ASEAN Regional Forum (ARF)

Space Security Workshop

Tokyo, Japan

October 9-10, 2014

Co-Chairs' Summary Report

1. Pursuant to the decision of the Association of Southeast Asian Nation (ASEAN) Regional Forum (ARF) Inter-Sessional Support Group (ISG) on Confidence-Building Measures and Preventive Diplomacy in Brussels, Belgium on April 9, 2014, the second ARF Workshop on Space Security was held on October 9-10, 2014 in Tokyo, Japan. The Workshop was co-hosted by the governments of Japan, Indonesia, and the United States and co-sponsored by Australia.
2. The Workshop was co-chaired by Mr. Shingo Yamagami, Ambassador for Policy Planning, International Security Policy, Foreign Policy Bureau, Ministry of Foreign Affairs of Japan; Mr. Thomas Djamaluddin, Chairman, National Institute of Aeronautics and Space (LAPAN), Indonesia; and Mr. Frank Rose, Deputy Assistant Secretary of State for Space and Defense Policy, Bureau of Arms Control, Verification and Compliance, U.S. Department of State.
3. The Workshop was attended by representatives from all ARF participants except Brunei Darussalam, the Democratic People's Republic of Korea, and Papua New Guinea, which represented an increase in ARF participation from the previous Workshop. More than 100 individuals participated in the Workshop. Members and participants from multilateral organizations, including the ASEAN Secretariat and the United Nations Institute for Disarmament Research (UNIDIR) attended. Representatives from several academic and non-governmental organizations also attended.
4. The Workshop's Agenda appears as Annex 1, and the list of participants appears as Annex 2.

Day 1

Opening Session

5. Mr. Yasuhide Nakayama, State Minister for Foreign Affairs of Japan, welcomed the participants to the 2nd ARF Space Security Workshop. Nakayama noted that the risk of collisions is increasing due to increasing numbers of space objects and space debris. Nakayama noted that Prime Minister Shinzo Abe had said that he intends for Japan to make a "Proactive Contribution to Peace" based on the principle of international cooperation. Nakayama stated that anti-satellite (ASAT) weapons testing is a serious

threat to the use of space. Nakayama stated that Japanese policy emphasizes: 1) rule-making, including developing international rules of common understanding, and the proposed International Code of Conduct was worth keen attention, so all ARF participants should deepen engagement on the Code); 2) international cooperation, for example through Space Situational Awareness data sharing and the Sentinel Asia initiative; and 3) dialogues, including the recent Japan-EU Space Policy Dialogue and the U.S.-Japan Comprehensive Dialogue. Nakayama concluded that this ARF Workshop was also a manifestation of Japan's desire to conduct dialogues.

6. Mr. Thomas Djamaluddin, Chairman, National Institute of Aeronautics and Space (LAPAN), Indonesia, stated that space utilization in a safe and sustainable manner was necessary for developing countries and that Indonesia wanted the peaceful use of outer space to continue. Djamaluddin noted that technology plays a significant role in supporting economic development, and Indonesia thought that countries should be able to advance their technology. Djamaluddin stated that dialogue on transfer of technology is helpful in assisting safe and sustainable outer space activities.
7. Mr. Frank Rose, Deputy Assistant Secretary of State for Space and Defense Policy, Bureau of Arms Control, Verification and Compliance, U.S. Department of State expressed his hope that participants would build upon the success of the first ARF Workshop on Space Security that was held in Hoi An, Vietnam in December 2012. Rose stated that this Workshop was an opportunity to discuss how we can work together to ensure the long-term sustainability and security of the space environment in the face of pressing threats, especially space debris. Rose stated that if the urgent problem of debris is not addressed, access to some space services could eventually be seriously degraded or even lost. Therefore, to preserve the right to use and explore space, international cooperation was necessary. Rose proposed that participants identify areas of pragmatic near-term cooperation. Rose noted that the key area in this regard was TCBMs that encourage responsible actions in, and the peaceful use of, outer space. As an example of the positive impact of such TCBMs, Rose noted that on August 15, 2014 the U.S. Joint Space Operations Center provided a collision avoidance notification to Vietnam that VNREDSat-1 faced a heightened probability of collision with another space object; Vietnam subsequently changed VNREDSat-1's orbit to avoid the possible collision. Rose also noted that a promising area for multilateral cooperation on space TCBMs was the implementation of the recommendations of the UN Group of Governmental Experts, or GGE, study of TCBMs, which was endorsed by consensus in the UN General Assembly. Noting that the GGE report endorsed efforts to pursue political commitments, for example "a multilateral code of conduct, to encourage responsible actions in, and the peaceful use of, outer space," Rose stated that the United States was actively involved in working with other governments to develop the International Code of Conduct for Outer Space Activities. Rose stated that the UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS) is also continuing to do important work to move forward in the development of new international long-term sustainability guidelines. Rose concluded that governments must work together to address urgent threats to the space environment, and TCBMs were the correct place to start.
8. Mr. Trinh Minh Manh, Deputy Director General, Vietnamese Ministry of Foreign Affairs, reviewed the work of the first ARF Space Security Workshop, which was hosted in Hoi An with Australia. The plenary sessions focused on: 1) space capabilities and

