

**CANADA**

WORKING PAPER

**REPORT OF THE CONFERENCE ON  
“BUILDING THE ARCHITECTURE FOR SUSTAINABLE SPACE SECURITY”  
HELD ON 30-31 MARCH 2006  
IN GENEVA<sup>1</sup>**

**INTRODUCTION**

1. In March 2006, the United Nations Institute for Disarmament Research (UNIDIR) continued its commitment to holding an annual discussion to explore the issue of security in space in order to further the understanding by, and the debate among, governments, academics, non-governmental experts and industry experts.
2. The meeting focused on:
  - (i) The preconditions for a space regime that would provide sustainable and secure access to outer space for peaceful purposes.
  - (ii) The creation of an environment which convinces space actors that it is safe not to base weapons in space.
  - (iii) Increasing awareness among governments and the public of the benefits of sustainable and secure access to and use of outer space.

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1 UNIDIR is grateful to the Governments of Canada, China, the Russian Federation and India and to the Simons Foundation for their financial support for this conference. Any errors or omissions in this report are the responsibility of UNIDIR.

3. The meeting was organized by UNIDIR and supported by the Governments of Canada, the People's Republic of China, the Russian Federation and the Simons Foundation and held in the Council Chamber of the Palais des Nations, Geneva. Representatives from Member States and Observer States of the Conference on Disarmament, and experts from Canada, China, France, India, Germany, Russia, the United States and the United Kingdom brought the total number of conference participants to over one hundred people. Opening remarks were delivered by: Dr Patricia Lewis, Director, UNIDIR; Mr Sergei Ordzhonikidze, Director-General, United Nations Office at Geneva; Ambassador Paul Meyer, Permanent Representative of Canada to the Conference on Disarmament; Ambassador Cheng Jingye, Ambassador for Disarmament Affairs, People's Republic of China; Ambassador Valery Loshchinin, Permanent Representative of the Russian Federation; and Dr Jennifer Simons, President, The Simons Foundation.

4. The following constitutes a summary report of the conference. The keynote speakers are identified along with summaries of their presentations. Participants in the ensuing discussions remain unidentified. As in previous years, the proceedings of the conference will be published by UNIDIR.

**SESSION ONE: FUTURE AND CURRENT THREATS TO THE PEACEFUL USES OF OUTER SPACE**

**Threats to the Security of Outer Space: Emerging Technologies**  
*Laurence Nardon, Institut français des relations internationales (Ifri)*

5. Emerging technologies can be defined as those technologies most actively researched at present, as opposed to technologies coming on-line today. Research conducted in the United States could be the best indicator of such emerging technologies given that in 2005 the United States had a space budget of approximately US\$22.5 billion.

6. In terms of the possibilities for anti-satellite weapons (ASATs), three considerations need to be taken into account: the target; the location of the weapon itself; and the level of damage required. All three considerations combine to make many kinds of anti-satellite weapons imaginable and/or desirable, from electronic warfare equipment ('jamming' devices) and cyber warfare capabilities, to weapons that attempt to target directly the satellite itself. However, in the past, attempts at developing the latter have run aground, such as the 'hit-to-kill' Kinetic Energy ASAT (or KEASAT) programme during the Clinton Administration, as well as the direct-ascent nuclear weapons tests that took place in the 1960s (known as the 'Starfish Series'). Regarding directed energy weapons, ground-based lasers capable of attacking objects in lower Earth orbit (LEO) require a significant amount of power, making them difficult to mount on aircraft due to their size and difficult to emplace in space due to energy requirements. Although funding in the 2007 US budget for the MIRACL laser programme has been cancelled, other ASAT programmes continue.

## **Development and Peaceful Applications of Outer Space: The Indian Experience**

*Balakrishnan Vasudevan, Indian Space Research Organisation (ISRO)*

7. India currently spends US\$650m each year on its space endeavours, which employ a work force of 16,500. In the past forty years India's remote sensing capabilities have gone from one-kilometre resolution to one-meter resolution and space launch vehicle capability has evolved so that India can now launch into geosynchronous orbits.

8. For India the most important peaceful applications of outer space include meteorological, surveillance, education, Earth observation and crisis management. The tsunami in December 2004 underlines the necessity of space for India's security—the value of remote imagery and space communication became clear to all. In addition to human security, space applications play an important role in the agricultural sector. Satellites identify potential fishing zones by measuring the temperature of the sea and then broadcast the information through radio transmissions to local fishermen. A number of other applications, such as remote education programmes, were also outlined. The speaker concluded by stating that enabling the peaceful application of outer space is as important for developing countries as for developed ones.

