SPACE SECURITY INDEX 2016

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SPACE SECURITY INDEX 2016 | EXECUTIVE SUMMARY

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Space Security Index 2016: Executive Summary

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INTRODUCTION

Space Security Index 2016 is the thirteenth annual report on developments related to safety, sustainability, and security in outer space, covering the period January-December 2015. It is part of the broader Space Security Index (SSI) project, which aims to improve transparency on space activities and provide a common, comprehensive, objective knowledge base to support the development of national and international policies that contribute to the security and sustainability of outer space.

The definition of space security guiding this report reflects the intent of the 1967 Outer Space Treaty that outer space should remain open for all to use for peaceful purposes now and in the future:

> The secure and sustainable access to, and use of,
> space and freedom from space-based threats.

The key consideration in this SSI definition of space security is not the interests of particular national or commercial entities, but the security and sustainability of outer space as an environment that can be used safely and responsibly by all. This broad definition encompasses the security of the unique outer space environment, which includes the physical and operational integrity of manmade objects in space and their ground stations, as well as security on Earth from threats originating in space.

From communications to financial operations, farming to weather forecasting, and environmental monitoring to navigation, surveillance, and treaty monitoring, outer space resources play a key role in the activities of all nations. In this context, issues such as the threat posed by space debris, the priorities of national civil space programs, the growing importance of the commercial space industry, efforts to develop a robust normative regime for outer space activities, and concerns about the militarization and potential weaponization of space are critical to consider as factors influencing overall space security.

The information in the report is organized under four broad Themes, with each divided into various indicators of space security. This arrangement is intended to reflect the increasing interdependence, mutual vulnerabilities, and synergies of outer space activities.

The structure of the 2016 report is as follows:

» **Theme 1: Condition and knowledge of the space environment**
Indicator 1.1: *Orbital debris*
Indicator 1.2: *Radio frequency (RF) spectrum and orbital positions*
Indicator 1.3: *Natural hazards originating from space*
Indicator 1.4: *Space situational awareness*

» **Theme 2: Access to and use of space by various actors**
Indicator 2.1: *Space-based global utilities*
Indicator 2.2: *Priorities and funding levels in civil space programs*
Indicator 2.3: *International cooperation in space activities*
Indicator 2.4: *Growth in commercial space industry*
Indicator 2.5: *Public-private collaboration on space activities*
Indicator 2.6: *Space-based military systems*

» **Theme 3: Security of space systems**
Indicator 3.1: *Vulnerability of satellite communications, broadcast links, and ground stations*
Indicator 3.2: *Reconstitution and resilience of space systems*
Indicator 3.3: *Earth-based capabilities to attack satellites*
Indicator 3.4: *Space-based negation-enabling capabilities*

» **Theme 4: Outer space governance**
Indicator 4.1: *National space policies*
Indicator 4.2: *Multilateral forums for space governance*
Indicator 4.3: *Other initiatives*

The most critical challenge to the security and sustainability of outer space continues to be the threat posed by space debris to spacecraft of all nations. The total amount of manmade space debris in orbit is growing each year, concentrated in the orbits where human activities take place.

Today the U.S. Department of Defense (DoD) is using the Space Surveillance Network to track some 23,000 pieces of debris 10 centimeters (cm) in diameter or larger. Experts estimate that there are more than 500,000 objects with a diameter larger than one centimeter and several million that are smaller.

There is a growing risk that space assets may collide with one another or with a piece of orbital debris. As outer space becomes more congested, the likelihood of such events increases, making all spacecraft vulnerable, regardless of the nation or entity to which they belong.

In recent years, awareness of the space debris problem has grown considerably and significant efforts have been made to mitigate the production of new debris through

compliance with national and international guidelines. The future development and deployment of technology to remove debris promise to ensure the sustainability of outer space if and when it becomes operational. It is incumbent upon the international community to proactively address the myriad technical, political, and financial challenges that will inevitably be associated with Active Debris Removal.