dependencies in the Asia-Pacific; 2) international space security framework; 3) prospects for space arms control; 4) strategies to improve the security and safety of the space environment; 5) space transparency and confidence building measures; and 6) contribution of regional cooperation organizations to space security. The key outcomes of the Workshop were: 1) the region was now dependent on a secure, safe and sustainable space environment; however, there were growing threats to space capabilities; 2) international legal instruments did not provide a sufficient framework of rules and principles for operating in space, and the meeting called on ARF participating countries to engage more in international and regional processes to develop norms and principles including UN initiated processes and the proposed Code of Conduct; and 3) space TCBMs could provide an important way to increase security and minimize the risk of miscalculation in space activities. Manh concluded that space security was still a new topic for the ARF, and the ARF had much to do in order to make its worthy contribution to enhancing space security in the region and beyond.

Session 1: The Impact of Space Activities in the Asia-Pacific Region

9. In the first session, moderated by Mr. Takao Imafuku, Director of the Ministry of Foreign Affairs of Japan, the Workshop considered the wide-ranging impact of space activities in the Asia-Pacific region.
10. Dr. Ida Bagus Rahmadi Supancana of Atmajaya University, Indonesia, provided a view of the role of space in the Asia-Pacific from the Indonesian perspective. Supancana examined the dual use nature of much space technology, and provided insight on the impact of Indonesia's 1945 constitution on its basic space policy, which is to promote general welfare, improve the lives of the people, and maintain international peace and security. Supancana also addressed the important institutional roles of Indonesia's National Outer Space Council, which is chaired by the President of Indonesia, and the National Aerospace Congress. Supancana stated that Indonesia's development of space capabilities was guided by national development plans, the National Space Act (Law No. 21 of 2013), soft law, and other state practices.
11. Amb. Shingo Yamagami of the Ministry of Foreign Affairs of Japan provided the Japanese perspective on the role of space in the Asia-Pacific. Yamagami stated that the Asia-Pacific region is currently characterized by: 1) fast growth in population and economy; 2) being prone to natural disasters; and 3) the presence of vast maritime areas and spread out small islands. Yamagami continued by outlining Japan's initiatives in the Asia-Pacific Regional Space Agency Forum (APRSAF), including the Sentinel Asia initiative, as well as Japan's cooperative efforts with the International Space Station, includingits use of the Japanese-made Kibo laboratory to launch, particularly, other Asian countries' satellites (including Vietnam's). Yamagami explained that current Japanese policy is guided by the 2008 Basic Space Law and 2013 Basic Plan for Space Policy, as well as Prime Minister Shinzo Abe's policy of "Proactive Contribution to Peace" based on the principle of international cooperation. Yamagami stated that Prime Minister Abe had instructed the government to formulate a new Basic Plan for Space Policy by the end of 2014. Yamagami concluded that key issues for space security were: 1) increasing transparency; and 2) rule-making for outer space (including the Code).

12. Ms. Leah Rodriguez of the Philippines' Department of Foreign Affairs provided an overview of space utilization for security purposes. Rodriguez explained that countries are dependent upon a range of space applications, including satellite-based navigation such as GPS, remote sensing, compliance with nonproliferation and arms control measures, and monitoring earth resources. Rodriguez stated that space has become the last frontier for competition in the region; since information is power, and the concept of security is based on that power, then access to information from satellites is deemed imperative for security. However, space can be a venue for cooperation as well as competition; for example, states are cooperating on maritime security (including the Automatic Identification System) to combat piracy. Cooperation in space can also assist in addressing environmental problems, particularly in Southeast Asia, which is prone to repeated large-scale environmental problems. In addition, cooperation can assist in dampening national threat perceptions. Rodriguez recommended continuing to raise public awareness and to engage legislators to raise the level of debate, as there is a lack of awareness of everyday benefits from space.
13. Mr. Mohd Zamri Shah Bin Mastor of the National Space Agency of Malaysia followed up with a presentation on the utilization of space for civil purposes. Mastor explained how communications satellites service the region as well as the globe, and how very-small-aperture terminals have become increasingly popular across the region. Mastor outlined the importance to the region of high-throughput satellite systems, satellite phones, television over internet protocol, remote sensing satellites, global navigation satellite systems, and space-enabled "smart cities."
14. During the question and answer period, a range of topics were raised during a wide-ranging discussion, including military use of space, the importance of transparency and confidence building measures such as the Code, and the threat from space debris. Some participants provided overviews of their national efforts in these and other areas of space.