## **The Private Sector and the Security of Outer Space**

*Stephen Stott, New Skies Satellites*

9. Since the early days of space exploration two basic principles have governed the use of space: right of access and freedom of navigation. Today there are many new and independent operators and space has become a truly open environment, comparable to the high seas when they were of prime importance to public, private and governmental agencies for civil, commercial and military operations. This surge in space-based activity has been met with a matching surge in irresponsible use, debris, radio frequency contamination and commercial piracy. There is a need now for the commercial sector to come to agreement on criteria that would ensure the security of space for commercial operations, i.e. mission assurance—the ability to provide a product when needed. Increasingly the line dividing the military and civil sectors in the field of space exploration is blurring, as is the distinction between strategic and commercial interests. Given the reliance of the military and the civil sector on each other, true space security requires collaboration in order to deter and protect against attacks on friendly space systems, be they military or commercial.

## **Terrorism in Outer Space**

*Jeffrey Lewis, Belfer Center, Harvard University*

10. The utility of the concept of terrorism in the field of space security was questioned. First, the term 'terrorism' contains a normative connotation and is difficult to define, which poses a number of problems in and of itself. Second, the space element may not be absolutely necessary to disrupting outer space activities given that an attack by a non-state actor could be made against a ground station or a launch vehicle at time of launch. Whether such an act would be considered any different to attacking an embassy is generally considered doubtful.

11. Four challenges posed by non-state actors were examined. The threat to satellites or space stations was ruled out and the threat of an attack at time of launch was deemed highly improbable. The real challenge seems to lie in physically protecting satellite ground stations or protecting operational systems from outside interference such as computer hacking. But such protection would not entail measures unique to the realm of space. A second challenge regards the issue of signal jamming or communications interference, however Lewis questioned whether this was a challenge particular to dealing with non-state actors given that governments are involved in this activity also. The proliferation in commercial satellite use and the diffusion of technology are two further challenges, but these are not understood to be associated with malevolent non-state actor behaviour (i.e. terrorism), but more as challenges posed by commercial entities.

### **Space Weapons and Proliferation**

*Michael Krepon, The Henry L. Stimson Center*

12. The central dilemma is that satellites are both indispensable and highly vulnerable. This dilemma generates a number of potential responses, such as: improving space situational awareness and intelligence, developing quick replacement parts/satellites, devising a code of conduct, drafting a new space treaty, or developing space weapons. Space weapons are defined as those weapons designed to physically attack satellites; jamming devices were excluded as space weapons, as are weapons with residual ASAT capabilities. The vulnerability of satellites is tied to the problem of space debris, a problem that space weapons are unable to counter and would only serve to make worse.

13. On the question of an arms race in outer space, the language of 'arms racing' can be unhelpful in constructing arguments against the weaponization of space because such a scenario is viewed as being highly unlikely in a time of asymmetric threats to the United States. The vulnerability of satellites to a 'cheap kill' attack on a ground station or even direct attacks in outer space could well make such competition unnecessary. The real problem lies in the proliferation of space weapons, driven by such factors as perceptions of insecurity and weakened norms. Space weapons could well make the problems of satellite vulnerability and space debris worse, which, in turn, would likely have a negative impact on proliferation. A code of conduct as discussed in previous meetings was offered as a near-term solution.

### **Debate**

14. Following the presentations, participants exchanged views on the following issues:

- (i) Civil-military collaboration;
- (ii) The question of 'arms racing';
- (iii) ASAT technologies and Ballistic Missile Defence (BMD);
- (iv) The definition of space weapons; and
- (v) Protection measures and commercial operations.

15. Referring to greater civil-military collaboration in defending space-based assets, the question was asked if members of the commercial sector advocate the emplacement of certain weapons in

space. The response from representatives in this field was that, as is generally understood, offensive weapons are not advocated but that a line needs to be drawn between what is acceptable self-defence and what is unacceptable. This led to a debate on the distinction between offensive ‘weapons’ and defensive ‘systems’. Regarding the notion of acceptable self-defence, another question arose as to whether this includes active defences such as ‘shoot-back’ systems, which many regard to be a weapon. The argument, common in the BMD debate, that a system is not a weapon because its primary role was seen to be defensive was felt to be illegitimate. One strong view from the commercial sector—although not shared by all—is that shooting back in any way is offensive, and the type of defences supported, and with which collaboration with the military is hoped for, are capabilities such as redundancy measures, radiation hardening and so forth.

