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宇宙活動の長期的持続可能性確保のための ベストプラクティスガイドライン(現状報告)

Development of UNCOPUOS Guidelines for the Long Term Sustainability of Outer Space activities (Current Status)

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国連宇宙空間平和利用委員会（UNCOPUOS）の役割は宇宙活動を統制する法律及び原則を確立し、国際協力を推進することである。今年、UNCOPOUS は宇宙活動の長期的持続性に関するベストプラクティスガイドライン作成という歴史的成果を収めた。UNCOPUOS の科学技術小委員会で、2011年に宇宙活動の長期的持続性確保のための作業部会が設立された。この作業部会の目的はすべての国の利益ため、平和的目的による宇宙の安全で持続的な利用を確実なものとするための方策について、調査し、ベストプラクティスガイドラインを提案することである。これまでの作業部会の活動と今回合意されたガイドラインについて、その合意成立の経緯と結果を説明するとともに、今後のさらなる作業について紹介する。

The role of the UN Committee on Peaceful Uses of Outer Space UNCOPUOS, is primarily to establish the laws and principles governing activities in outer space and promoting international cooperation. This year, UNCOPUOS, achieved historically remarkable success on development of UNCOPUOS Guidelines for the Long Term Sustainability of Outer Space activities. The Scientifc and Technologival Subcommittee (STSC) of UNCOPUOS established the working group of Long Term Sustainability of Outer space Activities in 2011. The objective of this working group is to examine and propose measures to ensure the safe and sustainable use of outer space for peaceful purposes for the benefit of all countries. Past working group activities and the resuts of agreed guidelines will be presented. And furter work will be explained.

Biography

Yasushi HORIKAWA

Dr. Horikawa, as a technical counselor of Japan Aerospace Exploration Agency (JAXA), provides advices to international relations.
During his carrier, he has assumed various executive and leadership positions. From 2005 to 2009, he served as an executive director of JAXA responsible for the development of application satellites such as Earth observations, communications, broadcasting and global positioning satellites as well as the operation and utilization of these satellites. He contributed to the development of the International Space Station as Japanese Program Manager and to the successful implementation of Japanese meteorological satellite programs and Earth observation programs.
He served the Chair of the United Nations Committee on Peaceful Use of Outer Space (UNCOPUOS) for 2012- 2013.
A graduate of the University of Tokyo and received PhD from the University of Tokyo on Electronics Engineering.

Space Debris Symposium
@ JAXA Chofu

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Oct. 18, 2016

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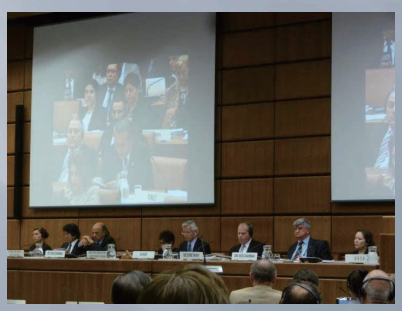
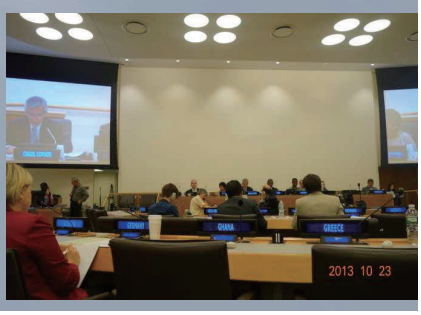
Former Chair of UNCOPUOS
Technical Counselor of JAXA

UN COPUOS – Overview

- UN COPUOS (Committee on the Peaceful Uses of Outer Space) is the primary international forum for the development of laws and principles governing activities in outer space
- A standing committee of the UN, founded in 1959 by 24 Member States
  - Currently 83 Member States and 33 permanent observers
  - This year, New Zealand and IATA is applying
- The technical work of COPUOS is carried out by two subcommittees
  - Scientific and Technical Subcommittee (STSC)
  - Legal Subcommittee (LSC)
- Decisions are reached by absolute consensus
- Report is adopted at UN general assembly as omnibus resolution
- Secretariat is the UN Office for Outer Space Affairs (Vienna)





Threats in space

- Orbital Debris
- Radio Frequency Interference
- Near Earth Objects

Factors of Threats

- Emerging Space Actors (New emerging countries and non-governmental entities such as private sectors or academia)
- Spontaneous Increase of Space Debris
- Difficulties of Active Debris Removal
- Lack of Transparency and Confidence Building Measures
- Differences in Priorities and Funding Levels on Outer Space activities
- A-SAT Testing for Security Reasons
- Space Based Military Systems

Needs of Space Sustainability

- All humanity uses space for peaceful purposes and for socioeconomic benefits.
- Space technology is a critical tool to support sustainable development.
- The Earth's orbital space environment and Radio- Frequency Spectrums are limited natural resources.

