6 February 2023

English only

Committee on the Peaceful Uses of Outer Space
Scientific and Technical Subcommittee
Sixtieth session
Vienna, 6–17 February 2023
Item 12 of the provisional agenda*
Long-term sustainability of outer space activities

Canada – Annex to update on its reporting approach for the voluntary implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities

The present conference room paper was prepared by the Secretariat on the basis of information received from Canada. The information was reproduced in the form it was received. A shorter related text is available in all the official languages of the United Nations in document A/AC.105/C.1/L.409.

* A/AC.105/C.1/L.405.

Canada: Annex to Update on its Reporting Approach for the Voluntary

Implementation of the Guidelines for the Long-Term Sustainability of Outer Space Activities

Canada is pleased to present its inaugural submission regarding the Voluntary Implementation of the 21 Guidelines for the Long-Term Sustainability of Outer Space Activities. We would like extend our appreciation to the United Kingdom for providing a template, which has aided by providing a clear and analyzable format by which we can assess guideline implementation.

Thorough consultations amongst the federal Government of Canada departments involved in outer space activities, the template represents a snapshot of the current status of Canada's ongoing efforts to implement the 21 Guidelines, activities undertaken or underway, and challenges encountered. In addition, through the detailed assessment of the Voluntary Implementation of the 21 Guidelines for the Long-Term Sustainability of Outer Space Activities, Canada has identified certain areas which could inform potential new guidelines, which will submitted for consideration at the 60th session of the Scientific and Technical Subcommittee.

A. Policy and regulatory framework for space activities

Guideline Reference	**A.1 Adopt, revise and amend, as necessary, national regulatory frameworks for outer space activities**	**Canada**
1. Thoughts or approach to implementation	The 2019 Canadian Space Strategy, *Exploration, Imagination, Innovation: A New Space Strategy for Canada*, committed to a review of Canada's regulatory framework for space-related activities to ensure it provides timely responses for industry, maintains strategic oversight for national security and enables commercial growth. This work will examine whether the regulatory system is keeping pace with emerging technologies and new business models in the space sector, and whether it is enabling innovative space companies to prosper in Canada. Ensuring robust implementation of the LTS Guidelines is a core consideration in this process.	
2. Current progress and/or proposed future activities	The Remote Sensing Space Systems Act (RSSSA) requires an independent review of the legislation every 5 years. Three reviews have taken place to date (in 2012, 2017 and 2022) and tabled in Parliament since the Act came into force in 2007. The most recent review was completed in March 2022. Canada established the RSSSA Ad-Hoc Advisory Committee in 2019. It met regularly, with its last meeting in April 2022. This committee was comprised of representatives from industry, academia, other Canadian government departments, and international governments. The focus of this Ad-Hoc Committee was to discuss the 2012 and 2017 Independent Reviews' recommendations. A permanent Advisory Committee will be set up in 2023 to provide ongoing feedback on the RSSSA implementation and modernization, including advancing on the RSSSA-related recommendations from the 2022 independent report. Canada currently has a RSSSA Application Guide and is also completing two other Guides to improve understanding of the Act and to provide guidance on maintaining a license. The regulatory frameworks and the relevant policies under the Radiocommunication Act and Regulations were recently updated to accommodate the licensing and operating requirements for mega	

	constellations. Future planned activities include the streamlining of the licensing regime to support the evolution of the satellite industry and facilitate the deployment of innovative satellite solutions, including those for broadband connectivity.
3. Experiences, challenges and lessons learnt	Various government departments are responsible for legislation and regulation of specific space activities in Canada. Given the different mandates involved, ongoing engagement and collaboration across government departments and agencies are required.
4. Comments on specific needs for capacity building necessary to support implementation	Canada has significant experience in developing regulatory frameworks generally, and is in the process of reviewing its domestic framework for space activities. Canada is open to discussing this subject with other nations and sharing Canada's experience with this process. As part of the modernization efforts for the RSSSA, Canada resumed its leadership in the EO data/system security as the co-chair of a multilateral process that Canada initiated with Germany and the US in 2010. The most recent meeting was held in Berlin in September 2022. Regulators from 11 countries participated in this meeting. This forum allows Canada to share its best practices and strengthen collaboration with regulatory counterparts. There are plans to regularize this meeting to increase capacity to solve collective problems and address how best to regulate the remote sensing industry.

