Overview of Space Governance and Norms of Behavior

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Space Sustainability Challenges

- Lots more stuff happening in space
  - Growing number & diversity of space actors (governments and commercial companies)
  - Growing number & diversity of space activities
- Negative externalities could have widespread impacts for everyone
- Very few hard "rules" about what is and isn't allowed

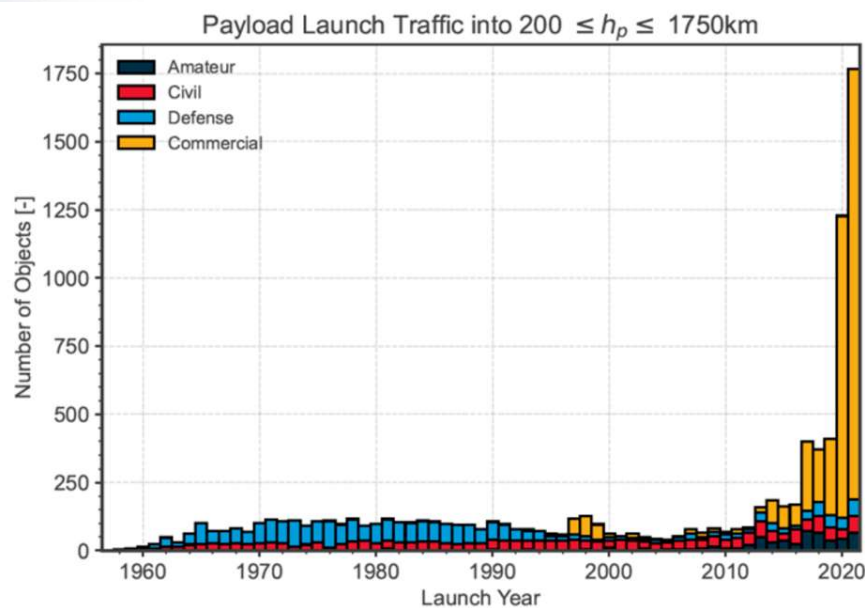*How can we ensure space is usable for future generations and uses??*

Growing number of countries in space
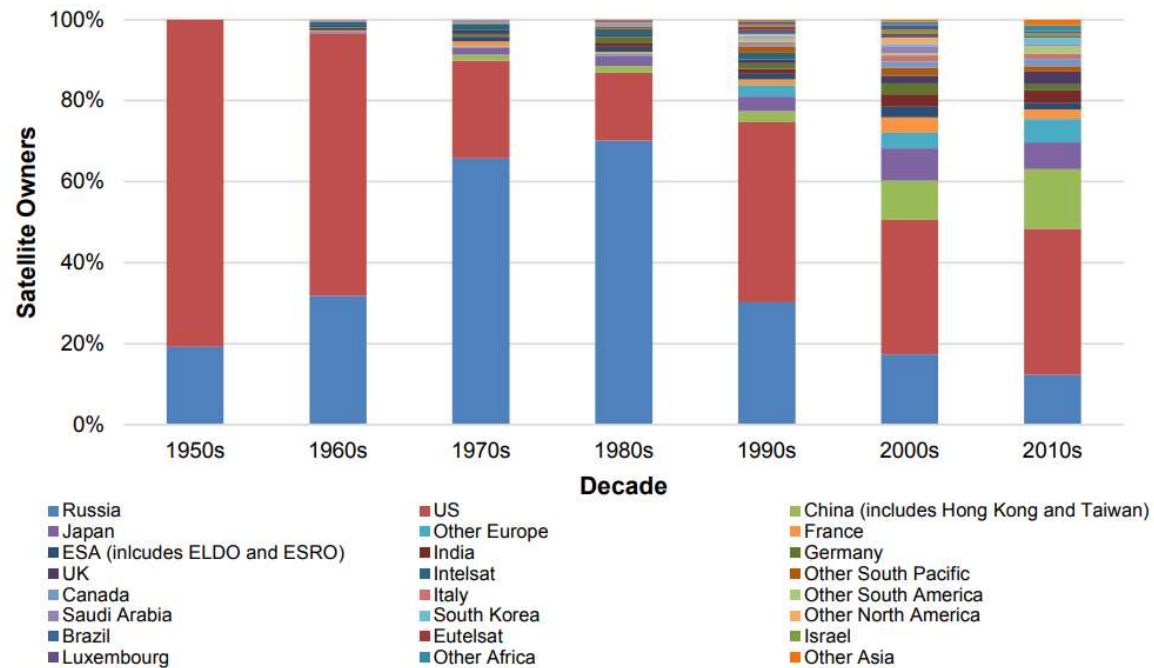
Source: Science and Technology Policy Institute (2015)

Emergence of large constellations

Payload Launch Traffic into $200 \leq h_p \leq 1750$ km

Source: ESA (2022)