16. The utility of the language of ‘arms racing’ and the argument that space weapons deployment is unlikely to precipitate an arms race received considerable attention. On the relevance of symmetry in competition, a number of participants argued that symmetry of actors’ capabilities in terms of resources and numbers was not necessary for an arms race as arms racing was not an end result, but a process. However, it was stated by one person that given the high vulnerability of satellites, any race to weaponize space was rendered unnecessary—significant capabilities are not necessary in order to compete in this area. As such, the kind of arms racing that was witnessed during the Cold War where the two superpowers developed thousands of weapons could not translate to the space arena; intelligent actors would not pursue such a course. But this was said to be a misunderstanding of what an arms race is: an arms race is not about numbers, but about perceptions of threat that lead another country to attempt similar capabilities, reinforcing perceptions, and so beginning a process of escalation. A view was expressed that arms racing is not solely a quantitative matter, but also a qualitative matter, meaning weapons development and research is just as important. However one response to this point was that the language of arms racing is not useful from a political perspective as there are those who believe an arms race in outer space could be won. Thus the language could be unhelpful and many participants felt that it should be replaced with something more apt. The withdrawal from the Anti-Ballistic Missile Treaty (ABM) was cited as case in point where, despite warnings to the contrary, an arms race has not yet ensued, thus supporting the argument that the terminology used in this debate should be made more accurate. However, as others pointed out, it could be still too early to tell what effects the ABM withdrawal might have. A closing comment on this issue was that it was unhelpful to focus on definitions of arms racing as this was not the only argument for prohibiting the weaponization of space—the existence of weapons in space is a danger in itself.

17. On the question of emerging ASAT technologies, questions were asked about research being conducted outside the United States in this area. The consensus among the experts was that very little research is being carried out in Western Europe or the Russian Federation, although it is difficult to be sure in some instances. For example, there tend to be suspicions that governments are willing to develop ASAT capabilities when they are funding research on, or the development of, micro-satellites, as such systems are susceptible to being converted into ASAT weapons. A number of countries are actively researching micro-satellites whose intentions related to ASAT capabilities development are not public. The issue as to whether space-based missile systems such as BMD fall under the auspices of ASAT weapons was debated. One view expressed was that BMD is primarily

a nuclear policy issue and not a space policy one, meaning that BMD operates according to a different logic. However this view was contested by the analysis that a weapon in space is a weapon in space, regardless of what its purpose is.

18. Concerning the definition of space weapons, one point of debate was whether a nation's nuclear-tipped intercontinental ballistic missiles (ICBMs) and space-based BMD should be considered as space weapons. Regarding weapons capable of targeting objects in outer space, such as ICBMs, it was argued that these should not be included in the definition of space weapons as only those weapons specifically designed to physically attack objects in space, weapons with latent or residual ASAT capabilities ought to be considered space weapons. However, space-based BMD should be considered as a space weapon because, as had already been expressed, a weapon in space is a weapon in space, regardless of its purpose there. It was noted that there is a difference between 'objects in space' (e.g. warheads) and 'space objects' (e.g. satellites), and that certain states are working towards a suitable definition on this front. It was generally thought that the definition needed more input from a variety of interested actors.

19. There was interest regarding what measures the Indian Space Research Organisation had taken to protect its space assets. It was asked what the chief concerns regarding vulnerability in the long-term were, and what steps had already been taken, such as redundancies or backups for example. As far as ground systems are concerned, redundancy measures are in place. Regarding the actual satellites, studies are being conducted but nothing had been implemented yet. And on the commercial aspect of India's space programme, this was said to be in its infancy and the issue of commercial satellites and their vulnerability had still to be addressed.

## **SESSION TWO: A RULES-BASED BEHAVIOUR APPROACH TO ENSURE SPACE SECURITY**

### **Creating Rules-Based Behaviour to Help Space-Faring Nations Avoid Conflicts in Space** *Douglas Aldworth, Foreign Affairs Canada*

20. The international community needs to adopt a broadened approach on the issue of space security to include all influencing factors of the space environment on space security, be they economic, technological, environmental or political. In this way the development of rules-based behaviour could best be approached. Weapons-effects hardening, evasive manoeuvring, redundancy and electronic protection measures such as anti-jamming technologies are all alternative ways of protecting space-based assets. Concerning methods for advancing rules-based behaviour, the United Nations Committee on the Peaceful Uses of Outer Space's (COPUOS) proposed space debris mitigation guidelines are to be welcomed. This approach to the development of rules-based behaviour might also be considered in the context of other space traffic management issues and as a means of building confidence and preventing conflict in space. Cooperation between the CD and other international forums that deal with various dimensions of space was also suggested, for example with the First and Fourth Committees of the UN General Assembly, and the International Telecommunications Union as a way of fostering greater awareness of their respective activities

relating to the peaceful uses of, and sustainable access to, outer space. For the commercial sector, voluntary guidelines for the commercial industry might not be very effective, but voluntary guidelines for states to apply, as appropriate, at the national level through national mechanisms could be a feasible alternative.

