intelligence (ODNI). In this capacity, Mr. Parikh was responsible for space threat and space intelligence mission management matters for the Intelligence Community, served as the IC representative to NSC interagency policy committee meetings, and authored numerous responses to White House and Congressional inquiries. Prior to his time in Washington D.C., Mr. Parikh worked at the National Air and Space Intelligence Center at Wright Patterson Air Force Base, Ohio as an aerospace engineer conducting analysis of threats to U.S. national security interests in support of policymaking, acquisition, and operational customers.

Mr. Frank Rose

Mr. Rose currently serves as the Deputy Assistant Secretary of State for Defense Policy and Verification Operations in the Bureau of Verification, Compliance, and Implementation. In this position, he is responsible for advising the Assistant Secretary and, as required, the Undersecretary for Arms Control and International Security, on key issues related to arms control and defense policy. These issues include missile defense, military space policy, defense acquisitions, and conventional arms control. His responsibilities also include liaison with the U.S. Intelligence Community on issues related to the verification of arms control treaties and agreements. Prior to joining the State Department June 2009, Mr. Rose held various national security staff positions in the U.S. House of Representatives, including service as a Professional Staff Member on both the House Armed Services Committee and the House Permanent Select Committee on Intelligence, where he focused on missile

defense, defense policy, and intelligence issues. Mr. Rose has also held numerous positions within the Office of the Secretary of Defense, including as Special Assistant to the Assistant Secretary of Defense for Strategy and Threat Reduction; and Policy Advisor in the Office of the Assistant Secretary of Defense for International Security Policy. Previous to that, he worked as a National Security Analyst with Science Applications International Corporation, and on the staff of U.S. Senator John F. Kerry (D-MA). Mr. Rose received his Bachelors degree in History from American University in 1994 and a Masters degree in War Studies from Kings' College, University of London in 1999. He is a recipient of the Department of Defense Exceptional Public Service Award (2001) and the Office of the Secretary of Defense Medal for Exceptional Civilian Service (2005).

Ambassador Gregory Schulte

Ambassador Gregory L. Schulte has served as Deputy Assistant Secretary of Defense for Space Policy since May 2010. Ambassador Schulte was U.S. Permanent Representative to the International Atomic Energy Agency and the United Nations in Vienna, where he was dispatched by President Bush in 2005 and extended by President Obama through June 2009. Ambassador Schulte helped report Iran to the UN Security Council, implement the U.S. nuclear cooperation agreement with India, and establish international nuclear fuel banks. After Vienna, Ambassador Schulte spent ten months as a Senior Visiting Fellow at the National Defense University's Center for the Study of Weapons of Mass Destruction. Mr. Schulte served three tours in the White House under two Presidents. As Executive Secretary of the National Security Council from 2003 to 2005, Mr. Schulte traveled extensively with President Bush, oversaw the White House Situation Room, and was responsible for NSC emergency readiness after 9/11. As Senior NSC Director for Southeast European Affairs from 2000 to 2002, Mr. Schulte advised Presidents Clinton and Bush on U.S. diplomacy and military deployments in Bosnia and Kosovo and oversaw U.S. efforts to bring democracy to Serbia and prevent civil war in Macedonia. As Special Assistant to the President from 1998 to 1999, Mr. Schulte advised President Clinton on the Kosovo crisis and oversaw interagency planning and decision-making for the NATO air campaign and subsequent deployment of KFOR and a UN mission. From 1992 to 1998, Mr. Schulte was assigned to the NATO Headquarter in Brussels. As Director for Crisis Management and Operations and Director for Nuclear Planning, Mr. Schulte helped NATO adapt its planning and posture after the end of the Cold War. As Director of the Bosnia Task Force, Mr. Schulte helped NATO organize its first out-of-area deployments and its first collaboration with the UN. Mr. Schulte was the first civilian outside the theater of operations to be awarded the NATO Medal. Mr. Schulte is a member of the Senior Executive Service and has received two Presidential Rank Awards. Mr. Schulte previously served in the Office of the Secretary of Defense as Principal Director for Requirements, Plans and Counterproliferation Policy, Director for Strategic Forces Policy, and Assistant for Theater

Nuclear Forces Policy. He began his career in 1983 as a Presidential Management Intern. Mr. Schulte graduated from the University of California at Berkeley in 1980 and earned a Master in Public Administration from Princeton University's Woodrow Wilson School in 1983. He runs marathons, recently completing his sixth, in Paris.

Mr. Naveen Srivastava

Mr. Naveen Srivastava joined the Indian Foreign Service in 1993. He served as Second Secretary from 1995-1997 in Hong Kong where he also learned Mandarin at the Chinese University of Hong Kong. Subsequently he served as First Secretary in the Indian Embassy in Beijing from 1997-2000. He returned to India in 2001 and worked in the Ministry of External Affairs. He was Director of Disarmament and International Security Affairs Division of the Ministry of External Affairs from 2002 to 2006 and dealt with issues related to multilateral Disarmament and Nonproliferation negotiations as well as regional security affairs. He was also involved in the India-US Civil Nuclear Initiative discussions from 2005-08. Mr. Srivastava was appointed Director in the Office of Foreign Secretary in September 2006 and continued in this position until June 2009. As Director (Special Assistant) to the Foreign Secretary, Mr. Srivastava was responsible for assisting the Foreign Secretary in his meetings. He joined the Indian Embassy in Washington D.C. in July 2009 as Political Counselor. Mr. Srivastava has master's degree in Electrical Engineering from the University of Maryland and bachelor's degree from the Indian Institute of Technology, Delhi.

Mr. Steven Stigall

Steve Stigall joined the National War College faculty in 2009. He received a B.A. from Webster University in St. Louis in History & Political Science in 1982 and an M.A. in Russian History from Indiana University in 1985. His early expertise was in strategic nuclear missile forces and naval operations. He served in a targeting cell at the Pentagon during Operation Desert Storm and from 1992-94 taught in the Political Science Department at the United States Air Force Academy. Since 1995 Mr. Stigall has focused on foreign cyber threats and has specialized in that field since. In 2002-2003 Mr. Stigall served in Afghanistan and Kuwait. He spent the opening phase of Operation Iraqi Freedom in Kuwait, where he deconflicted US military and other US government efforts in the theater.

Mr. Alexander Trofimov

Alexander Trofimov graduated from the Russian Economic Academy in Moscow. Mr. Trofminov has been an employee of the Ministry of Foreign Affairs of the Russian Federation since 1999. He has been First Secretary of the Political-Military Section of the Russian Embassy to the USA since November 2008. Before that assignment served in the Depatment for Security Affairs and Disarmament. Mr. Trofimov was also posted in the Russian Embassy in Argentina.

SPEAKER BIOGRAPHIES

Securing Space Assets for Peace, Crisis, and Future Conflict

A Center for Technology and National Security Policy Summary

Updated January 27, 2011

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On November 30th, 2010, the National Defense University hosted a *Transforming National Security Series* event entitled, "Securing Space Assets for Peace and Future Conflict." This conference was held at Fort Lesley J. McNair. Roughly 230 guests and speakers registered to attend. The following document thematically summarizes presentations, issues, and insights debated during the day long event. This was an unclassified/non-attribution forum.

Table of Contents

CONSIDERATIONS FOR POLICY-MAKERS 4
US INTEREST IN SPACE- PAST AND PRESENT 5
CHARACTERISTICS OF THE SPACE DOMAIN 6
THE STATE OF U.S. SPACE POLICY 8
CREATING A NEW SPACE REGIME 10
DESIGNING A STRATEGY OF SPACE DETERRENCE 12
PREPARING FOR CRISIS AND HOSTILITIES 14
UNDERSTANDING THE WORSENING ENVIRONMENTAL CHALLENGES 16
INTERNATIONAL PERSPECTIVES 17

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CONSIDERATIONS FOR POLICY-MAKERS

Recurring Policy Themes

1. Participants were sometimes critical of U.S. reluctance to formulate a clear vision for space governance, both domestically and internationally.
2. Domestically, some argued the U.S. interagency has been discouraged from coordinating space capabilities by the concerns of the Intelligence Community (IC) and uncertainty about which agency is in charge.
3. Participants also noted that internationally, the U.S. has often allowed others to lead the debate about what constitutes responsible behavior in space.
4. Many contributors asserted the guarantor of responsible behavior in space will be a framework for shared Space Situational Awareness (SSA), arguing that the failure to develop real time detection and attribution capability tends to invite miscalculation and increase the potential for hostile activity.
5. Creating a shared SSA architecture will be difficult because it must contain classified and unclassified information and produce varying degrees of precision data, according to the user
6. The U.S. Intelligence Community is wary that SSA data-sharing will compromise sources and methods
7. Major disruptions in space capabilities have the potential to affect virtually every sector of society
8. There was a consensus among participants that an attack on space capabilities will almost certainly be preceded by a Cyber attack.

