

## UNIDIR Space Security Conference 2012

### Conference Report

The United Nations Institute for Disarmament Research (UNIDIR) held its eleventh annual conference on space security from 29 to 30 March 2012. The conference, entitled “Laying the Groundwork for Progress”, was co-sponsored by Secure World Foundation and had support from The Simons Foundation and the governments of the People’s Republic of China, the Russian Federation and the United States of America. This year, the conference outlined the basics of space security and provided an outlook on its future and the potential progress that could be made. Furthermore, some domestic considerations and technical challenges were discussed that impact space security as well as transparency and confidence-building measures (TCBMs).

One of the key themes that emerged from the conference was that, while there is consensus on the need for space sustainability and security, it is a difficult task to accomplish with many possible ways forward. The international community is tackling these challenges within the context of several international initiatives, each with its own priorities and perspectives and subject to domestic and technical considerations. This report aims solely to reflect the content of the presentations and discussions and does not necessarily reflect the opinions and positions of UNIDIR, the sponsoring organizations or supporting states.

### CONSENSUS ON SPACE SUSTAINABILITY

The 2012 UNIDIR Space Security Conference took place at a timely juncture in the development of international space policy. The conference occurred in the context of marked progress as regards several key international space security efforts. Specifically, the United States announced a few months prior to the conference that it would pursue an International Code of Conduct for Outer Space Activities; the first meeting of the United Nations Group of Governmental Experts (GGE) on TCBMs in Outer Space Activities was scheduled to convene several months after the conference; and progress continued in the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) Long-term Sustainability of Space Activities (LTSSA) Working Group.

The opening speakers of the 2012 conference pointed out that agreement on taking an international approach to space security and sustainability seems to stem from an increasing recognition that space sustainability is both undeniably needed and threatened. The emergence of space sustainability as an international priority is the result of decades of evolution in the way that humans view and utilize the space environment. It is no longer simply the domain of two superpowers engaged in a Cold War but rather a resource upon which many countries depend. Moreover, actors in space have expanded from just state

entities to representatives from the private and public sectors. Space services enable telecommunications, tele-health, financial transactions, navigation, weather and disaster forecasting, planning and treaty verification. Simultaneously, the space environment is fragile and threatened by a number of factors, which include the increasing number of space actors and the growing population of orbital debris.

Speaking on behalf of the Director-General of the United Nations Office at Geneva, Mr. Jarmo Sareva stated that this dilemma between increased dependence and growing risk links us all together in shared vulnerability and collective responsibility to protect space for the long term. Many in the international community agree that existing international law governing space is an important foundation but needs to be updated to reflect the realities of the utilization of space and the coming challenges. The 1967 Outer Space Treaty binds together more than 100 states in the shared view that space should be reserved for peaceful use and the common good. However, the lack of a more comprehensive governance structure could lead some states to pursue military means for protecting their important space assets, which could, in turn, instigate an arms race in outer space. Mr. Sareva pointed out that the international community is faced with a unique opportunity to update, refine and expand the legal regime in pursuit of secure, safe and sustainable outer space or remain stagnant. Strengthening trust and common understanding about our interdependence in the space domain is one way forward and one of the objectives of the annual UNIDIR Space Security Conference. Chinese Ambassador Wu Haitao added during his remarks that we also need substantive progress in the Conference on Disarmament (CD). Multilateral negotiations within the CD framework would contribute to a safer, more secure space environment in the long run.

## **MANY WAYS FORWARD**

While there is a growing accord on the need to secure and sustain space through multilateral mechanisms, it was highlighted during the 2012 UNIDIR Space Security Conference that many states disagree about the specifics of the way forward. Some states feel priority should be placed on arms control and legally binding treaties while others prefer voluntary and normative mechanisms focused on behaviour. There is also disagreement about what is the biggest threat to space security: some believe that it is space debris while others believe it to be the possibility of space weapons.

Rather than allowing differences to hinder progress, some participants argued that states should focus on efforts that they can all support. Many already exist but need to be continued, strengthened or coordinated. For example, the Inter-Agency Space Debris Coordination Committee (IADC) Guidelines and subsequent COPUOS Debris Mitigation guidelines represent an international, cooperative accomplishment in this area. However, more states need to adopt and implement them for the benefits to be felt by all space actors.