### **Ways to Address the Security of Space Assets**

*Pan Jusheng, Defense Science and Technology Information Center of China*

21. As an initial measure, states should strictly adhere to the current treaties and agreements governing the use of outer space, such as the 1963 Partial Test-Ban Treaty, the 1967 Outer Space Treaty (OST), the 1968 Astronaut Rescue Agreement, the 1975 Registration Convention and the 1979 Moon Agreement. As a second measure, states should negotiate and conclude new treaties preventing the weaponization of space and an outer space arms race. The fourth article of the OST, which intends to keep space free of weapons of mass destruction (WMD), but neither defines WMD nor prohibits the deployment of other weapons, has significant shortcomings. This is a strong reason to negotiate new agreements, as is the fact that the threat or use of force in outer space is not yet prohibited. As an interim measure until such agreements are formulated, a number of transitional phases or intermediate steps, including a Code of Conduct, confidence-building measures (CBMs), and unilateral measures such as the Russian no-first-deployment pledge could be made. Such initiatives, while serving as temporary measures to further secure the space environment, would also engender greater trust and cooperation and thus serve as a good foundation for a future agreement on a treaty on the Prevention of an Arms Race in Outer Space (PAROS).

### **Activities or Types of Space Assets to be Monitored and Verified**

*Laura Grego, Union of Concerned Scientists (UCS)*

22. The current threat is primarily from activities related to ASAT weapons, such as jamming devices, ground-based lasers and kinetic energy weapons. Regarding jamming devices, signal interference is easily monitored; the only real difficulty remains in finding the appropriate diplomatic and legal channels to resolve the problem. Laser technology, such as that for ‘dazzling’ and ‘blinding’ satellites, is prolific and difficult to monitor, although there is no great utility in using such weapons. Regarding ground-based lasers that physically damage satellite integrity, the technology is not widespread and such lasers are generally at fixed sites and very difficult to transport. However, as far as kinetic energy weapons are concerned, the only technology really needed for an effective capacity in this area is satellite manoeuvrability in orbit and the ability to conduct close proximity operations with another object in orbit. In case of such an attack it would be unlikely that ground-based surveillance could detect the event happening in time to prevent it. Pre-launch inspections, though controversial, would have some value here. There are about twenty-two active launch sites at present, giving space launch a potential ‘bottleneck’ advantage in terms of verifying and monitoring space-related activities. However, as satellites get smaller and the technology improves, mobile space launch vehicles will become a greater possibility, thus making this task more difficult. There is also the possibility of using space launches in a fashion similar to the ‘atoms for peace’ element of the Nuclear Non-Proliferation Treaty (NPT).

### **Verification Measures Applicable to Future Outer Space Instruments**

*Richard Bruneau and Scott Lofquist-Morgan, Canadian Centre for Treaty Compliance*

23. A verification framework or blueprint designed to apply to any potential treaty proposal on preventing the weaponization of space was outlined. Knowing which tools are technically available, financially feasible, and credibly effective could force negotiators to be more specific about any proposed treaty's terms and scope, thereby helping to progress and shape negotiations. In designing the blueprint, four considerations need to be taken into account:

- (i) Flexibility, in order to apply to multiple treaty designs;
- (ii) Details of intrusiveness levels and confidence issues to facilitate decision-making;
- (iii) Reliable estimates of costs associated with each verification method; and
- (iv) Possible synergies between verification methods to increase cost-effectiveness.

24. With these considerations in mind, the optimal way to structure a verification system is a layered approach. Six layers were outlined: on-site verification; launch detection and post-launch confirmation; space situational awareness; on-orbit inspection; detecting the use of laser and other directed energy weapons; and re-entry vehicle detection and characterization. The possibility of designing verification systems according to desired cost, whereby one could demonstrate what a verification system might look like at US\$100 million, US\$150 million and so on, can provide a concrete tool for negotiators. In addition, outsourcing is always a possibility, for example the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO Preparatory Commission) has such potential.

### **Debate**

25. Following the presentations, participants exchanged views on the following issues:

- (i) Verification;
- (ii) CD-COPUOS collaboration; and
- (iii) ASAT weapon use.

26. The central topic of discussion arising from the speakers' presentations in this session concerned verification aspects following the presentation of the verification blueprint concept. Participants were quick to note the utility of the blueprint concept and felt that perhaps it would function better if it were designed as a 'pick and mix' option, giving it even greater flexibility. However, the blueprint model was criticized for relying on more traditional verification measures when the current trend is moving away from such systems and their associated high management costs. An alternative is to think of verification as a system of collective sharing and information analysis.

27. How the commercial sector could be integrated into any proposed verification regime was raised as a potential obstacle that needed due consideration. The problem of commercial secrets being exposed to external bodies or personnel is a significant concern. This was tied to the issue of vulnerability—the more advanced a company, the more vulnerable it felt, making it less likely to concede vital areas of research and development to verification measures. This was compared to the



age-old problem faced by governments concerned with questions of national security, which often has the effect of limiting a treaty's level of intrusiveness and thus effectiveness. This led to the question of who would carry out inspections for any proposed treaty. The general feeling among participants was that commercial actors needed to put more thought into the verification issue at both the research and policy levels.

28. An effective verification and compliance system would provide credibility to any chosen enforcement mechanisms. Disaggregating the issues of enforcement and compliance, as some states do, was said to constitute a misperception of how the two activities interact with each other.