Recurring Principles

1. Without rules in space, there can be no rule-breakers
2. Space Situational Awareness (SSA) is the central challenge for governing the domain
3. An effective strategy of deterrence will rely on resilience and redundancy rather than ‘red lines’
4. Responsibility for major space operations should *not* reside primarily with the Intelligence Community
5. Partnerships are essential force-multipliers in virtually all space endeavors

Recurring Recommendations

1. Lead international efforts to establish a space regime, beginning with the most pressing governance issues: Code of Conduct, space situational awareness, debris mitigation and tracking, traffic and resource management, dispute resolution forum
2. Clarify tolerable limits for the development of technology adapted for the disruption of space capabilities
3. Create an Under Secretary of Defense for Space
4. Incorporate public and private sector participation wherever possible
5. Designate a lead civil agency, office, and/or council to arbitrate interagency disputes and coordinate U.S. development in space

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US INTEREST IN SPACE- PAST AND PRESENT

The U.S. has a longstanding investment in leading the peaceful development of space and:

- These commitments are based on the conviction that the space domain constitutes a vital strategic interest to U.S. national security and economic prosperity.
- Support for these efforts have spanned five administrations and survived Cold War tensions
- Believes its efforts on behalf of the "freedom of space" are largely responsible for the proliferation of new civil, commercial, and military capabilities
- The U.S. regards the potential for an unrestrained arms race in space as an existential threat
- While the U.S .is still the leading space-faring nation, its leadership is in relative decline as other states develop comparable space capabilities and the number of stake-holders increase

The Space environment has changed since the Cold War in terms of:

- The relative decline of U.S. dominance in that domain
- The number of owners, investors, or operators of space assets
- The civil, commercial, and military stake-holders that depend on space capabilities

During the Cold War, space assets:

- Were primarily seen as tools for intelligence gathering
- Became a mainstay of the strategic balance
- Incited the creation of the Outer Space Treaty (1967)

The Outer Space Treaty (Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies) provided a legal framework in which space:

- Is declared the province of all mankind
- Is to be used only for peaceful purposes
- Access and use is the sovereign right of all nations
- Operational guidelines require international consultation
- Treaty signatories retain ownership of their space assets and bear responsibility for damage caused to others

Since the original Outer Space Treaty was first implemented:

- The U.S. has become reliant on space capabilities for essential commercial, civil, and military services
- The means of interfering with space assets have become widespread, inexpensive, and accessible

In the past, an analysis of U.S. space vulnerabilities tended to focus on:

- Enemy capabilities in space
- Enemy disruption of American assets
- Enemy attacks on critical US infrastructure

…And analysts tended to focus on scenarios involving:

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- Nuclear detonation in space
- Kinetic weapons
- Directed energy weapons
- Electronic warfare

Now, a consensus is emerging that identifies Cyber as the chief threat in space, because:

- It poses little danger of escalation
- It incorporates 'fast moving' technological innovations
- "Hardening" potential targets is complex

Some critics believe the U.S. interagency process created during the Cold War has not suitably adapted to the modern threat environment in space. As a result:

- Interagency authorities and responsibilities have become misaligned, leading many wondering, "Who is in charge?"
- Policy-makers remain unprepared for the accelerating speed of decision-making and increased complexity
- Many participants believe domestic "turf battles" must be resolved before the U.S. can effectively shape the space environment internationally

CHARACTERISTICS OF THE SPACE DOMAIN

Space is a maturing and contested domain. Historically, all domains have become a medium for conflict. With this in mind, policy-makers should consider:

- Space gives the U.S. both an asymmetrical advantage and an asymmetrical vulnerability
- It is cheaper to attack than to defend space assets
- Potential aggressors can be deterred by a strong "attribution architecture" and a resilient national infrastructure
- The failure to develop real time detection and attribution capability in space invites miscalculation and increases the potential for attack

The domain of space is increasingly characterized by:

- Physical Congestion (1100 active systems, 21,000 pieces of debris)
- Commercial Competitiveness (11 countries operating 22 launch sites)
- Security Contests: Emerging anti-satellite and jamming capabilities

Some analysts believe warfare in space between major powers is unlikely because:

- Nuclear armed states tend to avoid direct confrontation
- Interfering with space capabilities- during peacetime, crisis, or conflict – is viewed as extremely destabilizing
- Hostile action in space would almost certainly provoke terrestrial warfare
- The relatively low number of ASAT tests implies a restrained pace of militarization

…However, the space regime is becoming less stable because:

- "Rules of the road" are ambiguous

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- Space governing treaties are weakening or expired
- Technologies that interfere with satellites are widespread and proliferating
- The number of space-faring stake-holders is large and growing
- The number of orbital space objects is increasing

"A comprehensive approach" to stabilizing the space domain would mean:

- Utilizing "all elements of statecraft and national power" to protect space systems and their supporting infrastructure
- The development of international norms and standards of behavior
- The mobilization of public and private sectors to detect and deter potential attacks and reconstitute capabilities in a worst-case scenario
- The cooperation of state and non-state actors for collective security
- A transparent regime for establishing SSA (Space Situational Awareness) and discriminating hostile intent from mishap

A coalition or alliance operating in space would face:

- Technical challenges associated with interoperability standards and IT integration
- Information sharing challenges associated with levels of classification
- Authorities challenges associated with short time-frames and multiple chains of command
- Training challenges associated with the cost and complexity of preparatory exercises
- Education challenges associated with how each member coordinates its assets and makes products available to commanders

As the cost of space access decreases, that domain is likely to become:

- A more conventional "global commons" in which many nations compete for strategic or commercial advantage
- Employed by some entities in ways that run counter to U.S. interests
- More dangerous. Consequently, the costs associated with operating U.S. assets in space are likely to increase

Most space systems are dual-role systems, and a variety of domestic and international partners share identical:

- Launch Systems
- Operators
- Tracking systems
- Networks
- Data processing capabilities

Despite the cross-sector dependence of space systems:

- Capabilities are not well networked
- Aging systems strain to support current peacetime operations
- Little capacity exists to accommodate the increased tempo of crisis scenarios

Satellites are only part of a broader system of electronic traffic. Communication and internet data between continents:

- Is mostly carried over undersea cables

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- Can be occasionally vulnerable to natural and man-made phenomena such as undersea earthquakes, avalanches, fishing trawler nets, and ships anchors
- Have become a military target during periods of conflict
- Are vulnerable to espionage

THE STATE OF U.S. SPACE POLICY

Some contributors argued the three most important principles of the U.S. National Space Policy are the:

- Sustainability of space
- Free access to space
- Stability of the space regime

The Obama administration has placed a renewed emphasis on building "a global architecture of cooperation" in space. Consequently, the U.S. seeks international partners to:

- mitigate orbital debris
- share space situational awareness information
- improve information sharing for collision avoidance
- develop transparency and confidence building measures

The new Space Policy differs from previous versions by:

- Declaring space capabilities to be a vital interest of the U.S. (rather than specific systems)
- Renewing an earlier principle of non-interference for all nations (rather than just U.S.)
- Suggesting that when deterrence fails, the U.S. may retaliate using a variety of methods (rather than targeting an adversary's space capabilities, exclusively)

The current administration advocates a shift in U.S. Space Strategy by more actively developing transparent guidelines on space-related behavior, or "Rules of the Road," to:

- Avoid a potential arm race in space
- Ensure the future development of civil and commercial space capabilities
- Protect space traffic and manage resources

These guidelines for establishing responsible behavior in space are likely to require:

- Negotiated legal agreements among both space-faring and non space-faring states
- A transparent regime that allows situational awareness/verifiability among a broad variety of actors
- Confidence-building measures
- The force of precedent and established behavior
- Active compliance and accountability measures

Critics of U.S. Space Policy believe the administration has not formulated a coherent strategy and:

- Is unprepared to address fundamental issues that straddle civil, commercial, and military space communities
- Has not integrated the private sector into the administration's decision-making process

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- Allows the interagency process to remain fragmented and ad hoc

The notion of "U.S. National Security Space" is bureaucratically ambiguous because:

- A variety of agencies within the U.S. government share the national security mission, either officially or unofficially
- No single agency is charged with managing space capabilities or coordinating efforts
- Space capabilities affect the civil, scientific, commercial, and security sectors
- A variety of government/non-government, and domestic/international partners share space capabilities with the U.S.

Some believe the National Security Act of 1947 should be replaced:

- Because it represents an outmoded 'industrial approach' to policy processes and organization
- With a 'whole of nation' approach that employs U.S. hard and soft power from government and non-government sectors
- By the notion that the national security threat environment will require sustained and persistent 'active engagement.'

The National Space Policy directs U.S. agencies to collaborate with other nations to develop Space Situational Awareness (SSA) and the ability to rapidly:

- Detect man-made and natural disturbances in space
- Warn of pending disruption
- Characterize the nature of the threat to space assets
- Attribute the source of the disturbance

The State Department and DoD are implementing the NSP's directive regarding Space Situational Awareness by:

- Conducting technical exchanges with European experts
- Considering cooperation with Asia-Pacific allies

The National Space Policy calls for collaboration with other states on orbital tracking and collision avoidance data. Presently, the U.S.:

- Is improving its own national tracking and identification capabilities
- Provides notifications to other governments and commercial satellites owners of potential collision

Seeking diverse international partnerships for space missions ensures:

- The U.S. diminishes its individual risk and corresponding costs
- Global capabilities among allies and friends develop in tandem, and are mutually supportive
- A growing number of entities have a stake in ensuring the long-term sustainability of the space regime
- Potential aggressors must confront a widening circle of actors when choosing their targets

The most obvious opportunities for international partnerships are projects that manage:

- Space traffic
- Debris mitigation
- Launches and standards for operational planning

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- Information related to space weather
- Terrestrial defense
- Humanitarian and disaster relief

Challenges to constructive engagement in space include:

- An undefined vision for what constitutes responsible conduct in space
- The absence of global leadership working to build consensus at the political level
- Uncertain operational guidelines
- Imperfect and inequitable distribution of space situational awareness (SSA) capabilities
- U.S. reticence to create "co-dependent" SSA systems
- The Intelligence Community's institutional aversion to data sharing

The National Space Policy states the U.S. will work with other nations to develop Transparency and Confidence Building Measures (TCBMs). The State Department has executed this guidance by:

- Conducting expert visits, exchanges, and dialogues with allies and partners
- Reviewing the European Union's "Code of Conduct for Outer Space Activities" initiative

The State Department will be working to broaden the U.S. relationship with Russia on space issues by:

- Inviting a Russian delegation to tour the Joint Space Center
- Continuing the space security dialogue
- Attempting to find ways to communicate collision analysis in a timely manner

The Allard Commission (2008) contains important recommendations for how the U.S. should re-organize to manage space assets by:

- Reinstating the National Space Council to coordinate national level space activities and arbitrate interagency disputes
- Creating an Undersecretary of Defense for Space
- Creating a National Security Space Office to monitor national resources and more effectively manage development efforts
- Including commercial space stake-holders in development efforts

CREATING A NEW SPACE REGIME

New rules/norms governing behavior in space should seek to regulate:

- Debris mitigation (current guidelines are voluntary and weak)
- Purposeful, harmful interference against objects in space (current guidelines are ambiguous)
- Space traffic management regime (current guidelines are missing entirely)

The EU Code of Conduct is a project seeking to fill an important vacuum of leadership in formulating new space norms. However, its development so far suffers from important shortcomings, such as:

- Its slow and uncertain pace of development
- Guidelines which are likely to be objectionable to non EU states, particularly Russia, China, Brazil, and India
- The inclusion of an international forum for space-faring nations

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The absence of U.S. leadership in helping set new norms in space has led many to wonder which entity will ultimately fill this void. Who will authoritatively codify new norms in space for all stakeholders?