Session 2: Space Security Threats and Hazards: Why Should We Care?

15. The second session, moderated by Mr. Thomas Djamaluddin, focused on the basics of space security threats and challenges.
16. Mr. Ben Baseley-Walker of the UN Institute for Disarmament Research began with an overview of what space security is, outlining the history of space utilization, which began with the military use of space. Baseley-Walker also stressed the importance of space to all nations and the need to prevent space from becoming an arena of conflict. He looked at balancing the interests of both established and emerging space-faring nations, and recommended building stability in space without impeding other nations' development. Baseley-Walker also discussed the key relevant international bodies that deal with space and focused on the need to build a foundation of understanding through definitions of critical terms.
17. Japan Aerospace Exploration Agency's Dr. Yasushi Horikawa provided an overview of how losing access to space would affect users on earth. Horikawa began by discussing the tremendous impact that space has on earth, particularly in the areas of ASEAN countries for disaster warning and various daily satellite services. Looking at threats that could prevent nations from accessing space, he focused on what the loss of space would mean in areas of communication, navigation, meteorology, and remote sensing.

18. Mr. Abdul Rachman of the National Institute of Aeronautics and Space (LAPAN) of Indonesia spoke on the threat of space debris to outer space activities. Highlighting the dramatic increase in debris since 1957, Rachman focused on two primary risks—collisions and re-entry. He also examined why emerging space powers should care about debris and how debris could be mitigated. Finding the current Space Debris Mitigation Guidelines inadequate, Rachman recommended a more aggressive type of debris mitigation and suggested improving monitoring and cataloging artificial space objects system.
19. Ms. Caroline Baylon of Chatham House gave an excellent presentation on the importance of protecting the cybersecurity of space systems. Looking at the cyber threats to space systems, Baylon focused on the threat of jamming to communications satellites. The jamming and spoofing of navigation satellites was also covered. Baylon also examined the threats of eavesdropping and cyber-attacks to force a satellite to pre-maturely re-enter Earth's orbit.
20. Ending the session, Dr. Kazuto Suzuki of Hokkaido University looked at the realities of the various threats to space. Suzuki reiterated the risks of space debris and also examined a variety of other threats to satellites including anti-satellite weapons (ASATs), space mines, parasite satellites, and directed-energy weapons. Suzuki also looked at how to mitigate these threats including debris removal and space situational awareness, and regulating space through legally binding and non-legally binding rules.
21. Discussion during the question and answer session showed a great deal of interest in the threats of cyber-attacks on space systems and space debris. Participants were interested in further case studies and examples of cyber-attacks. There was also interest in how to strengthen the space debris mitigation guidelines.

Session 3: Assessing the Direction of the Space Legal Regime

22. The third session, moderated by Mr. Ian Biggs of the Australian Department of Foreign Affairs and Trade focused on the space legal regime.

23. Dr. Setsuko Aoki, Keio University, Japan, provided an overview of the United Nations Outer Space Regime. This regime was created initially by the UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS), which currently has 76 member states. Aoki noted that the space regime faced increasing risks, but UNCOPUOS has a mandate that limits its work to civil uses and has not produced a treaty in 35 years. Aoki concluded that current rules on debris mitigation are insufficient to addressing the issue, and there are increasing risks to the safe, secure, and sustainable use of outer space; for example, the 2007 Chinese anti-satellite weapons test and the 2009 Cosmos-Iridium collision created thousands of pieces of additional space debris. Aoki examined the prospects for the Code as well as space arms control, and noted that the former would of great importance to enhance safety, security and sustainability of outer space while the latter, beingaddressed by the UN Conference on Disarmament (CD) has been stagnant on space issues for more than three decades.
24. Dr. Sergio Marchisio, the Italian expert on the UN Group of Governmental Experts (GGE) on TCMBs in Outer Space Activities, outlined the role of soft law in space security. While Marchisio noted that some see soft law in a negative light, assuming it is

too weak to adequately address the challenges to security in space, Marchisio saw several benefits of soft law. For example, soft law provides a preliminary flexible regime, avoiding the sometimes cumbersome domestic procedures that are often required for legally-binding treaties. Soft law also allows for "reinforceability" over time. Marchisio explained that even non-legally binding instruments still imply some implementation, and non-binding norms can help determine if damage has taken place and help in establishing liability. Marchisio concluded that implementation is important in evaluating effectiveness of a TCBM; political statements without possible implementation cannot be considered TCBMs, which are intended to help build confidence in peaceful intentions of states.

