Legal and Regulatory Challenges to Active Debris Removal and On-Orbit Satellite Servicing Activities

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Current Space Debris Situation

- Presently, many more countries are launching objects into space and more objects are being launched into higher orbits (and are thus staying longer in space).
- Currently, the global rate of launches into LEO averages 36 launches per annum. Assuming that each launch injects 2 objects into LEO (i.e., 1 payload and 1 rocket body) at least 72 new objects are being injected into LEO each year. Taking the natural decay rate of 5 objects per year into consideration, it is estimated that, at the current launch rate, 67 new objects remain in orbit in LEO each year.
- Even if no new space objects are launched, the number of objects already in orbit will make mankind's use of the space environment (at least the most used Earth orbits) unsustainable in the near future, if no ADR and OOS efforts are undertaken.

Current Space Debris Situation

- The IADC and UNCOPUOS Space Debris Mitigation guidelines focus on the mitigation (or reduction) of the rate at which *new* pieces of space debris are generated during the conduct of space activities.
- However, in view of the massive amount of debris already in existence in Earth orbit, growing consensus among experts suggests that active removal of *existing* debris from space and on-orbit servicing of satellites are indispensable (in addition to ongoing mitigation efforts) to ensure the sustainability of current and future space operations.

Essential Prerequisites

- The following have been identified as some of the essential prerequisites for the conduct of ADR and OOS activities:
  - Development of "cost effective" techniques that include, at the very minimum, capability to: locate and rendez-vous with the target object; connect the deorbit/servicing device; control orientation; and, service the target object in orbit or move it to the desired destination;
  - Available and willing targets for removal or customers for servicing as well as someone to pay the costs involved;
  - An appropriate legal, policy and regulatory framework both at the international, regional and domestic levels; and
  - A means for ensuring the safety of the public on the ground, at sea and traveling by air.

Legal and Regulatory Challenges

- None of the existing international space law treaties *legally* defines what constitutes "space debris". As such, any object that is launched into space retains its special protected status as a space object under international law. This status continues even when the object has disintegrated into its component parts or has returned to Earth. OST Art. VIII implies that "abandonment" does not apply to space objects.
- The *technical* definition of space debris endorsed by the IADC and UNCOPUOS focuses on the functional status of a space object. Thus, if a space object is functional, it is considered not to be space debris and *vice versa*.
- However, this technical definition has not attained the status of law under international law. It is also not sufficient for purposes of ADR and OOS because ownership of a space object or its component parts does not cease merely because the object has become non-functional.
- Moreover, the technical definition excludes functional but non-maneuverable space objects.

Legal and Regulatory Challenges

- Under OST Art. VIII, the State that is entitled to exercise jurisdiction and control over a space object is the State on whose registry the space object is carried. A State or an entity that wishes to remove or service a space object can only do so legally upon seeking and obtaining the prior permission or consent of the State of Registry.
- Currently, although state-to-state transfer of space objects is not prohibited under international law, the rules are not clear as to whether or not and the extent to which a transferee state that is not a launching state has obligations under the provisions of Articles I, III and IV of the Registration Convention.
- For ADR and OOS to proceed, the international community needs to develop mechanisms that will facilitate the seeking and granting of permission and also establish rules respecting the jurisdiction and control issue as well as consent.

Legal and Regulatory Challenges

- At the domestic level, certain policies, laws and regulations pose major challenges to ADR and OOS activities. In furtherance of national security and economic interests, several countries have established domestic legal and regulatory regimes that impose onerous restrictions on the transfer of jurisdiction and control over their space objects to foreign countries or entities. The US regime of ITARs best exemplifies such legal and regulatory restrictions.
- Any ADR or OOS activity that involves a US satellite, or a satellite of another country that has US components or US technology on board, would likely fall within the definition of "export" under the US ITARs regulatory regime.
- For the foreseeable future, it is reasonable to assume that national legal and regulatory regimes such as ITARs will continue to be a major hindrance to the conduct of ADR and OOS operations.

Looking Ahead

- Domestic policies, laws and regulations can facilitate the conduct of ADR and OOS activities. For example, Canada's *Remote Sensing Space Systems Act of 2005* prescribes mandatory systems disposal requirements for all licensees.
- Under the Act, a licensee and, in the case of a licence that has terminated, the former licensee, is required to ensure that his satellite system is disposed of in accordance with a system disposal plan approved by the Minister.
- National licensing rules could thus be amended to include an assured removal clause that would apply to satellites and relevant launcher upper stage(s). Under such a clause, the licensee/operator could be required to take out an insurance policy to cover the costs of removal or disposal in the event that a failure or malfunction prevents performance of the planned disposal procedures at end of life.

Looking Ahead

- Increased compliance by States with Article III clauses 2 and 3 of the Registration Convention could provide an opportunity for States to declare the ownership, jurisdiction and control interests in their space objects to the international community when those objects become non-functional or unmaneuverable.
- Such unilateral declarations could provide a way around the need to obtain the permission or consent of a state of registry for the conduct of ADR and OOS activities.

Conclusions

- The problem of space debris is of growing concern for space safety and the long-term sustainability of outer space activities. Estimates suggest that, even if no new space objects are launched, the amount of space debris will continue to grow.
- The implementation of debris mitigation measures might have a significant impact in curtailing the rate of creation of new debris during the conduct of space activities. However, ADR and OOS activities are necessary to address the massive amount of space debris already in orbit.
- In addition to the development of technical means and operational procedures for ADR and OOS, other relevant legal, regulatory, financial, safety, organisational and strategic challenges must also be addressed for the effective conduct of ADR and OOS

THANK YOU FOR YOUR KIND ATTENTION

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