- The United Nations?
- The European Union draft of the "Code of Conduct?"
- A coalition of space-faring nations?
- The commercial space community?

The most pressing problems associated with a new space "regime" are the questions of how states should manage:

- Resource allocation
- Spaceflight safety
- Debris mitigation
- Space situational awareness (SSA)
- Principle of non-interference (declaratory policies)
- A crises situation/hostilities involving space capabilities

A "Bad Actor" in space is an entity that:

- Behaves aggressively
- Generates debris (either from launch, testing, or inferior equipment)
- Launches satellites that have no ability to maneuver
- Has no plan for the disposal of its satellites and all associated equipment

A "Workplan to Achieve Responsible Use of Space" should include the means to:

1. Design agreed measures to achieve transparency of action and attribution of behavior
2. Incentivize nations to avoid actions that are contrary to responsible behavior
3. Increase effective warning time and modify policy processes to enable diplomatic and operational options to be employed
4. Reduce adversaries' incentive to target space capabilities, e.g., by use of multi-national space assets and non-space capabilities
5. Develop a space architecture with defense in-depth—a layered defense—to ensure availability of key services
6. Create certainty for the opponent that efforts to attack space systems will be defeated

The ability to develop a strong, "real-time attribution" architecture will be the most important factor for:

- Stabilizing the space regime
- Strengthening U.S. soft power
- Developing space for the mutual benefit of all mankind
- Ensuring a successful deterrence strategy in space
- Increasing U.S. resilience against potential attack

The U.S. National Space Policy states that one of the chief aims of the U.S. is to "develop, maintain, and use *Space Situational Awareness*…to identify and attribute actions in space that are contrary to *responsible use*." This suggests the need for an institutional framework that defines 'responsible behavior' in space and answers the questions:

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- What information about space assets are responsible actors obliged to share?
- How much "conjunction (collision) analysis" would responsible actors be required to conduct?
- What would be the costs for such an analysis, and who would bear those costs?
- Which party is responsible if mistakes or miscalculations occur?
- How much advance warning is appropriate in case of potential collision?
- What qualifies as a 'close approach' between objects in space?
- How should notifications of possible collision be delivered, and how widely should that information be disseminated?

The weakened or missing legal instruments protecting a state's critical "National Technical Means" are:

- Threshold Nuclear Test Ban Treaty
- Intermediate-Range Nuclear Forces Treaty
- Conventional Forces in Europe
- SALT and ABM treaties (both are inoperable)

A comprehensive ban on ASAT weapons is problematic because:

- Of the difficulty of verifying compliance
- Space assets employ dual use technology
- Complicated notions of equity among states with varying capabilities

DESIGNING A STRATEGY OF SPACE DETERRENCE

Some participants asserted a strategy of space deterrence should:

- Incorporate the participation of a wide range of commercial and international actors that share risk collectively and have a vital interest in the outcome of any crisis
- Encourage the development of a space SSA architecture that involves classified and unclassified information and produces varying degrees of precision data
- Recognize that deterrence and dissuasion may fail
- Prepare the DoD to "fight through" a potential attack by using backup systems and operational redundancies
- Clarify potential rules of engagement for local forces, coalitions, and other partners
- Define interagency priorities, responsibilities, and authorities
- Create a plan for reconstitution and recovery

Due to an asymmetric vulnerability in space assets, the U.S. cannot rely exclusively on a deterrence strategy that threatens retaliation against another state's space assets. A successful deterrence strategy should instead depend upon:

- Accepted norms and behaviors
- International partnerships
- Operational resilience
- Redundant capabilities
- The threat of asymmetric retaliation

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A concise "Code of Conduct" and Space Situational Awareness in space are prerequisites for developing a strategy of deterrence by defining the acceptable limits of:

- Harmful interference against space assets
- A proportionate response
- Collateral damage in space
- The Law of Armed Conflict in space

Currently, U.S. policy-makers rely on ambiguity rather than a clear 'red line' for responding to states that:

- Invest in research and development of anti-satellite technologies
- Test anti-satellite R&D systems
- Deploy anti-satellite systems
- Employ anti-satellite systems

Some experts believe strategic ambiguity in space is counter-productive because it:

- Increases the potential for mishaps and misunderstandings
- Does not encourage behavior that is acceptable and discourage aggressive behaviors that are unacceptable
- Does not build a consensus around red lines/zones/thresholds/triggers for defensive action

The U.S. puts its vital strategic interests at risk when it:

- Permits the purposeful interference of its space (and cyber) assets
- Ignores ambiguous behavior that raises the 'noise level' and gives others the ability to manage U.S. perceptions
- Does not act to prevent aggressors from enjoying the benefits of their aggression

Operational resiliency against an attack on space capabilities can be improved by:

- Cultivating allied and commercial redundancies
- Increasing situational (shared) awareness

To improve resiliency, confuse 'targeting,' and prepare for scenarios in which American space capabilities have been compromised, the U.S. should consider:

- Relying on larger constellations of networked satellites
- Increasing commercial and international partnerships
- Conducting realistic civil and military exercises
- Developing systems designed to quickly reconstitute degraded space based capabilities during an exigency
- Creating back-up systems that replicate space assets in other domains (air, sea, ground)
- Diversify capabilities across domains

Entities with an incentive to threaten U.S. capabilities might include:

- Near Peer, space-faring nations pursuing anti-satellite capabilities
- Emerging space-faring nations
- Non-State actors

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- States that derive little direct benefit from space, but are capable of developing ‘counter-space’ capabilities

To strengthen deterrence, a National Space Strategy should:

- Use all instruments of political statecraft to shape the operational environment in advance of hostilities
- Incorporate all affected sectors of American society
- Include a plan to fully educate the public
- Employ active and passive defenses
- Maintain an offensive plan that includes domain escalation
- Prepare for unilateral, coalition, or allied action

PREPARING FOR CRISIS AND HOSTILITIES

Policy-makers should plan for a scenario in which deterrence has failed and the U.S. has a limited time-frame in which to:

- Switch to independent systems that duplicate space capabilities
- Assess the seriousness and extent of the damage
- Formulate emergency civil response options
- Alert all domestic and international stake-holders of any relevant information
- Inform and calm the public
- Seek to attribute the source and motive of the attack
- Formulate a proportionate retaliatory response
- Rally the international community to collective action
- Issue appropriate Rules of Engagement to local commanders, coalition partners, allies, and other affected organizations
- Dissuade potential aggressors from taking additional hostile actions (across all domains)
- Reconstitute space assets

During a crisis involving irresponsible behavior in space, the President is likely to ask his advisors:

- How do we know what happened, and with what level of confidence can we conclude our intelligence is correct?
- How much does the affected country know?
- How much does the attacker know?
- What was the attacker’s intent?
- What other entities have knowledge of the situation?
- What is the likely reaction of the international community?
- What steps could the U.S. take which would improve or worsen the crisis?
- How much debris has been created?
- What services have been/are likely to be disrupted?
- Are there back-up systems and reconstitution plans to ensure the integrity of U.S. capabilities?

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Most space assets are dual-use. The interruption of these capabilities would affect multiple sectors of U.S. security, and could mean:

- Modern navigation, timing, communications, imagery, and weather data would be compromised
- An ad hoc civilian and interagency emergency response would generate uncertain consequences for all sectors of the U.S. and global infrastructure
- National technical capabilities (ex. missile warning satellites) would be disrupted
- DoD capabilities would fall back to 1970s levels

Damage to space assets could range in severity, as:

- Indiscriminate damage (nuclear detonation)
- Reversible/temporary effects (GPS jammers, Satcom jammers, synthetic aperture radar jammers)
- Minor damage (low powered lasers)
- Major damage (High powered microwaves, direct ascent ASAT)

Satellites communicate with their terrestrial operators by means of the electromagnetic spectrum, making them vulnerable to Cyber interference, electromagnetic disruption, and kinetic strike. A hostile attacker might:

- Introduce errors to the information stream
- Jam or disrupt signals
- Sabotage ground station networks or satellite software by means of virus or other hacker intrusion
- Target ground stations or satellites kinetically

Cyber is an unusually effective weapon because of the:

- Difficulty of recognizing when an asset has been attacked
- Problem of attributing an attack to its source
- Low 'barriers to entry' (cheap, effective)
- Unlimited range
- The ubiquitous physical and electronic global infrastructure

The "Attribution Problem" means it can be particularly difficult to identify a Cyber attacker's:

- Geographic origin
- Identity
- Complicit and/or unwitting accomplices
- Intent

Some analysts contend that U.S. secrecy about hostile activity in cyber/space is:

