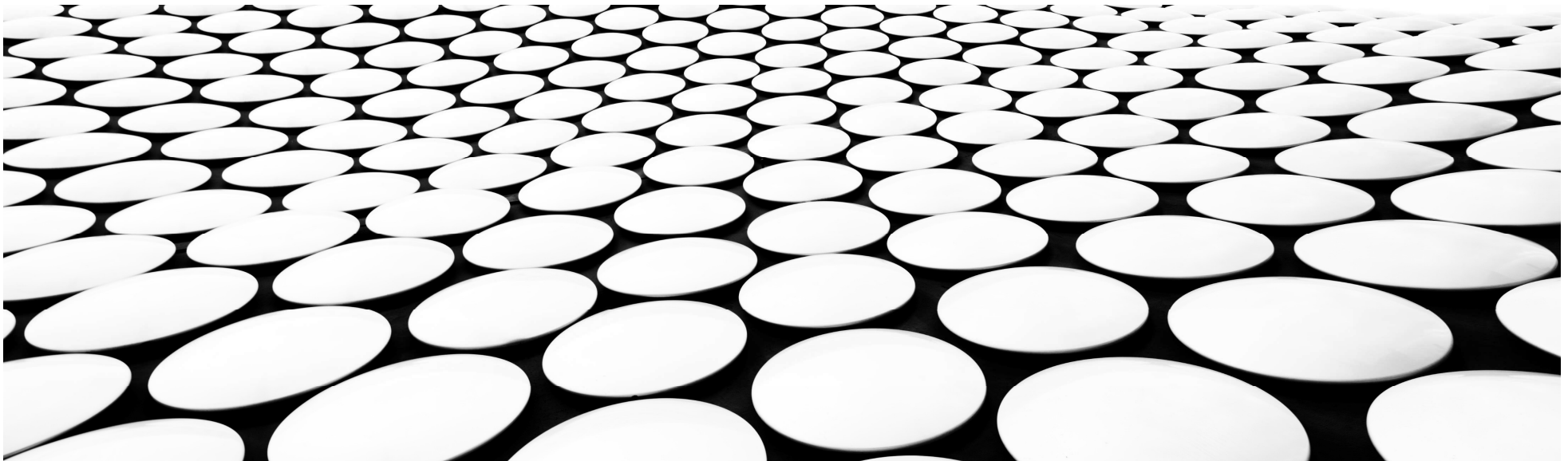

SATELLITES BUSINESS – HOT TOPICS: FROM LICENSING TO SPACE DEBRIS REMOVAL

IBA CONFERENCE, 11-12 OCTOBER 2021





SETTING THE SCENE: OVERVIEW OF LEGAL/REGULATORY FRAMEWORK FOR SATELLITE OPERATION

CECIL AMEIL, SES



Space is congested,
contested, competitive...

Prof. Christopher Newman,
Northumbria University

and crucially *multi-sectored*



<https://www.weforum.org/videos/19060-9-fascinating-things-to-know-about-why-the-space-economy-is-so-important-to-you>

The Pyramid of Space Governance

Domestic Regulation

- Required by Art VI OST
- UK - Outer Space Act 1986 (Space Industry Act 2018)
- Licensing mechanism prior to mission and during mission
- UK OFCOM regulates the use of RF Spectrum



International Treaty Obligations

- ❖ Outer Space Treaty 1967
- ❖ Rescue Agreement 1968
- ❖ Liability Convention 1972
- ❖ Registration Convention 1975

Non-Binding Mechanisms

Sector specific guidelines such as the UN Debris Mitigation Guidelines can be incorporated via licensing requirements

International Space Law

Outer Space Treaty 1967 is central 'Trunk'

An international treaty of the UN – Binding on all parties (over 100 ratifications)

- *Arts. I-V imposes behavioural requirements (All states shall enjoy free access to space, no appropriation of outer space & celestial bodies, no nuclear weapons)*
- *Art. VI impose an **authorization**, licensing, supervision duty, Art VII makes Launching States **liable** for damage cause by space objects and Art VIII incentivizes **registration** by giving jurisdiction and control to states who register space objects*
- *Art. IX requires states not to engage in activities which **interfere** with other states' space activity. Also, requirement to consult if '**harmful contamination**'*

Liability Convention 1972 is also key

Creates two branches of State liability:

1. *Art II Liability Convention: Damage on Earth & air space (absolute liability – no fault needed)*
 2. *Art III Liability Convention Damage elsewhere other than on the surface of the Earth or air space*
- This covers **on-orbit damage** caused by space object of one launching state to another will arise only if the damage is due to its (the launching state) fault or the fault of persons *for whom it is responsible*