One international initiative that many at the conference agreed was a positive step forward is the upcoming GGE on TCBMs in space. Long-time spacefaring nations such as the Russian Federation and the United States have voiced their optimistic anticipation for this process and the possibility for it to mitigate risk, enhance stability and promote responsible operations in space. The GGE will build upon existing international law, analyse submissions to the Secretary-General on space TCBMs made by various Member

States, learn from the 1993 GGE report on Confidence-building Measures in Outer Space Activities and produce a new consensus report without prejudice to the Prevention of an Arms Race in Outer Space (PAROS) process in the CD. It will also consider other related initiatives such as the proposed draft International Code of Conduct, the COPUOS LTSSA discussion and existing bilateral TCBMs. Topics to be reviewed in the GGE include different categories of TCBMs, implementation and a proposed central point of contact for all space TCBMs. The objective of the GGE process and its report is to improve cooperation and reduce the risks of misunderstanding and miscommunication in space activities.

Another international initiative targeting space security and sustainability that was discussed at the conference is the proposed draft International Code of Conduct for Outer Space Activities. Inspired by the Secretary-General's four requests for submissions on space TCBMs from 2007 to 2010, the European Union began a process several years ago to put together a group of voluntary "rules of the road" and best practices for space activities. Frank Asbeck from the European External Action Service updated the conference attendees on the process and status of the proposed draft Code of Conduct. The first draft, put forth in 2008, was agreed upon within the European Union and was revised after receiving limited international feedback, resulting in a second version released in 2010. Progress toward a final draft is ongoing. The proposed draft Code of Conduct has three core principles: peaceful use of space for all, the preservation and safety of on-orbit objects and due consideration for the unique needs of the space environment. It aims to outline basic best practices in both civil and military uses of space.

As a result of the cross-cutting nature of the proposed draft Code of Conduct, the European Union chose not to introduce the proposed draft into the CD or COPUOS for negotiations. Rather, it pursued an informal bilateral consultation method for promoting the proposed draft internationally. Through this process, the European Union has garnered support and received feedback from other states. Most recently, the United States announced its decision to support the development of an International Code of Conduct for Outer Space Activities. In doing so, it joined other states, such as Japan and Australia, who have supported this concept originally put forth by the European Union. Other key spacefaring states, such as China, attach importance to the proposed draft Code, but have submitted concerns on some of its aspects, including the balance between rights and obligations, and the scope of application.

Another space sustainability initiative that has received broad international support is the COPUOS LTSSA Working Group. This effort focuses on developing best practice guidelines from the bottom-up. It was born out of the recognition among COPUOS members that because the space environment is a finite natural resource and is critical for sustainable development on Earth, we must ensure that humans can use it for peaceful purposes and socioeconomic benefits in the long term. The LTSSA Working Group was established in 2010 and began meeting in 2011 to address this need within COPUOS. COPUOS has a long history of accomplishments, and it has grown from an initial 24 Member States when it was founded in 1959 to 71 Member States and many permanent observers today. It has negotiated five major space treaties, including the foundational Outer Space Treaty of 1967. It has overseen 110 United Nations General Assembly resolutions regarding space, the establishment of regional training centres for training and education, three United Nations space conferences and the formulation of debris mitigation guidelines.

It is the hope of the Committee that the LTSSA Working Group will join this long list of accomplishments and will successfully contribute to space sustainability.

As outlined by Working Group Chair Peter Martinez, the objective of the Working Group is to examine and propose measures to ensure the safe and sustainable use of outer space for peaceful purposes and the benefit of all countries, particularly considering the interests of all states and sustainable development. However, the Working Group is not without its challenges. It must sift through different definitions and interpretations of key terms such as sustainability, space situational awareness (SSA), spacefaring state and safety. Many established space states are fearful that the Working Group might limit their freedom of action in space. At the same time, emerging space states are worried that it could create more barriers to entry as they build their own space programmes. Many are also concerned about the legal and economic implications of what the Working Group may produce.