29. With any proposed treaty, the capabilities under surveillance would all be dual-use—this applies across the board, including space-based interceptors. The crux of the matter is in verifying acts of non-compliance, not capabilities that could be used to contravene a treaty. This points to the importance of space situational awareness in monitoring activities and thus acting as a means of verifying events that had already occurred or were in the process of occurring. It was proposed that this should be the purpose of any proposed verification model given the problem of dual-use technologies. International space surveillance systems could be used to pool information.

30. How to promote more effective partnership between the CD and COPUOS on space-related issues was of considerable interest. The space environment is changing: the artificial barriers between civil and military activities in space are already dissolving and in turn will effect how the UN operates in this area. One idea is to see which activities of the CD and COPUOS are in concert and cooperate on those. But simple factors, such as the fact that the Russian Federation will hold the presidency of the CD in June, at the same time the CD is planning to discuss the PAROS agenda item, which also coincides with COPUOS's annual meeting, could act as a mechanism for examining common thinking and activities and deciding where to go from there.

31. Regarding ASAT technologies: who would be in a position to use these devices? Signal jamming and communication disruption could be the key here, for example the jamming of Global Positioning System (GPS) signals, which has a short-term impact. Such incidents are increasing and pose a significant threat. Incidents of television and Internet content signal jamming in certain countries in 2005 were noted.

### **SESSION THREE: LEVERAGING EXISTING INSTRUMENTS TO ENHANCE SPACE SECURITY**

#### **Framing the Debate: the Space Security Index** *Sarah Estabrooks, Project Ploughshares Canada*

32. The annual Space Security Index (SSI) provides a comprehensive approach to the issue of space security so as to frame the debate for policy makers. The index incorporates eight indicators of space security that highlight current trends and developments. The eight indicators are: the space environment; laws, policies, and doctrines; civil space and global utilities; commercial space; space

support for terrestrial military operations; space systems protection; space systems negation; and space-based strike weapons. A brief summary of developments in 2005 was given to the conference using these eight indicators. The space environment increased by 195 objects in 2005 bringing the total number of identified trackable objects in space to 9428. Twenty-four civil spacecraft were launched and budgets increased everywhere except in Japan. The United States continued to be the single largest commercial space client, with 60% of the commercial satellite sector. There were significant cutbacks to a number of US military space programmes in addition to the cancellation of the US NFIRE Kill Vehicle test, although the United States successfully tested its GPS 'pseudolite'. A number of occurrences of jamming incidents had been reported. In the policy realm, 2005 also saw the first opposition to the PAROS resolution in the UN General Assembly by the United States and Israel.

### **Leveraging the Existing UN Space Machinery for Sustainable and Secure Access to Outer Space**

*Gérard Brachet, incoming COPUOS Chairman, Sic Itur SARL*

33. COPUOS is a body composed of 67 states and 30 observer organizations. It could contribute to developing the architecture for sustainable space security by:

- (i) Raising awareness among its members and community of observers that space security is a major issue.
- (ii) Building on the experience gained from the discussions on space debris mitigation. Beyond the guidelines more work is needed. A report on space traffic management will be officially presented in June 2006 at the COPUOS plenary meeting.
- (iii) Contributing to confidence building via its current work on the application of the 1975 Registration Convention. In 2004 COPUOS established a working group on registration, reporting to the legal Sub-Committee, whose work plan should lead to a set of recommendations in 2007.
- (iv) Promoting open communications on PAROS issues with the Conference on Disarmament. The incoming chairman of COPUOS is committed to facilitating and encouraging such communication.

34. In February 2005 the COPUOS Scientific and Technical Sub-Committee proposed a set of guidelines on space debris mitigation. These guidelines will be officially submitted to COPUOS member states before the Sub-Committee's next meeting in February 2007. If approved at the COPUOS plenary in June 2007, they will then be submitted to the UN General Assembly in the form of a resolution later that same year.

### **Outer Space Treaty Review Conference: Progress and Possibilities?**

*Joanne Gabrynowicz, University of Mississippi*

35. In terms of international law, the OST is relatively rare because it created an interrelated framework with other space treaties. The OST is 'quasi-constitutional' in that it functions like a constitution. This means that if the OST were to be opened for amendment of one particular article

or to clarify a certain issue, the entire treaty would then be open for discussion. A thorough risk analysis of what could be lost as well as gained if an OST Review Conference was convened (with the intention of amending the treaty), is needed. This means asking some difficult questions regarding whether the provisions the OST presently contains could be achieved today. For example, an agreement banning nuclear weapons and WMD might not be possible to achieve in the current climate, nor perhaps an agreement on limiting military activity to peaceful or scientific purposes. The status of the OST during such negotiations would also be uncertain. There is a fear that some states could potentially move into the legal vacuum and create new types of practices. On the question of the treaty's status in international law in the case of an outbreak in hostilities, the presumption is that the treaty would not be suspended. This presumption is based on the similarity of the OST principle of non-interference with the neutrality principle in the law of war, which is maintained during conflict. Participants were warned to watch what they wished for in reviewing the treaty's operation as this could increase the lack of clarity on certain issues.

