

# Legal and practical considerations of registering constellations and space debris

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**IISL / ECSL Symposium**

04 April 2016, UNCOPUOS, Vienna, Austria

# The language of the Registration Convention

- a pinch of ambiguity:
- *‘as soon as practicable’, ‘from time to time’, ‘to the greatest extent feasible’, ‘additional information’, ‘appropriate agreements’, ‘general function’, ‘equitable and reasonable conditions’* .
- efforts towards a more uniform state practice: UNGA Res. 62/101 ‘Registration Practice Resolution’ (2007) and the OOSA ‘Registration Information Submission Form’ (2010).

# Registration and notification

- Articles II and IV REG: processes for registering space objects and furnishing information to the UN.
- Distinction between ‘registration’ and ‘notification’.
- ‘Registration’ (Art. II para. 1 REG in conjunction with Art. VIII OST) establishes jurisdiction and control over a space object and turns a launching State into a ‘State of registry’ (in relation to the registered object).

# State practice and the practice of IGOs

- heterogeneous state practice with regard to the REG.
- ESA -> first IGO to declare acceptance of the rights and obligations of the REG in 1978; new 'ESA Space Object Registration Policy' + multi-functional ESA space object register in 2014 .
- legal and practical questions: *orbital debris, satellite constellations, transfer of ownership, launch from orbital platforms, aerospace vehicles and other non-orbital objects.*

# 'Mega-constellations'

- future large satellite infrastructures in Low Earth Orbit (LEO) for telecommunication purposes.
- saturation of GSO, complexity and cost to reach and service GSO, limited coverage, high latency time (700 ms vs. 30 ms).
- concepts for hundreds up to thousands of satellites developed by commercial operators.



# Constellations: factual and legal perspectives

- important increase in launch and orbital traffic.
- paradigm change in satellite production and testing.
- (semi-)automated in-orbit operations including CAM.
- legal and regulatory questions: *orbit and spectrum access and coordination; end of life; joint launches; registration, responsibility and liability; ADR; orbital environment, relationship btw. regulators and operators, etc.*

# The registration of constellations

- a practical rather than a legal issue: *amount of satellites per constellation, replenishment, automated operations, etc.*
- satellite batches per orbital plane as ‘single objects’?
- joint launches -> determination of the appropriate ‘State of Registry’ (c.f. Art. II para.2 REG).

# Space debris

- “Space debris are all man made objects including fragments and elements thereof, in Earth orbit or re-entering the atmosphere, that are non functional” (IADC 2002).
- A legal and practical question is whether or not space debris can and should be registered, and if so, how.

# The registration of non-functional objects

- A registered space object ceasing to be functional while in Earth orbit (or beyond) remains registered -> the State of Registry may provide “additional information” under Art.IV para.3 REG.
- Objects that are non-functional *ab initio* still should be registered.
- Functionality is not a criterion for registration nor for the exercise of jurisdiction and control or ownership.

# The registration of fragmented objects (1)

- Do fragments have to be registered separately, and down to which size can one possibly, and reasonably, register them?
- Example: A registered satellite breaks up into two parts:



## The registration of fragmented objects (2)

- Argument A: jurisdiction and control, once attributed to the State of registry, remain associated to an object “and its component parts” (Article I lit(b) REG) -> fragments considered as ‘component parts’ of the original space object.
- Argument B: A space object ceases to exist in the moment of disintegration or destruction -> runs contrary to the object and purpose of the space treaties (c.f. allocation and determination of responsibility and liability).

# Space debris: practical considerations

- fragmentation events can produce hundreds of micro-objects: impossible to register or notify. Perhaps this is also not necessary:
  - legal registration =/ SSA database or object tracking catalogue;
  - “additional information” under Art.4 para.2 REG.
- The current state practice is heterogeneous.
- ESA Register ‘Main Section’ + ‘Annex Section’. If an ESA S/O becomes non-functional while retaining its physical characteristics and orbital parameters, ESA would notify this under Article IV para. 2 REG.

# Conclusion

- Continued developments in spaceflight and the orbital environment require legal answers and practical solutions with regard to space object registration.
- These approaches must satisfy the terms of the Convention in good faith, in their ordinary meaning, in their context and in the light of the Convention's object and purpose.

Altitude: 479 Km  
Speed: 25200 Km/h

# Thank you.

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