In spite of these many challenges, the LTSSA Working Group has forged ahead, negotiating and agreeing on Terms of Reference, planned outcomes, organization of work and a timeline. The Terms outline the Working Group's objective as described above; explain that the Working Group will consider current practices, procedures, standards and policies associated with sustainability in all phases of a mission's life cycle; and take as a legal framework all existing treaties related to space so as not to duplicate effort. The Working Group's outcomes will include a consensus report, which will consolidate a set of best practice guidelines relevant to all space actors, including international organizations, non-governmental organizations and Member States. While the guidelines will be voluntary, they could become legal if incorporated into national legislation. Work on this report will take place in four expert groups that meet on the margins of the COPUOS Scientific and Technical Subcommittee. Member States have already nominated experts to these subgroups and are calling for input from other relevant entities. The four expert groups will study the following issues and all related subtopics:

- sustainable space utilization supporting sustainable development on Earth, co-chaired by Portugal and Mexico;
- space debris, space operations and tools to support SSA, co-chaired by Italy and the United States;
- space weather, co-chaired by Japan and Canada; and
- regulatory regimes and guidance for new actors in the space arena, co-chaired by Australia and Italy.

The Working Group will aim to produce a draft report in 2013, which will be revised into a final report by 2014.

Another topic discussed at the conference was that, while many states support these international initiatives, others emphasize that they should be supplements to, not substitutes for, a legally binding treaty. States that hold this view agree that outer space is a common asset shared by all and it is, therefore, of the utmost importance and urgency that all states balance between security and development of this environment. It is the responsibility of all states to ensure the long-term peaceful use of space—only when this has been achieved can states further develop and benefit from that shared

resource. Some believe that both the security and further development of space are threatened by a trend toward space weaponization and the further deterioration of the space environment because of congestion. From this perspective, substantive progress on a PAROS treaty must be accomplished in the CD to prevent an arms race. As representatives stated at the conference, China would prefer to negotiate the treaty proposal it put forth with the Russian Federation at the CD in 2008. From its perspective, the draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects (PPWT), is the most mature proposal thus far for a PAROS treaty in the CD and represents the desire of its authors, China and the Russian Federation, and others to negotiate against space weaponization.

Advocates for a PAROS treaty believe that normative and voluntary mechanisms such as TCBMs should be pursued in parallel with that legally binding instrument. Many TCBMs already exist, but mostly in bilateral form. For example, China provides information on its spacecraft and launches to international organizations and the United States issues conjunction notifications to all space actors. Another example is that the Russian Federation and the United States have conducted a series of security dialogues, meeting three times in the last 18 months. Perspectives on such bilateral TCBMs and their potential vary by state. China, for example, approaches bilateral dialogue with caution and pragmatism—it is open to these discussions, but feels they must be conducted based on mutual trust, benefit and equality. When this is the case, agreement can be reached, as was recently done between China and the Russian Federation on ballistic missile launches. Another perspective is that the GGE could provide an acceptable platform for multilateralization of these bilateral TCBMs. Some envision the GGE report as a menu of TCBMs from which states can choose those that best meet their particular capabilities and needs in space.

## **DOMESTIC PERSPECTIVES ON SPACE SECURITY**

Domestic considerations necessarily influence these ongoing international initiatives aimed at space security and sustainability. These considerations can be influenced by opinions just as diverse as those expressed at the international level. The 2012 UNIDIR Space Security Conference spent some time exploring a few of those domestic perspectives in an attempt to shed light on the domestic opinions shaping state stances in international fora such as the CD.

One conference speaker explored US perspectives. In the United States, the 2010 National Space Policy guides space security efforts. Four out of the five principles in that policy relate to security. Those four principles emphasize responsible behaviour, peaceful purposes, right of passage and assured use of space and defence against attacks. In keeping with these principles, the policy has three major goals: to expand international cooperation, to strengthen stability and to work toward space capability assurance and resilience. These goals are not goals in and of themselves but instead are means to an end. Their overall purpose is to create a predictable and transparent space domain—one that supports unfettered commercial and scientific operations and the freedom to engage in legitimate military and intelligence activities. Expanded international cooperation is prioritized as a way to increase transparency, confidence and predictability in space so as to achieve that stable end.

The speaker explained that some within the United States feel that the objective of space security efforts should be to deter hostilities in space. From that view, effective deterrence has three major components: attribution, signalling and credibility. For space security, attribution would take the shape of SSA; signalling—TCBMs or other ways of defining acceptable and unacceptable behaviour; and credibility—the defensive capacity to absorb attacks and the capability and political will to retaliate, though not necessarily in space. From this point of view, space security initiatives should be aimed not at preserving space as a sanctuary but rather establishing and maintaining an acceptably predictable and transparent environment so that when a hostile act occurs, it can be identified and attributed, ultimately contributing to effective deterrence.

