Space Update

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The Changing Space Industry and Environment

→ We've seen…

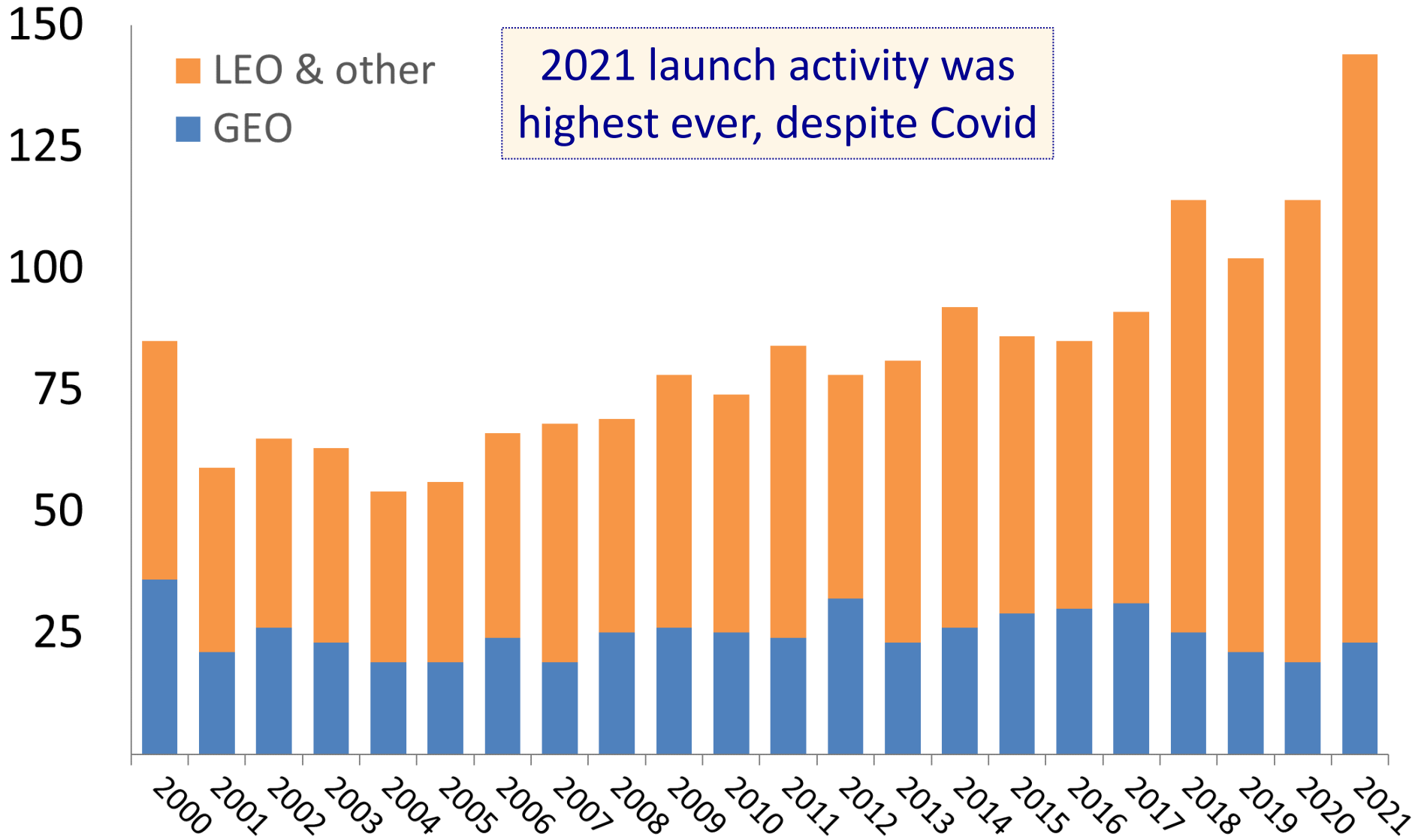
- ✓ New launch vehicles and satellite technologies flown and planned
- ✓ GEO satellite orders increasing with coverage expansion, replenishments, and C-band clearing
- ✓ More constellations of small satellites deployed and proposed
- ✓ Rapidly increasing population of satellites and debris on orbit
- ✓ Improved space situational awareness and space traffic management capabilities