Similarly, the development of space situational awareness (SSA) capabilities to track space debris provides significant space security advantages—for example, when used to avoid collisions. The sensitive nature of some information and the small number of space actors with advanced tools for surveillance have traditionally kept significant data on space activities shrouded in secrecy. But recent developments followed by the Space Security Index suggest that there is a greater willingness to share SSA data through international partnerships—a most welcome trend. In addition, commercial providers of SSA information are also emerging.

As barriers to entry go down, more nations will enter space. However, the limitations of some space resources will challenge the ability of newcomers to gain equitable access.

The use of space-based global utilities has grown substantially over the last decade. Millions of individuals rely on space applications on a daily basis for functions as diverse as weather forecasting, navigation, and search-and-rescue operations.

International cooperation remains key to both civil space programs and global utilities. Collaboration in civil space programs can assist in the transfer of expertise and technology for the access to, and use of, space by emerging space actors. Projects that involve complex technical challenges and mammoth expense, such as the International Space Station, require nations to work together. The degree of cooperation in space, however, may be affected by geopolitical tensions on Earth.

The role that the commercial space sector plays in the provision of launch, communications, imagery, and manufacturing services and its relationship with civil and military programs make this sector an important determinant of space security. A healthy space industry can lead to decreasing costs for space access and use, and may increase the accessibility of space technology for a wider range of space actors.

The military space sector is an important driver in the advancement of capabilities to access and use space. Many of today's common space applications, such as satellite-based navigation, were first developed for military use. Space systems have augmented the military capabilities of a number of states by enhancing battlefield awareness, offering precise navigation and targeting support, providing early warning of missile launch, and supporting real-time communications. Furthermore, remote sensing satellites have served as a technical means for nations to verify compliance with international nonproliferation, arms control, and disarmament regimes.

However, the use of space systems to support terrestrial military operations could be detrimental to space security if adversaries, viewing space as a new source of military threat or as critical military infrastructure, develop negation capabilities to neutralize the space systems of other nations.

The security dynamics of space systems protection and negation are closely related and space security cannot be divorced from terrestrial security. In this context, it is important to point out that offensive and defensive space capabilities are not only related to systems that are physically in orbit, but include orbiting satellites, ground stations, and data and communications links.

No hostile anti-satellite (ASAT) attacks have been carried out against an adversary; however, recent incidents testify to the availability and effectiveness of missiles to destroy an adversary's satellite. The ability to rapidly rebuild space systems after an attack could reduce vulnerabilities in space. The capabilities to refit space systems by launching new satellites into orbit in a timely manner to replace satellites damaged or destroyed by an attack are critical resilience measures. Smaller spacecraft that may be fractionated or distributed on hosts can improve continuity of capability and enhance security through redundancy and rapid replacement of assets. While these characteristics may make attack against space assets less attractive, they can also make assets more difficult to track and could potentially hinder transparency in space activities. In addition, capabilities required to repair or service satellites in orbit could also enable space-based negation activities.

International instruments that regulate space activities have a direct effect on space security because they establish key parameters for acceptable behavior in space. These include the right of all countries to access space, prohibitions against the national appropriation of space, and the obligation to ensure that space is used with due regard to the interests of others and for peaceful purposes. International space law, as well as valuable unilateral, bilateral, and multilateral transparency and confidence-building measures, can make space more secure by regulating activities that may infringe upon the ability of actors to access and use space safely and sustainably, and by limiting space-based threats to national assets in space or on Earth.

While there is widespread international recognition that the existing regulatory framework is insufficient to meet the current challenges facing the outer space domain, the development of an overarching normative regime has been slow. Space actors have been unable to reach consensus on the exact nature of a space security regime, although specific alternatives have been presented.

Proposals include both legally binding treaties, such as the proposed Treaty on the Prevention of the Placement of Weapons in Outer Space, and of the Threat or

Use of Force against Outer Space Objects (known as the PPWT), and politically binding norms, such as the proposed International Code of Conduct for Outer Space Activities.