State Liability

- **If a satellite is damaged in orbit**, the economic, political & strategic implications could be significant
- There has been no litigation as yet to test the limits of the existing liability regime
- Under international space law, liability for damage caused is assigned to the launching state on a *fault* basis (Art III Liability Convention 1972)
- Usually in law, fault will be either because of lack of compliance with treaty obligation, breach of a duty of care or failure to comply with codes of conduct, norms of behaviour
- **In satellite operations**, there is limited normative ruling in respect of assigning fault for collisions in space



From International to National Laws

- **As a result of OST, states need to authorize, licence and supervise space activities within its borders and by its nationals**
- Example: UK Outer Space Act 1986 established a licensing mechanism governed by UKSA 
- Other jurisdictions have tried to adapt regulatory framework to the shifting contours of the 21st Century space environment (Netherlands Space Activities Act 2007, France Act on Space Operations 2008, Luxembourg Space Resources Law 2017)
- International cooperation: flourishing of national space agencies & inter-state agreements
- **No jurisdiction has legislated for STM.** No exemplar regime exists

The Regulation of Satellite Communications



- **Laws** are 'commands backed by threat of sanctions' and have primary rules governing conduct/behaviour
- **Regulation** is concerned with authorizing, monitoring and controlling the way in which activities are undertaken
- **Safety** is the primary concern of a regulator

ITU Radio Regulations set the structure – international treaty status for regulation of orbital slots with associated frequencies



Bundesnetzagentur

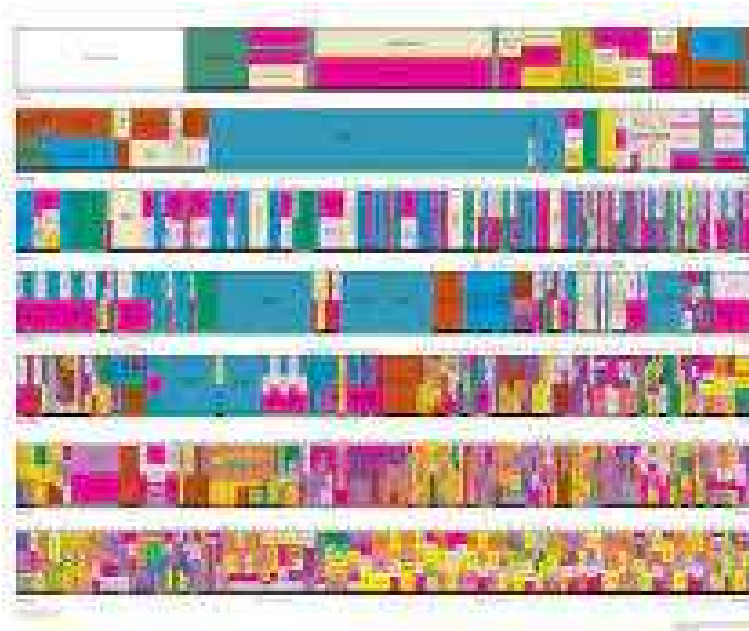
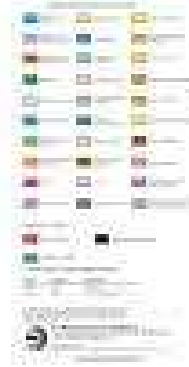
National telecom regulators (e.g. UK OFCOM or DE BNetzA) regulate the **use of RF spectrum** and grant licenses to use spectrum and deliver services

- Regional regulatory (e.g., CEPT, CITELE, ATU) edict non-binding recommendations or decisions that depend on national implementation
- Prepare regional positions for ITU conferences

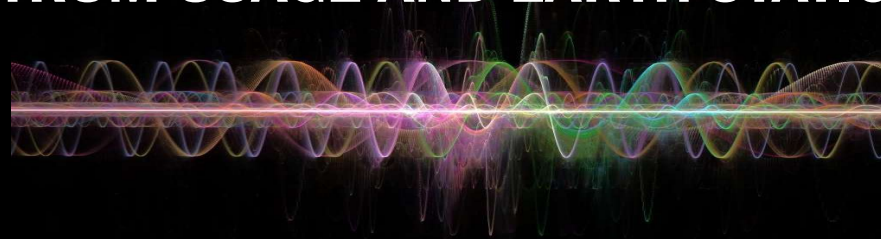


UNITED STATES FREQUENCY ALLOCATIONS

THE HARP/SPECTRUM



ALL ABOUT SPECTRUM USAGE AND EARTH STATION OPERATION





OVERVIEW OF SPACE INDUSTRY TODAY: NEW PLAYERS & ACCESS TO SPACE

CECIL AMEIL, SES



Small Sats Prospects (2019-2029)