Guideline Reference	**A.2 Consider a number of elements when developing, revising or amending, as necessary, national regulatory frameworks for outer space activities**	**Canada**
1. Thoughts or approach to implementation	In reviewing the Canadian regulatory framework, a core element is to ensure that Canada's is balancing strategic oversight for domestic needs, including national security, as well as advancing technology and enabling commercial growth. In addition, it is an opportunity to develop approaches that ensure Canada is meeting the LTS Guidelines as well as the other suggestions outlined in paragraph 2 of Guideline A.2.	
2. Current progress and/or proposed future activities	In the ongoing review of its regulations, Canada continues to work closely with international partners, industry, academia, and regulators and participates in different fora to gather information regarding the latest developments in the field, consider best practices, explore ways to streamline regulatory processes and increase predictability. For example, in the latest RSSSA independent review, the impact of the RSSSA on Canada's implementation of international agreements and treaties was one of the three areas assessed. The report concluded that the RSSSA provides an effective formal framework to implement international obligations for remote sensing space systems operated by Canadians	

	worldwide and foreign operators in Canada, which must be licensed under the Act.
3. Experiences, challenges and lessons learnt	Canada underscores the importance of being an active participant in international forums, as well as engagement with industry and academia, to keep up-to-date on information sharing and cooperation occurring in these spheres. As an early player in space activities, Canada developed a "fit for purpose" regulatory framework. As a result, there are activities, especially those emerging technologies that are not specifically covered under existing legislation. A holistic evaluation of all current and future space activities is required to help "future proof" a modern regulatory framework.
4. Comments on specific needs for capacity building necessary to support implementation	Canada has significant experience in developing regulations and is open to discussing this subject with other nations.

Guideline Reference	**A.3 Supervise national space activities**	**Canada**
1. Thoughts or approach to implementation	Canada's space activities are supervised through various laws and regulations. The RSSSA, the Canadian Space Agency Act, the Aeronautics Act, and the Radiocommunication Act provide the primary legislation that make up Canada's regulatory framework. Canada's civilian Satellite Operations Centre also works closely with National Defence partners at the Canadian Space Operations Centre to collaborate and share information on space debris and active space assets. Canada has two space-based Space Situational Awareness (SSA) assets – NEOSSAT and Sapphire.	
2. Current progress and/or proposed future activities	To the extent that all satellites use radiofrequencies, the Radiocommunication Act is the primary regulatory framework for space activities in Canada. All Canadian operators are required to obtain a licence for the use of the spectrum and comply with the conditions of licence. The RSSSA regulates all remote sensing space systems owned and/or operated by Canadians and all remote sensing operations in Canada by foreign entities. Canada continues to explore the means by which existing legislation could be used to supervise new space activities if they fall within the definition of remote sensing to ensure Canada continues to meet its international obligations. Canada is engaging with domestic and international partners to consider the implications of emerging space activities, including in-situ resource utilization. This engagement is aligned with the Canadian Minerals and	

	Metals Plan, which identifies global leadership in mining new frontiers, including space, as an area for action, recognizing that cross-sectoral collaboration can foster investment, innovation, and advance economic opportunities.
3. Experiences, challenges and lessons learnt	These activities are ongoing.
4. Comments on specific needs for capacity building necessary to support implementation	Canada has significant experience in developing regulatory frameworks to supervise space activities and is open to discussing this subject with other nations. It should be noted that all Canadian legislation and regulations can be found on line.

