

On-orbit servicing: legal perspectives

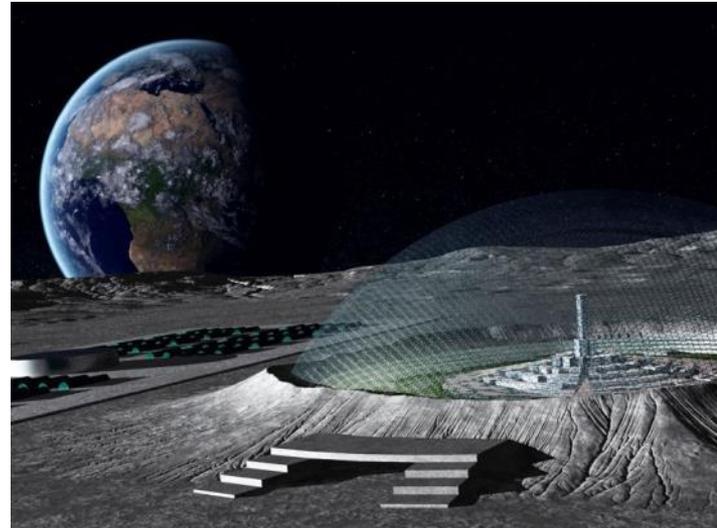
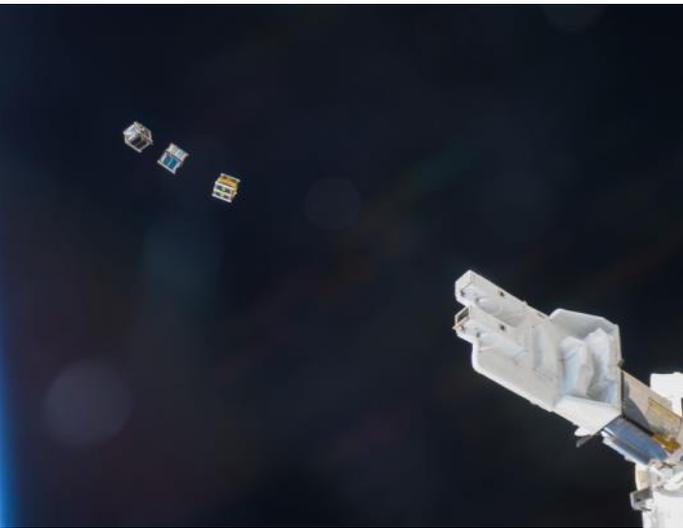
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Context: towards an era of “new space”



On-orbit satellite servicing

Drivers

- to more fully exploit the flight systems already launched (lifetime / upgrade)
- to develop new systems that reliably and cost-effectively support space activities
- **to reduce, reuse and recycle**



Possible elements

- Re-fueling
- Maneuvering
- Repairing
- Assembling
- Cleaning

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Normative levels

- an **international law** perspective
 - launching States (“on-orbit”!)
- a **national regulatory** perspective
 - authorities and non-governmental actors
- a **contractual** perspective
 - service provider and customer: two satellites (space objects) involved



Framing the conduct of space activities

- **Public international law:**
 - Treaty on Principles Governing the Activities of States in the Peaceful Exploration and Use of Outer Space (1967)
 - other UN space treaties;
 - ITU regime; UN Charter (“space activities ... in accordance with IL”)
- **Domestic** laws and regulations
- **Private / contractual law** (launch service agreements, S/C operations)
- **Non-legally binding instruments** incl. technical norms

Parties with rights and obligations with regard to the same satellite

- **Space object owner:** natural or juridical person having the full and disposable right of disposition over the space object
- **Space object operator:** no defined category in international law but in some national laws (e.g. Belgium and France)
- **Launching State:** the State which launches, procures a launch, or from whose territory or facility a space object is launched
- **State of registry:** the State which exercises jurisdiction and control over the satellite