- Increasing uncertainty, an effect which has a destabilizing effect on the space and cyber regime
- Undermining the commercial sector's ability to innovate new security protections and cross sector partnerships
- Equivalent to the secret submarine confrontations of the Cold War
- Undermining U.S. deterrence by failing to reassure allies and adversaries American space/cyber capabilities are secure

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Most analysts believe a Cyber attack is likely to be used during major hostilities. As a means of hardening space capabilities and the systems they support, policy-makers should consider:

- Rejecting the notion the U.S. must tolerate routine, low-level cyber attacks
- Taking a lead role in developing norms for Cyber space
- Re-assigning "cyber power" to the inter-agency and military, rather than reserving it almost exclusively to the espionage and intelligence communities
- Re-allocating substantial new resources to the Cyber domain as a means of raising 'barriers to entry'
- Working to create defensive networks that detect, identify, and target aggressors
- Aggressively defending U.S. assets against all hostile activity and seek retributive action against aggressive actors

UNDERSTANDING THE WORSENING ENVIRONMENTAL CHALLENGES

Debris in space represents a serious and growing concern. Currently:

- 21,000 pieces of space debris orbit the earth
- There are over 1,000 orbiting satellites belonging to more than 40 countries operating in space
- Most debris is the result of collisions, launches, or ASAT testing in space
- NASA considers critical collisions with orbital debris to be the biggest threat to Space Shuttle missions

The U.S. is addressing the problem of debris by:

- Signing the U.N. Space Debris Mitigation Guidelines
- Conducting a UN study on the subject within the Scientific and Technical Committee of the U.N. Committee on the Peaceful Uses of Outer Space, or COPUOS
- Investing in R&D of debris-mitigating technologies in cooperation with other space-faring nations

The Kessler Syndrome describes:

- The likelihood of collision based on the number of low-orbiting objects
- The prediction that debris fields created by each collision would exponentially increase the likelihood of future accidents
- The possibility that space debris could some day render it practically unusable

Analysts identify three methods for mitigating the Kessler problem:

- Employ treaties and international agreements to slow the growth of new debris (outline of safety standards, ban on ASAT testing and deployment, post-mission disposal guidelines)
- Deepen and broaden the collision avoidance platforms currently in use
- Deploy debris removal systems capable of removing at least 5 objects from orbit each year (to achieve a steady state)

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Of the removal methods that might be used to clear space debris, some scientists believe:

- ASAT systems are most likely to create additional objects in space
- Airborne laser systems would be prohibitively expensive
- Ground based systems using telescopes and 10KW lasers could be the most promising and affordable option for "pushing" objects out of orbit

The U.S. is particularly vulnerable to the effects of space weather. Solar events (geomagnetic storms) have the potential to:

- Destroy virtually all unshielded electronics
- Cripple the U.S. electrical grid
- Remove the means for rapid recovery
- Lead to strategic miscalculation
- Pull down low orbiting satellites as the earth's atmosphere distorts

INTERNATIONAL PERSPECTIVES

Japan's history of using satellites for security purposes is extremely limited because:

- For nearly 40 years, Japan adhered to an extremely restrictive interpretation of the Space Treaty, prohibiting the use of space to the military.
- Japan only began allowing its military to use satellites for security purposes in 2008.

Japan's Space Policy underwent a dramatic change in 2008 when the government issued a comprehensive strategy that:

- Shifted the focus of Japan's space programs from R&D to space utilization
- Declared the government would help foster and promote Japan's space industrial base
- Allowed the development and use of space for enhancing Japan's national security

Japan's "Quasi-Zenith Satellite System" is an ongoing program that:

- Will improve GPS accuracy in the region by a factor of ten (from tens of meters to less than one meter)
- Will ensure at least one satellite is always in orbit near Japan's zenith
- Has launched one satellite (Michibiki) and will deploy at least two others
- Is compatible with the U.S. GPS system (both new and old)

The government of Japan recognizes that most space-faring states:

- Lag far behind the U.S. in SSA capabilities
- Face serious discrepancies between their operational and technical capabilities in space
- Are reluctant to share SSA information that could be considered to be sensitive intelligence
- Will require a clear framework for sharing SSA information

In order to quickly develop a specialization in the use of space for security purposes, Japan's Ministry of Defense has concluded it will need to:

- Acquire and develop 'in house' expertise rather than relying on the commercial sector and U.S. partners
- Prioritize C4ISR functions

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- Support the effort to build an international framework for space governance
- Anticipate the dual-use nature of many space assets
- Recognize that some states are likely to act in 'bad faith' regarding the use of space technologies (example: 2009 North Korean launch of 3 stage Taepodong-2 missile that it claimed was used to put a communications satellite into orbit)

Germany has the most world's most advanced R&D program for remote control of space robots and has:

- Conducted experiments that have allowed operators on earth to control robotic tools in space in virtual real time (accounting for 5-7 second transmission delay)
- Enabled remote operators to manipulate robotic arms in space via laptop and cell phone internet technologies
- Demonstrated systems that allow a carrier and robot satellite to coordinate their actions dynamically
- Developed and funded a project for capturing non-cooperative space debris using two robotically coordinated satellites
- Developed a project for repositioning aging satellites using remotely controlled robots

The Russian Federation has worked to prevent the weaponization of outer space and has demonstrated its commitment to the peaceful development of space by:

- Working with China to prepare a "Treaty on the Prevention of the Placement of Weapons in Outer Space (PPWT)" and of the "Threat or Use of Force Against Outer Space Objects (PPWT)

The purpose of the PPWT proposed by Russia and China is to:

- Guarantee the status quo (i.e. no weapons in space)
- Supplement current international treaties which only prohibit WMD in space
- Strengthen and encourage arms control
- Support the security interests of all states
- Represent a first step in the establishment of an enduring, peaceful, and sustainable space regime

The PPWT is intended to prevent:

- An arms race in space
- Strategic destabilization
- International tensions aroused by new, tactically flexible weapons platforms in space
- The corrosion of international trust and building confidence measures
- An asymmetrical offensive advantage that invites hostilities

The practical implementation of the PPWT Treaty would:

- Require subsequent treaties to outline the details of a formal verification process
- Establish a system of transparency and confidence building measures (TCBMs) on a bilateral, multilateral, regional and global format
- Create mechanism for resolving international disputes related to space assets
- Set-up an executive body for implementing the provisions of the treaty

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Responsible Use of Space

Securing Space Assets for Peace and Future Conflict
30 November 2010

Thomas Behling
Executive Director, CENTRA Technology, Inc.
behlingt@centratechnology.com

Use of Space Assets in Conflict

1. What are appropriate red lines?
   - What are acts of space aggression?

2. What are likely paths of escalation?
   - What are proportionate responses?

Start by examining current National Space Policy

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Vital Interests

New Policy

- The United States considers the sustainability, stability, and free access to, and use of, space vital to its national interests.

Old Policy

- The United States considers space capabilities—including the ground and space segments and supporting links—vital to its national interests.

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Rights of Passage

New Policy

- The United States considers the space systems of all nations to have the rights of passage through, and conduct of operations in, space without interference.
- Purposeful interference with space systems, including supporting infrastructure, will be considered an infringement of a nation's rights.

Old Policy

- The United States considers space systems to have the rights of passage through and operations in space without interference.
- Consistent with this principle, the United States will view purposeful interference with its space systems as an infringement on its rights.

The 1996 National Space Policy states, "Purposeful interference with space systems shall be viewed as an infringement on sovereign rights."

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Deterrence

New Policy

- The United States will employ a variety of measures to help assure the use of space for all responsible parties, and, consistent with the inherent right of self-defense, deter others from interference and attack, defend our space systems and contribute to the defense of allied space systems, and, if deterrence fails, defeat efforts to attack them.

Old Policy

- Consistent with this policy, the United States will: preserve its rights, capabilities, and freedom of action in space; dissuade or deter others from either impeding those rights or developing capabilities intended to do so; take those actions necessary to protect its space capabilities; respond to interference; and deny, if necessary, adversaries the use of space capabilities hostile to U.S. national interests;

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1. Need for Red Lines

- National Space Policy (June 28, 2010):
  - Develop, maintain, and use space situational awareness (SSA) information from commercial, civil, and national security sources to detect, identify, and <u>attribute actions in space that are contrary to responsible use and the long-term sustainability of the space environment;</u>
  - For example, decades of space activity have littered Earth's orbit with debris; and as the world's space-faring nations continue to increase activities in space, the chance for a collision increases correspondingly.

What are other Red Lines?