Guideline Reference	**A.4 Ensure the equitable, rational and efficient use of the radio frequency spectrum and the various orbital regions used by satellites.**	**Canada**
1. Thoughts or approach to implementation	Canada aims to maintain its leadership role and commitments at the International Telecommunication Union (ITU). Applicants for spectrum licenses must demonstrate compliance, on an on-going basis, with the ITU Radio Regulations and follow all of the established processes to ensure compliance with ITU Radio Regulations and Canadian regulations. Canada takes a whole-of-government approach to ensure both civil and security stakeholders are engaged in ITU frequency filings planning discussions, and in preparing positions for the relevant agenda items for the World Radio Conference, which is led by the ITU to review and, as necessary, revise the radio regulations.	
2. Current progress and/or proposed future activities	Canada is an active member at the ITU. Canada's spectrum management frameworks are guided by the ITU principles of ''rational, efficient and economical use of'', and ''equitable access'' to orbital resources.	
3. Experiences, challenges and lessons learnt	This activity is ongoing.	
4. Comments on specific needs for capacity building necessary to support implementation	Canada has significant experience in working with the ITU in spectrum management activities and is open to discussing this subject with other State Members.	

Guideline Reference	A.5 Enhance the practice of registering space objects	Canada
1. Thoughts or approach to implementation	Canada maintains a registry of space objects. Canada will continue working on the registration of Canadian Space Objects and provide UNOOSA with registration information.	
2. Current progress and/or proposed future activities	Canada will continue the enhancement of its national mechanism for the registration of Canadian space objects. A key component involves education and outreach to ensure an understanding of the obligation to report and register all satellites. In 2021 and 2022, Canada registered a total of twenty-eight satellites, including three constellations, with UNOOSA.	
3. Experiences, challenges and lessons learnt	Canada notes that whole-of-government collaboration as well as timely engagement with relevant external stakeholders is important for timely and accurate registration of space objects. All Canadian space system operators are asked to liaise with the Canadian Space Agency to register their satellites as soon as possible.	
4. Comments on specific needs for capacity building necessary to support implementation	NA	

B. Safety of space operations

Guideline Reference	**B.1 Provide updated contact information and share information on space objects and orbital events** **B.2 Improve accuracy of orbital data on space objects and enhance the practice and utility of sharing orbital information on space objects.** **B.3 Promote the collection, sharing and dissemination of space debris monitoring information** **B.4 Perform conjunction assessment during all orbital phases of controlled flight** **B.5 Develop practical approaches for pre-launch conjunction assessment**	**Canada**
1. Thoughts or approach to implementation	Canada is sharing information on space object and orbital events with the National Defence led Centre of Operations as well as regularly updating orbital data on its operational missions (with propulsion) by uploading it multiple times per day on the US-led free service www.space-track.org. Canada will continue to operate available Canadian sensors to contribute to improving the accuracy of orbital data on space objects and will maintain the Collision Risk Assessment and Mitigation Systems (CRAMS) services to evaluate the status of orbital data.	

	Canada's civilian Satellite Operations Centre also works closely with National Defence partners at the Canadian Space Operations Centre to collaborate and share information with international partners on space debris and active space assets. Canada is conducting outreach with industry and academia to promote the development and use of techniques and methods to improve the accuracy of orbital data. This includes participating in conferences, workshops, and exercises to promote the importance of space situational awareness, and the tools and measurements used to capture it. To date, this has included participating in the Commercial Sprint Advanced Concept Training (SACT) international exercises, which bring together government representatives and commercial partners to test operational tools for space surveillance.
2. Current progress and/or proposed future activities	Licence holders under the Radiocommunication Act and the RSSSA are required to provide contact information of the individuals involved in operation of the satellite communication and remote sensing space system. Licence holders under the Radiocommunication Act also provide specific orbital parameter information and system capabilities (attitude and propulsion control systems, navigation and control capabilities, etc.) In addition, Canada has two space-based SSA assets that collect observational data that is shared with international partners. Civil experts work alongside their military counterparts in the Canadian Space Operation Centre, liaising with industry and international partners to enable timely notifications in case of potential risks to their space operations. Research and innovation is ongoing to improve SSA data accuracy. For example, research is ongoing with ThothX ARO, a 46m Inverse Synthetic Aperature Radar antenna located in central Canada to track SSA satellites in GEO.
3. Experiences, challenges and lessons learnt	There is a benefit to collaboration between civilian and military stakeholders for conjunction analysis and space situational awareness. In addition, the ability to analyze SSA data from multiple sources, independently verify and collaborate with international partners is important.
4. Comments on specific needs for capacity building necessary to support implementation	