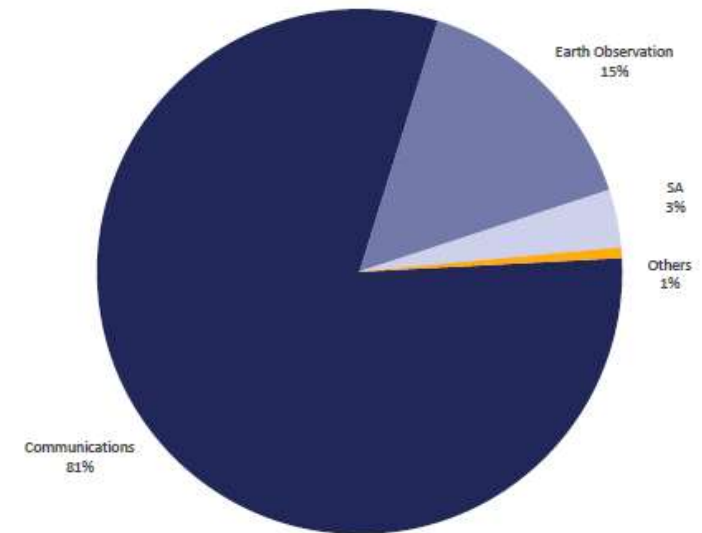
Over 4,000 satellites in 1-100 kg expected to launch

Majority in S&T

Use Cases for S&T :

Testing new techno, Earth Science, Techno Validation, Satellite Inspection, Debris Removal, IOS

Mostly from universities, Commercial, Government and a few Military missions



Over 6,500 satellites in 100 – 500 kg range will launch

Majority of them for communications

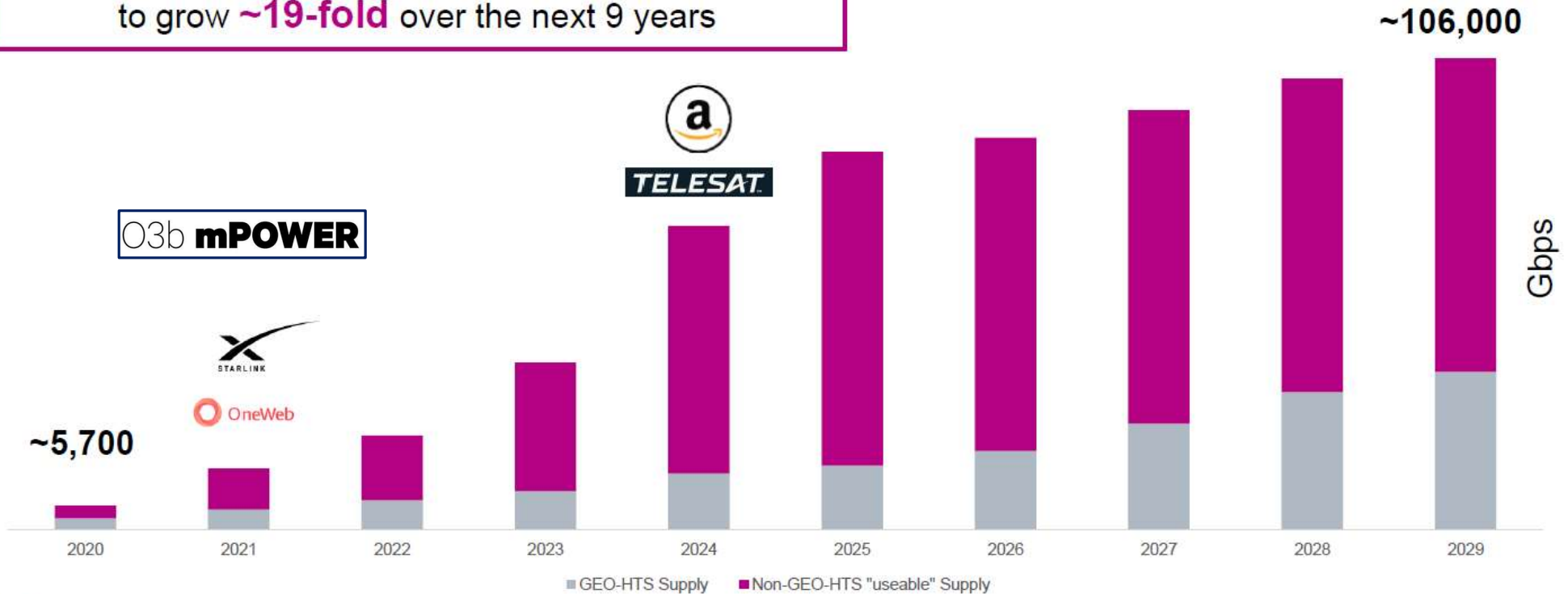
Commercial constellation players dominate communications market in number of satellites to launch including mega HTS constellations and smaller IoT constellations.