As in previous editions, *Space Security Index 2016* includes a brief Global Assessment analysis, which is intended to provide a broad assessment of the trends, priorities, highlights, breaking points, and dynamics that are shaping current space security discussions.

The Global Assessment is assigned to a different space security expert every year to encourage a range of perspectives. The author of the current assessment is Jana Robinson, Space Security Program Director at the Prague Security Studies Institute. Robinson previously served as Space Policy Officer at the European External Action Service in Brussels and as a Space Security Advisor to the Czech Foreign Ministry.

The information in *Space Security Index 2016* is from open sources. Great effort is made to ensure a complete and factually accurate description of events. Project partners and sponsors trust that this publication will continue to serve as both a reference source and a tool for policymaking, with the ultimate goal of enhancing the sustainability of outer space for all users.

Expert participation in the Space Security Index is a key component of the project. The primary research is peer-reviewed prior to publication through various processes. For example, the Space Security Working Group in-person consultation is held each spring for two days to review the draft text for factual errors, misinterpretations, gaps, and misstatements. This meeting also provides an important forum for related policy dialogue on recent developments in outer space.

For further information about the Space Security Index, its methodology, project partners, and sponsors, please visit the website **www.spacesecurityindex.org**, where you can find the full report, *Space Security Index 2016*. Comments and suggestions are welcome.

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EXECUTIVE SUMMARY

Definition of space security: secure and sustainable access to and use of space, and freedom from space-based threats

Theme 1: Condition and knowledge of the space environment

INDICATOR 1.1: Orbital debris — Space debris poses a significant, constant, and indiscriminant threat to all spacecraft. Most space missions create some space debris, mainly rocket booster stages that are expended and released to drift in space along with bits of hardware. Serious fragmentations are usually caused by energetic events such as explosions. These can be both unintentional, as in the case of unused fuel exploding, or intentional, as in the testing of weapons in space that utilize kinetic energy interceptors. Traveling at speeds of up to 7.8 kilometers (km) per second, even small pieces of space debris can destroy or severely disable a satellite upon impact. The number of objects in Earth orbit has increased steadily. There have already been a number of collisions between civil, commercial, and military spacecraft and pieces of space debris. Although a rare occurrence, the reentry of very large debris could also potentially pose a threat on Earth.

2015 Developments

Space object population

- Satellite breakups contribute to growth in debris; significant increase in active objects in space

Debris-related risks and incidents

- Breakup of U.S. DMSP F13 raises questions about safety of similar satellites in space
- Debris continued to pose risks to human spaceflight operations

International awareness of debris problem increases as progress toward solutions continues

- Uncontrolled reentry of Russia's Progress-59 prompts potential mitigation strategies
- International awareness of debris mitigation shows effectiveness, but challenges remain
- Progress on research for orbital debris mitigation
- Growing awareness of challenges posed by small satellites, with industry leading mitigation efforts

INDICATOR 1.2: Radio frequency (RF) spectrum and orbital positions — The growing number of spacefaring nations and satellite applications is driving the demand for access to radio frequencies and orbital slots. Issues of interference arise primarily when two spacecraft require the same frequencies at the same time

and their fields of view overlap or they are transmitting in close proximity to each other. While interference is not epidemic, it is a growing concern for satellite operators, particularly in crowded space segments. More satellites are locating in Geostationary Earth Orbit (GEO), using frequency bands in common and increasing the likelihood of frequency interference. The increased competition for orbital slot assignments, particularly in GEO, where most communications satellites operate, has caused occasional disputes between satellite operators. The International Telecommunication Union (ITU) has been pursuing reforms to address slot allocation backlogs and other related challenges.