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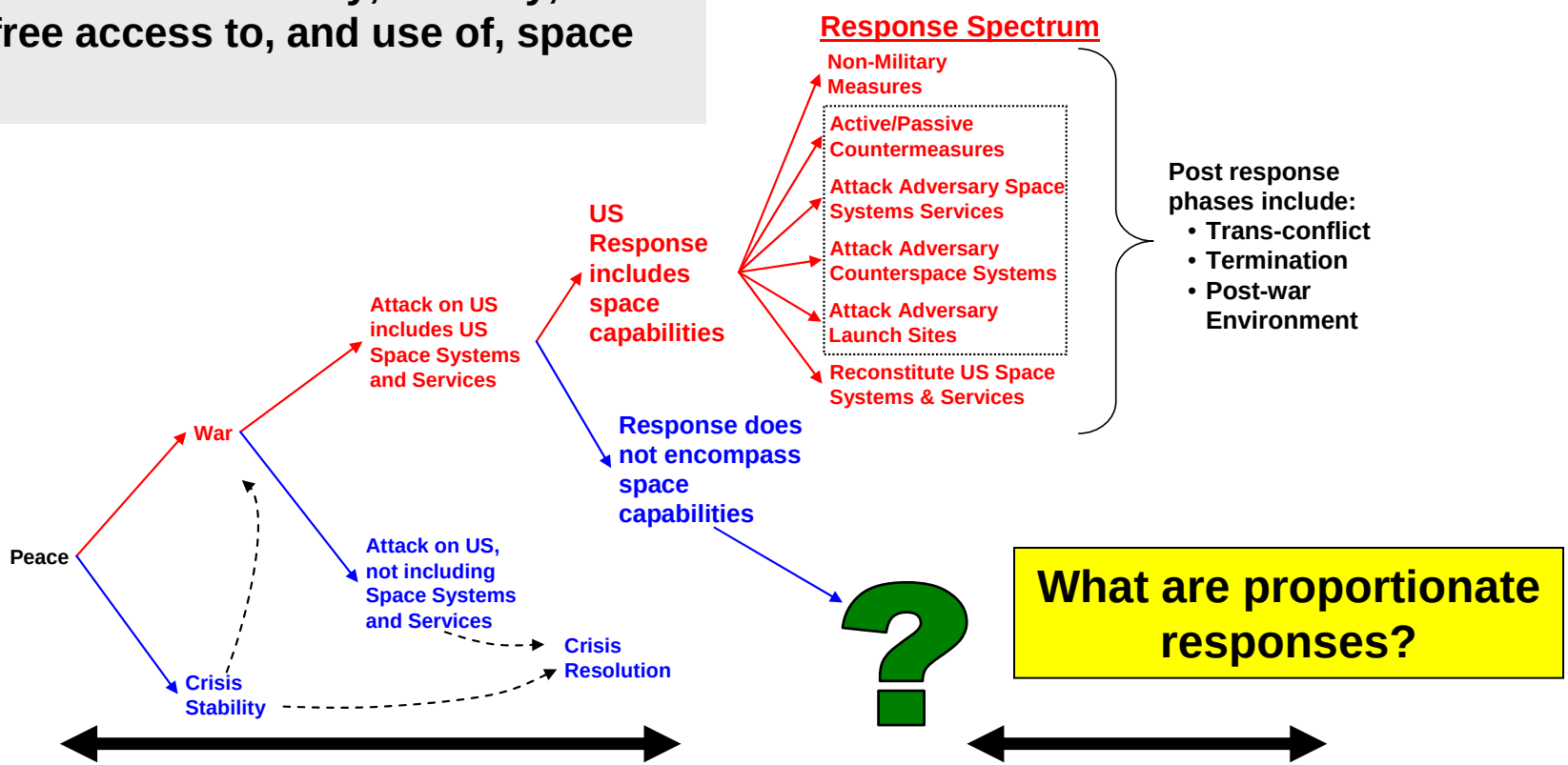
2. Exemplar Path for Escalation

Goal: sustainability, stability, and free access to, and use of, space



Deterrence requires initiatives that address these phases

Deterrence and warfare options should consider all phases

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How Much Transparency of Space Capabilities is Needed in a Crisis?

Enough to Answer Questions that POTUS Might Ask

1. How do you know what happened and how do you assess your confidence in understanding what happened?
2. What alterative explanations are possible and what is your confidence that these alternatives can be ruled out?
3. How much does the attacked country know about the event? How confident are they about their knowledge?
4. What does the attacker know about the outcome? If this is a one-off attack, what was the intent of the attacker? How do we know it was not a miscalculation?
5. Why should I care about this? What steps or actions would make the situation worse (possibly leading to more attacks)?
6. What is global reaction to the attack? How much is know publicly? How much privately? By who? What are the trends in the reaction?
7. What are the Allies' reactions? How are they interpreting the event? Is this seen as an economic issue, a political statement, or a military issue?
8. How much debris has been created? At what point will this problem impact our own space access?
9. What services have been disrupted and how could these services be replaced or substituted? How quickly could this be done?
10. Who uses similar space capabilities? Who owns and operates these capabilities? How could these suppliers be enlisted to replace the capability?

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A Workplan to Achieve Responsible Use of Space

1. Design agreed measures to achieve transparency of action and attribution of behavior
2. Incentivize nations to avoid actions that are contrary to responsible behavior
3. Increase effective warning time and modify policy processes to enable diplomatic and operational options to be employed
4. Reduce adversaries' incentive to target space capabilities, e.g., by use of multi-national space assets and non-space capabilities
5. Develop a space architecture with defense in-depth—a layered defense—to ensure availability of key services
6. Create certainty for the opponent that efforts to attack space systems will be defeated

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International cooperation for security use of space

Nov 30 2010

Ministry of Defense, Japan

Efforts after Enforcement of The Basic Space Law

- **Enhance R&D and attach greater importance to utilization**
- **Make the best use of high technology and highly skilled people to achieve goals of "improving people's standard of living" and "making international contribution"**

- **Six Basic Pillars**
  - ① Ensure rich, secure and safe life
  - ② *Strengthen security environment*
  - ③ Promote diplomacy for space
  - ④ Create an energetic future by promoting the state-of-art R&D area
  - ⑤ Foster strategic industries for the 21st century
  - ⑥ Consider the environment

Quasi-Zenith Satellite System (QZSS)

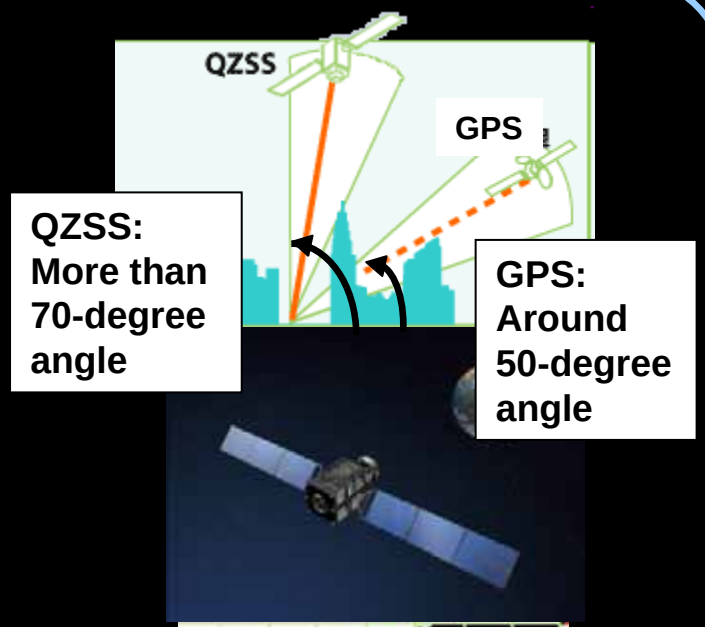
QZSS

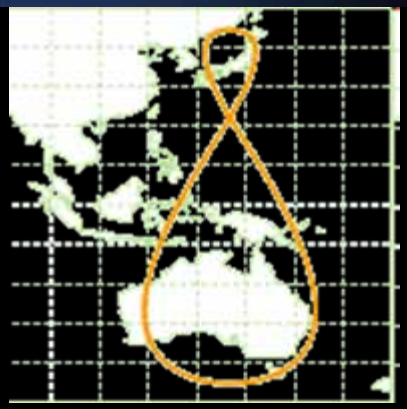
- Regional space based PNT system, supplementing GPS

PLAN

- Successful launch of the first satellite "Michibiki" on the 11th September

- Technical experiment and test runs





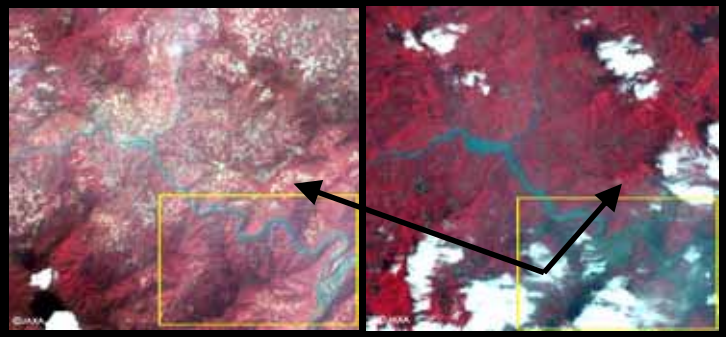
QZSS Orbit

Land and Ocean Observing Satellite System to contribute to Asia and other regions

Sichuan earthquake (China)

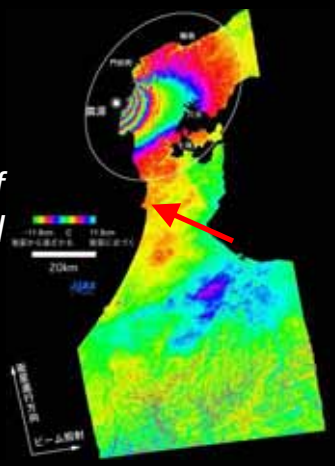
Formation of "dam-lake" due to landslide
→ danger of flooding downstream

before → after



Land deformation from Noto Peninsula Earthquake in Japan(FY19)

→ Seismic upheaval of 45cm or less detected



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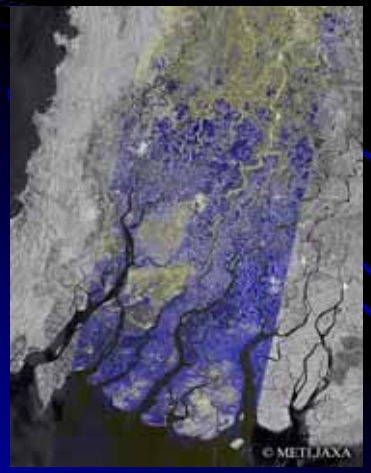
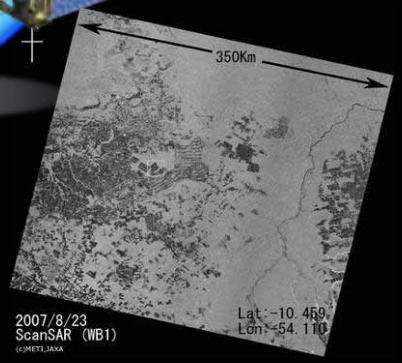


Flooding from Cyclone Nargis (Myanmar)

Submerged land region (shown in blue)
Underground water increases (shown in yellow)
Deforestation region (shown in dark color)



Specific in forest deforestation region (A dark part is a deforestation region).