The speaker then questioned whether the proposed draft Code of Conduct constitutes a positive step towards space security from the many varying perspectives held in the United States. The proposed draft's stated goal suggests it is not aimed at deterring hostile acts. As such, there are varying domestic viewpoints within the United States about its utility. To some, signing onto a future Code would cost the United States little because it already follows most of the principles outlined within the document. To another set, there are unknown costs associated with the United States signing on. If the United States already engages in most of these activities, why should it sign on to something that might further limit its behaviour? Another opinion within the United States argues that a Code is necessary for calling out bad behaviour. Yet another claims that, in the long run, pragmatic and achievable TCBMs, such as a Code of Conduct, are more beneficial than engaging in a lengthy treaty process that ultimately ends in a binding, but unverifiable and unenforceable, document. Some in the United States think that, while this may be true, the future Code will be useless if not all states sign it. Finally, there is a faction in the United States that worries the proposed draft Code will significantly limit US national security space capabilities and decrease its options for defence, even though the proposed draft ensures all states' inherent right to self-defence.

Another set of domestic perspectives explored at the 2012 UNIDIR Space Security Conference concerned India. The speaker reflected on the origin of India's space programme and its current concerns and challenges. The Indian space programme has strong civilian roots. It has placed a heavy emphasis on the use of space assets, applications and services for human and socioeconomic development within its borders. In pursuit of these benefits, India has made a considerable investment of US\$37 billion in the space- and ground-based portions of its space programme. The speaker argued that, as such, India feels just as strongly as other spacefaring states about protecting these expensive and critical assets and the environment in which they operate.

Consequently, many in India appreciate the threats facing space security and are concerned about advancing military space programmes and capabilities in Asia. For some, anti-satellite weapons development and testing pose a serious threat to critical space infrastructure such as position, navigation and timing (PNT) systems. Cooperation between countries to advance space technologies in this area could threaten regional stability and international security. To some, this potential strengthens the argument for pursuing "rules of the road" now. As part of the G-21, India actively supports the pursuit of a treaty banning weapons in outer space but views TCBMs as positive, complimentary instruments. This comes out of a view that legal measures are born out of normative exercises.



The speaker stated that much thought has been given in Indian to the proposed draft Code of Conduct and its potential to fulfil this need for norms, as well as to what India's role should be in that dialogue. A dominant perspective within India views the current draft with scepticism. They see the voluntary nature of the Code as undermining its enforceability and, therefore, its utility. However, there are those within India who believe in the utility of a space code and desire for India to play a major role in that normative process. Those who hold this view argue that, as one of the earliest spacefaring states with an enormous investment in space-based services, India would naturally be interested in helping to write rules to govern the space environment. These rules would not differ greatly from the provisions laid out in the current EU draft, but being involved in shaping those norms from the outset is important and crucial for creating a sense of ownership within the Indian space community. To many within that community, the European Union missed an important opportunity by not including India more from the beginning. Recent announcements about a revived United States-led effort may help reclaim that missed opportunity.

A final domestic perspective discussed at the conference was that of the Russian Federation. Some within the Russian Federation argue that the development and deployment of space-based weapons is a major threat to space security and preventing that should be accomplished now. The Russian Federation unilaterally declared in 2004 that it would not be the first to place weapons in space and invited all those invested in space security to declare likewise, arguing that these political statements were an important foundation for a treaty against space weapons.

The Russian Federation has also actively supported the development and proliferation of space TCBMs as a complement to the treaty process and was a leading force in establishing the upcoming GGE. A prevailing viewpoint from the Russian Federation is that the inclusive United Nations GGE could produce constructive work on space norms, more so than the proposed Code of Conduct. This perspective, like that within India, sees a lost opportunity in the European Union's failure to truly involve certain states from the outset of the proposed draft Code of Conduct process. Nevertheless, the Russian Federation has already engaged in consultations on the EU's proposed draft of the Code and is willing to participate in what it suspects will be a long road ahead of meetings and further discussion.

