Update on legal and policy aspects of small satellites:
sustainability, frequency (interference), registration and ownership

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Overview

1. Prospects for small sats and outer space activities
2. Sustainability
3. Frequency interference and compliance with radio regulations (ITU-RR)
4. Registration and Registration Practice
5. Technology transfer
6. Ownership and Finance/UNIDROIT Space Assets Protocol
7. Conclusions
1. Current and future prospects

**Education/science**
- University satellites
- Commercial off-the shelf ‘small satellite’ kits

**Earth Observation**
- Increasing EO market;
- Access to data (+ data sharing)
- Downstream sector for ‘apps’

**Communication**
- Emerging requirements for placing small communication sats. in orbit
- Increasing telecoms market in LEO
- Example: OneWeb

**Launching small sats**
- e.g. ISS example of Nanoracks, or
- New low altitude systems such as Zero2Infinity
Sustainability of outer space activities (1)

Catalogued orbital population

- Over 200 in-orbit fragmentations: 56%
- Decommissioned satellites: 38%
- Operational satellites: 6%

See: http://www.esa.int/Our_Activities/Space_Engineering_Technology/Clean_Space/Space_debris_mitigation
2. Sustainability of outer space activities (2)

- Increase in number and volume of small satellites (large constellations of small sats)
- Importance of debris mitigation guidelines - integrating and transposing international requirements to the national licensing level
- Licensing conditions
  - Launching states
  - Commercial backdrop
  - TPL insurance?
2. Sustainability of outer space activities (3)

Space Debris Mitigation Guidelines (various)

- Non-binding ‘soft law’ tools
- Relevant under national law in France (penalties), Austria;
- Cf. UK licensing practice
- Degree of acceptance required to establish ‘state practice’?
- None of which linked to fault liability Art III LIAB

Federal Law on the Authorisation of Space Activities and the Establishment of a National Registry (Austrian Outer Space Act, as of 11 October 2011)

- § 5: „The operator has to make provision for the mitigation of space debris in accordance with the state of the art and in due consideration of the internationally recognised guidelines for the mitigation of space debris. In particular, measures limiting debris released during normal operations have to be undertaken“
‘Prague Declaration’ on Small Satellite Regulations 2015

- Soft law = non-binding
- “urge the small satellite community to comply with the applicable international and national laws, regulations and procedures, indispensable to guarantee the long-term sustainability of small satellite projects, the avoidance of harmful interference and proper management of space debris”
3. Frequency interference and compliance with radio regulations (ITU-RR) (1)

- Dangers for amateur spectrum
- System for notifying space network modifications to enable deployment of small sat constellations?
- Closer interface between national and international framework
  - Art VI OST/ IADC Guidelines
3. Frequency interference and compliance with radio regulations (ITU-RR) (2)

Prague Declaration on Small Satellite Regulations 2015

- “noting the specific nature of small satellite space stations in the amateur–satellite service and the frequency coordination process within the International Amateur Radio Union (IARU)
- to avoid harmful interference to amateur and amateur–satellite stations,
- confirm and strengthen the importance of implementing national legal and regulatory frameworks in conformity with the above international instruments,
- clearly defining rights and obligations of every stakeholder participating in small satellite initiatives“
RESOLUTION 757 (WRC–12) Regulatory aspects for nanosatellites and picosatellites
The World Radiocommunication Conference (Geneva, 2012)

Meeting of ITU and International Amateur Radio Union (IARU) representatives
March 2015

Preparation for WRC–15 November 2–27

resolves to invite WRC–18 to consider whether modifications to the regulatory procedures for notifying satellite networks are needed to facilitate the deployment and operation of nanosatellites and picosatellites, and to take the appropriate actions,

Examining the use of frequency spectrum and satellite orbits to facilitate the launch of a new generation

3. Frequency interference and compliance with radio regulations (ITU–RR) (3)
considering

- a) that nanosatellites and picosatellites, commonly described as ranging in mass from 0.1 to 10 kg and measuring less than 0.5 m in any linear dimension, have physical characteristics that differ from those of larger satellites;
- b) that nanosatellites and picosatellites are satellites which typically have a short (1–2 years) development time and are low cost, often using off-the-shelf components;
- c) that the operational lifetime of these satellites ranges from several weeks up to a few (< 5) years depending on their mission;
- d) that nanosatellites and picosatellites are being used for a wide variety of missions and applications, including remote sensing, space weather research, upper atmosphere research, astronomy, communications, technology demonstration and education, as well as commercial applications, and therefore may operate under various radiocommunication services;
- e) that these satellites are typically launched as secondary payloads;
- f) that some missions performed with these satellites require the simultaneous launch and operation of several such satellites;
g) that, currently, many nanosatellites and picosatellites use spectrum allocated to the amateur satellite service and the MetSat service in the frequency range 30–3 000 MHz although their missions are potentially inconsistent with these services;

h) that nanosatellites and picosatellites may have limited orbit control capabilities and therefore have unique orbital characteristics;

i) that the standing Agenda item 7 of WRCs has up to now not led to consideration of regulatory procedures for notifying nanosatellites and picosatellites, further considering

a) that successful and timely development and operation of picosatellites and nanosatellites may require regulatory procedures which take account of the short development cycle, the short lifetimes and the typical missions of such satellites;

b) that the existing provisions of the Radio Regulations for coordination and notification of satellites under Articles 9 and 11 may need to be adapted to take account of the nature of these satellites,
4. Registration and Registration Practice

Taking account of need to register, Art II REG
National register + Notify UN Sec Gen

Example Austria
Durchführungsverordnung: 36. Verordnung der Bundesministerin/des Bundesministers für Verkehr, Innovation und Technologie zur Durchführung des Bundesgesetzes über die Genehmigung von Weltraumaktivitäten und die Einrichtung eines Weltraumregisters (Weltraumverordnung) 2015

Reg. practice after the fact, often serious delays in registration process
Sustainable international cooperation suffering from this impact of reforms.

ITAR as major hurdle for international cooperation.


Participating states and universities.

QB 50 as flagship for international cooperation in small sats.

Impact of reforms.

Sustainable international cooperation suffering from this.
6. Ownership and finance (1)

Ownership not concept belonging to space law, but Jurisdiction, Art VIII OST

Transition within space sector and growth of small sat operators and companies
Need for internat. system creating security over assets?

Transition away from contract-based securities to register-based system considered attractive
6. Ownership and finance (2)

- Funding for small sat. partnerships
- PPP etc.
- Impact of Unidroit CONVENTION ON INTERNATIONAL INTERESTS IN MOBILE EQUIPMENT (2001) and Cape Town Protocol (Berlin)
- Advantage for ITU and frequency control
7. Conclusions

Increasing awareness in regulating small satellite activities

- Sustainable use of outer space / Space debris mitigation
- Sustainable use of frequencies
- Space traffic management

Increasing importance of guidelines and Codes of Conduct

- Transforming non-binding guidelines into binding laws

Increasing importance of international cooperation

- Considerations for facilitating technology control and transfer?