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Agenda item 10: Space weather

Progress report on the work of the Expert Group on Space Weather under UNISPACE+50 thematic priority 4 "International framework for space weather services" at the 54th session of the Subcommittee

Submitted by the Rapporteur of the Expert Group on Space Weather

I. Introduction

1. The present document contains information on the progress of work of the Expert Group on Space Weather, as presented to the Subcommittee by the Rapporteur of the Expert Group, Ian Mann of Canada.

2. The Expert Group held two meetings on the margins of the 54th session of the Subcommittee and focused its work on aligning its present workplan, as contained in document A/AC.105/1088, para. 169, with the UNISPACE+50 thematic priority 4 on "International framework for space weather services", within the framework of which the Expert Group on Space Weather is the mechanism to work towards the implementation of objectives under this thematic priority 4 on space weather, with substantive support by the Office for Outer Space Affairs.

II. Summary of progress in work

3. The Expert Group continues to work in accordance with its mandate, not least in relation to the promotion of increased and expanded member State involvement in providing space weather monitoring, from the ground and in space, and in developing, advancing, and sharing and delivering space weather services.

4. In that regard, the Expert Group very much welcomes the additional mandate from the Committee on the Peaceful Uses of Outer Space from its June 2016 meeting to additionally develop strategies to address thematic priority 4: International Framework for Space Weather Services within the UNISPACE+50 process.

5. Recognising the huge synergy between the tasks in the existing Work Plan defined for the Expert Group by the Subcommittee, and the requirements derived from the objectives for UNISPACE+50 thematic priority 4 on space weather, the Expert Group agreed that it could best fulfill its mandate over the coming year by focussing on the preparation of a report for the mitigation of space weather effects through planning for thematic priority 4, to be considered by the Committee during the UNISPACE+50 segment of the 61st session of the Committee on the Peaceful Uses of Outer Space (COPUOS) in June of 2018.

6. At its meetings on the margins of this session of the Subcommittee, the Expert Group built on the very successful outcomes of the "Space Weather Workshop: From Scientific Discovery to Applications, Services, and Infrastructure Protection" which it hosted last year on the margins of the 53rd session of the Subcommittee in February 2016. Specifically, the Expert Group has begun the definition of a "road map for international coordination and information exchange on space weather events and their mitigation, through risk analysis and assessment of user needs" as required by the objectives for the planning for thematic priority 4.

7. With the participation of more than 27 Experts from around 20 countries, the Expert Group has in particular highlighted two clear and high impact goals through which the COPUOS could make very significant and actionable future contributions towards the mitigation of the adverse impacts of space weather.

8. Firstly, the Expert Group identified the urgent need to develop an improved basis for international monitoring, forecasting, and warning procedures especially in the form of more coordinated international communication and coordination of warnings of extreme space weather events. The Expert Group noted some existing functionality in this regard in individual Member States upon which to build. For example, proof of concepts where monitoring and forecast services are integrated with user driven alerts targeting specific user sectors such as in the electric power grid or aviation sectors. However, despite its obvious importance, the functionality for international extreme space weather "watches" and "warnings" has yet to be fully developed. In other words, Members States around the world really need to know "when" they should act.

9. Equally important is then knowing "what" to do. This requires understanding the unique space weather vulnerabilities in each Member State, and having a defined set of best practices, operating procedures, and actions which can be taken during such extreme space weather. As a first step, this requires an assessment in each member state of their space weather risks and related socio-economic impacts, as well as defined operating procedures which should be developed in partnership with critical infrastructure and civil protection administrations.

10. The Expert Group continues to re-iterate in the strongest possible terms the importance of Member States understanding the implications of extreme space weather for their citizens. The Expert Group hence continues to remind Member States of the benefits to be gained through the completion of such risk assessments, including subsequent considerations of how such information should be reflected in National Risk Registries, and then subsequently also reflected in best practices and operational procedures which are implemented to protect both people and property during severe space weather events.

11. The Expert Group further identified and considered elements within six core themes, which it proposes will form the basis of the future space weather roadmap to achieve these goals. These will be revised and updated by the Expert Group moving forward and during the course of its future work.