## **Debate**

36. Following the presentations, participants exchanged views on the following issues:

- (i) Re-framing the debate—the environmental aspect;
- (ii) The purpose of an OST Review Conference;
- (iii) Launch registration obligations; and
- (iv) The OST's principle of non-interference and the neutrality principle.

37. The use of terminology commonly associated with environmental issues to apply to space, for example 'pollution' and 'debris', was postulated as a useful way of approaching the notion of outer space security in that such language could serve as an alternative paradigm for promoting objectives. The quality of the space environment is directly connected to the ability to operate in a secure manner. Today the problem or threat is not yet space weapons but space debris, which is primarily an environmental issue. In addition to the discussion in COPUOS there are people already looking at how the environmental approach could complement the arms control approach. The concern, however, is that although space weaponization has not taken place, serious pollution already is having a major effect. Yet the focus of the international community is still on the former and not the existing problem.

38. A Review Conference of the OST could be convened to review the treaty's status without the intention of amending the treaty, like the review conference processes of other arms control treaties. It was generally felt that there could be a lot of utility in assessing the OST's performance at this stage. It was asked whether there would be value in negotiating a protocol to the treaty that could further the international community's understanding vis-à-vis Article IV, with the intention of extending its prohibition to the emplacement of all weapons in space. A Review Conference was suggested as a possible means of establishing a working group to look at such a possibility. In that regard, the very first UN General Assembly resolution (dated 24 January 1946) defines WMD as all weapons adaptable to WMD. Had this definition been included in the treaty, the Article IV problem would not exist. It was suggested that instead of a Review Conference an anniversary meeting could be held in 2007 timed to coincide with the OST's 40th anniversary (noting too that 2007 was also

the 50th anniversary of the first Sputnik mission). It was asked who would call for such a meeting. As the UN Secretary-General is the treaty's depository, it was suggested that a meeting could be established via a UN General Assembly resolution.

39. Regarding the 1975 Registration Convention concerns were expressed as to whether this is a voluntary or political commitment, whether it is a requirement for all UN Member States, and whether it applies to both military and commercial satellites. One participant gave the example of the European Space Agency's Ariane launch programme that launches from French Guiana. In this case it was asked whether the host country is responsible for registering launches or if this is the responsibility of the owners of the satellite. One problem is that some commercial satellite bodies that were once intergovernmental organizations have since privatized. States in which a company's headquarters were located do not take responsibility for being the launching state. A COPUOS working group is currently reviewing this situation in relation to the Registration Convention and it was felt by a number of participants that both the owners of the satellite and the launch hosts should share responsibility in this matter.

40. In regard to the similarity between the OST's principle of non-interference and the neutrality principle in the laws of war, both are concerned with protecting peaceful activities in an area or region from non-belligerents. The OST codifies the right of all states to peacefully use and explore space. If two or more states were in conflict, it is presumed that this would not affect the rights of access of others. Thus the treaty would be maintained during conflict, following the reasoning that the neutrality principle is not suspended in times of war.

#### **SESSION FOUR: DEVELOPING CONFIDENCE-BUILDING MEASURES (CBMs)**

##### **The Potential for Outer Space Confidence-Building Measures** *Phillip Baines, Foreign Affairs Canada*

41. Confidence-building measures (CBMs) are not designed to address the capabilities of others, rather they address perceptions of intent; thus they succeed best when they lead to a transformation in perceptions. Some previous CBMs in outer space have worked well, such as the 1975 Apollo Soyuz Test Project, concerning the use of compatible docking systems that led to the first international handshake in space. Pre-launch notification is an area of space utilization in which CBMs could be effective today. A cooperative monitoring process referred to as '3D' (Declare, Do, Demonstrate) could be a suitable practice to apply to pre-launch CBMs. A 3D process would consist of three steps: declare what you will do, do what you had declared, and demonstrate that you did what you had declared. Such cooperative monitoring, which places the onus on compliance demonstration, could be less adversarial than challenge inspections or invitations to observers. Infrasonic technology could well be an applicable technology—it is possible to detect Space Shuttle launches at the Kennedy Space Center from a distance of 1,200km away. Applying the 3D cooperative monitoring system initially to pre-launch notifications and then to in-orbit satellite manoeuvres, as well as to guided vehicle re-entry, could take the international community to the next level of CBMs: a space traffic management system. Taking a 'system of systems' approach, akin to air-traffic control, is one way of achieving this system.

