



SpaceBiz Breakfast

Business Perspectives on Space Debris

Risks, Opportunities, or Both?

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What is Space Debris?

of cataloged objects in LEO:

1957 – 2007: ~10,000 objects 2007 – 2021: ~20,000 objects 2022: ~22,000 objects

“Constellations”

Operational satellites or spacecrafts



“Clouds”

Fragments created from collisions or humanmade events



“Clusters”

Defunct rocket (parts) or satellites



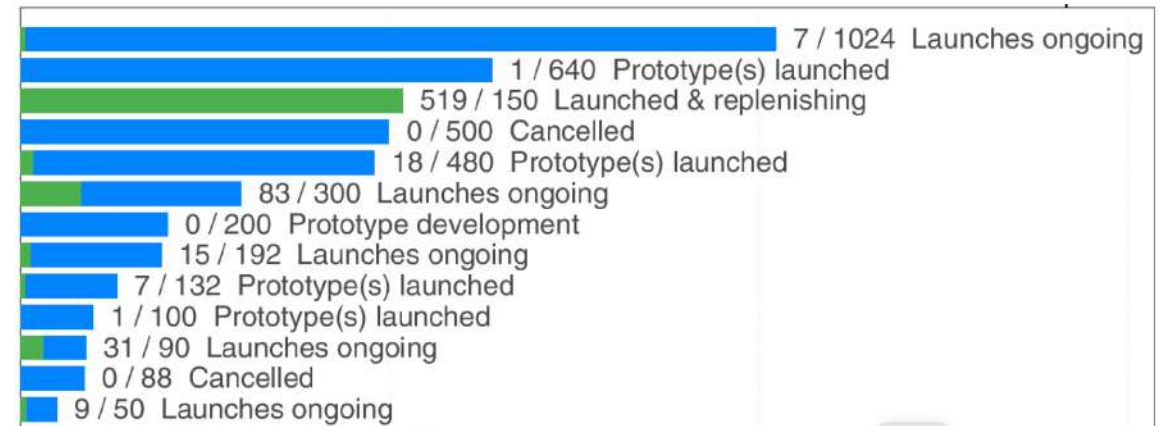
Space Debris

Why? Smaller satellites but larger constellations

Constellation size of satellite internet company

	Country	Company stage	Planned #
Starlink (SpaceX)	US	Private, considering to list in future	12,000
Guo Wang (GW)	China	State-owned	13,000
OneWeb	UK	Acquired	2,000
Project Kuiper	US	Owned by Amazon	3,200
AST Spacemobile	US	SPAC listed	170
Lynk Global	US	Series B	5,000

Constellation size of Earth Observation company



More than 5,000 Earth Observation satellites planned to be launched to space

What are the risks, other than sustainability in space?

Regulatory Risks



No law to prevent country from creating more space debris. A new rule requiring satellite operators to **de-orbit old satellites in 5 years.**

Asset Risks



Probability of satellites and space debris collision **increases substantially** and **will be extrapolated** when collisions happened.

Business Risks



Commercial satellite operators and launchers based their growth assumptions on “**business as usual**” in space, which might not be the case.

More stringent government actions expected

Like waste management on earth, government's policy and spending **create "value" on junks.**



- By 2030, to **regulate removal of all European satellites** from valuable orbits
- Established new Space Safety programme **"Clear Space" to support "tow truck" in space**



- Funded projects in **removing and recycling space debris**
- Each instance of **planned release of debris larger than 5 mm** in any dimension that remains on orbit for more than 25 years should be evaluated and justified.



- Funding \$70million+ annual on an AI project aims to create **algorithms that will autonomously monitor and help satellites to avoid space debris**
- **Space debris guideline** and **fostering international exchange** like the Sino-US Expert Workshop

No more spacecraft insurance, at least in LEO

Disrupted



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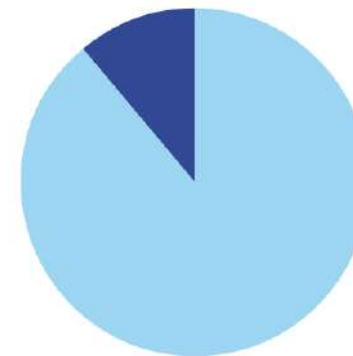
Launching into space? Not so fast. Insurers balk at new coverage

By Noor Zainab Hussain and Carolyn Cohn

- Insurers either **stopped providing spacecraft insurance**, or **only cover GEO** which is deemed to be less risky.
- Other than insurance against loss of property value, there is also **third-party insurance**

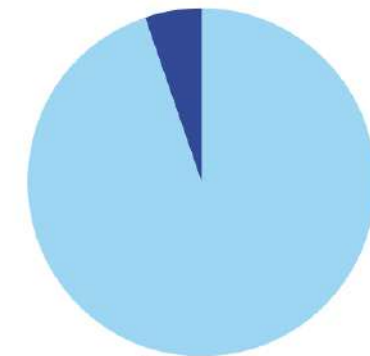


Number of insured satellites



■ LEO	21
■ GEO	167

Total value of insured satellites



■ LEO	USD 1.0 bn
■ GEO	USD 18.3 bn

Figure 12. Most insured satellites are in GEO (as of 2011)

Business opportunities of Space Debris

- How will the NewSpace economy change because of Space Debris?
- What are the opportunities that arise from the Space debris Ecosystem?
- What are the new business models to avoid creating more Space Debris?

Satellites Monitoring



Sustainability Rating



Data Provider



Space Insurer



Let's take a step back – Sustainability on Earth

<p>RESEARCH</p> <p>Think Tanks</p> <p>Academia</p>	<p>NETWORKS</p> <p>Membership</p> <p>Co-working</p> <p>Purpose-aligned meeting space</p>	<p>SUPPORT AND RECOGNITION</p> <p>Accelerators and incubators</p> <p>Awards, competitions and events</p> <p>Certification</p> <p>Recruitment</p>	<p>Impact measurement and reporting</p> <p>Consultants and advisors</p>
<p>GOVERNMENT</p> <p>Government</p>	<p>Movements and campaigns</p> <p>Movements and campaigns</p>	<p>INVESTMENT</p> <p>Advisors</p> <p>Angel networks</p> <p>Crowdfunding</p>	<p>Investment groups</p> <p>Trusts and foundations</p>

What are the opportunities? 3R for Space Junks

Remove



Japanese company. Developing **satellite end-of-life and active debris removal services** to mitigate the growing and hazardous buildup of debris in space

Reuse



US company. Providing on-orbit refueling services to **extend the lifetime of operational satellites**, which are planned to be decommissioned

Recycle



US company. Building metal **foundries in space with the use of debris as an input resource**, enabling in-space manufacturing and accelerating space industrialization

More investors have started to see the opportunities



*“The **miniaturization** of technology and the **lower costs** to send small sat into space means more people want to do it”*

Are satellite companies the “upstream suppliers” for space debris companies?

*“The **most pressing necessity** in the space industry (on solving the space debris problems) leads to the **most profitable inventions**”*

What will the market size be when space debris removal becomes mandatory?