Toward Sustainable Use of Space: Legal Perspectives

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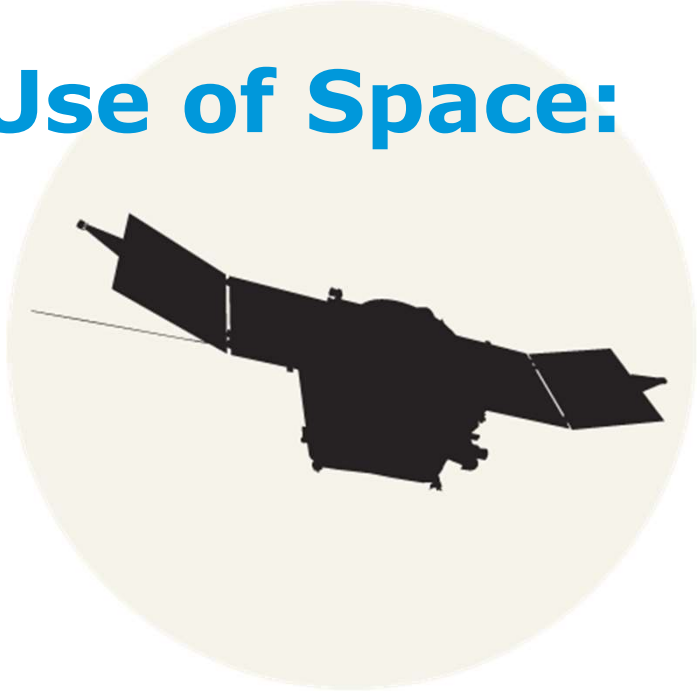
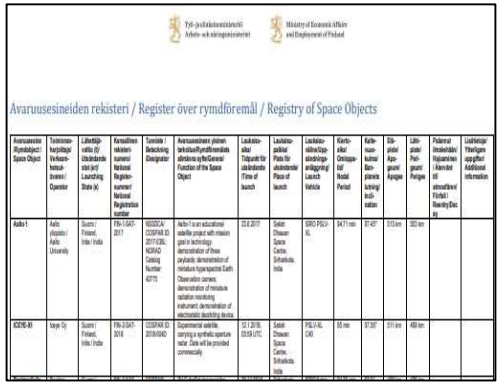


A legal frame for space activities



Työ- ja elinkeinoministeriö
Arbets- och näringsministeriet

Ministry of Economic Affairs and Employment of Finland

Avaruusesineiden rekisteri / Register över rymdföremål / Registry of Space Objects

Avaruusesine (Rymdobjekt / Space Object	Toiminnan harjoittaja / Verksamhetsutövare / Operator	Lähettäjävaltio (ja Ulkoistettu olot ja/tai Launching State (s)	Kansallinen rekisteri numero/ National Register-number/ National Registration number	Toimista / Beteckning / Designator	Avaruusesineen yleinen tarkoitus/Rymdföremålets allmänna ändamål/General Function of the Space Object	Laukaisupäivä/ Tidpunkt för utskjutande/ Time of launch	Laukaisupaikka/ Plats för utskjutande/ Place of launch	Laukaisuajoneuvo/Uppskjutningsanordning/ Launch Vehicle	Kiertoaika/ Omloppstid/ Orbital Period	Kaltevuus/ Banplanets lutning/ Inclination	Ylä-pistä/ Apogeum/ Apogee	Alapistä/ Perigeum/ Perigee	Poikenut ilmoitettuja tiloista/ Avvikande till utsatt/avvikande Förlorat i Rymdny-Det ny	Lisätietoja/ Ytterligare uppgifter/ Additional information
Aalto-1	Aalto yliopisto / Aalto University	Suomi / Finland, Intia / India	FIN-3-GAT-2017	1993CCA/ COSPAR ID: 2017-036L, NORAD Catalog Number: 42771	Aalto-1 is an educational satellite project with mission goal in technology demonstration of three payloads: demonstration of miniature hyperspectral Earth Observation camera; demonstration of miniature radiation monitoring instrument; demonstration of electrostatic deorbiting device.	23.6.2017	Satish Dhawan Space Centre, Sriharikota, India	ISRO PSLV-XL	94.71 min	97.43°	315 km	323 km		
ICEYE-X1	Varga Oy	Suomi / Finland, Intia / India	FIN-2-GAT-2018	1233PAR ID: 2018-049AD	Experimental satellite, carrying a synthetic aperture radar. Data will be provided commercially.	12.1.2018, 03:59 UTC	Satish Dhawan Space Centre, Sriharikota, India	PSLV-XL, C40	95 min	97.50°	511 km	488 km		

Short history of sustainability

- **"… development that meets the needs of the present without compromising the ability of future generations to meet their own needs"**
- UN General Assembly Report of the World Commission on Environment and Development: Our Common Future, 1987
- **4 pillars: human, social, economic and environmental**
- Environmental law "emerging" since the 1970s
- Stockholm Declaration 1972; "Earth Summit", Rio de Janeiro 1992; Sustainable Development Summit, Johannesburg 2002
- Adoption of 17 UN Sustainable Development Goals in 2015

Paradigm changes in space activities

More objects, more actors, more debris.