### **Confidence-Building in Outer Space**

*Anton Vasiliev, Permanent Mission of the Russian Federation to the Conference on Disarmament, and Alexander Klapovsky, Ministry of Foreign Affairs of the Russian Federation*

42. The Russian Federation's resolution on transparency and confidence building in the sixtieth session of the UN General Assembly was a significant event. A simple first step in securing outer space and engendering confidence could be for interested parties to develop recommendations on possible CBMs together. In this way CBMs could contribute to favourable conditions for a new agreement or treaty. Disagreements over verification measures could pose a considerable obstacle to agreement. These, however, could be prepared at a later stage and CBMs could compensate for a lack of verification measures in a new treaty for the time being. Transparency is the key for any specific CBM. A number of ways in which CBMs could be implemented were outlined, including: information sharing; demonstration; notifications (of launches, satellite manoeuvres, re-entry of guided spacecraft, re-entry of nuclear powered craft); consultations; and thematic workshops. Such a proposal is not new but builds on what has already been done to build confidence among space-faring nations. The Russian Federation's no-first-space-weapon-deployment pledge is a good example of how states could take unilateral measures to build confidence. Such CBMs could be of a voluntary nature initially with the possibility that they might form part of a future treaty.

### **The European Space Agency Space Situational Awareness (SSA)**

*Gerhard Brauer, European Space Agency (ESA)*

43. Space surveillance or space situational awareness systems need to be able to provide: characteristics of satellites, in particular orbit parameters and activity status of satellites; characteristics of potentially threatening debris, in particular trajectory data and physical parameters; and information related to space weather and near Earth objects. Other data could be included to provide up to date space situational awareness needed for threat assessments, as well as alert cues to avoid collisions. From the European view, the cost-effectiveness of any system would depend on its use.

### **Confidence-building Measures: Help or Hindrance in Achieving a Space-Based Weapons Ban?**

*Theresa Hitchens, Center for Defense Information (CDI)*

44. CBMs are a stepping-stone to an eventual legal mechanism and as such they should not be skipped. As discussions on a PAROS treaty are currently at a standstill, states have a number of other options before them. One option is for dedicated nations to pursue a weapons ban treaty outside formal processes and structures, as was successfully done through the Ottawa Process used to achieve the Mine Ban Convention. Another answer could be for interested nations and parties to continue to work to define a possible treaty approach, creating draft legal instruments, verification protocols, etc., until the time was ripe for negotiations to occur in the traditional setting of the CD. The crux of the situation is that some states remain unconvinced that a weapons-free space environment is either achievable or necessarily in their interests. In this regard CBMs are of value.

They are a way of dampening national threat perceptions and establishing consensus on mutual interests. Space debris is the most immediate area relevant to CBMs. COPUOS's proposed guidelines need development, such as better data sharing across the gamut of space stakeholders, international practices and protocols for collision avoidance, and joint research to combat problems such as ways to remove space debris. While CBMs are no substitute for a treaty, a combination of transparency regimes, CBMs, codes of conduct and strictures against debris-creating weapons, could, taken together, go almost as far as a total weapons ban.

## **Debate**

45. Following the presentations, participants exchanged views on the following issues:
- (i) Transparency issues;
  - (ii) CBMs and BMD;
  - (iii) The 'dual use' problem;
  - (iv) The objective behind CBMs;
  - (v) Existing reporting requirements; and
  - (vi) The view from the United States.
46. The need for greater transparency within existing transparency measures was expressed. None of the pre-launch notifications or reports of ballistic missile tests required in the existing arrangements and agreements or submitted to the Hague Code of Conduct (HCOG) are made available to the public. This information is important and its lack of transparency could undermine the ability of the HCOG to further build confidence. The 3D concept could contribute to increasing transparency of those CBMs already in place.
47. On the question of BMD it was suggested that states should think ahead as to what possible CBMs could be applied for the deployment of such systems. Some felt that when states begin testing in space, regardless of whether the system worked, it would erode the norm against weaponizing space and therefore needed to be addressed. The issue is not whether the system is effective but what perceptions such deployment or potential employment engenders in others—which is precisely the point of CBMs, to build confidence in one state's perceptions of another state's intentions and activities. Another participant added that while BMD systems might not function as a whole, elements of BMD have latent ASAT capabilities, which have been tested by directing missiles at particular targets in space; hence the relevance of the CBM question.
48. The dual-use problem related to space situational awareness was raised—in the sense of the same asset being used by both civilian and military enterprises. So far there has not been sufficient discussion on how a system could be developed for both the civilian and military communities. It was thought that if the military contributed to any such system it could demand to own it at certain times, for example in times of crisis. The space-faring community's discussion on this issue is still in its early stages and there is currently only one agreement in existence, the Turin Agreement, between France and Italy. Legal research is being conducted on what a satellite sharing agreement that satisfied both communities would look like.