WG on Long-Term Sustainability of Space Activities

Objective

- The objective of the Working Group is to examine and propose measures to ensure the safe and sustainable use of outer space for peaceful purposes, for the benefit of all countries

Terms of Reference

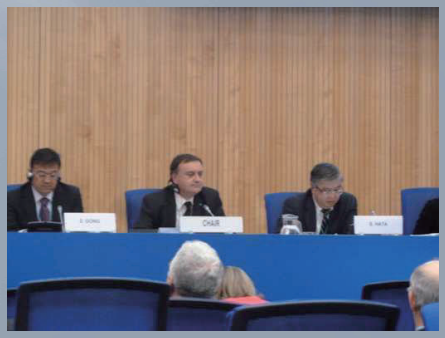
- The Working Group will examine the long-term sustainability of outer space activities in the wider context of sustainable development on Earth
- The work will take into consideration current practices, operating procedures, technical standards
- The Working Group will take as its legal framework the existing United Nations treaties and principles

Outcomes by 2014 (postponed to by 2016)

- Prepare a report on the long-term sustainability of outer space activities
- Produce a set of voluntary recommended guidelines

Organization of works

- Four Expert Groups (sustainable space utilization, space debris, space weather, regulatory regime)
- Inputs received from international organisations (e.g. IAA, IADC, CCSDS, etc.) and non-governmental organisations



Clustering

A. Expert group on sustainable space utilization supporting sustainable development on Earth
Co-Chairs: Filipe Duarte Santos (Portugal) and Mr. Enrique Pacheco Cabrera (Mexico)

23 States
5 IGOs
→ 7 candidate guidelines
4 topics for future consideration

B. Expert group on space debris, space operations and tools to support collaborative space situational awareness
Co-chairs: Claudio Portelli (Italy) and Dick Buenneke (USA)

23 States
4 IGOs
→ 8 candidate guidelines
3 topics for future consideration

C. Expert group on space weather
Co-Chair: Takahiro Obara (Japan) and Mr. Ian Mann (Canada)

27 States
5 IGOs
→ 5 candidate guidelines
2 topics for future consideration

D. Expert group on regulatory regimes and guidance for actors in the space arena
Co-Chair: Sergio Marchisio (Italy) and Michael Nelson (Australia)

25 States
6 IGOs
→ 11 candidate guidelines
5 topics for future consideration

Progress of Guideline Consideration

- The candidate guidelines of the EGs are necessarily thematically oriented and some address cross-cutting issues from a thematic perspective.
- Before the COPUOS meeting in 2014, the WG Chair issued the paper composed of 31 candidate guidelines from the EGs and 2 additional guidelines added by the WG Chair for considerations by the WG. (A/AC.105/C.1/L.339)
- These guidelines were broadly grouped into implementation-oriented categories, such as:
  - ✓ Policy, regulatory, and organizational,
  - ✓ Scientific and Technical,
  - ✓ International Cooperation and Capacity building
- In June 2014, the Working Group began its consideration of the candidate guidelines including 3 additional guidelines, 2 proposed by Russia and 1 by Switzerland, and agreed on the framework for consolidation to eliminate duplication. Further, the WG mandate was extended to 2016 to discuss additionally proposed guidelines.
- In February 2015, the WG further considered and consolidated to 19 guidelines out of 36 guidelines. (A/AC.105/L.298)
- In June 2015, 10 additional guidelines, 8 from Russia, 1 from US and 1 from GRULAC, were proposed. France proposed a new structure for guidelines and Japan and US also proposed a similar approach.