25. Mr. Mardianis, National Institute of Aeronautics and Space (LAPAN), Indonesia, discussed harmonizing national law with international space law, drawing on the experiences of Indonesia. Mardianis said that in Indonesia's case, it depends on the type and context of the international law if it needs to be ratified and transformed nationally in the form of law. Mardianis also outlined a combination ofvarious existing systemsto be considered as an alternative CBMs.
26. Ms. Jo Beadsworth of the UK Foreign and Commonwealth Office provided an overview of the history of the UN CD and noted that the organization now has 65 members. Beadsworth explained that the Prevention of an Arms Race in Outer Space (PAROS) has been on the CD's agenda since the organization's creation in 1979, and the UK had chaired the 2014 informal session on PAROS in Geneva. Beadsworth outlined some of the challenges with space arms control, including: whether to approach the issue from a behavior-based or capability-based paradigm; the difficulty of policing treaties that many countries cannot monitor; and handling the inherently dual use nature of many space assets, in which innocuous items can still damage critical national security satellites. For example, a satellite designed specifically for orbital maintenance could also be used as an anti-satellite (ASAT) weapon. Beadsworth also wondered if some states are overly concerned with the notion of weapons being placed in outer space while ground-based ASATs are already being currently developed. Beadsworth noted that TCBMs, such as those outlined in the GGE report, which was later endorsed by a consensus UNGA resolution, can serve as the basis of development of non-legally-binding initiatives. Beadsworth stated that, as recognized in the GGE, TCBMs should be: clear, practical, and proven; objectively verifiable; and reduce or eliminate causes of mistrust, miscalculation, and misunderstanding. Beadsworth concluded that TCBMs can complement but not substitute for legally-binding treaties and verification regimes.
27. Mr. Wei Liu, Chinese Ministry of Foreign Affiars, made a comprehensive presentation on the Russian-Chinese draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Space Objects (PPWT). Liu said that China has been promoting PAROS as priority in the CD. Liu stated the international community should adopt preventive measures to negotiate and conclude new international legally-binding instrument to prevent the weaponization of outer space. Liu mentioned that the submission of the PPWT reflects the common aspiration of the international community. Liu stated that the updated PPWT submitted by China and Russia on June 10, 2014, made many improvements to the 2008 draft, including more consistency with the existing space law system, clearer definitions and treaty obligations, and more specified provisions on treaty implementation and dispute resolution. He

explained instead of using the term "outer space weapons" which is hard to define, the PPWT used a two-track definition, including trying to manage actions which could be more easily defined and detected. Second, citing the Biological Weapons Convention as an example, he underlined that verification should not be a prerequisite for starting negotiations of an arms control treaty. Thirdly, he stated it is unfair to say that the PPWT does not cover anti-satellite weapons, because when using or testing of such weapons constitutes use or threat of force, such an action is prohibited under the PPWT. Finally, he underlined that the PPWT text remains open, and specific proposals from all parties were welcome.

28. After Session 3, there was a robust discussion of the foregoing presentations. One key area of discussion was how to expand the frontier of cooperative activity in space, and importance of the ARF in such discussions. Another key area of discussion centered on the legal consequences of non-legally binding instruments such as the Code and the role of legal measures in space. Interests were shown by some participants regarding the verification of the draft PPWT and how the deployment of ground-based ASAT weapons could be addressed by the PPWT. In this connection, questions were raised by some participants regarding the verifiability of the draft PPWT and its exclusion of testing of such ASAT weapons, in particular using a country's own satellite. India stated its position on the evolving outer space regime