2015 Developments

- Spectrum allocations at World Radiocommunication Conference 2015 reflect shifting uses of outer space
- WRC-15 restricts application of Article 48 for National Defense Service
- WRC-15 clarifies several bringing-into-use deadline requirements
- ITU acknowledges special circumstances of developing countries for extension of BiU deadlines on a case-by-case basis
- Continued regulatory concerns about trend to small satellites

INDICATOR 1.3: Natural hazards originating from space — Natural hazards originating from space fall into two categories: Near-Earth Objects (NEOs) and space weather. NEOs are asteroids and comets in orbits that bring them into close proximity to Earth. By mid-2016 there were 14,653 known Near-Earth Asteroids, 1,723 of which were identified as Potentially Hazardous Asteroids, whose orbits come within 0.05 astronomical units of Earth's orbit and have a brightness magnitude greater than 22 (approximately 150 meters in diameter). Increasing international awareness of the potential threat posed by NEOs has prompted discussions at various multilateral forums on the technical and policy challenges related to mitigation. Ongoing technical research is exploring how to mitigate a NEO collision with Earth.

"Space weather" is a term that over the past few years has come to refer to a collection of physical processes, beginning at the Sun and ultimately affecting human activities on Earth and in space. The Sun emits energy as flares of electromagnetic radiation and as electrically charged particles through coronal mass ejections (CME) and plasma streams. Powerful solar flares can cause radio blackouts and slow down satellites, making them move to lower orbits. Increases in the number and energy of charged particles can induce power surges in transmission lines and pipelines, disruptions to high-frequency radio communication and GPS navigation, and failure or incorrect operation of satellites.

2015 Developments

Near-Earth Objects (NEOs)

- Continued observation and assessment of Potentially Hazardous Objects
- Technologies for possible asteroid deflection continue to be explored

Space weather

- Additional resources study space weather
- World Meteorological Organization and United States plan better response to space weather
- Growing role for commercial sector to address space weather
- New cooperative efforts to monitor, mitigate effects of space weather

INDICATOR 1.4: Space situational awareness — Space situational awareness (SSA) refers to the ability to detect, track, identify, and catalog objects in outer space, such as space debris and active or defunct satellites, as well as observe space weather and monitor spacecraft and payloads for maneuvers and other events. SSA enhances the ability to distinguish space negation attacks from technical failures or environmental disruptions and can thus contribute to stability in space by preventing misunderstandings and false accusations of hostile actions. Increasing the amount of SSA data available to all states can help to increase the transparency and confidence of space activities, which can reinforce the overall stability of the outer space regime. The Space Surveillance Network (SSN) puts the United States far in advance of the rest of the world in SSA capability. But there is currently no operational global system for space surveillance, in part because of the sensitive nature of surveillance data.

2015 Developments

- United States prioritizes SSA, dedicates more funding
- United States expands bilateral SSA data-sharing to include Germany, France, and Israel
- U.S. commercial sector enhances contributions to SSA
- Russia, Europe, China, and India continue to develop independent SSA capabilities

Theme 2:
Access to and use of space by various actors

INDICATOR 2.1: Space-based global utilities — These global utilities are space assets that can be used by any actor equipped to receive the data they provide. The use of space-based global utilities has grown substantially over the last decade. Millions of individuals rely on space applications on a daily basis for functions as diverse as weather forecasting, navigation, Earth-observation applications, disaster mitigation, and search-and-rescue operations. Global utilities are important for

space security because they broaden the community of actors that have a direct interest in maintaining space for peaceful uses. Many, such as the Global Positioning System (GPS) and weather satellites, were initially developed by military actors, but have since become applications that are almost indispensable to the civil and commercial sectors. Advanced and developing economies alike depend on these space-based systems.

2015 Developments

- Diversification of navigation systems reduces reliance on U.S. GPS
- Space-based Automatic Identification System (AIS) continues to expand
- Remote sensing capabilities continue to advance
- Efforts to enhance remote sensing data for meteorological purposes
- Satellite services a significant focus of disaster and humanitarian responses
- Private industry adopts greater role in providing global access to utilities

INDICATOR 2.2: Priorities and funding levels in civil space programs — Civil space programs can have a positive impact on the security of outer space because they constitute key drivers behind the development of technical capabilities to access and use space, such as those related to the development of space launch vehicles. As the number of space actors able to access space increases, more parties have a direct stake in space sustainability and preservation for peaceful purposes. As well, civil space programs and their technological spinoffs on Earth underscore the vast scientific, commercial, and social benefits of space exploration, thereby increasing global awareness of its importance.