12. The Expert Group also re-iterated the importance of developing improved scientific and technical understanding of the fundamental space weather processes

responsible for extreme space weather, as well as an improved understanding of their impact upon a variety of vulnerable technological infrastructure. The Expert Group hence identified the need for future improvements to space weather services to be underpinned by improved scientific and technical understanding of the science and impacts of space weather. Such developments would also benefit from improved communication and coordination amongst the actions being taken in Member States and with their national and international organisations towards improved scientific and technical understanding of the drivers, causes, and adverse impacts of space weather.

13. During its deliberations, and consistent with its mandate, the Expert Group also continued to examine the potential future governance and cooperation mechanisms needed for the implementation of such a Roadmap. In other words the mechanisms for "how" the COPUOS could take appropriate steps towards reaching its space weather goals.

14. In particular the Expert Group re-iterates the importance of establishing a clear relationship between the role of COPUOS and that of other United Nations entities and other space weather stakeholders, including the World Meteorological Organisation (WMO), the International Civil Aviation Authority (ICAO), the International Space Environment Service (ISES), the Coordination Group for Meteorological Satellites (CGMS), the Committee on Space Research (COSPAR), the International Space Weather Initiative (ISWI), the Scientific Committee Solar-Terrestrial Physics (SCOSTEP), and others.

15. The Expert Group continues to emphasise the importance of the role of COPUOS Space Weather activities in relation to the development of policy, which serves Members States needs and promotes the coordination of the broad base of international space weather efforts. However, the Expert Group also continues to re-iterate the importance of coordination with the developing and already extensive actions which are either underway or being planned in other space weather entities, not least in the realm of service implementation.

16. The Expert Group expressed its strong opinion that introducing appropriate mechanisms that facilitate communications and the coordination of such activities towards common goals is of the utmost importance. In that regard, the Expert Group re-iterates its commitment to identify appropriate governance and cooperation mechanisms within COPUOS to support international space weather needs, and proposes to address such recommendations in the strategic plan for thematic priority 4 for UNISPACE+50.

Intersessional work and upcoming workshops

17. In its future intersessional work and with the support and guidance of the Office for Outer Space Affairs, the Expert Group intends to seek the active participation of the relevant United Nations and other bodies, including WMO, ICAO, ISES, CGMS, and others, in an effort to ensure that future proposals for any UN COPUOS governance and cooperation mechanisms are integrated appropriately with these other stakeholders.

18. As part of its considerations and as background information, the Expert Group appreciated presentations from the Office of Outer Space Affairs in relation to the governance structures already adopted for the United Nations International Committee on Global Navigation Satellite Systems (ICG), and in relation to the International Asteroid Warning Network (IAWN) and the Space Mission Planning Advisory Group (SMPAG).

19. The Expert Group re-iterated its commitment to continue intersessional work to meet the timetable it intends to follow for developing strategic plans for UNISPACE+50.

20. In particular, the Expert Group re-iterates its intention to develop draft strategic plans, for outreach to stakeholders, and confirmed its intention to hold two days of Expert Group meetings on the margins on the European Geosciences Union meeting here at the United Nations in Vienna from 27 to 28 April of this year.

21. As a goal, the Expert Group intends to complete a draft in time for initial consideration, perhaps in the form of a Conference Room Paper, at the next meeting of the Committee this summer.

22. The Expert Group then intends a series of outreach activities which seek input from the various scientific, technical, space weather services, and government stakeholders into the proposed strategy. This will include significantly the United Nations/United States Workshop on the International Space Weather Initiative to be held at Boston College in the United States of America, from 31 July to 4 August this year. Member States are encouraged to send their Experts and representatives of their space weather entities to participate in the April Expert Group meeting and the August United Nations/United States Workshop.

23. Finally, following appropriate input from stakeholders, Member States will again have the opportunity to review a final draft of the UNISPACE+50 strategy for thematic priority 4 “International Framework for Space Weather Services” during the 55th meeting of the Subcommittee in February 2018, in advance of its final consideration and hopefully adoption by the Committee in June 2018.

24. The Expert Group reiterates that now more than ever, international cooperation which addresses appropriate planning and a coordinated response from Member States and their national and international agencies to the space weather threat, is of the utmost importance. Recognising that fact, the Expert Group continues to enjoy the very active participation of Member States and we believe we are making very significant and ongoing progress towards our mandate. In particular, we believe we have identified clear and strategic opportunities for the COPUOS to facilitate the level of international collaboration needed to meet the challenges of understanding and mitigating the impacts of severe space weather, for the benefit of all mankind.