The biggest satellite constellations are SpaceX Starlink, OneWeb and Amazon's Project Kuiper that makes for a significant portion of overall launches. Other systems Swarm Technologies, Astrocast, Myriota, Fleet, and various M2M/IoT constellations.

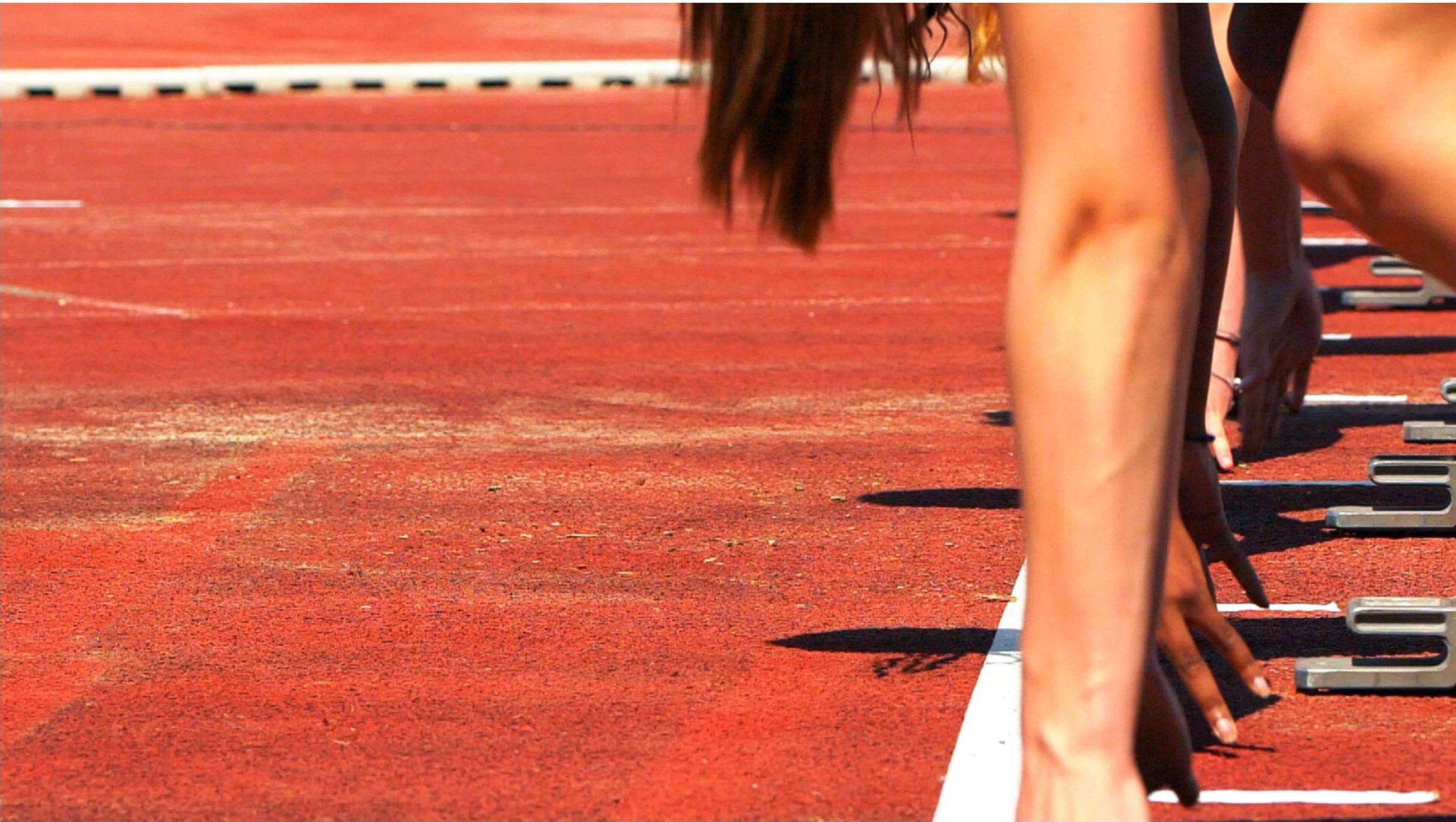
Ultra GEO HTS & NON-GEO HTS

Supply evolution

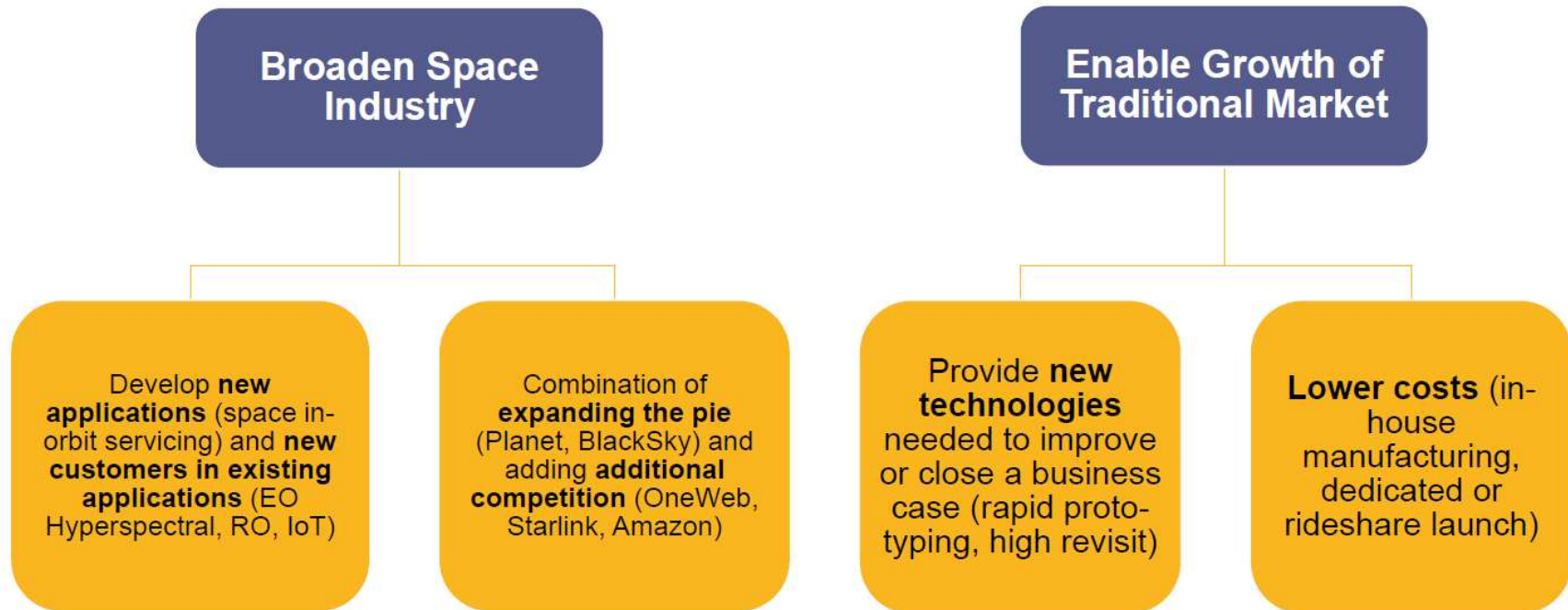
With the launch of the LEOs, HTS Supply is expected to grow **~19-fold** over the next 9 years



Note: Illustrative representation of useable throughput



Small Sats Opportunities



Space, Space, Space!

- ❑ More and More states want to use the benefits of space-based infrastructure (military dimension, national sovereignty, high-tech hype)
- ❑ The busier space gets, the higher the risk of satellite collisions is (sustainability challenge) – Space Traffic Management becomes a priority issue
- ❑ Nations want to control the space environment to limit the chances of a collision but not allow any other state to control space (US deep pockets and granting of rights vs. China, India or EU)
- ❑ International Treaties are time consuming and hard to negotiate – ITU role is challenged
- ❑ Satellite operators and service providers want the lightest touch regulation
- ❑ National regulators are only able to control and supervise activity on their national territory

BIG CHALLENGE IS: ACCESS TO SCARCE RESOURCES AND ACCESS TO SPACE



Thank you for your attention!

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