Guideline Reference	B.6 Share operational space weather data and forecasts B.7 Develop space weather models and tools and collect established practices on the mitigation of space weather effects	Canada
1. Thoughts or approach to implementation	Canada operates the Canadian Space Weather Forecast Centre (CSWFC), a Regional Warning Centre (RWC) of the International Space Environment Service (ISES) that contributes to the World Meteorological Organization (WMO). In addition, civilian experts work with their security counterparts to distribute daily Space Weather forecasts and weather forecast data for potential impact on space operations. Scientists at the Canadian Space Weather Forecast Centre (CSWFC) both monitor and research space weather and its impacts on a variety of technologies. Their goal is to reduce the risk of interruptions to the safe operation of critical infrastructure, such as power grids, pipelines, satellites, communication, and navigation. Canadian researchers have provided many important contributions to reduce the vulnerability of critical technology to space weather hazards. These include developing forecasts, alerting of hazardous geomagnetic storms, and modelling and monitoring geomagnetic effects on power systems, pipelines, satellites, high frequency communication and navigation. Canadian researchers continue to investigate new and emerging topics to improve space weather forecasts. Canada is a member of the Inter Agency Space Debris Coordination (IADC) Group and takes part in regular re-entry analysis activities in order to assess risks associated with uncontrolled re-entry.	
2. Current progress and/or proposed future activities	Canada will continue to provide space weather review and weather forecast data to satellite operators and continue to raise awareness concerning the importance of space weather to the operation of space-based services. Canada will continue to maintain expertise and ensure state of the art modelling of space weather events.	
3. Experiences, challenges and lessons learnt	One challenge is that awareness of the importance of space weather to the operation of crucial space-based services (i.e. satellite communications) and the impact of a space weather event on these services continues to be low amongst end-uses (e.g. the general population).	
4. Comments on specific needs for capacity building necessary to support implementation	N/A	

C. International cooperation capacity building and awareness

Guideline Reference	C.1 Promote and facilitate international cooperation in support of the long-term sustainability of outer space activities C.2 Share experience related to the long-term sustainability of outer space activities and develop new procedures, as appropriate, for information exchange	Canada
1. Thoughts or approach to implementation	Canada continues to participate in UN COPUOS and its Subcommittees and to work with partners to promote and facilitate the long-term sustainability of outer space activities. Canada is a member of the Inter Agency space Debris Coordination committee (IADC), the ITU, and fosters cooperation with other space agencies in order to support the long-term sustainability of space activities. Canada offers, free of charge, support for space debris risk assessment and mitigation to operators, both national and foreign, upon request. By engaging at the international level, including through the IADC, support to Committee on Space Research (COSPAR) science goals, and fostering cooperation and information sharing with other space agencies, Canada aims to be well-positioned to support the safety and sustainability of the growing space industry.	
2. Current progress and/or proposed future activities	Canada is sharing its expertise and experience through a variety of international fora in order to advocate the importance of responsible behaviours in space that will support long-term sustainability of outer space activities. Through bilateral and multilateral consultations, Canada continues to promote the peaceful use of space and provide leadership in coordinating the regulation of remote sensing space activities that support long-term sustainability goals and other international obligations.	
3. Experiences, challenges and lessons learnt	It is important that a broad cross-section of stakeholders is engaged in long-term sustainability activities; this includes public, commercial and academic representatives in addition to relevant foreign governments.	
4. Comments on specific needs for capacity building necessary to support implementation	Canada has significant experience in developing best practices for space activities and would welcome the opportunity to discuss approaches to enhancing international cooperation in this area.	