2015 Developments

- Diverging budget trends but similar priorities among advanced space countries
- Iran, North Korea enhance space capabilities; Laos gets its first satellite
- Efforts to enhance national launch capacities; China debuts Long March 6, 11

INDICATOR 2.3: International cooperation in space activities — Due to the huge costs and technical challenges associated with access to and use of space, international cooperation has been a defining feature of civil space programs throughout the space age. Scientific satellites, in particular, have been cooperative ventures. International cooperation remains a key feature of both civil and global utilities space programs. By allowing states to pool resources and expertise, international civil space cooperation has played a key role in the proliferation of the technical capabilities needed by states to access space. Cooperation agreements on space activities have proven to be especially helpful for emerging spacefaring states that currently lack the technological means for independent space access. Cooperation agreements also enable established spacefaring countries to tackle high-cost, complex missions as collaborative endeavors with international partners.

Finally, cooperation enhances the transparency of space programs and can foster both technical and cultural understandings. The International Space Station (ISS) remains the most prominent example of international cooperation.

2015 Developments

- Cooperation on the International Space Station extended; China participates indirectly
- International cooperation in efforts to reach the Moon, Mars
- United States and China hold inaugural Civil Space Dialogue in Beijing
- Ongoing geopolitical competition shapes patterns of space cooperation
- Launch vehicles remain focus of international cooperation, tensions

INDICATOR 2.4: Growth in commercial space industry — The role that the commercial space sector plays in the provision of launch, communications, imagery, and manufacturing services, as well as its relationship with civil and military programs, make this sector an important component of space security. A healthy space industry can lead to decreasing costs for space access and use, and may increase the accessibility of space technology for a wider range of space actors. Increased commercial competition in the research and development of new applications can also lead to the further diversification of capabilities to access and use space.

2015 Developments

- Significant increase in venture capital investment in U.S. space startups
- States attempt to grow commercial space sector through regulatory changes
- Reusable launch technology matures with SpaceX, Blue Origin successes
- Private sector invests in low-cost satellite Internet services for emerging, remote markets
- Space startups experiment with new funding models, public buy-in, with some success
- China launches first commercial Earth observation satellite

INDICATOR 2.5: Public-private collaboration on space activities — The commercial space sector is significantly shaped by the particular security concerns of national governments. There is an increasingly close relationship between governments and the commercial space sector. Various national space policies place great emphasis on maintaining a robust and competitive industrial base and encourage partnerships with the private sector. The space launch and manufacturing sectors rely heavily on government contracts. The retirement of the space shuttle in the United States, for instance, opened up new opportunities for the commercial sector to develop launch services for human spaceflight. Governments play a central role in commercial space activities by supporting research and development, subsidizing certain space industries, and adopting enabling policies and regulations. Conversely, because space technology is often dual-use, governments have sometimes taken actions, such as the imposition of export controls, which hinder the growth of the commercial market.

2015 Developments

- The United States seeks increased role for private sector in civil space programs
- U.S. military considers commercial sector for hosted payloads, satellite operations/maintenance
- Russia and China adopt hybrid approaches to commercial space industries
- Commercial trade restrictions continue to pose obstacles to U.S. space industry, government
- ITAR an issue in Brazilian commercial launch project

INDICATOR 2.6: Space-based military systems — Space assets are being used for terrestrial military purposes by a growing number of states. The United States has dominated the military space arena since the end of the Cold War and continues to give priority to its military and intelligence programs, which are now integrated into virtually all aspects of military operations. Russia maintains the second largest fleet of military satellites, but many of its systems were developed during the Cold War. China does not maintain a strong separation between civil and military applications, but its program is widely believed to provide support to the military, as is India's. In the absence of dedicated military satellites, many actors use their civilian satellites for military purposes or purchase data and services from civilian satellite operators.