## **TECHNICAL CONSIDERATIONS**

In addition to national considerations, technical possibilities and limitations necessarily influence and shape these international initiatives on space security and sustainability. One concern is radio frequency interference and its impact on critical infrastructure. This threat to space security is caused by natural and technical limitations, as well as the exploitation of technology to interfere with space services. Human utilization of the space environment depends, in large part, on the electromagnetic spectrum. This resource is limited, though, and as people depend more and more on these services, it is a challenge to come up with additional bandwidth. As a result, the radio frequency spectrum is increasingly under pressure from various users and is sensitive to intentional and unintentional interference.

At the 2012 UNIDIR Space Security conference, a speaker explored one particular example of critical infrastructure and its vulnerability to interference—global navigation satellite systems (GNSS). These systems, such as the US Global Positioning System (GPS), have become critical to the operation of most people’s daily lives, not just on an individual basis, but also for national security and commerce. However, despite the technologically advanced nature of this critical infrastructure, it is vulnerable to minor disturbances and interference between its space segments and ground stations.

Efforts are being made to better understand and respond to the threat of interference to these essential systems, whether it stem from space weather, unintentional interference spilling over from other space services or intentional jamming or spoofing. In the case of space weather, historical evidence has shown that it can significantly disturb space-based activities and ground-based infrastructure. Experts have learned that space weather can create considerable errors in the functioning of GNSS and that this is dictated by an 11-year solar cycle, the peak of which will next occur in 2013. In terms of unintentional interference, experts study the effects that nearby transmissions have on the GNSS signals. These experts run tests on different professional receivers in an attempt to understand where the vulnerabilities lie and how solutions such as filtering might mitigate the effects. Finally, our growing reliance on GNSS has invited intentional interference from those who wish to maliciously exploit its technical limitations.

By better understanding these threats to all GNSS systems, plans can be made to reduce the negative impact on end-users by adjusting hardware and regulatory frameworks, thereby enhancing space security. The main recommendations in this direction include better detection and mitigation of both intentional and unintentional interference, perhaps through the deployment of a system that would geo-locate and report disturbances, the hardening of receivers and antennae, or the establishment of back-up systems to guarantee services in the face of disruption or damage.

Other technical considerations enable and facilitate space security. Space situational awareness, or tracking and monitoring space objects, is a prime example of this. Expansion and enhancement of SSA capacity dramatically improves space security. Growth in the number of actors using space, the associated increase in active spacecraft to support these uses and the debris problem that comes along with that threaten the ability to benefit from the space environment. SSA allows space actors to keep track of their assets and manoeuvre out of potential harm’s way. However, current technological limitations restrict the ability to always operate safely in this congested domain. The United States has the most extensive SSA capabilities but are limited to tracking objects 10cm or greater in size, even though serious damage can be inflicted by much smaller objects. Furthermore, objects of this size can only be tracked in lower orbits. The United States is unable to track objects even that size in more distant, high-use orbits such as geosynchronous. In addition, its southern hemisphere coverage is limited.

Due to the limitations of SSA to address all threats of this nature, the first responsible course of action is to mitigate debris creation. Until SSA capabilities can provide highly accurate information on debris in the most crowded orbits, it is prudent to reduce the creation of even more debris. International efforts continue in this direction. For example, the IADC created mitigation guidelines, which later formed the basis for the COPUOS



Debris Mitigation Guidelines. Moreover, the proposed draft Code of Conduct highlights debris mitigation as a key principle of responsible space activities.

A next step in addressing the threats of congestion is to expand SSA. The European Space Agency (ESA) also embarked on an SSA programme that seeks to make use of existing assets and investigate what more would be needed to maintain an indigenous SSA capability. Ideally, this European SSA capacity would ensure that Europe is responsible for its own actions in space and can shoulder some of the burden for keeping the orbital regions around the Earth usable for all in the long term. ESA recognizes that no good SSA system will work in isolation so it has actively worked with other space agencies and militaries to develop standards for data exchange and SSA cooperation. One outcome of this collaborative effort is the Conjunction Data Message (CDM), the first international standard on conjunction warnings, developed within the Consultative Committee for Space Data Systems.