Situation of green space in Sakurajima (Japan)

Efforts after Enforcement of The Basic Space Law

Efforts by MOD

Demand for enhancement of the situational awareness, information sharing, Command and Control by utilizing Networking and Systematic approach

☆Robust C4ISR(*) is Vital

Development and Use of Space is a very effective means

Information gathering, Warning and Surveillance and Communications

C4ISR：Command, Control, Communication, Computer, Intelligence, Surveillance, Reconnaissance

○ Regulate operational models for SSA

○ Assess current SSA capability of Japan

○ Study development of SSA capability based on the current resources of MODJ (FPS-5 etc.)

FPS-5

○ Study concept of SSA operation with air-defense mission

○ Study future cooperation with other countries

Discussion by The Council on Security and Defense Capabilities in the New Era

The report by The Council on Security and Defense Capabilities in the New Era on the 27 Aug 2010

Outline of the report (Only space-related)

- ✓Space and cyber attacks are threat to security in recent years
- ✓Emergence of risk of degrading openness of the "Global commons"
- ✓Strengthen outer space situational awareness.
- ✓Envision satellite system aiming at security and maritime domain awareness as mid- and long- term targets for improvement.

➢ **Review of the National Defense Program Guideline and Formulation of the new Mid-Term Defense Program by the end of the year**

Action of the future by MODJ

Review of the Basic Guidelines if necessary

- **Accumulation of knowledge, development of qualified personnel**
- **Considering technological progress and expansion of the JSDF activities**
  - enhancement of satellite communication function
  - enhancement of functions for information gathering, warning, and surveillance
- **<u>Cooperation to build an international framework for use of space</u>**

Remarks of Frank A. Rose
Deputy Assistant Secretary
Bureau of Arms Control, Verification and Compliance
U.S. Department of State
National Defense University's Conference on Securing Space Assets for Peace and Future Conflict
Fort McNair, Washington, DC
November 30, 2010

Thank you for your kind introduction. It is a pleasure to attend this conference. The State Department is extremely supportive of the work done here at NDU, and I am particularly pleased that the university is taking a hard look at what can be done to create a stable, secure, and sustainable space environment.

Much of my time at the State Department is focused on the national security aspects of international space cooperation, particularly working with traditional space-faring allies and partners, but also in exploring potential opportunities for cooperation with emerging space powers. My colleagues at State and I also continue to work closely with the Departments of Defense, Commerce, and Transportation as well as with NASA and the Intelligence Community to implement this new policy and to preserve the long-term sustainability of our space activities.

As all of you know, the U.S. National Space Policy was released in late June of this year. This policy is a statement of the Administration's highest priorities for space, and reflects our principles and goals to be used in shaping the conduct of our space programs and activities.

In the four years since the issuance of the previous U.S. National Space Policy, a number of developments have changed the opportunities, challenges, and threats facing the international space community. This new policy both accounts for those changes, and reflects the fact that space has become an even more important component of our collective economic and international security.

Secretary of State Hillary Clinton has talked about building a "global architecture of cooperation" to deal with today's challenges. In fact, a key

component of the new National Space Policy is its increased emphasis on expanding international cooperation and collaboration. Such opportunities include cooperation to mitigate orbital debris, share space situational awareness information, improve information sharing for collision avoidance, and develop transparency and confidence building measures. Collaboration in each of these areas has the potential of enhancing stability in space. I will discuss these opportunities for cooperation now and then close with some of our views on how all countries can contribute to preserving the space environment for future generations.

Cooperation to Mitigate Orbital Debris

One issue that underlines the need for cooperation is the growing presence of debris in space. There are now around 21,000 pieces of space debris in various Earth orbits – in other words, about 6,000 metric tons of debris orbiting the Earth. Some of this debris was created accidentally through collisions or routine space launches, some was intentional such as the Chinese ASAT test in 2007. Experts warn that the quantity and density of man-made debris significantly increases the odds of dangerous and damaging collisions. This debris also adds to the overall magnitude of hazards in critical orbits, such as those used by the space shuttle and the International Space Station. For example, the space shuttle is impacted by debris repeatedly on every mission. In fact, debris poses the single largest threat to the shuttle and to the astronauts onboard during these missions. The typical risk of the space shuttle being critically impacted by debris is about one in 250.

To address the growing problem of orbital debris, the United States plans to expand its engagement within the United Nations and with other governments and non-governmental organizations. We are continuing to lead the development and adoption of international standards to minimize debris, building upon the foundation of the U.N. Space Debris Mitigation Guidelines. The United States is also engaged with our European allies and partners and other like-minded nations on a multi-year study of "long-term sustainability" within the Scientific and Technical Committee of the U.N. Committee on the Peaceful Uses of Outer Space, or COPUOS. This effort will provide a valuable opportunity for cooperation with established and emerging space actors and with the private sector to establish a set of "best practice" guidelines that will enhance space-flight safety.

In collaboration with other space-faring nations, the United States is also pursuing research and development of technologies and techniques to mitigate on-orbit debris and increase our understanding of the current and future debris environment. We are also working to develop international and industry standards to slow down the accumulation of debris in space to put ourselves on a more sustainable path. These activities provide valuable opportunities for expanded international cooperation with the global space-faring community and the private sector, and also contribute to preserving the space environment for future generations.

Cooperation in Space Situational Awareness

International cooperation is also necessary to ensure that we have robust situational awareness of the space environment. No one nation has the resources or geography necessary to precisely track every space object. The National Space Policy implicitly recognizes this fact and thus directs us to collaborate with other nations, the private sector, and intergovernmental organizations to improve our space situational awareness – specifically, to improve our shared ability to rapidly detect, warn of, characterize, and attribute natural and man-made disturbances to space systems.

An example of our efforts to cooperate in the area of space situational awareness is our collaboration with Europe as they develop their own space situational awareness, or SSA system. The State Department, in collaboration with Department of Defense, is currently engaged in technical exchanges with experts from the European Space Agency, European Union, and individual ESA and EU Member States to ensure interoperability between our two SSA systems. Looking ahead, State and DoD also see opportunities for cooperation on SSA with our allies and partners in the Asia-Pacific and other regions.

Cooperation to Prevent Collision Avoidance

International cooperation is also essential to enable satellite owners and operators to have the information necessary to prevent future collisions. As a result, we are seeking to improve our ability to share information with other space-faring nations as well as with our industry partners. Such

cooperation enables us to improve our space object databases as well as pursue common international data standards and data integrity measures.

The National Space Policy calls for collaboration on the dissemination of orbital tracking information, including predictions of potentially hazardous conjunctions between orbiting objects. In addition to improving our own capabilities to conduct expanded space object detection, characterization, and tracking and maintaining the space object catalogue, the United States also provides notifications to other governments and commercial satellite operators of potential conjunctions. Currently, U.S. Strategic Command is working in coordination with the State Department as well as with experts from NASA and the Department of Commerce to improve the accuracy of our conjunction analyses and to facilitate rapid notifications of space hazards. To ensure timely notifications, the Department of State is reaching out to all space-faring nations to ensure that the Joint Space Operations Center has current contact information for both government and private sector satellite operations centers.

We hope that as our space surveillance capabilities improve, we will be able to notify satellite operators earlier and with greater accuracy in order to prevent collisions in space. The U.S. Government is currently working closely with the commercial space industry to determine the kinds of satellite data and other information that can be shared within appropriate national security and proprietary bounds. Working together at the operator level to share collision warning information will have the added benefit of improving spaceflight safety and communication among governmental and commercial operators, users, and decision-makers.

Cooperation in Developing TCBMs

Finally, the United States is working with the international community to develop transparency and confidence building measures, or TCBMs. The National Space policy clearly states that the United States will continue to work with other space actors to pursue pragmatic bilateral and multilateral TCBMs to mitigate the risk of mishaps, misperceptions, and mistrust. It also affirms that we are open to considering space-related arms control concepts and proposals, provided they meet the rigorous criteria of equitability, effective verifiability, and enhance the national security of the United States and its allies.

The United States will pursue pragmatic, near-term TCBMs to enhance U.S. security as well as the security of our allies, friends, and space partners. Examples of bilateral space-related TCBMs include dialogues on space policies and strategies, expert visits to military satellite flight control centers, and discussions on mechanisms for information exchanges on natural and debris hazards. Space security dialogues are another important example of TCBMs. To date, the State Department has conducted these dialogues with a number of key allies and partners including Australia, Canada, France, Germany, Italy, Japan, and the United Kingdom, and we expect to engage other nations in the coming months.

Additionally, following the February 2009 collision between a commercial Iridium spacecraft and an inactive Russian military satellite, the United States and Russia were in direct communication to discuss the incident. This experience is contributing to the ongoing dialogue with Russia on developing additional concrete and pragmatic bilateral TCBMs that will enhance spaceflight safety. This past August 24, I led a U.S. interagency delegation to Moscow for a bilateral space security dialogue between experts. There we reviewed national space policy developments and opportunities for reciprocal site visits and collaboration in multilateral fora.