Constellation	Total Sats	Altitude (km)	Country
Starlink G1	4,408	550 – 560	US
OneWeb	6,372	1,200	UK
Starlink G2	30,000	340 – 614	US
Kuiper	7,774	590 – 650	US
GW	12,992	590 - 1145	China
Cinnamon	327,320	550 – 630	Rwanda
LightSpeed	1,969	1,015 – 1,325	Canada

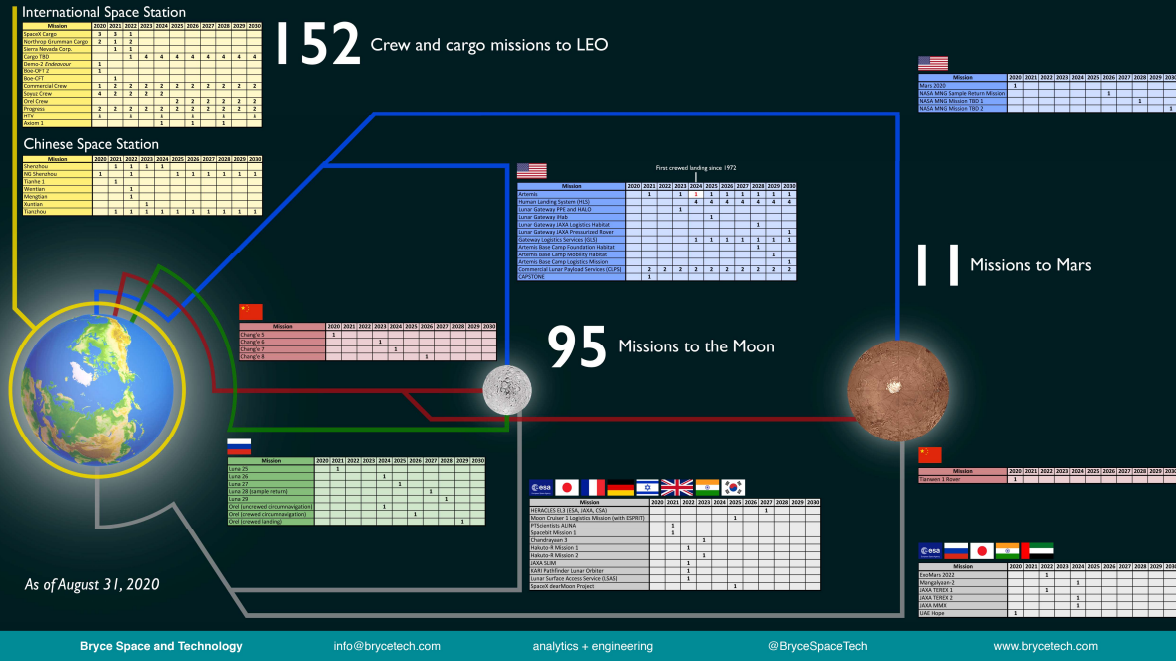Source: Jonathan McDowell (2021)

Adding to already congested domain
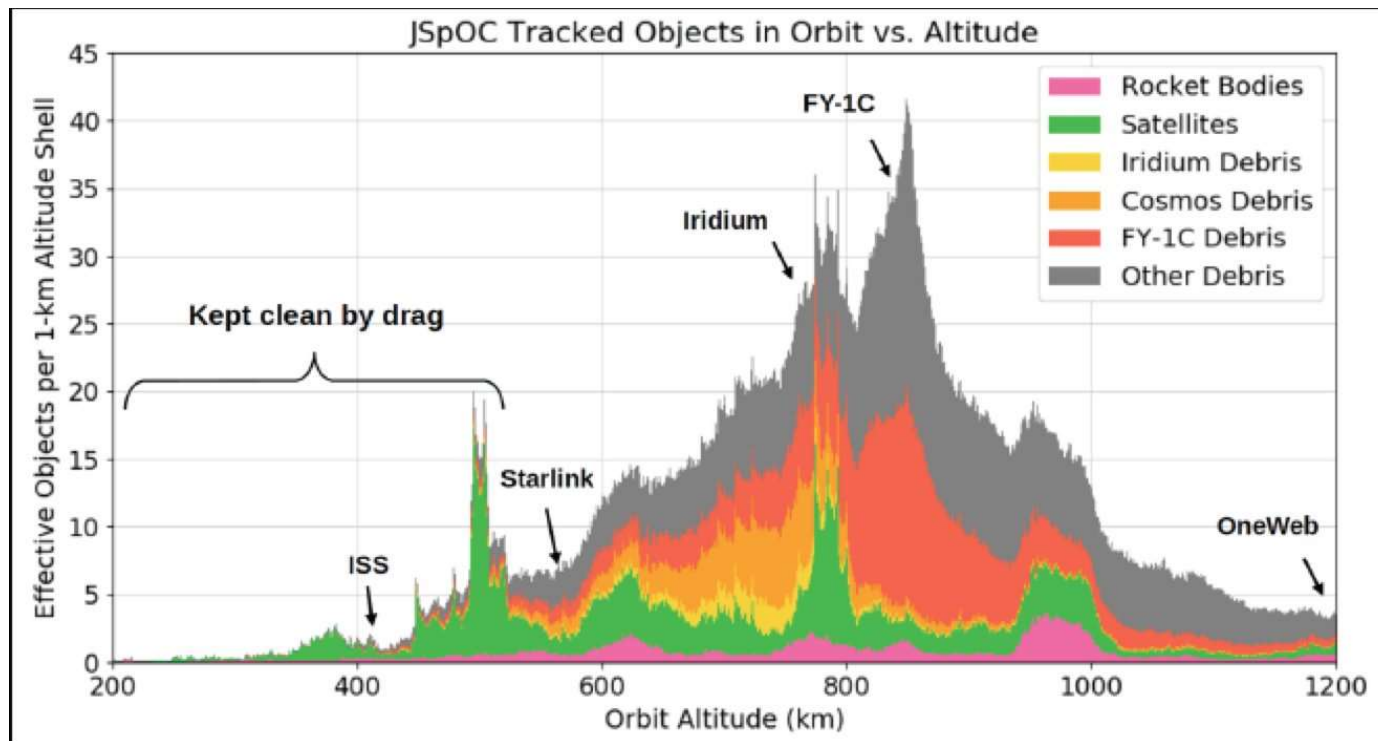
Source: SpaceX FCC Filing