'Crowding' of orbits and the heightened risk of conjunctions and collisions.

Major growth of the space sector.

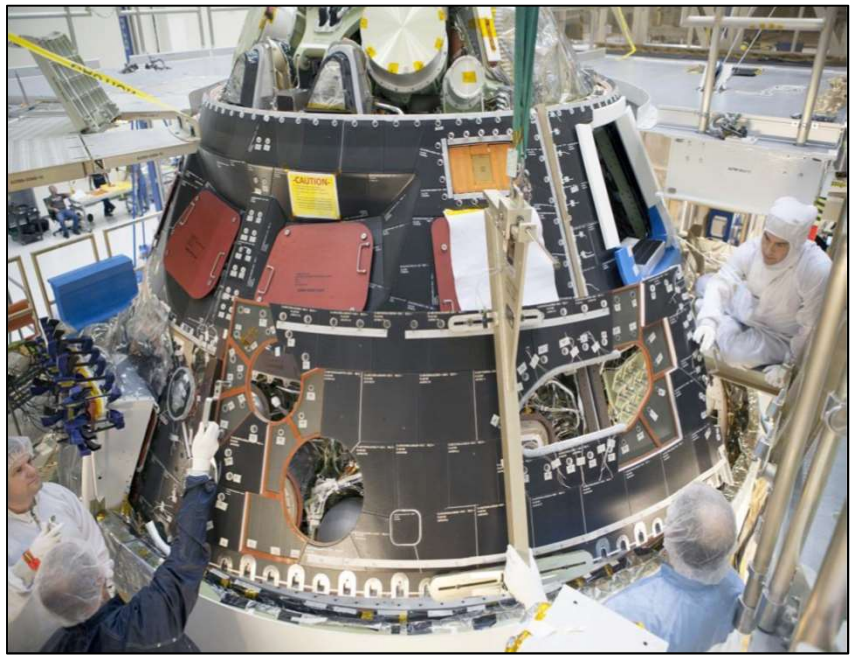
Increased investments, expansion in commercial activities - more stakeholders with diverse profiles and interests.

Concerns on safety and sustainability of space activities.

How does 'space governance' respond?

- 'Soft law' instruments
- Rise of national space laws

How can (and does) ‘space governance’ respond?



SDM Guidelines: 2 decades of development

2002

- **IADC "SDM Guidelines"** (2002+): 13 agencies; technical requirements applicable to S/C & O/S mission planning, design and operation.
- **"European C.o.C. for SDM"** (2004): ASI, BNSC, CNES, DLR and ESA; re-enforced SDM commitment.
- **UN "SDM Guidelines of the COPUOS"** (UNGA Res. 62/217, 22Dec2007): widest political SDM commitment to date; consensus-based.
- **ISO standard 24113** "Space Systems – SDM Requirements" (2011): a technical standard establishing design and operations requirements.
- **ECSS standard ECSS-U-AS-10C** "Space Systems – SDM Requirements" (2012), adopted ISO 24113; basis for the space debris mitigation policy of the European Space Agency.
- **National space laws** require "compliance with internationally recognized SDM guidelines"

2022 … and on-going …!