In addition to these exchanges, the United States looks forward to implementing a range of reciprocal military-to-military exchanges, including many of the specific measures noted by Russia in its past submissions to the Secretary General of the United Nations. The United States has invited Russian military space officials to participate in events such the STRATCOM Space Symposium, which occurred earlier this month. We have also invited them to visit STRATCOM's Joint Space Operations Center at Vandenberg Air Force Base in California.

Additionally, the United States stands ready to discuss space security with China as part of the U.S.-China Strategic and Economic Dialogue, the U.S.-China Security Dialogue, and through military-to-military exchanges. Such exchanges fulfill the call of President Obama and President Hu in the joint statement of November 17, 2009, to take steps to enhance security in outer space.

The adoption of international norms or multilateral "codes of conduct" are also examples of TCBMs. The United States is currently completing an extensive review of the European Union's initiative to develop a comprehensive set of multilateral TCBMs, also known as the "Code of Conduct for Outer Space Activities." Over the past three years, the United States has been actively consulting with the EU on the Code. It is our hope to make a decision in the coming months as to whether the United States can sign on to such a Code, pending our ongoing review and the results of further consultations with the EU and other like-minded nations.

The United States looks forward to continued and substantive discussions on pragmatic and voluntary TCBMs within multilateral fora. During last month's meeting of the UN General Assembly First Committee, we sought to collaborate with Russia on a resolution establishing a group of government experts to assess options for TCBMs. The United States offered the Russian Federation and the People's Republic of China a constructive text for co-sponsorship. Ultimately, we could not support this resolution's linkage with the "Prevention of Placement of Weapons in Outer Space Treaty" (PPWT).

That said, while we had some concerns about the resolution text, we nonetheless appreciate the efforts of the Russia Federation to advance our shared goals of developing TCBMs. In particular, we are supportive of the resolution's establishment of a Group of Government Experts (GGE) to examine TCBMs in space. Any GGE report, which would be adopted only upon consensus, should focus on pragmatic and voluntary TCBMs that solve concrete problems. We look forward to working with our colleagues, on this effort in such a GGE. Additionally, the United States continues to support the inclusion of a non-negotiating, or discussion, mandate in any CD program of work under the agenda item, "Prevention of an Arms Race in Outer Space," known as PAROS.

We also believe it is time to consider how space relates to the challenges facing the North Atlantic Alliance, and how to strengthen Alliance partnerships to reflect the globalized, interconnected world that we live in today. Less than two weeks ago, during their Summit meeting in Lisbon, NATO leaders adopted a new Strategic Concept. This document will serve as the Alliance's roadmap for the next ten years and re-confirms the

commitment to indivisibility, that is, to defend one another against attack, including against new threats.

The new Strategic Concept paves the way for the Alliance to modernize its ability to carry out its core mission of collective defense as well as trans-Atlantic consultations on all matters that affect the territorial integrity, political independence, and security of its members. The Concept also commits the Alliance to prevent crises, manage conflicts and stabilize post-conflict situations, including by working more closely with our international partners, most importantly the United Nations and the European Union.

Of particular interest to this group is the fact that the Strategic Concept urges Allies to invest in key capabilities to meet emerging security challenges.

The Concept's discussion of the global security environment notes while the threat of a conventional attack against NATO territory is low, many other regions and countries around the world are witnessing the acquisition of substantial, modern military capabilities with consequences for international stability and Euro-Atlantic security that are difficult to predict.

Specifically, the Concept notes that "[a] number of significant technology-related trends – including the development of laser weapons, electronic warfare and technologies that impede access to space – appear poised to have major global effects that will impact on NATO military planning and operations."

In the coming months, the United States intends to consult with our Allies at NATO on the implications of these trends, as well as efforts to carry out the necessary training, exercises, contingency planning and information exchange for assuring our collective self-defense against emerging security challenges in space. We will also consult with them regarding associated measures to provide appropriate visible assurance and reinforcement for all Allies who benefit from the free use of outer space.

Conclusion

In closing, I'd like to mention that all countries can contribute to preserving the space environment for future generations. As the first principle of our National Space Policy affirms, "[i]t is the shared interest of all nations to act

responsibly in space to help prevent mishaps, misperceptions, and mistrust." The United States calls on governments around the world to work together to adopt approaches for responsible activities in space in order to preserve this right for the benefit of future generations. As a result, the United States is seeking to cooperate in the areas of debris mitigation, situational awareness, collision avoidance, and responsible and peaceful behavior in space. This will require the assistance from all space actors – not only established space-faring nations, but also those countries just beginning to explore, and use, space.

President Obama's National Space Policy renews America's pledge of cooperation in the belief that, with re-invigorated U.S. leadership and strengthened international collaboration, all nations and peoples—space-faring and space-benefiting—will find their horizons broadened, their knowledge enhanced, and their lives greatly improved. The United States looks forward to our future work with all responsible space actors to create a more secure, stable, and safe space environment for the benefit of all nations

NDU Conference on "Securing Space Assets for Peace and Future Conflict"

Ambassador Gregory L. Schulte
Deputy Assistant Secretary of Defense (acting) for Space Policy
30 November 2010

Space is critical to the Department of Defense. Capabilities based in space enable our Armed Forces to navigate accurately, communicate quickly, see the battlefield clearly, and strike precisely. However, the environment in which our space systems operate has fundamentally changed.

During the Cold War, space was the private reserve of the United States and Soviet Union. It was the "High Frontier" from which we could support national defense and power projection with near impunity.

Today, space is increasingly a shared domain in which we operate with more and more space-faring countries -- both close allies and potential adversaries. It is a shared domain that is increasingly challenged by what we call "the three C's": congested, competitive, and contested.

Space is increasingly congested. There are over 1,100 active systems on orbit, and an additional 21,000 pieces of debris littering the skies. Radio frequency interference is also a concern, with more than 9,000 satellite transponders expected on orbit in 2015.

Space is increasingly competitive. Eleven countries are operating 22 launch sites. More than 60 nations and government consortia currently operate satellites. The US share of worldwide satellite exports dropped from nearly 2/3 in 1997 to 1/3 in 2008. This is a significant challenge to our industrial base …. but also opens opportunities for international cooperation.

Space is increasingly contested. China demonstrated a direct-ascent anti-satellite capability in 2007 and is developing other capabilities to disrupt and disable satellites. Iran and others have demonstrated the ability to jam satellite signals. Our reliance on space tempts potential adversaries to see it as a vulnerability to be exploited.

A New Strategic Approach

The space environment has changed, and our national space policy has changed. The Department of Defense must change its strategic approach to space accordingly.

Secretary Lynn spoke about the need for change in his November 3rd speech to the STRATCOM Space Symposium. The forthcoming National Security Space Strategy, to be issued jointly by the Secretary of Defense and the Director of National Intelligence, will elaborate on the changes that are needed.

Today I will focus on the changes necessary for the subject of this conference: "Safeguarding our Space Assets for Peacetime and Future Conflict." I will argue that we must change our strategic approach in three areas: rules of the road; resiliency and mission assurance; and deterrence.

Rules of the Road

First, we need to start work on rules of the road.

There are a variety of potential roles for such rules. These include: promoting spaceflight safety; reducing unintentional interference; maximizing the use of crowded orbits; reducing mistrust and misperceptions; and discouraging destabilizing crisis behavior. Moreover, rules provide a way to hold accountable those who break them.

Rules normally apply in peacetime, but may also help to shape crisis behavior. The rules may be written and agreed internationally. Rules may also be tacit, based upon established practice, diplomatic or military-to-military exchanges, or even declaratory policy.

An obvious place to start making rules is to build on emerging guidelines to avoid the generation of long-lived space debris. With this in mind, we are closely examining the EU's proposed Code of Conduct and are encouraging other space-faring countries, including Russia, China, and India, to do the same.

Ultimately we seek agreed rules – or at least tacit understandings – that limit the risk of mishaps or miscalculations in crisis. During the Cold War, there seemed to be tacit basic rules of the road between the U.S. and U.S.S.R. These were founded in part on treaty obligations not to interfere with either side's "National Technical Means." Such rules of the road do not exist today, but are needed as more countries are developing capabilities that can be used for hostile purposes.

In his speech, Secretary Lynn called on us to consider what further measures of transparency, verification, and confidence-building can enhance the stability of space.

Rules of the road need to be accompanied by practical measures to implement them and monitor compliance. STRATCOM is already doing important work to help other countries avoid collisions by providing Space Situational Awareness services. Just as the Air Force through STRATCOM is the world's premier provider of global positioning data, STRATCOM is becoming the world's premier provider of collision warning.

Strengthening our capabilities for Space Situational Awareness and further developing our mechanisms to share it will reinforce our efforts to establish international rules of the road.

Resiliency and Mission Assurance

Second, we need to increase emphasis on resiliency and mission assurance.

Past means to protect our space systems were frequently too narrow. Too often they provided system-level protection or no protection at all. They also tended to focus on specific satellites, not the mission they performed.

We need a different approach. Specifically, we need to make our space-based architectures more resilient and to assure the missions that they support. This may entail a variety of means:

- No matter what else, we must improve our capability to "fight through" interference. Our Services are already conducting training and exercises that simulate a degraded space environment, helping and indeed requiring them to develop the necessary tactics, techniques and procedures for this environment.
- Rather than relying on a small number of satellites for critical functions, we may want to "fractionate" their functions across multiple satellites. This is a concept being pursued by DARPA.
- We may want to leverage commercial space systems or use foreign space capabilities to complicate targeting and add resilience. The Wideband Global SATCOM system is a good example. Australia is joining the constellation and other allies are looking at doing the same.
- We may want to have a responsive capability to reconstitute space-based capabilities that have been degraded or lost. The Air Force's Operationally Responsive Space program is starting us on a trajectory to that end.
- Finally, we may want to pursue cross-domain solutions with ground-, sea-, or air-based systems backing up space-based capabilities. UAVs are one option that we are exploring.