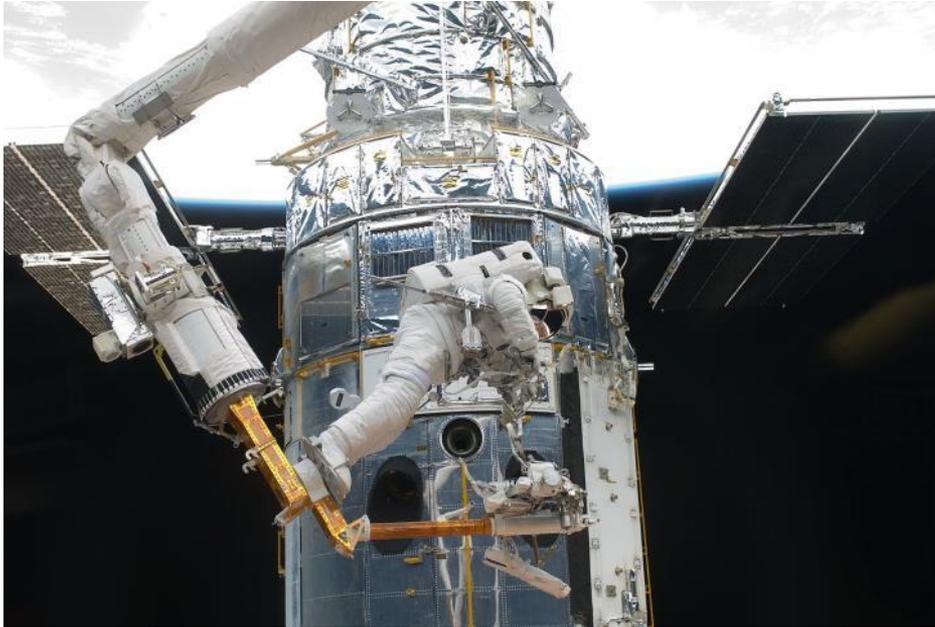
International legal frame

- States are **free to conduct OOSS activities**
- States are **responsible for their OOSS activities**, including those of non-governmental entities
- States are internationally **liable for any damages caused by their OOSS activities**
- States shall **authorise and supervise OOSS activities**
- States shall **avoid harmful interference** in undertaking OOSS activities



OOSS = 'space activities' involving 'space objects'

OOS: past & future examples



Measuring standards of care in space

- OOSS will inevitably involve **close proximity operations**
→ risk of unwanted interference or damage
- damage in space triggers liability of the launching States if the latter are at **fault**
- **no clear benchmarking for what constitutes ‘fault’ in relation to space operations in orbit**
- Role of ‘soft law’, e.g. **OOSS operation standards**



Space object ownership

- *“ownership of objects launched into outer space ... is not affected by their presence in outer space”* (Art. VIII OST)
- Target selection must take into account the ownership situation including securing consent of spacecraft owner to OOSS



S/C servicing contracts – a new realm?

- OOSS requires very close cooperation between service provider and client
- Contractual aspects to be considered:
 - Scheduling (milestones)
 - Technical information and data exchange
 - Contract performance (best effort?)
 - Liability for damages or service failure
 - Cost / payment milestones
- Analogies in **launch service contracts**



Other aspects

- potential applicability of rules of **export control**
 - CPO, and particularly the physical linkage between two space objects, could be qualified as an “export”.
 - This would require obtaining necessary authorizations before a CPO maneuver could be conducted.
- ITU regime governing the Geostationary Orbit (ITU)
- Guidelines on the Long-Term Sustainability of Outer Space Activities (once endorsed)

1. In principle and in legal terms, OOSS are space activities like any other:
 - they need to be **authorised** under national law;
 - States are **internationally liable** for any damages caused by the involved satellites to others.
2. Due to the close proximity / interaction between two (or more) spacecraft, particular attention must be paid to:
 - ensuring that the target owner (and possibly its Launching State) agree to the CPO
 - consequences (damages in particular) are clarified beforehand between the parties of the service
 - there are no issues of export control, security, safety, etc.
 - relevant standards and procedures are developed and adhered to
3. CPO are not novel (rendezvous and docking since the 1960s) **but new as a service** – possible additional regulation in the future

Altitude: 479 Km
Speed: 25200 Km/h

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