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Meeting hosted by Switzerland on possible further work on the long-term sustainability of outer space activities: Background and Chair's Summary

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Meeting hosted by Switzerland on possible further work on the long-term sustainability of outer space activities

11 June 2019, Vienna International Center

Background and Chair's summary

Background

Switzerland has engaged substantially in the work of COPUOS on the long-term sustainability of outer space activities since the very beginning. In 2014, the Swiss delegation proposed a draft guideline on new measures to manage the space debris population in the long term (see the amended proposal as guideline D.2 in document A/AC.105/C.1/L.366). In June 2017, at the 60th session of COPUOS, Switzerland proposed the establishment of a new working group on space objects and events, the topic of Thematic Priority 3 of UNISPACE+50, under the chairpersonship of the Swiss candidate, Prof. Thomas Schildknecht (see A/AC.105/2017/CRP.27). At the 61st session of COPUOS in June 2018, the Swiss delegation refined its proposal (see Non-paper[1]) with a view to help find a consensus at a time the Working Group on the Long-term sustainability of outer space activities was concluding its mandate.

Switzerland is convinced that current developments in space activities pose challenges to the long-term sustainability of outer space activities, which need to be addressed in substantial work at COPUOS level. Against this backdrop, the Swiss delegation proposed, during the 56th session of the Scientific and Technical Subcommittee, to host a brainstorming session on possible further work on the long-term sustainability of outer space activities, to be held on 11 June 2019, the day prior to the 62nd session of COPUOS in Vienna (see A/AC.105/1202, para 263). In preparation of that meeting, Switzerland held informal consultations on the margins of the 58th session of the Legal Subcommittee. To this aim, it proposed a list of topics (see Discussion Paper[2]) for possible further work on the long-term sustainability.

From the list in the Discussion Paper, four topics were selected as a basis for discussions in the meeting of 11 June 2019. The objective of the meeting was to share views and advance mutual understanding with a view to making progress towards reaching a consensus on topics of possible further work on the long-term sustainability of outer space activities. The meeting was chaired by the Head of the Swiss delegation to COPUOS, Dr Natália Archinard (Federal Department of Foreign Affairs) with the support of Prof. Thomas Schildknecht, Director of Zimmerwald Observatory (University of Berne). All delegations to COPUOS (Member States and Permanent Observers) received an invitation to attend the meeting. Political, technical, scientific and legal expertise on the part of delegations was most welcome so as to enable a multidisciplinary discussion. Experts with scientific, technical, legal and/or policy background were invited to introduce the four topics. Delegations were encouraged to share their views and engage in an interactive discussion.

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[1] http://www.unoosa.org/documents/pdf/copuos/stsc/LTS/Switzerland_Non-paper_COPUOS61_20180626.pdf

[2] http://www.unoosa.org/documents/pdf/copuos/lsc/2019/LSC-2019-NP03E.pdf

Chair's summary

This is a summary prepared by the Chair of the meeting to inform delegations. It is not exhaustive nor does it represent a consensus. Instead, it captures information, proposals and ideas, which were presented and discussed during the meeting by participants.

The Chair is thankful for the rich exchange of views and the depth of discussions both from invited speakers and from delegations. With their scientific, technical, legal and/or policy background, all participants contributed to a constructive multidisciplinary discussion with a positive spirit of collaboration.

The Swiss delegation wishes to thank all participants for making this meeting a success. It hopes that the findings of the meeting will contribute to feed the mandate of a possible new working group with emerging issues to tackle. As a matter of fact, Switzerland believes that this meeting demonstrated the need for further substantial work on the long-term sustainability of outer space activities within COPUOS and its two subcommittees.

The full programme of the meeting as well as some presentations will be available online[3].

Topic 1 – *Options for collaborative information sharing and exchange with the aim of ensuring the safety and sustainability of space operations*

1.1 It was recalled that the preamble of the 21 consensual guidelines on the long-term sustainability of outer space activities foresees COPUOS as the principal forum for institutionalized dialogue on the implementation of the 21 guidelines (see A/AC.105/C.1/L.366, para 21). Elements of information exchange in the 21 guidelines were highlighted. National implementation of the 21 guidelines and international institutionalized dialogue were deemed two sides of the same coin.

1.2 The remark was made that the consensual report of the Group of Governmental Experts (GGE) on transparency and confidence-building measures (TCBM), which was published as A/68/189, also encouraged information sharing as a mean to create mutual understanding and trust.