→ …which results in more…

- ✓ Launch failures – new launch vehicles fail more often than mature vehicles
- ✓ Satellite failures – small satellites built with shorter schedules, less testing, less redundancy
- ✓ Supply chain stress – huge demand for electronic parts and globalization of space economy
- ✓ Collision risk – urgent need for accurate and timely object tracking and conjunction warnings

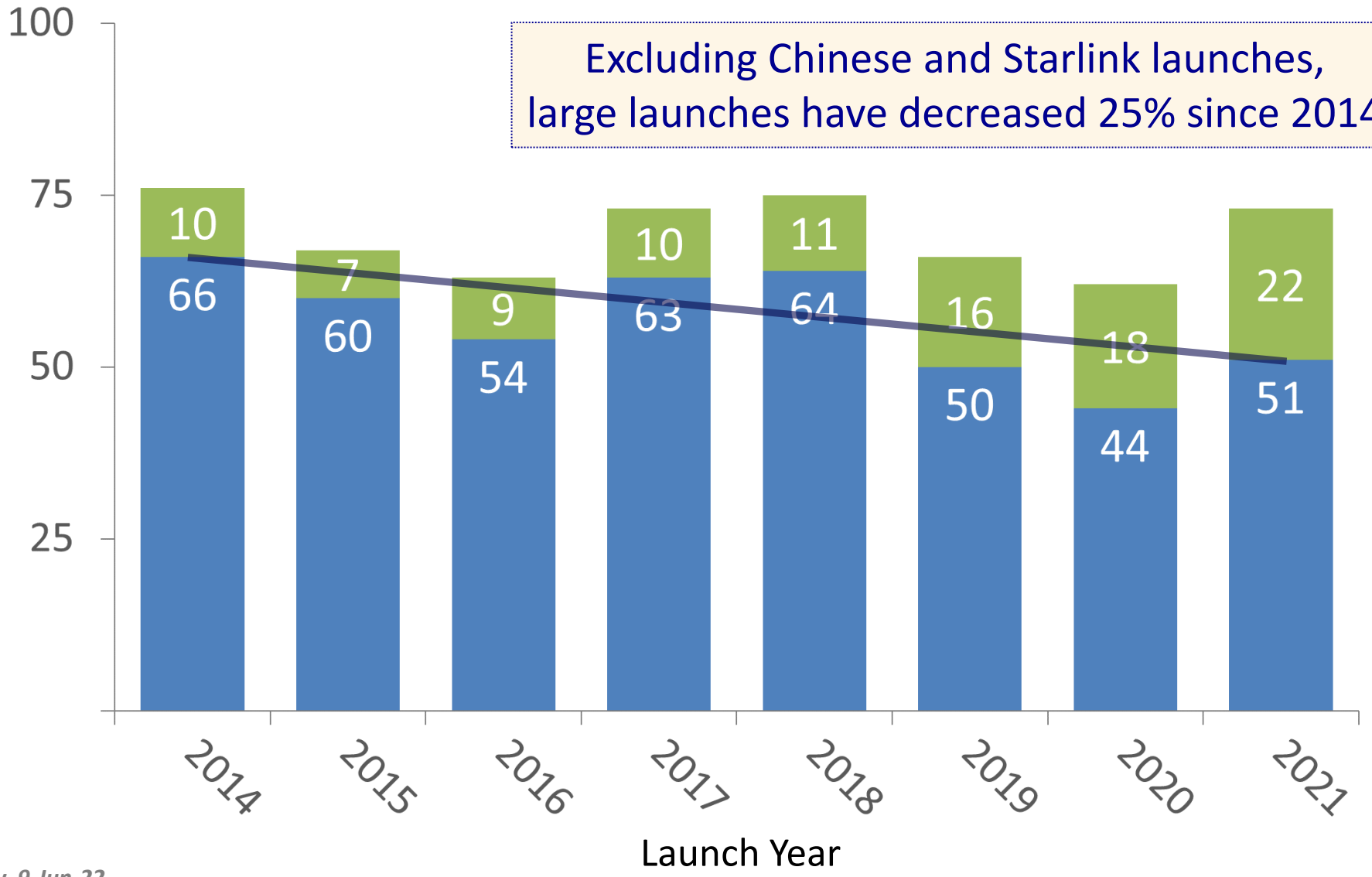
Launches to Orbit

GEO vs. LEO



Launches to Orbit – Large vs. Small

Excluding China and Starlink



Excluding Chinese and Starlink launches, large launches have decreased 25% since 2014