- During the intersessional meeting in Oct. 2015, the guidelines were grouped into categories to facilitate their implementation by various governmental and non-governmental space actors.
  - policy and regulatory framework for space activities
  - safety of space operations
  - international cooperation, capacity-building and awareness
  - scientific and technical research and development
  - implementation and updating
- The candidate guidelines became 29 in total. (A/AC.105/C.1/L.348) Chair categorized them and proposed a phased approach at WG at STSC in Feb. 2016
  - For 11, close to consensus (one merged to other)
  - For 10, expected to achieve consensus
  - For 7, difficult to achieve consensus
- The WG at STSC failed to achieve consensus even for the WG report as some States did not agree to the phased approach.
- The WG Chair reissued the full candidate guidelines in Mar. 2016 (A/AC.105/L.301) for consideration at intersessional meeting in Jun. 2016

LTSWG informal meeting highlights

- Participating states

US, Russia, Brazil, China, France, Canada, UK, Checo, Austria, Japan, Italy, Germany, South Africa, Belgium, Cuba, Algeria, Mexico, Korea, Costa Rica, Indonesia, Israel, Switzerland, Turkey, Saudi Arabia, Poland, UAE,-----

- Cordial atmosphere in spite of the failure of the phased approach and the confrontation of US and Russia in Feb.
- Positive spirit, active and serious attitude and constructive discussion
- Repeated cyclic reviews for all guidelines including preamble
- Well streamlined and productive meeting but more political toward the end

- 22 like-minded member states issued a proposal to adopt the first set of guidelines together with a renewed work plan for LTSWG of STSC before the COPUOS meeting in Jun. 2016 (A/AC.105/L.305).
- L.305 was updated with the increase of co-sponsor (26 in total including US, Japan, Korea and Columbia) during the COPUOS meeting (A/AC.105/2016/CRP.11/Rev.2)
- The WG met in Jun. 2016 at the intersessional meeting and COPUOS meeting and discussed based on L.301 thoroughly and repeatedly.
- 12 guidelines were adopted by consensus.
- Preamble part as well as Guidelines 7, 11, and14 were intensively discussed but could not reach consensus.
- For future consideration, the WG chair issued the Guidelines for LTS (A/AC.105/2016/CRP.17)
- Additional intersessional meeting was held in Sept. 2016.
- Consolidated guideline will be formalized by 2018 targeting UNISPACE+50.
- Final set of guideline will be a separate resolution of UN general assembly.

Conflict points (Example)

- Procedural matters
  - WG expiration vs Interim product
    - interim product: annex or standalone document
    - annex: full or agreed (no change)
    - standalone document: no visibility but changeable
  - package deal
    - interim product: annex
    - work plan extension
  - wording expression
    - ex. envoronment: maintain or protect or preserve or conserve
      - LTS: ensure or enhance
      - record keeping on space objects and events: unified or consistent or haramonized or standardized
  - regulatory handling position policy vs voluntary
  - reference of GGE TCBM vs PPWT

Discussed items (example)

- preamble (no consensus)
  - definition of sustainability
  - in good faith ---voluntary---in all earnest
- national security protection
- contact point for normal operation and emergency
- solely peaceful purpose (Brazil:G-7))
  - non-aggressive (US)
  - non-military (Russia)
- conjunction assessment (France:G-14)
  - what, who, when, where and how
  - STM and information exchange
  - prelaunch assessment (Russia)
- reservation for capital (government) instruction
- (hostage? for continued negotiation)

12 Guidelines adopted by COPUOS

A. Policy and regulatory framework for space activities

1. Adopt, revise and amend, as necessary, national regulatory frameworks for outer pace activities (G-1)
2. Consider a number of elements when developing, revising or amending, as necessary, national regulatory frameworks for outer space activities (G-2)
3. Supervise national space activities (G-3)
4. Ensure the equitable, rational and efficient use of the radio frequency spectrum and the various orbital regions used by satellites (G-4)

B. Safety of space operations

5. Improve accuracy of orbital data on space objects and enhance the practice and utility of sharing orbital information on space objects (G-12)
6. Promote the collection, sharing and dissemination of space debris monitoring information (G-13)

7. Share operational space weather data and forecasts (G-16)
8. Develop space weather models and tools and collect established practices on the mitigation of space weather effects (G-17)

C. International cooperation, capacity-building and awareness

9. Promote and support capacity-building (G-25)
10. Raise awareness of space activities (G-26)

D. Scientific and technical research and development

11. Promote and support research on and the development of ways to support sustainable exploration and use of outer space (G-27)
12. Investigate and consider new measures to manage the space debris population in the long term (G-28)

(G-)indicates the guidelines referred to in WG Doc.

