Statement by an Observer

Agenda Item 6 - Space Debris

ESA, H. Krag

Madame Chair,

Distinguished Delegates,

ESA has a very long history in characterizing and assessing the issue of space debris and in defining and implementing prevention measures. Being a technical Agency, capabilities to predict the uncontrolled re-entry of space objects have been established already for the re-entry of Skylab in 1979. ESA has then built up a database (called DISCOS) providing information on space object characteristics for more than 40,000 objects and for hundreds of debris generating events. ESA has then become a founding member of the Inter-Agency Debris Coordination Committee (IADC) in 1993. It has then developed the renown MASTER model for prediction of debris particle fluxes onto orbit surfaces. Before the UNCOPUOS debris mitigation guidelines where published, ESA has been already actively disposing its geostationary spacecraft from the GEO protected zone. As one of the first operators in Europe, ESA introduced operational collision avoidance for the spacecraft under its control in 2002. In 2006, a dedicated space debris office was formed for the research and development of related matters. In 2008, ESA has formed an optional programme for “Space Situational Awareness” with an overall subscription reaching 200 Million Euro by today. This programme has developed and tested technology to generate space object data with the help of radar, optical and laser sensors. Also, the Cleanspace activity has been formed which looks into the technology required to implement space debris mitigation onboard such as reliable passivation and design-for-demise to limit the risk on-ground upon re-entry. In 2011, ESA successfully de-orbited the 2-ton ERS-2 satellite that was operated in about 800km altitude. Although ESA is not a “state” with means to enforce legislation, its Director General has issued instructions that make sure that all ESA missions developed after that date implement debris mitigation according to the ECSS-24113 standards. Such Director General instructions are the Agency’s most normative vehicle and can be considered the equivalent of a “law”. Any waiver requires the approval of the Director General. ESA has also been an active contributor to the efforts of the working group of the Long-term Sustainability of Spaceflight. ESA is happy to report that the majority of the guidelines are already fulfilled by ESA’s proven processes since many years. Further assessments with the goal to achieve a full implementation are ongoing. In this regard, you will certainly welcome the notion that ESA and its member states have decided to openly license its MASTER and DRAMA software worldwide. These tools allow mission implementers to assess the impact risk and debris mitigation aspects of their mission. Following the spirit of the guidelines, ESA and its member states opened access to the DISCOS space object database. Today, more than 1000 engineers and operators worldwide already benefit from the use of this data in the interest of the long-term sustainability of spaceflight. Also, ESA is transparent on its own mitigation efforts and issues an annual report providing statistics on the overall global adherence level to the UN space debris mitigation guidelines, which I regularly report on to this committee.

Madame chair, distinguished delegates, in November 2019 during the Ministerial Council, the ESA member states have established a new “Space Safety Programme”. This programme will address hazards originating in space, such as space weather, asteroid impacts and space debris and develop early warning and counter measures. The funding level subscribed allows ESA to implement:

- An ambitious Core programme that will provide pre-operational space weather services, observations and predictions of asteroid impacts and debris tracking and mitigation technology
- The first elements of a space weather mission to Earth-Sun Lagrange Point 5 with the capability to provide operational forecasts for major solar events
- A Planetary Defense mission, called Hera, forming part of the ESA/NASA DART mission to perform and characterize an asteroid deflection test via kinetic impact on the Didymos/Didymoon system
- A mission for the first ever removal of a space debris object from orbit, performed in an end-to-end service contract by an industrial consortium, shaped to stipulate a future market in this area
- Technology to enable spaceflight in a scenario of increasing space-traffic, by developing technology for the automated coordination of manoeuvres and decision making in case of collision alerts

Let me say, that ESA is extremely proud of this portfolio and grateful for the subscription of its member states, which is suited to put Europe in the forefront in tackling the issue of space debris.

Madame chair, distinguished delegates, let me briefly address future needs in the field of space debris as we see them. ESA’s first ever active removal mission will be performed to remove an ESA-owned object in full transparency. However, such close proximity operations lack operational and technical standards, for which ESA is committed to support finding a consensus and apply them. Also, we are convinced that a consensus should be established on how to evaluate the impact of a mission to the space environment. ESA has been engaged in developing a metric for the environmental footprint since many years. Such a measure allows a to provide a link between a mission and its contribution to the long term evolution of the space environment. It can be used as an evaluation metrics for environmental critical ADR missions and for the impact assessment of a fleet for a regulator. In 2019, a consortium was formed to define a Space Sustainability Rating that will further develop this concept. This consortium consists of the World Economic Forum, Massachusetts Institute of Technology, Bryce Space and Technology, The University of Texas at Austin and the European Space Agency. Multiple outreach events have been already organised to create a large group of stakeholders spanning governmental, industrial, and commercial actors. The space sustainability rating concepts for space missions achieved international recognition as a way forward to incentivise and put in the spotlight the better than required behaviour of missions.

Madame chair, distinguished delegates, let me close my intervention by underlining ESA’s commitment to a sustainable use of space. In this regard, we are gathering space actors in regular events for an exchange on the practicalities of the implementation of the 21 guidelines on the sustainable spaceflight. As a major contribution, ESA is preparing to drive the technology required to maintain awareness of the space objects, to safely operate in space and share the associated data, to remove debris from space and to prepare space missions for a robust implementation of debris mitigation measures. I thank you very much for your attention.