Debris mitigation and SSA help address the threat of crowding to space security, but some argue that they are not enough and thus active debris removal (ADR) should be undertaken. The Swiss Space Center is exploring an ADR programme called Clean-mE. It currently receives a small amount of funding to develop CleanSpaceOne, which will remove SwissCube, a satellite launched by Swiss students that does not comply with space debris mitigation guidelines. The project now aims to increase awareness and responsibility regarding orbital debris, demonstrate ADR technologies and de-orbit a known piece of debris. Partnership among various institutions drives the five-year project, which is open to further international cooperation. All of these efforts demonstrate a commitment to a cleaner future for space, one that utilizes SSA and other technologies to make space more secure and recognizes that no one entity can achieve this alone.

However, there are challenges to cooperation and collaboration on these technical solutions to space security threats. ADR, if not conducted transparently, may lead some actors to perceive additional threats to space security. Since CleanSpaceOne is a project conducted transparently and has the potential to contribute to ADR research, development and deployment. Even still, the political, security and legal implications of ADR, which is inherently dual-use, will need to be addressed before it can become widely used.

There are both technical and political challenges to greater SSA data-sharing as well. For example, SSA capabilities often involve classified assets and information that is too sensitive to share. Additionally, in order to share, data standards need to be defined and adhered to. Finally, there are challenges to accessing and disseminating data that has been cleared for exchange. A commercial initiative known as the Space Data Association (SDA) has addressed some of these issues through its “black box” format which protects proprietary information without sacrificing the sharing of highly accurate data. The United States, through its SSA Sharing Program, is also working on standardization and easing of state-to-state cooperation. Nevertheless, more work needs to be done to address all issues and facilitate these technical solutions to space security challenges.

## OTHER CONSIDERATIONS

In addition to domestic and technical considerations, other issues shape the ongoing international dialogue on space security and sustainability. Those discussed at the 2012 UNIDIR Space Security Conference included the relationship between space and its broader security context, the realities of space weaponization and the inclusion of non-state stakeholders.

Realities on Earth drive activities in space, so any effective international effort aimed at space sustainability must take into account broader geopolitics. For example, these efforts must appreciate that hostilities on Earth can lead to hostilities in space and vice versa. In addition, non-hostile space activities are both the consequence of and can have ripple effects on factors on Earth such as economic conditions and space programme budgets. There also needs to be a recognition that no one approach will succeed at making space secure. Rather, in the same way that many factors influence security on Earth, a truly stable space environment will arise from certain behaviours and decisions on the part of all space actors.

Several “grey” areas complicate this relationship between space and its broader security context. It is not clear how and in what venue actors will respond to hostilities that take place in or spill over to the space domain. Combined with the difficulty of attributing actions and intentions in space, effective deterrence becomes extremely difficult and complex. Furthermore, conflict in space is not discriminate in its impact. A kinetic confrontation in space could produce a cloud of debris that negatively affects all space users, not just those directly involved. Along similar lines, many space assets are not owned or used exclusively by any one state, making it incredibly difficult to target a single actor without incurring collateral damage.

It was pointed out at the conference that space also affects strategic stability on Earth. Many states depend heavily on space assets and applications for critical national security needs, rendering them vulnerable. From another angle, space has become essential for the functioning of our financial and economic markets. Space services meet a variety of daily needs for the average citizen. Should these services be interrupted or discontinued, social unrest could undermine global stability. Finally, from a longer term perspective, international security is dependent upon sustainable development in struggling regions of the world. Space applications dramatically contribute to development in those regions.

It was also noted that another positive way that space contributes to security on Earth is through international cooperation. To some extent, cooperation on space issues is easier than in other realms. The inherently international nature of the space environment leads states to recognize that they must work together on space-related issues. In addition, the financial burden of pursuing space activities unilaterally creates another incentive to cooperate not present in other domains. Many believe that cooperation through space programmes can ease international relations and create opportunities for collaboration in other domains.

In addition to broader geopolitics, the realities of space militarization and weaponization affect space security. There is no doubt that space is militarized. The use of satellites for tactical and strategic purposes is widespread and generally accepted. As discussed above, space assets also support national security needs on a wider scale. While the militarization

of space is uncontested, it is still unclear if space is weaponized. This is partially because there is no clear definition of space weapons and because so many space assets are inherently dual-use. Satellites capable of rendezvous and proximity operations could be used for counter-space purposes. Furthermore, harmful interference with satellite signals causes damage but is not usually associated with a physical weapon on orbit. Finally, ballistic missile technology, owned and pursued by many states, is often indistinguishable from direct-ascent anti-satellite weapon technology.