Expanding into cislunar space and beyond

Source: BryceTech

Space governance today

- Much of the existing space governance framework is based on norms
  - Example: Freedom of overflight for satellite reconnaissance
  - Launch of Sputnik in 1957 helped set the norm that satellite overflight did not breach territorial sovereignty
  - By mid-1960s, freedom of overflight was a generally accepted norm
  - Was not codified into "hard law" until Outer Space Treaty of 1967

- For the moment, space governance discussions focus on establishing new norms of behavior, not binding agreements/treaties
  - Far more space actors than ever before, with diverse interests and goals
  - Increasingly challenging to get global consensus on new "hard law"
  - Several major space powers (including United States) resistant to any discussion of binding agreements

United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS)

- Main international body on space, source of the five major international space treaties

- 100+ State members, plus 40+ observers

- Current issues
  - Orbital Debris
  - Long-term sustainability of space activities
  - "Dark and Quiet Skies" (light pollution from large constellations)
  - Space Traffic Management
  - Space resources
  - Use of space for sustainable development on Earth

UN LTS Guidelines

- In 2010, the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS) established the Working Group on the <u>Long-Term Sustainability (LTS) of Outer Space Activities</u>
  - The Working Group was tasked with producing a set of voluntary, non-binding guidelines for all space actors to help ensure the long-term sustainable use of outer space

- In June 2019, the COPUOS plenary officially adopted these 21 guidelines, and agreed to create a working group under the agenda item of "The Long-term Sustainability of Outer Space Activities" of the Scientific and Technical Subcommittee

- 92 Member States agreed on these guidelines

- Full text available in UN document <u>A/AC.105/2018/CRP.20</u>. The four major sections:
  - Policy and regulatory
  - Safety of space operations
  - Cooperation and capacity-building
  - Scientific and technical R&D

National-level governance

- Under Article VI of the Outer Space Treaty, each country **bears international responsibility** for their national space activities and is required to provide "**authorization and continuing supervision**," including of the private sector

- Typically results in requirement to get a license from the govt
  - US: FCC (spectrum), NOAA (remote sensing), FAA (launch/reentry)

- Current discussions on "space traffic management"
  - Who has oversight of new/emerging commercial space activities and what does that regime look like?
  - What does "continuing supervision" mean?

The rise of "industry best practices"

- Space Safety Coalition
- Satellite Industry Association's "Principles of Space Safety for the Commercial Satellite Industry"
- Consortium for Execution of Rendezvous and Servicing Operations (CONFERS)
- AIAA/Iridium/OneWeb/SpaceX "Satellite Orbital Safety Best Practices Guide"
- Aerospace Space Safety Compendium

- Space Data Association
- Paris Peace Forum's Net Zero for Space
- eSpace Space Sustainability Rating

Big takeaways

- Governance is polycentric in nature (multiple centers of semiautonomous decision-making with overlapping authorities)

- Top-level principles but not a lot of agreement on interpretation or implementation

- Policymakers do not have a deep understanding of the underlying technologies

- Most of the existing system is predicated on human-in-the-loop operations and slow-moving bureaucratic processes

Thank you!

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