LARGE	SMALL
Angara	Antares
Ariane	Astra
Atlas	Dnepr
Delta	Electron
Falcon	Firefly
GSLV	LauncherOne
H-IIA/B	Minotaur
Proton	Pegasus
PSLV	Taurus
Soyuz	Vega
Zenit	Misc small

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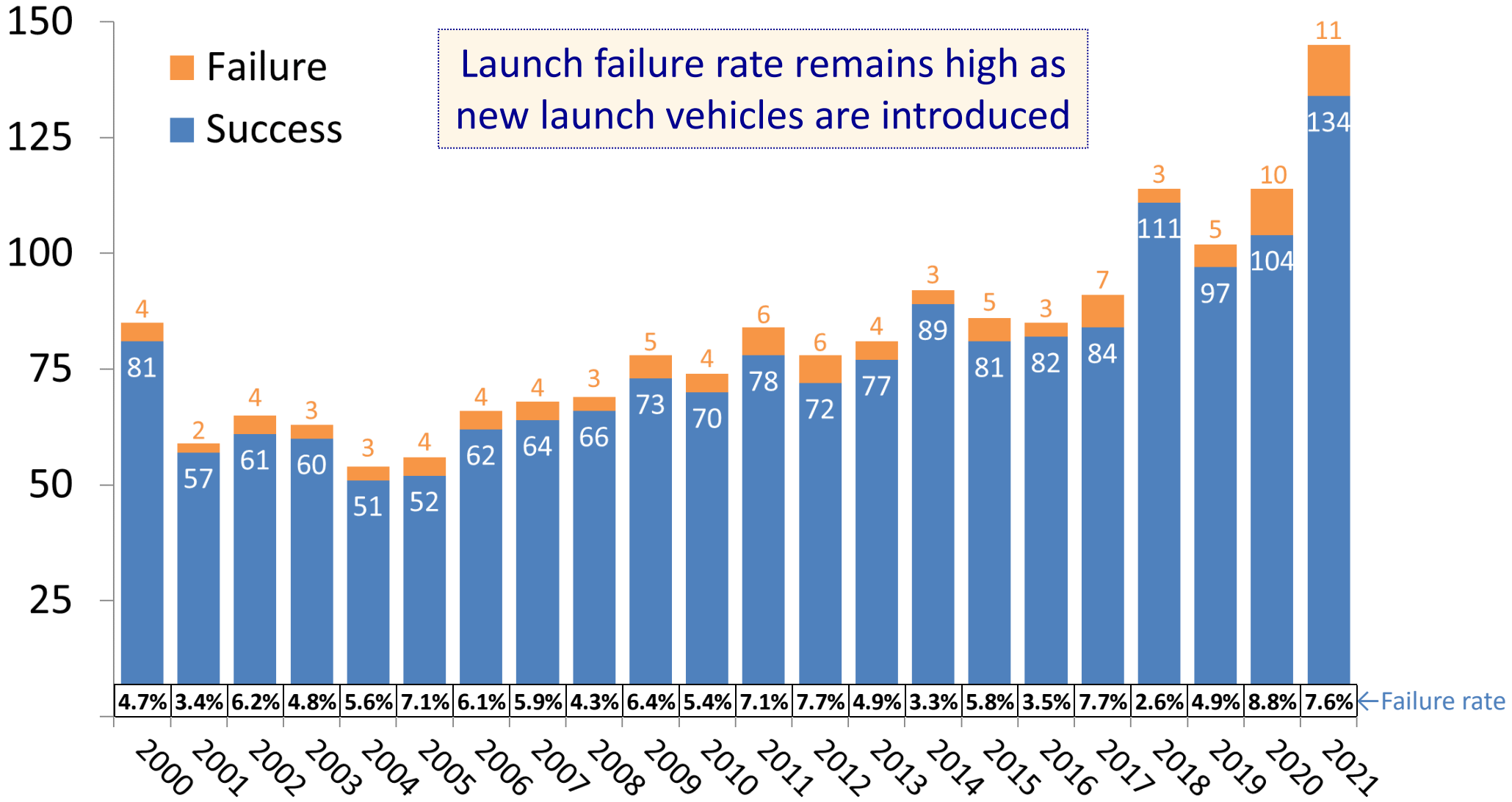
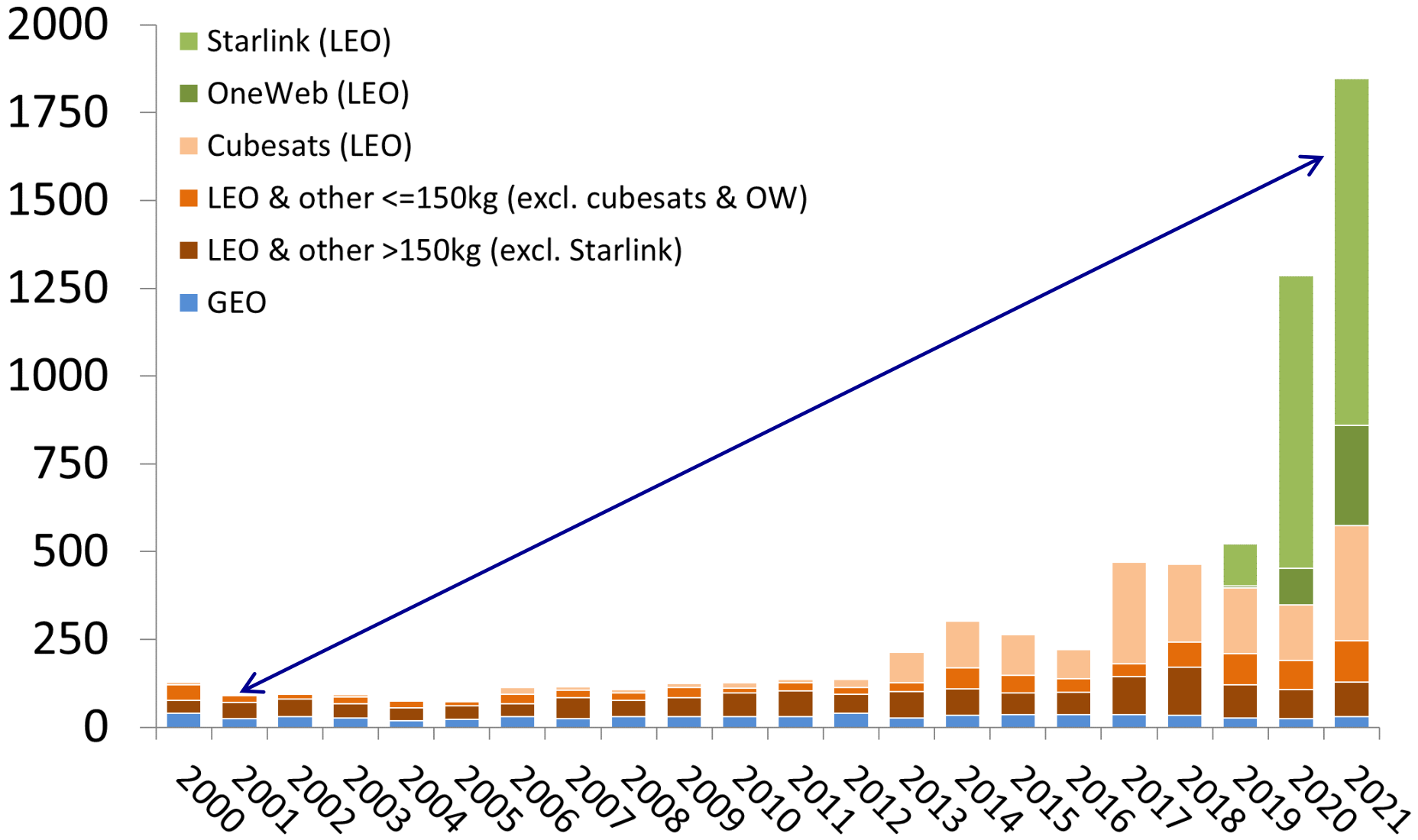
Launches to Orbit