These space weaponization realities inform our space security efforts. For example, the difficulty in defining space weapons has motivated a move toward limiting behaviour in space instead of capabilities. It was argued at the conference that, regardless of definitional difficulties, the technical improbability and burdensome financial requirements of developing hypothetical counter-space capabilities emphasizes the need to focus on more immediate threats such as harmful interference and orbital debris. Finally, the point was made that our international efforts must recognize that space is no longer a sanctuary, but not yet a battlefield. Preventing the latter is important and comprehensive “rules of the road,” targeted at defining responsible behaviour in space, constitute a step in that direction.

From the perspective of some conference participants, international dialogue on space security impacts non-state space stakeholders and should involve them in discussions. As mentioned above, space is critical not just for state actors, but also for those in the private, academic and civil sectors. In fact, these other groups play a significant role in space activities and, in some cases, can boast a heavier presence in space than governments. These stakeholders need to be engaged in international space security efforts, especially given their differing priorities from state actors. For example, some non-state users of space may place a higher priority on keeping the space market open to entry by new actors or may place heavier emphasis on data-sharing. Civil society and industry should be included not just to avoid oversight and resulting criticism from these sectors but also to incorporate their wealth of expertise. In the case of the aforementioned SDA, the private sector has developed technical solutions and best practices for SSA in the crowded geosynchronous orbit. The SDA is enhancing the safety and integrity of space operations for its 13 international members by monitoring 237 satellites in geosynchronous orbit, 110 satellites in low-Earth orbit and 938 pieces of space junk. Space security and sustainability discussions can and should pull from these experiences.

## **CONCLUSION**

The 2012 UNIDIR Space Security Conference took place in an atmosphere of consensus on the importance of space security and sustainability. Conference speakers and attendees discussed several international initiatives currently addressing these issues, from United Nations-based efforts such as the draft PPWT in the CD, the LTSSA Working Group in COPUOS, and the upcoming GGE on TCBMs in space activities; to the International Code of Conduct for Outer Space Activities. These initiatives offer different ways forward, from voluntary to legally binding, and cover a range of threats to space security, from orbital debris to space weaponization. States may disagree on which way forward is best or where priorities should lie, but there are several areas of agreement that represent potential for positive progress.

The conference examined other considerations that will influence these initiatives. National considerations, such as varying domestic opinions and public interests, impact the way states negotiate international instruments. In addition, technical limitations and possibilities change the landscape of these discussions. Some physical characteristics of the space environment create or facilitate threats to space security. Technology offers some solutions but is also limited in its potential to address threats to sustainability in space. The broader geopolitical context is intertwined with space security issues and must be considered as well. Finally, there are many stakeholders interested in the long-term sustainability of the space domain. These diverse interests need to be taken into account and reflected in traditionally state-centric initiatives.

One key take-away from the 2012 UNIDIR Space Security Conference is an appreciation of the difficulty of tackling space security and sustainability. The momentum seen in the international realm towards solutions is positive, though some may wish it moved at a faster pace. However, concrete steps forward, such as developing norms of responsible behaviour or TCBMs, will enhance safety and strengthen stability for all space actors. These voluntary measures can advance that momentum already building in the international community towards more difficult accomplishments. Any form of progress is desirable. This is not to say that the international community should give up on the more challenging aspects of space security but instead should be cognizant of the complexity of the task it has before it and the positive consensus it has already achieved.



# UNIDIR RESOURCES

## About UNIDIR

The United Nations Institute for Disarmament Research (UNIDIR)—an autonomous institute within the United Nations—conducts research on disarmament and security. UNIDIR is based in Geneva, Switzerland, the centre for bilateral and multilateral disarmament and non-proliferation negotiations, and home of the Conference on Disarmament. The Institute explores current issues pertaining to the variety of existing and future armaments, as well as global diplomacy and local tensions and conflicts. Working with researchers, diplomats, government officials, NGOs and other institutions since 1980, UNIDIR acts as a bridge between the research community and governments. UNIDIR's activities are funded by contributions from governments and donor foundations.