

# Committee on the Peaceful Uses of Outer Space Scientific and Technical Subcommittee 61<sup>st</sup> Session

Agenda Item 6: “Space Debris”, January-February 2024

Statement by Mr Niklas HEDMAN, COSPAR Vice-Chair, Panel on Social Sciences and Humanities

Honorable Chair, Distinguished Delegates,

Thank you for allowing me this opportunity to report on the matter of Space Debris. I am presenting the following report on behalf of the Committee on Space Research (COSPAR).

On the matter of cis-lunar space debris policies.

As we are making progress with the first ever fine on an incomplete end-of-life maneuver in the geostationary earth orbit (<https://www.fcc.gov/document/fcc-takes-first-space-debris-enforcement-action>), the space fairing and debris generation in the cis-lunar realm, in the space above the geostationary region expanding all the way out to the Moon, including the Earth-Moon Lagrange points, is unregulated. While one could be led to believe that the sustainability of cis-lunar region would only have impacts on the space fairing in that region, this assumption is erroneous. A single fragmentation in the cis-lunar space can release fragments all the way back to the lunar surface AND the earth surface, colliding on the way with near-earth space assets. To provide one example of one object: the problem was highlighted by a recent cis-lunar upper stage that was not passivated, providing an actual real-world hazard already. Passivation of upper stages is a well-established mitigation practice in near-Earth space and could be easily accomplished for cis-lunar upper stages as well from a technical point of view.

We are in dire need for recommendations and regulation in that region. As a first step, the cis-lunar region should be recommended to be a protected region. Secondly, collision avoidance and near-Earth recommendations such as passivation of all upper stages should be encouraged, debris creation in the mission conduction minimized. Thirdly, more research is needed for finding successful end-of-life strategies that are compliant with planetary protection of the Moon, for which more funding should be allocated.

On the emerging matter of contamination of upper atmosphere by reentering and burning up of space objects.

Deorbiting as an end-of-life maneuver has been a well-established space debris mitigation practice for the low-Earth orbital region. As a rule of thumb, objects lighter than two metric tons mostly burn up during reentry. Recent research has highlighted two aspects: with the almost exponential increase of the number of satellites in constellations, the number of reentering objects and reentry mass has drastically increased, furthermore the satellite materials have changed, hence interact in a new way with the atmosphere upon reentry. This increase leads to two separate problems: in the accumulation, the amount of material that reaches the ground is becoming significant. Albeit being mostly small fragments which do not necessarily provide a hazard on impact, it leads to a spread of human-made discarded materials, a.k.a. trash, upon the surface of the Earth. Furthermore, recent studies have found that chemical reactions in the burn-up phase have a non-negligible negative impact on the upper atmosphere. The sheer number of expected decaying satellites makes this into a global problem.

Reentry as an end-of-life measure is still encouraged and without alternative. However, there needs to be further research into the types of materials and ways of reentry in order to limit the negative impact on the upper atmosphere in particular and the Earth ecological system in general. Further research should be encouraged and funding allocated accordingly.

Thank you, Chair.