2015 Developments

- U.S. military space launches in 2015 contribute to modernization of capabilities
- Management and organizational changes at U.S. DoD, funding, emphasize space control mission
- U.S. Congress pushes for reconsideration of space-based missile defense test-bed
- China restructures military forces, enhances access to reconnaissance and position, navigation, and timing (PNT) capabilities
- Russia merges air and space forces, upgrades military space capabilities
- India enhances military use of its space program
- Japan releases Basic Plan on Space Policy with greater focus on military uses
- Rising military tensions in Asia drive increased focus on military space
- United States extends military space cooperation in Asia, focusing on India, Japan

Theme 3: Security of space systems

INDICATOR 3.1: Vulnerability of satellite communications, broadcast links, and ground stations — Satellite ground stations and communications links constitute likely targets for space negation efforts, since they are vulnerable to a range of widely available conventional and electronic weapons. While military satellite ground stations and communications links are generally well protected, civil and commercial assets tend to have fewer protective features. While many actors

employ passive electronic protection capabilities, such as shielding and directional antennas, more advanced measures, such as burst transmissions, are generally confined to military systems and the capabilities of more technically advanced states. Because the vast majority of space assets depend on cyber networks, the link between cyberspace and outer space constitutes a critical vulnerability.

2015 Developments

- Efforts to mitigate satellite interference to try to keep up with proliferation of jamming capabilities
- Secure, laser-based satellite communications continue to develop
- U.S. military moves toward development of a common architecture for satellite ground stations

INDICATOR 3.2: Reconstitution and resilience of space systems — The ability to rapidly rebuild space systems after an attack could reduce vulnerabilities in space. The capabilities to refit space systems by launching new satellites into orbit in a timely manner to replace satellites damaged or destroyed by an attack are critical resilience measures. Multiple programs show the prioritization of, and progress in, new technologies that can be integrated quickly into space operations. Smaller, less expensive spacecraft that may be fractionated or distributed on hosts can improve continuity of capability and enhance security through redundancy and rapid replacement of assets. While these characteristics may make attacks against space assets less attractive, they can also make assets more difficult to track, and so inhibit transparency. Although the United States and Russia are developing elements of responsive space systems, no state has perfected this capability.

2015 Developments

- Successes and setbacks for responsive space launch-enabling capabilities
- Continued efforts to develop space-based inspection, diagnosis, service, and repair capabilities for satellites
- United States broadens approach to space-based protection
- United States renews space surveillance efforts for detection and protection purposes
- Efforts to build resilience through alternatives to space-based GPS

INDICATOR 3.3: Earth-based capabilities to attack satellites — Launching a payload to coincide with the passage of a satellite in orbit is the fundamental requirement for anti-satellite capability. Ground-based anti-satellite weapons employing conventional, nuclear, and directed energy capabilities date back to the Cold War, but no hostile use of them has been recorded. Conventional anti-satellite weapons include precision-guided kinetic-intercept vehicles, conventional explosives, and specialized systems designed to spread lethal clouds of metal pellets in the orbital path of a targeted satellite. A space launch vehicle with a nuclear weapon would be capable of producing a High Altitude Nuclear Detonation (HAND), causing widespread and immediate electronic damage to satellites, combined with

the long-term effects of false radiation belts, which would have an adverse impact on many satellites. Security concerns about the development of negation capabilities are compounded by the fact that many key space capabilities are dual-use. Recent incidents involving the use of ASATs against their own satellites (China in 2007 and the United States in 2008) underscore the detrimental effect that such systems have for space security. Such use not only aggravates the space debris problem, but contributes to a climate of mistrust among spacefaring nations.