In many cases, we may want to pursue multiple means. Take for example the Global Positioning System, a space-based capability critical to all of our Services. To enhance its resiliency and mission assurance, we may want a combination of on-orbit spares, interoperability with Europe's Galileo satellite system, and land-based backup … including refresher courses in compass navigation!

Resiliency and mission assurance can help protect critical capabilities in crisis and conflict. Moreover, to the extent we develop and demonstrate resilience and mission assurance, potential adversaries may be dissuaded in peacetime from pursuing counterspace capabilities.

<u>Deterrence</u>

We also need to think differently about deterrence.

We must not assume that attacks in space can or should be deterred by the threat of retaliation in space. Rather, as Secretary Lynn has argued, a strategy that encompasses a broad range of options will have the greatest chance for success.

Many of the actions that I have already described can contribute to deterrence by complicating the decision-making of a potential adversary: creating norms that would need to be broken; building international partnerships that would need to be attacked; and strengthening resilience and mission assurance that would reduce the benefit of attack.

The threat of retaliation can still play a role, though it need not be confined to space. As Secretary Lynn said, we must make clear that United States "views its space assets as a vital national interest. Consistent with our inherent right of self-defense, we will respond accordingly to attacks on them." This implies certainty of response but in a manner of our own choosing.

Ultimately, like any deterrent strategy, the deterrent strategy for space must be developed in the context of particular countries and particular scenarios. And we must consider the best means to convey our deterrent messages in peacetime and to influence the decision-making of potential adversaries in crisis and war.

Conclusion

As we adapt our strategy to take on new challenges, the Department of Defense does not have a monopoly on good ideas. We need to tap the advice and input of experts such as you from the United States, our allies, and other space-faring countries.

In his speech last month, Secretary Lynn said:

> "Succeeding in the new space environment will depend as much on changing mindsets fifty years in the making as it will on altering longstanding institutional practices. The fundamental mission of the Department of Defense to deter war and to protect the security of our country stays the same. But how we use space capabilities to achieve this mission will change."

Change we must. I look forward to your advice on how best to do so.

THE DRAFT TREATY ON THE PREVENTION OF THE PLACEMENT OF WEAPONS IN OUTER SPACE

TRANSPARENCY AND CONFIDENCE-BUILDING MEASURES IN SPACE ACTIVITY, THEIR PLACE AND ROLE IN SPACE SECURITY

Alexander Trofimov

Embassy of the Russian Federation

Washington D.C.

November 30th, 2010

THE DRAFT TREATY ON THE PREVENTION OF THE PLACEMENT OF WEAPONS IN OUTER SPACE (PPWT)

- **In his speech in Munich (February 11, 2007) Russian President Vladimir V. Putin stated that a draft special treaty preventing the dangerous process of weaponization of outer space was being prepared.**

- **On February 12, 2008 Minister of Foreign Affairs Sergei Lavrov officially introduced the joint Russian-Chinese draft of the treaty on the Prevention of the Placement of Weapons in Outer Space, and of the Threat or Use of Force Against Outer Space Objects (the PPWT).**

- **PPWT is not something totally new. It is based on working document CD/ 1679 tabled by Russia and China with a group of cosponsors in June 2002. All the documents relating to the draft treaty and working papers of the previous discussions are available at the CD website.**

The Rationale Behind the PPWT

- Modern international space law does not prohibit deployment in space of weapons other than WMD.
- Deployment of weapons in space by one state will inevitably result in a chain reaction.
- The objective of the draft PPWT is to eliminate existing lacunas in international space law, create conditions for further exploration and use of outer space, preserve costly outer space property, and strengthen international security and arms control regimes.

- <u>Why do we need the PPWT?</u>

- Without such a treaty it would be difficult to predict the development of the strategic situation in outer space and on Earth.
- International situation would be seriously destabilized due to a possibility of *unexpected, sudden* use of space weapons because space weapons, unlike WMD, may be applied selectively and discriminately.
- Placement of weapons in outer space would arouse *suspicions and tensions* in international relations .
- Attaining monopoly of space weapons would be an illusionary goal, all kinds of symmetrical and assymetrical responses would inevitably follow.

Definitions and Scope of the PPWT

- **The draft PPWT provides for some basic definitions which are essential for the clarification of the specific scope of the Treaty.**

- **The non-use of force obligation is an application of the basic UN Charter principle to outer space activities. It covers a wide range of possible hostile actions against outer space objects: destruction, damage, imparing normal functioning, disruption of channels of communication with ground command and control centers, deliberate change of orbit parameters, etc.**

- **A special verification protocol can supplement the treaty at a later stage or a PPWT verification mechanism may be substituted by a set of confidence building measures.**

- **It is proven that verification of non-placement of weapons in outer space is technically feasible.**

The PPWT draft and the CD

- The CD has been discussing and developing basic elements of the PPWT for five years.
- No substantive and convincing arguments against the PPWT have been tabled.
- The CD shall focus on substantial discussions on the PPWT under its Agenda item 3.
- The draft PPWT is submitted with a research mandate

Next steps

- **We propose to conduct discussions on the PPWT on the basis of the structure of the Draft Treaty elements.**

1. **Preamble. Aims of a new Treaty, explanation of its importance and practical usefulness.**
2. **Terms and definitions.**
3. **The scope and basic obligations.**
4. **Use of outer space for peaceful and other purposes.**
5. **Transparency and confidence building measures in outer space activities.**
6. **Settlement of disputes mechanism.**
7. **The need for establishing an executive body to deal with the implementation of the PPWT, how it would interact with the COPUOS and other international organizations.**
8. **The PPWT and the international cooperation in research and use of outer space for peaceful purposes.**
9. **Organizational issues: amendments, signature, ratification of the Treaty, and its entry into force.**
10. **Possible additional elements for such a Treaty.**

- **A number of countries have already submitted specific proposals and comments to the draft Treaty.**

CONCLUSIONS:

- *The PPWT will serve the security interests of all states and will contradict the interests of none.*
- *PPWT is a most efficient way to solve the key problems of the outer space security*
- *Russia is open for work on the PPWT and flexible on any thoughts and suggestions the international community could present to us considering this Draft.*

Transparency and confidence-building measures in space activity are an important component of the space activity regulation

- **UNGA Resolutions (45/55B; 47/51; 48/74B) that reiterate:**

> **"the importance of confidence-building measures to prevent the arms race in outer space“**

- **The UNGA Resolution on the prevention of arms race in outer space, adopted every year, recognizes that:**

> **"specific proposals on TCBMs can become an integral part of an agreement or agreements to prevent the arms race in outer space"**

Some applications of transparency and confidence-building measures in the international law of outer space

- **Notification of UNSG, general public and international scientific community about the character, conduct, location and results of outer space activities**

  (Outer Space Treaty of 1967)

- **Provision of data about launched space objects and terminated or modified Earth orbiting objects**

  (Registration Convention of 1975)

- **Cooperation in joint resolution of emerging problems, etc.**

“ Research on application of measures for confidence-building in outer space“

Report of the group of governmental experts
at the 48-th session of the UN GA

Main conclusions and recommendations:

- **Any space activity should be carried out in the interest of strengthening the international peace and security**
- **The main problems that raise concern of the majority of States are related to potential deployment of weapons in outer space**
- **The transparency measures must be developed in such a way as to take into account the need for strengthening international confidence and protection of national security interests**
- **In considering eventual confidence-building measures in outer space the different space potential of States should be taken into account**
- **In the view of several States the time has come to start large scope negotiations with a view to an international agreement prohibiting the weaponization of outer space**
- **Relevant confidence-building measures in space can become an important step towards the prevention of an arms race in outer space and peaceful use of outer space by all States**
- **International cooperation in the exploration and use of outer space is one of confidence-building measures. Any space activity should be carried out in the interest of strengthening the international peace and security**

- **The main problems that raise concern of the majority of States are related to potential deployment of weapons in outer space**
- **The transparency measures must be developed in such a way as to take into account the need for strengthening international confidence and protection of national security interests**
- **In considering eventual confidence-building measures in outer space the different space potential of States should be taken into account**
- **In the view of several States the time has come to start large scope negotiations with a view to an international agreement prohibiting the weaponization of outer space**
- **Relevant confidence-building measures in space can become an important step towards the prevention of an arms race in outer space and peaceful use of outer space by all States**

Examples of transparency and confidence-building measures implemented as an initiative

- **Since 2003 Russia has been posting in the web the information for the international community on scheduled launches and their mission**
- **In 2004 Russia announced that it will not be the first to deploy weapons in outer space**
- **In 2005 this initiative of the Russian Federation was endorsed by the Member-States of the Collective Security Treaty, who made similar statements**
- **Norway provides notifications on scheduled launches of rocket probes from its missile range in the Arctic Ocean**
- **On June 8, 2006 the UK Delegation made a statement at a plenary meeting of the Conference on Disarmament that the UK "has no intention to deploy weapons in outer space“**

CONCLUSIONS:

- **Transparency and confidence-building measures are an integral part of international legal framework to ensure international security, prevention of armed conflicts, and progress in the field of disarmament**
- **In developing the transparency and confidence-building measures we should take into account the need to strengthen international trust and protect the interests of national security, with due regard to differences in space potential of States**
- **Transparency and confidence-building measures may be developed and applied within the bilateral, multilateral, regional or global formats**
- **Transparency and confidence-building measures can and are contributing to the progress towards reaching agreement on prohibiting the placement of weapons in outer space. They can play an independent role in ensuring space security and remain an integral part of control mechanism of a treaty prohibiting the deployment of weapons in outer space**
- **Transparency and confidence-building measures with all their importance and relevance for security in space cannot substitute comprehensive legal obligations on the prevention of an arms race in outer space**