Session 4: Possible Steps Towards Improving Space Security and Sustainability

29. Mr. Frank Rose, Deputy Assistant Secretary of State for Space and Defense Policy, Bureau of Arms Control, Verification and Compliance, U.S. Department of State, moderated Session 4. Before turning to the panelists, Rose noted that, during Cold War, both the United States and the Soviet Union developed ASAT capabilities. Although both countries deployed these capabilities, there was strategic restraint on both sides. Rose also observed that major advances in space security had occurred when security and environmental concerns intersected, such as the Outer Space Treaty and the Limited Test Ban Treaty. Rose further noted the positive example of the UN GGE, which showed that governments can make advances on space security when they choose to work together.
30. Mr. Ken Hodgkins, Director, Office of Space and Advanced Technology, Bureau of Oceans and International Environmental and Scientific Affairs, U.S. Department of State, discussed the work of the UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS) on the long-term sustainability of outer space activities. UNCOPUOS established four Expert Working Groups on various topics related to long-term sustainability. By mid-2013, the Expert Groups had identified 31 candidate guidelines and work was progressing to consolidate the guidelines. UNCOPUOS states also agreed to extend Working Group until 2016. Hodgkins stated that there were also other initiatives addressing sustainability, including the UN GGE and the proposed International Code of Conduct for Outer Space Activities. Hodgkins concluded that the guidelines work could potentially provide the consensus-based technical foundation for the implementation of both efforts.
31. Mr. Kang Yoo-sik, Deputy Director, Disarmament and Nonproliferation Division, Ministry of Foreign Affairs of the Republic of Korea, discussed implementing the GGE recommendations in an Asia-Pacific context. Kang recounted the history of the GGE,

which was established pursuant to UNGA Resolution 65/68 and adopted its report in July 2013. The GGE was composed of 15 member states' experts, including the following ARF participants: the ROK, Sri Lanka, the United States, China, and Russia. Kang noted the growing dependence on space systems and that the space environment is becoming increasingly congested, contested, and competitive. Threats to space capabilities can result from both natural and man-made hazards and the possible development of counterspace capabilities. Kang noted the purpose and characteristics of TCBMs, as well as proposed elements of TCBMs such as information exchanges, risk reduction notifications, contacts and visits to space launch sites and facilities, international cooperation, coordination and consultative mechanisms, and outreach. Kang also outlined the GGE's recommendations for states and intergovernmental organizations, including its endorsement of efforts to pursue political commitments, in the form of unilateral declarations, bilateral commitments, or a multilateral code of conduct, to encourage responsible actions in, and the peaceful use of, outer space. In discussing the way forward, Kang stated that TCBMs can be a foundation for the development of new international norms of behavior, and he noted that the proposed TCBMs were fully incorporated in the draft International Code of Conduct for Outer Space Activities. Kang concluded that it was important for more ARF participants to take part in the Code process.

32. Mr. Vladimir Yermakov, Deputy Director General of the Department for Nonproliferation and Arms Control, Ministry of Foreign Affairs of the Russian Federation, focused on globalization of the multilateral initiative/political obligation not to be the first to place weapons in Outer Space (NFP). Yermakov stated that Russia's NFP initiative is a major confidence building measure in outer space activities and a practical step towards PPWT and he called on all responsible States to support the proposed UN First Committee Draft Resolution on NFP. Yermakov stated that in spite of the mounting strategic instability in world affairs, outer space remained the only environment still free of weapons. Yermakov stated that the placement of weapons in outer space by one state could force other states to follow suit or to develop asymmetric advantages, opening up an arms race. Yermakov stated that to prevent such fatal for international security development, various multilateral initiatives are being promoted: PPWT, NFP, TCBMs, and the ICOC. Yermakov concluded by stressing that whenever we start to discuss security of outer space activities or any "code of conduct" in that field the first question we must find an answer on is prevention of placement of weapons in outer space. Yermakov stated that without tackling this very problem all other efforts alone look like mere hypocrisy.
33. Mr. Frank Asbeck, Principal Adviser for Space and Security Policy, European External Action Service (EEAS), provided an overview of the International Code of Conduct for Outer Space Activities. Asbeck stated that the landscape of space activities had changed dramatically due to the growing dependence on space globally and hazards and threats to space activities. Asbeck stated that debris congestion in particular has received extensive attention. Asbeck stated that the EU initiated the effort to develop the Code in 2007 in response to the UN Secretary General's call for concrete TCBMs for outer space activities, and the Code was formally presented to the international community in June 2012. Asbeck stated that the EU had engaged in open, transparent, and inclusive consultations on the draft Code, and that 95 UN member stated had engaged in three

rounds of Open-Ended Consultations. Asbeck stated that the main objectives of the Code were to achieve stability and security in outer space, introduce TCBMs as a realistic and pragmatic political proposal for a way forward, and address urgent concerns for safety and sustainability. Asbeck stated that the draft Code enjoyed support with regards to its key principles and brought added value. Asbeck concluded by noting that the EU plans to move from a consultative to negotiating phase on the Code and desired to conclude the Code as soon as feasible.