Guideline Reference	C.3 Promote and support capacity-building	Canada
1. Thoughts or approach to implementation	Canada is engaging with partners to support capacity building and promote the long-term sustainability of outer space activities. This includes fostering cooperation and support from academia nationally, such as knowledge transfer and program development activities. Canada also regularly attends workshops, seminars and conferences and shares its regulatory approaches and practices. The CRAMS service and technical advisory services is also offered to nations with small satellite fleets to enhance a common approach based on best practices.	
2. Current Progress and/or proposed future activities	Canada will continue to engage and explore opportunities for cooperation on space-related issues and potential capacity-building activities with domestics and international partners. In accordance with the International Charter on Space and Major Disasters, Canada continues to make Earth Observation (EO) data available to countries affected by disasters or other catastrophes, and support capacity-building that includes: - The Earth Observation Data Management System (EODMS) - a state-of-the-art archiving, cataloging and access system for Canada's Earth Observation (EO) data. EODMS supports the delivery of RADARSAT Synthetic Aperture Radar data to members of the International Space Disaster Charter. - Canada's Emergency Geomatics Service (EGS) provides geomatics support for emergency response both within Canada and abroad. Geomatics products and services are derived from authoritative geospatial base layers and up-to-date EO data, to provide critical information for situational awareness during natural disasters. Canada also participates in international fora to advance geospatial information management and support capacity building such as the Commission for Environmental Cooperation and the UN Committee of Experts on Global Geospatial Information Management.	
3. Experiences, challenges and lessons learnt	It is important that a broad cross-section of stakeholders is engaged; this includes public, commercial and academic representatives.	
4. Comments on specific needs for capacity building necessary to support implementation	Canada would welcome the opportunity to discuss approaches to enhancing international cooperation in this area.	

Guideline Reference	C.4 Raise awareness of Space activities	Canada
1. Thoughts or approach to implementation	Canada promotes awareness of the application of earth observation data to sustainable development, environmental monitoring and assessment, disaster management and emergency response through information sharing and promotion of its applications and services online. Canada regularly engages with stakeholders and is participating in national and international conferences to raise awareness about space activities. This includes programs for industry and academia as well as through media relations, official websites and social media to enhance public understanding of space activities. For example, Canada is proud to continue the Junior Astronauts campaign for teachers, educators, youth group leaders and young Canadians. This campaign enables young Canadians to test their skills and knowledge, to understand the role they can play in future Canadian missions to the Moon, and to get excited about science and space. Additionally, the Canadian CubeSat Project permits numerous universities throughout Canada, to design and build a CubeSat under the guidance of experts from the Canadian Space Agency. Canada continues to cooperate with NASA in the preparation and delivery of 10 Earth Observation (EO) related sessions for the annual Indigenous Mapping Workshop 2022, as part of a task under the Committee on Earth Observation Satellites (CEOS) Working Group on Capacity Building and Data Democracy. The IMW events are organized by The Firelight Group for Indigenous Nations, organizations and practitioners supporting indigenous-led geospatial research and projects.	
2. Current progress and/or proposed future activities	Canada will continue to engage with academia, industry and interested members of the public through media (traditional, social media and podcasts), industry events, and conferences.	
3. Experiences, challenges and lessons learnt	Raising awareness of space activities is of significant benefit and Canada intends to continue advancing a range of outreach activities where applicable.	
4. Comments on specific needs for capacity building necessary to support implementation	Canada has significant experience in developing awareness of space activities and is open to discussing this subject with other nations.	