The Long-Term Sustainability of Outer Space Activities

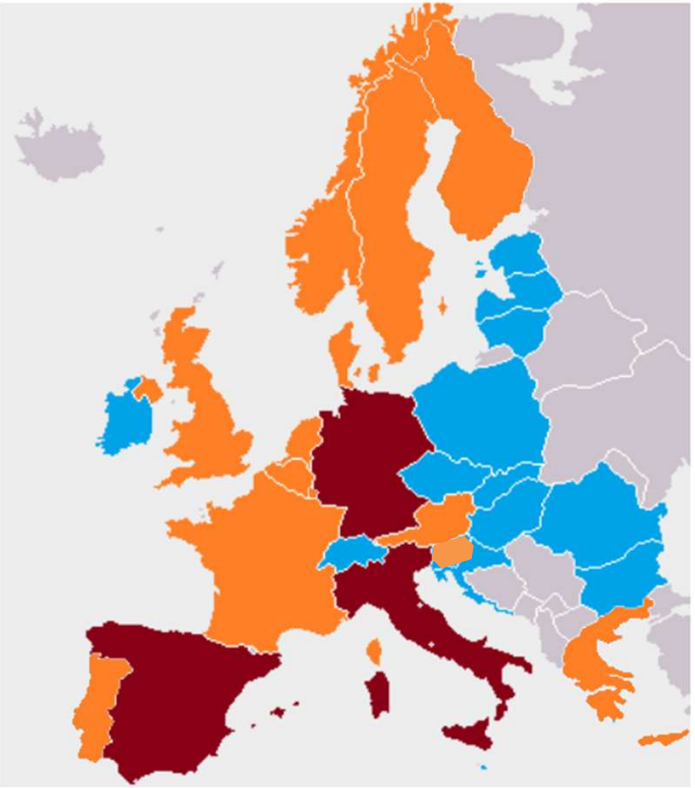
- Space sustainability entered the agenda of COPUOS early 2000s
- In 2007, COPUOS started to negotiate guidelines for LTS; adoption in 2019; 'LTS Working Group 2.0' starting its work 2022
- 'Four chapters: policy/regulation; safety of space ops; cooperation/capacity bldg.; research and development
- Heterogeneous group of norms, linguistic and terminology issues

A.1 Adapt, revise and amend, as necessary, national regulatory frameworks for outer space activities

B.5 Develop practical approaches for pre-launch conjunction assessment

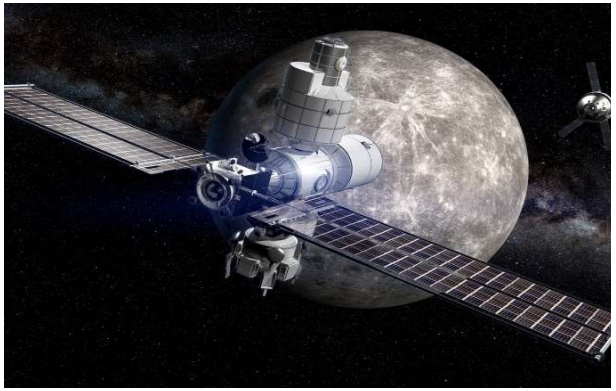
National space laws in Europe

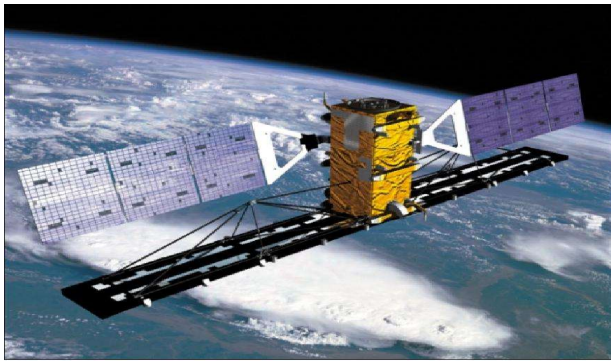
- 13 States have national laws (orange)
- 3 other States have regulatory acts, e.g. for liability or registration only (brown)
- The rest (7) have not as of yet adopted national space law (blue)



Outlook: space sustainability and law

- **Renaissance of space exploration:** new activities, new actors, new ways to use and explore outer space, rising geopolitical, strategic, commercial interests
- Between **cooperation** and a new **space race**
- *Where will space governance go?*
  - Soft law: common understanding, best practices; implementation of the LTS guidelines, technical standards
  - Ideas to develop elements for space traffic management (incl. US/EU)
  - 'Future proofed' national space laws





Further work by the authors

Normative references to non-legally binding instruments in national space laws: A risk-benefit analysis in the context of domestic and public international law

https://researchportal.helsinki.fi/en/publications/normative-references-to-non-legally-binding-instruments-in-nation

National Implementation of Non-Legally Binding Instruments: Managing Uncertainty in Space Law?

https://researchportal.helsinki.fi/en/publications/national-implementation-of-non-legally-binding-instruments-managi

Does the End Justify the Means? A Legal Study on the Role and Consequences of Normative Pluralism in International Space Governance

FORTHCOMING https://iafastro.directory/iac/paper/id/60417/abstract-pdf/IAC-20,E7,7,2,x60417.brief.pdf?2020-07-13.11:55:03

Toward Sustainable Use of Space: Economic, Technological, and Legal Perspectives

https://www.sciencedirect.com/science/article/pii/S0265964621000205?via%3Dihub

"Standardization as an instrument of cooperation: a silver lining for harvesting common benefits on the way back to the Moon?"

FORTHCOMING https://iafastro.directory/iac/paper/id/66706/abstract-pdf/IAC-21,E7,2,3,x66706.brief.pdf?2021-03-29.18:58:39