34. A wide-ranging discussion followed Session 4. One key area of discussion revolved around the GGE's criteria for a valid TCBM, with some participants questioning whether NFP met such criteria. There was also debate regarding whether or not the revised draft PPWT covered ground-based direct-ascent ASAT weapons systems, with some participants questioning why such systems appeared to be excluded from the draft treaty, while others stressed that using of such weapons against outer space objects were in fact captured by the draft treaty. However, some participants further questioned why testing of such systems, in particular using a country's its own satellite, is not captured by the draft treaty. Some participants questioned the language in Article 2 of the draft PPWT, which seemed to allow the use of force against non-States Parties in spite of the prohibition on the use of force enshrined in the UN Charter. Another key area of discussion centered on the difficulty of determining the function of an object in space, including whether or not it was a weapon.

Day 2

Summary for Day 1's Discussions

35. Co-chair Mr. Frank Rose provided a recap of the first day's discussions and the emerging themes of the Workshop: 1) space is critical to everything we do on earth; 2) the long-term sustainability of the space environment is at risk from space debris and other challenges; 3) some Workshop participants had recommended non-legally binding TCBMs, while others recommended legally-binding approaches; and 4) all countries have an interest in maintaining the long-term sustainability of the space environment regardless of their respective approach, and we needed to look for ways to achieve this outcome. Rose concluded that the implementation of the recommendations of the GGE Report could be one promising area of cooperation.

Session 5: What Does Regional Space Cooperation Look Like?

36. The fifth session, moderated by Mr. Trinh Minh Manh of the Vietnamese Ministry of Foreign Affairs focused on the role of regional space cooperation.
37. Dr. Rajeswari P. Rajagopalan ("Raji"), Senior Fellow in Security Studies, Observer Research Foundation, India, discussed the proliferation of space technology and its implications for space security and Asia. Rajagopalan stated we will see more countries joining the space club in the future, and while cooperation was a positive thing, a certain amount of regulation was needed. Rajagopalan stated that more regional space agencies have been emerging, especially in Latin America and Africa, but the two regional organizations in Asia are not quite to the same level of development, and private sector

participation is not as big yet in Asia as in the some other regions. Rajagopalan stated that it will not be possible to control proliferation of space technologies in the same manner as nuclear technologies, and the Chemical Weapons Convention would be a better model for how to control the technologies than the Non-Proliferation Treaty. Rajagopalan concluded that existing arrangements were inadequate to deal with new challenges, and the Outer Space Treaty was too expansive and lacked definitional clarity. While having new legal mechanisms would be ideal, political differences among the great powers obstructed agreement. As a result, Rajagopalan recommended governments start with the least controversial issues, such as TCBMs.

38. Ms. Leah Rodriguez of the Philippines' Department of Foreign Affairs discussed space and disaster relief. Rodriguez stated that images from earth observation satellites helped assess the damage caused by disasters and assessed the vulnerability to hazards. Rodriguez used the Philippines' experience with Typhoon Yolanda, which was a category 5 typhoon before it made landfall, to show the positive impact on disaster relief that space assets can have. In responding to Yolanda, the Philippines drew on a range of space services, including pooling data from 10 optical satellites, using "TV white space" to deliver broadband access, and relying on the mini-mobile satellite (MIMOSA) platform.
39. Mr. Andi Alisjahbana, PT Indonesian Aerospace, Indonesia, spoke about technology transfer in a regional context. Alisjahbana drew on Indonesia's experience with aerospace technology. Since Indonesia is a very big country with thousands of islands, more than 200 million people, and three time zones, aerospace technology is essential to the country's development. Alisjahbana stated that Indonesia gained aircraft manufacturing skill through offset technology transfer and joint development until the country had capabilities to develop indigenous design aircraft. Indonesia will continue to build its aerospace human and technical capabilities, and recently this process was assisted by various regulations that promote technology transfer. Alisjahbana stated that air navigation is still an issue in Indonesia and region. While U.S. GPS had been helpful for air traffic management, it may not sufficient for future use. Indonesia is proposing and Air Navigation Satellite System (ANSS), a new navigation system that would cover Indonesia and the Southeast Asia region and benefit ASEAN countries in precision air navigation. Alisjahbana stated that several support technologies for such an effort are already being developed, including as satellite payload design, guidance and launching.
40. Ms. Jessica Powers, U.S. Department of Defense, addressed space military-to-military cooperation in an ASEAN context. Powers stated that ARF participants share a common goal of pursuing responsible use of space, and one recent example of the region pulling together to cooperate in space was during the search for Malaysian Airlines Flight 370. Powers recommended that states seek to address congestion in space with TCBMs. Powers reported that the United States has signed agreements to share space situational awareness data with 47 commercial firms and eight partner countries. In addition, the United States also shared SSA data with countries that do not have SSA agreements, such as was done recently with Vietnam to help avoid a possible collision with VNREDsat-1. Powers encouraged participants to explore international cooperation in space. TCBMs were especially important for nascent space endeavors. Powers stated that space was increasingly a warfighting domain, and we needed to prevent such conflict by dissuading adversaries of aggression in space and prioritizing mission assurance by having systems