Remaining Guidelines

Preamble

- need further discussion for various issues

POLICY AND REGULATORY FRAMEWORK FOR SPACE ACTIVITIES

- G-5 Provide registration information on space objects
  - (merged to G-6)
- G-6 Enhance the practice of registering space objects
  - issue is a space information center
- G-7 Commit, in national legal and/or policy frameworks, to conduct space activities solely of a peaceful nature
  - wording for peaceful uses, close to consensus
- G-8 Implement operational and technological measures of self-restraint to forestall adverse developments in outer space
- G-9 Implement policy aimed at precluding interference with the operation of foreign space objects through unauthorized access to their on-board hardware and software
- G-10 Refrain from intentional modifications of the natural space environment
  - G-8, 9 and 10 need more clarification from Russia

SAFETY OPERATIONS

- G-11 Provide contact information and exchange information on space objects and orbital events
  - Close to consensus but needs understanding of space operation
- G-14 Perform conjunction assessment during orbital phases of controlled flight
  - Close to consensus.
- G-15 Develop practical approaches for pre-launch assessment of possible conjunctions of newly launched space objects with space objects already present in near-Earth space
  - clarification of necessity of pre-launch assessment
- G-18 Respect the security of foreign space-related ground and information infrastructures
- G-19 Strengthen the security and resilience of terrestrial infrastructure upon which the operation of space systems and services depend
  - G-18 and 19 will be merged and waiting for a new text

- G- 20 Develop and implement criteria and procedures for the preparation and conduct of space activities aimed at the active removal of space objects from orbit
- G- 21 Establish procedures and requirements for the safe conduct, in extreme cases, of operations resulting in the destruction of in-orbit space objects
- G-22 Develop criteria and procedures for the active removal of space objects, and under exceptional circumstances, for the intentional destruction of space objects, specifically as applied to non-registered objects
  - G-20, 21 and 22 relates to ADR and need clarification of many issues

INTERNATIONAL COOPERATION, CAPACITY-BUILDING AND AWARENESS

- G- 23 Promote and facilitate international cooperation in support of the long-term sustainability of outer space activities
- G- 24 Share experience related to the long-term sustainability of outer space activities and develop procedures for sharing information exchange
  - G-23 and G-24 will be rather easily adopted after appropriate wording selection

- G 29 Establish normative and organizational frameworks for ensuring effective and sustained implementation of the guidelines and subsequent activity on their review and enhancements
  - G-29 will be incorporated in preamble

Summarized Timeline

2011 WG adopts Terms of Reference and three-year work plan
WG establishes four expert groups to consider topics in TOR

2012 First COPUOS Long-Term Sustainability Workshop
Expert Groups commence work and refines list of topics to discuss

2013 Second COPUOS Long-Term Sustainability Workshop
Candidate guidelines proposed by expert groups (31+2 guidelines)

2014 WG begins consideration of draft guidelines during STSC (3 additions)
Begin consideration of consolidated guidelines (19 guidelines) and review work plan (agreed on 2-years extension)

2015 Submit proposals on new elements, structural change or additional guidelines (10 additions resulted in 46 guidelines in total)
WG consolidates the updated draft guidelines (29 guidelines)

2016 Review draft guidelines and agree on work plan and discuss mode of submission to GA (12 guidelines adopted and attached to the COPUOS report)

Way Forward

From June 2016 to 2018 Consider final consolidated guidelines and agree on final amendment
Agree on mode of submission to GA

Concluding Remarks

- In July 2013, UNGA adopted GGE report which states that the best practice guideline for long term sustainability of outer space activities will have characteristics similar to those of transparency and confidence-building measures
- ISEF held in WDC in 2014 acknowledged that the UNCOPUOS is an important venue in which spacefaring and non-spacefaring nations alike can continue to discuss important issues regarding the long-term sustainability of the space environment for all users, and protecting Earth from potentially hazardous objects.
- European proposal for an international code of conduct for outer space activities is not necessarily well progressed.
- In 2018, UNISPACE+50 is planned.
- With this, it would be still important to look into the overall role in meeting the needs for long-term space utilization by appropriately identifying the synergies of common interest issues with related countries.
- LTS is currently the only multilateral space security initiative that is making slow, but steadily progress.
- It is highly encouraged to achieve consensus toward 2018 for the final best practice guidelines.

Thank you for your attention!

Visit UNOOSA Website :

http://www.oosa.unvienna.org/oosa/COPUOS/copuos.html