2015 Developments

- Deployment of electronic warfare systems in Ukraine, Syria
- Development of hit-to-kill technology continues
- Work on high-energy lasers continues, but technological barriers remain

INDICATOR 3.4: Space-based negation-enabling capabilities — Deploying space-based ASATs—using kinetic-kill, directed energy, or conventional explosive techniques—would require enabling technologies somewhat more advanced than the fundamental requirements for orbital launch. Space-based negation efforts require sophisticated capabilities, such as precision on-orbit maneuverability and space tracking. Microsatellites, maneuverability, and other autonomous proximity operations are essential building blocks for a space-based negation system, but they have dual-use for a variety of civil, commercial, and non-negation military programs. On-orbit servicing is also a key research priority for several civil space programs and supporting commercial companies. While some nations have developed these technologies, there is no evidence that they have integrated on-orbit servicing into a dedicated space-based negation system.

2015 Developments

- The United States signals greater focus on space control capabilities
- Ongoing maneuvers in space by the United States and Russia

Theme 4: Outer space governance

INDICATOR 4.1: National space policies — The development of national space policies that delineate the principles and objectives of space actors with respect to access to and use of space has been conducive to greater transparency and predictability of space activities. National civil, commercial, and military space actors all operate according to these policies. Most spacefaring states explicitly support the principles of peaceful and equitable use of space, and emphasize space activities that promote national socioeconomic, scientific, and technological goals.

Virtually all space actors underscore the importance of international cooperation in their space policies; several developing nations have been able to access space because of such cooperation. However, the military doctrines of a growing number of states emphasize the use of space systems to support national security. Major space powers and emerging spacefaring nations increasingly view space assets such as multiuse space systems as integral elements of their national security infrastructure.

2015 Developments

- U.S. commercial legislation raises legal/regulatory questions on rights to space resources
- National U.S., Chinese, and Russian security strategies mark growing tensions in space
- Japan's third Basic Plan on Space Policy prioritizes national security in space
- UK adopts commercial focus in national space policy
- African science and education ministers adopt first regional space policy

INDICATOR 4.2: Multilateral forums for space governance — A number of international institutions provide multilateral forums to address space security issues. Within the United Nations, these include the UN General Assembly (UNGA) First and Fourth Committees, UN Space, the UN Committee on the Peaceful Uses of Outer Space (COPUOS), the International Telecommunication Union (ITU), the Conference on Disarmament (CD), and the International Committee on Global Navigation Satellite Systems (ICG). Outside the UN, there is also an important European-led initiative to develop an International Code of Conduct for Outer Space.

2015 Developments

- Approaching consensus at UNGA on Prevention of an Arms Race in Outer Space (PAROS) and transparency and confidence-building measures (TCBMs); vote on No First Placement of Weapons in Outer Space divided
- Unprecedented joint meeting of UNGA First and Fourth Committees to address possible challenges to space security and sustainability
- Work plan of COPUOS Working Group on long-term sustainability of outer space stalled
- CD remains divided over draft Treaty on the Prevention of the Placement of Weapons in Outer Space
- Meetings on International Code of Conduct for Outer Space Activities stalls
- ICAO-UNOOSA AeroSPACE Symposium 2015

INDICATOR 4.3: Other initiatives — A growing number of diplomatic initiatives relate to bilateral or regional collaborations in space activities. Examples of this include the work of the Asia-Pacific Regional Space Agency Forum and discussions in the African Union to develop an African space agency. The UN Institute for Disarmament Research (UNIDIR)—an autonomous unit in the UN system—has also played a key role to facilitate dialogue among key space

stakeholders. Every year UNIDIR partners with civil society actors and some governments to bring together space security experts and government representatives at a conference on emerging security threats to outer space.

2015 Developments

- United States and China open communication on space activities
- 7th Space Conference of the Americas
- Asia-Pacific Regional Space Agency Forum on "Sharing Solutions through Synergy in Space"
- UNIDIR Space Security Conference addresses foundations of space security
- Canada-UK Colloquium "Space: Obstacles and Opportunities"

2016

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