that are resilient, hard to eliminate, defensible, reconstitutable, and available when needed most. Powers concluded that increased information sharing could help with maintaining stability. Powers stated that she hoped that ASEAN militaries would work together to keep space safe.

41. During the first discussion segment of Session 5, participants had a dialogue on the relationship between national regulatory frameworks and the international framework. The prospects of weaponization and conflict in outer space were mentioned. Questions were also raised regarding the references to self-defense in the PPWT and the Code. Some participants reiterated that the use of space should be preserved for the future. Other participants also raised the need to complement but not replace existing treaties with TCBMs, as well as to address the challenges of space traffic management and space debris.
42. Mr. Hirota Tani from the Japanese Ministry of Education, Culture, Sports, Science and Technology provided an overview of the Asia-Pacific Regional Space Agency Forum's (APRSAF's) role in establishing regional partnerships for developing space capabilities. Tani stated that the APRSAF was the largest organization of its kind in the region and constituted an open and flexible cooperation framework, promoting initiatives that benefit daily lives such as the "Sentinel Asia" project aimed to support disaster management in the region. Tani stated that the APRSAF celebrated its 20th anniversary last year in Hanoi and always welcomed new participants.
43. Dr. Li Jiangang, China National Space Administration, provided an overview of the Asia-Pacific Space Cooperation Organization's (APSCO's) role in establishing regional partnerships for developing domestic space capabilities. Jiangang stated that APSCO was founded in Beijing in 2008 to promote and strengthen development of collaborative space programs among its member states. Jiangang outlined several of APSCO's educational and training activities.
44. Dr. Nyunt Soe, Technological University (Meikhtila), Ministry of Science and Technology, Myanmar, discussed the role of ASEAN and the ARF in space. Soe outlined the overview of ASEAN's Sub-Committee on Space Technology and Applications (SCOSA). SCOSA currently handled 11 projects and collaborated internationally with several partners, including Japan, India, China, and the European Space Agency.
45. During the second discussion period of Session 5, several topics experienced substantive dialogue, including military-to-military cooperation, the need for transparency, and the development by some countries of ASAT capabilities. In addition, participants discussed the differences between "militarization" and "weaponization" of outer space. Participants also discussed the Code's possible role in the transparent exchange of information on space policies and strategies (including those that are security-related),

Session 6: Examining the Future of Asia in Space Security

46. Mr. Ben Baseley-Walker chaired the final session of the workshop, which looked at the future of Asia in space security. To frame the issue before dividing the participants into breakout groups, Dr. John Sheldon of the Marshall Institute spoke on the need for Asian nations to participate in multilateral space security initiatives. Sheldon looked at the strategic importance of space utilization for Asian nations, and how this relates to

interests in other domains. He analyzed how space provides users with certain strategic advantages, specifically the ultimate high ground, global access, global presence, and enhanced strategic depth, which in turn provide for versatility and continuous operations. After stressing the strategic value that space assets provide, Sheldon then turned to examine ongoing multilateral initiatives and their potential usefulness in peacetime and crisis.

47. Mr. Ian Biggs, Australian Department of Foreign Affairs and Trade followed with a presentation looking at how the ASEAN Regional Forum could contribute in the future to discussions on space security. Biggs noted that space security had been on the ARF agenda for two years now, and the ARF had been helping foster dialogue and consultation. However, awareness raising needed to continue so that understanding of the reliance on space permeated a wider audience. Biggs stated that regional and international cooperation was needed to ensure ongoing access to the benefits of space, emphasizing the importance of developing rules of the road. Biggs noted the significant work done in the last couple of years on TCBMs, including the GGE, UNCOPUOS, and the Code. Biggs recommended a holistic approach to security in the ARF.