49. Undue fixation on a treaty or on the necessity of agreeing to negotiate a treaty before other measures are discussed could be a mistake. It is important to remember first principles: the central issue is outer space security and how to establish it. Negotiating a treaty is a lengthy process, one the international community had yet to agree to. Interested actors now need to think about their goals and not become enslaved to the process. Some participants felt that a treaty might not be the best solution in any case. Often people regard treaties as the optimum way to shape state behaviour, but the custom and practice that arises out of CBMs was proposed as another way. However, as one participant mentioned, it is important to remember that CBMs would not prevent the weaponization of space but should be understood as a transitional measure or part of a more realistic way to achieve this goal. Although CBMs are not a panacea, they would be worthwhile if they could command consensus and strengthen or create trust.

50. The prospects for consolidating the present reporting requirements under the various arrangements and agreements, such as the HCOC and the 1975 Registration Convention for example, with a view to using these reports to monitor compliance with current obligations were discussed. Consolidation could develop transparency and build confidence on the basis of existing arrangements and agreements. A space traffic management system could serve this function. An important question is how the existing reporting requirements could best be interfaced and who should be responsible for coordinating this, as well as which department at the national level should handle the information.

51. There was uncertainty expressed as to the United States view of CBMs. The United States voted against a Russian-sponsored resolution in 2005 that concerned preliminary discussions on CBMs. The internal debate was said to be on transparency/CBMs versus what might be risked. The United States Air Force is interested in transparency but apparently the intelligence agencies are not as keen. However, there are two areas where internal bureaucracies in the United States could move toward positions that could be expanded into CBMs. The first is regarding the protection of commercial satellites. There is increasing recognition that private companies are not national entities and so discussions concerning the protection of commercial satellites would need to include actors from outside government. A level of transparency would be needed to have these discussions. The second area concerns space debris, a problem that possesses no national allegiance. There is increasing recognition that mutual interests are apparent on these two issues. A way to start a dialogue that recognizes these mutual interests is now needed.

**SESSION FIVE: INTERACTIVE DEBATE ON PUBLIC AWARENESS AND  
ADVOCACY IN POLICY MAKING**

**Strategies for Raising Public Awareness and Influencing Political Decision Making**  
*Rebecca Johnson, Acronym Institute for Disarmament Diplomacy*

52. Much had changed since the first Geneva seminar on space security was held in November 2002, with a main focus on educating, informing and raising awareness. A range of proposals and initiatives that have come to the fore since then, including: the space security index; codes of

conduct; the guidelines for mitigating space debris; initiatives for reviewing and strengthening the Outer Space Treaty in its fortieth year (2007); and treaty approaches, including the Russian–Chinese draft treaty tabled in the CD.

53. But, however good the ideas might be, without public awareness and effective strategies they remain in the realm of thought, not action. There are various drivers for raising public awareness, including: fear of weapons or war in space; self-interest not to lose vital space applications on which we are now so dependent; commercial investments and interests; opposition to BMD; and the romantic or moral appeals associated with space exploration and notions of keeping the heavens safe and peaceful.

54. Resolutions in both the UN First and Fourth Committees in 2007 could be tabled calling for support for and universal adherence to the Outer Space Treaty, and for a Review Conference to be held to commemorate and review its forty years of operations, and consider ways to strengthen implementation and progress towards universality. It could also be possible to bring the 1967 Treaty up to date (without opening it for amendment, which would not be desirable) by adopting a more space-relevant interpretation of the term ‘weapon of mass destruction’ in the Treaty: that in view of the particular circumstances of outer space, any weapon used in or from outer space would result in unpredictable and potentially mass destructive effects.

The discussion on this presentation returned to the proposed Review Conference of the Outer Space Treaty, specifically linking it to the 50th anniversary of the launch of Sputnik (4 October 2007), and holding it at the United Nations in October 2007.

55. The idea was proposed to invite commercially interested parties to the discussion table: Boeing, as a part owner of the pioneering Sea Launch Company, was singled out as one such entity that could be worthwhile to include. The idea of convening a specific forum whereby those in the business and academic communities could come together to share their views was also suggested.

56. The possibility of creating an Internet network for exchanging ideas as a useful way of facilitating and developing ongoing discussions was raised. It was noted, however, that such a network already exists although it remains under-utilized due to lack of awareness. Participants were informed of the Pugwash Internet Discussion and Information Sharing Forum an initiative borne on the sidelines of the Pugwash conference “60 years after Hiroshima and Nagasaki” held in Hiroshima, Japan in 2005. The Forum was created to stimulate ideas and overcome the various existing boundaries to such interaction.

57. Rebecca Johnson concluded that:

- (i) There is still a need to forge alliances and communicate better with commercial and military players, including in the United States, to ensure sustainable space security.
- (ii) We now need to engage parliamentarians much more effectively, to raise the level of debate in different countries and regional institutions such as the European Union, and to provide legislators with the information and questions to ask governments, defence ministries and regional alliances such as NATO.



- (iii) We need to do more to break down the institutional and political barriers so as to address both the civilian and military aspects of space security more coherently.
  - (iv) In order to adapt a principle of political strategy (think globally but act locally), we need to think comprehensively, but build the space security architecture incrementally.
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