1.3 Furthermore, it was underscored that not all space objects were identifiable. In fact, a substantial fraction of the small size space debris cannot be attributed to any launching State, thus leading to legal uncertainty. Hence, there is a need for an international consensus on how to deal with these unidentified objects.

1.4 The description of the position of a given space object in orbit may be significantly different depending on the catalogue chosen as a reference. This situation may lead to either unnecessary manoeuvers or manoeuvers creating a collision. Hence, there is a need for international data exchange and internationally agreed standards on space objects and events.

Topic 2 – *Challenges posed by large constellations*

2.1 If thousands of satellites are launched into a constellation, at least 90% of the objects from the constellation will have to be removed after the end of their life in order to prevent an uncontrollable growth of the space debris population. This is technically very demanding taking into account that the current reliability of traditional spacecraft is of the order of 80%. However, the resilience of such large constellations is achieved by a large number of satellites, which do not need to be individually as reliable as traditional, more expensive spacecraft.

[3] http://www.unoosa.org/oosa/events/data/2019/meeting_on_possible_further_work_on_the_long-term_sustainability_of_outer_space_activities.html

2.2 There is a need to look at the totality of space objects in a certain orbital region instead of looking at the objects individually. The idea was put forward to develop an “orbit resource management” considering Earth orbits as a shared resource with limited capacity. The requirements on post-mission disposal could for instance depend on the remaining capacity of the orbital region. The use of this orbital capacity needs to be coordinated at a multilateral level in order to prevent saturation by one or a few individual actors, as it is done by the ITU for the use of the geostationary orbit (GEO) region through slot allocation. The same could be applied for lower orbits.

Topic 3 – *Issues associated with rendezvous and proximity operations, including active debris removal and on orbit servicing activities*

3.1 Rendezvous and proximity operations (RPO) is not a homogeneous concept of activities. RPO comprises activities such as on orbit servicing (OOS), active debris removal (ADR), certain cases of formation flying, and “inspection” in the context of space-based Space Situational Awareness (SSA), each associated with a different set of technical approaches and challenges. These activities will probably be rapidly increasing with the commercial sector leading them. The main concerns are the safety issues related to these technologies. OOS and ADR may in the worst-case lead to the production of new debris, while close flybys involving a foreign object, e.g. in the course of inspections, may give rise to misunderstandings which may even result in a collision. Hence, measures would need to be taken at multilateral level. In particular, the sharing of information on RPO activities would be an important factor to increase the safety in orbit. It can also be seen as an important transparency and confidence-building measure (TCBM).

3.2 OOS and ADR operations involving different launching states give rise to legal questions and may require novel legal approaches. The question whether new norms, a new interpretation of existing norms, or new non-binding guidelines are needed lies at the core of COPUOS’s mandate and would need to be addressed in the near future.

3.3 RPO activities are inherently risky operations and may compromise the safety of space operations and harm the space environment. As a consequence, it was suggested that the notification of such operations would increase safety by allowing other actors in space to coordinate their operations with the planned RPO. The modalities of such notifications (by who? to whom? including which information? according to which timing?) would need to be discussed by COPUOS.

Topic 4 – *Concepts on international coordination of space traffic*

4.1 It would be important to define the main objectives of an international coordination of space traffic. The overarching goal should be to ensure the safety of traffic to, in, and from outer space. Specifically, international coordination of space traffic should enhance the safety of operations in space, and the efficiency of space operations by minimizing the number of avoidance maneuvers. The question whether a global governance mechanism would be needed to set up international rules of space traffic would require further discussion.

4.2 It was noted that some mandatory elements for an international coordination of space traffic could already be found in the 21 consensus guidelines. This is the case, for instance, of the sharing of accurate and timely orbital data with its associated uncertainty. Multilateral information exchange is foundational to space traffic coordination.

4.3 The private operators of the upcoming large constellations, as well as several space agencies, are planning to deploy automated or even autonomous collision avoidance capabilities based on artificial intelligence algorithms in a near future. Artificial intelligence in decision-making is different from a regulatory standpoint. Such algorithms will definitely need to be based on internationally agreed “rules of the road” as it is the case in the coordination of air traffic. When developing such regulations, the corresponding rules and procedures established in the air and maritime domains may serve as examples. An important feature would be to have the same rules applying worldwide, as it is the case in the ICAO rules for air traffic.

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