Breakout Group Discussions

48. Workshop participants divided into eight breakout groups, whose discussions were guided by the following prompt:
    a. "Interest in space capabilities and their benefits is growing rapidly in the Asia-Pacific region. Given their growing use of and dependence on space assets, Asia-Pacific nations have a large stake in ensuring that all outer space activities are conducted in a responsible manner. Given the wide range of equities and different levels of interest and development in regards to space in the region, what roles should Asia-Pacific countries play? How can we take into account the diverse needs of the region? What are the roles of the ARF and ASEAN in dealing with emerging challenges such as space security?"
49. Breakout Group A reported to the Workshop that their group proposed that there should be no weapons in outer space and that developing countries should receive transfers of technology. The group further recommended that non-legally binding measures not replace legally-binding measures.
50. Breakout Group B reported that, while space security means different things for different countries, all countries could agree that space makes our lives better. Nevertheless, space faced a range of threats. The group noted that developing and ASEAN countries see the development of space capabilities as a priority for both developmental and security reasons. The group also concluded that countries should not destroy each other's satellites without their permission. Furthermore, sustainability should be an international norm, and common understand among countries is needed on sustainability.
51. Breakout Group C reported to the Plenary that the spectrum of views on space security was very wide: for some countries this represented a whole new issue, while for others it was a matter of life and death. The group asked if ASEAN could develop a common position on space, particularly since one half of ASEAN states will have the potential capability to launch satellites in the near future. The group noted that space was increasingly congested, so more international cooperation – and action - was needed on

cleaning up space debris. The group saw political and practical discussions overlapping during the discussion of space security.

52. Breakout Group D recommended the promotion of multi-level cooperation on space in ASEAN, and proposed uniting ASEAN with a project of common interest such as a regional positioning, navigation, and timing system, or perhaps an expansion of the Indonesia-Philippines satellite phone initiative. The group suggested there be additional regional meetings on space topics, and asked for information regarding when the third Workshop on Space Security would be held. The group also concluded that further attention was needed in order to address issues at the intersection of cyber and space security.
53. Breakout Group E reported that its members had a heated yet interesting discussion. The group noted that this Workshop had been very useful and timely, and proposed that there be a future Workshop, which could potentially incorporate additional private sector stakeholders into the discussions. The group stated that there is a nexus between cyber and space security issues. The group concluded that participants should consider moving to the concrete stage of development of TCBMs at the regional level.
54. Breakout Group F concluded that the general public was not always aware of the critical importance of space in their daily lives, and that initiatives such as "a day without space" could help improve this situation through education. The group noted that the ARF could benefit from the history and experience of European collaboration in space, contrasting the European model with the more individualistic development of space capabilities by some governments in the Asia-Pacific region. The group further noted the positive example of the EU Satellite Center, which shared data among EU member states, and concluded that such a center constituted a TCBM both in space and on earth. The group agreed that space assets must be protected.
55. Breakout Group G stated that, given the prevalence of natural disasters in the region, it made sense to cooperate on disaster response, as well as other non-traditional security challenges. The group reported to the Plenary that there was disagreement on whether it was more important to tackle space debris or space weaponization first, although group members agreed that TCBMs were a positive thing. The group noted the possibility of a parallel approach between TCBMs and legally-binding measures.
56. Breakout Group H reported having a heated discussion. Nevertheless, group members found the Workshop to have been very informative, and found the presentations, especially the technical ones, to be very useful. The group concluded that: 1) how to proceed on space security remained unclear, and 2) space security should be a wider concept than militarization or weaponization. The group recommended that all governments should abide by the UN space treaties; correspondingly, more ratification and accession to the treaties was needed. The group noted that the involvement of the private sector in space was increasing and stated that private companies should abide by international law in the course of their space operations.

Closing Session

57. Based on the presentations by the expert speakers and subsequent discussion, including feedback from the eight breakout groups, Mr. Basely-Walker of UNIDIR offered the following summary of the Workshop's discussions:

a. Space security was highly important;
b. Governments needed to safeguard access to space and the utilization of space;
c. There was a continued rise of new actors in space;
d. The importance of the rule of law in space should be emphasized and we should strive to both fill existing gaps and address new challenges as they emerge, possible with ICOC, the PPWT, or other measures;
e. The views of the participants has evolved considerably since the first ARF Workshop on Space Security; and
f. There should be an additional Workshop in the future.

58. Many participants called for a third ARF Space Security Workshop to be held.