Successes vs. failures



Satellites Launched by Year

By orbit and size, since 2000



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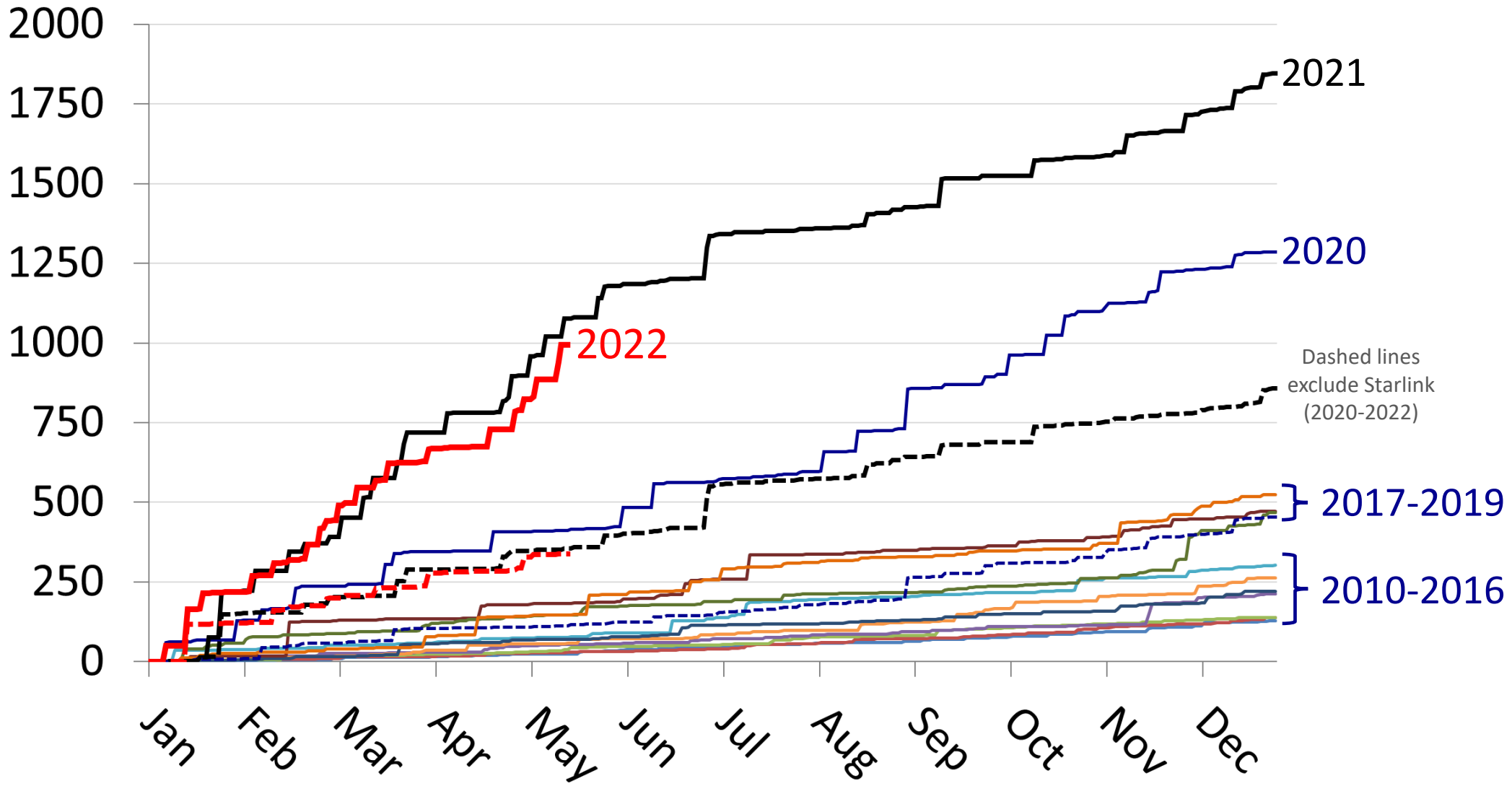

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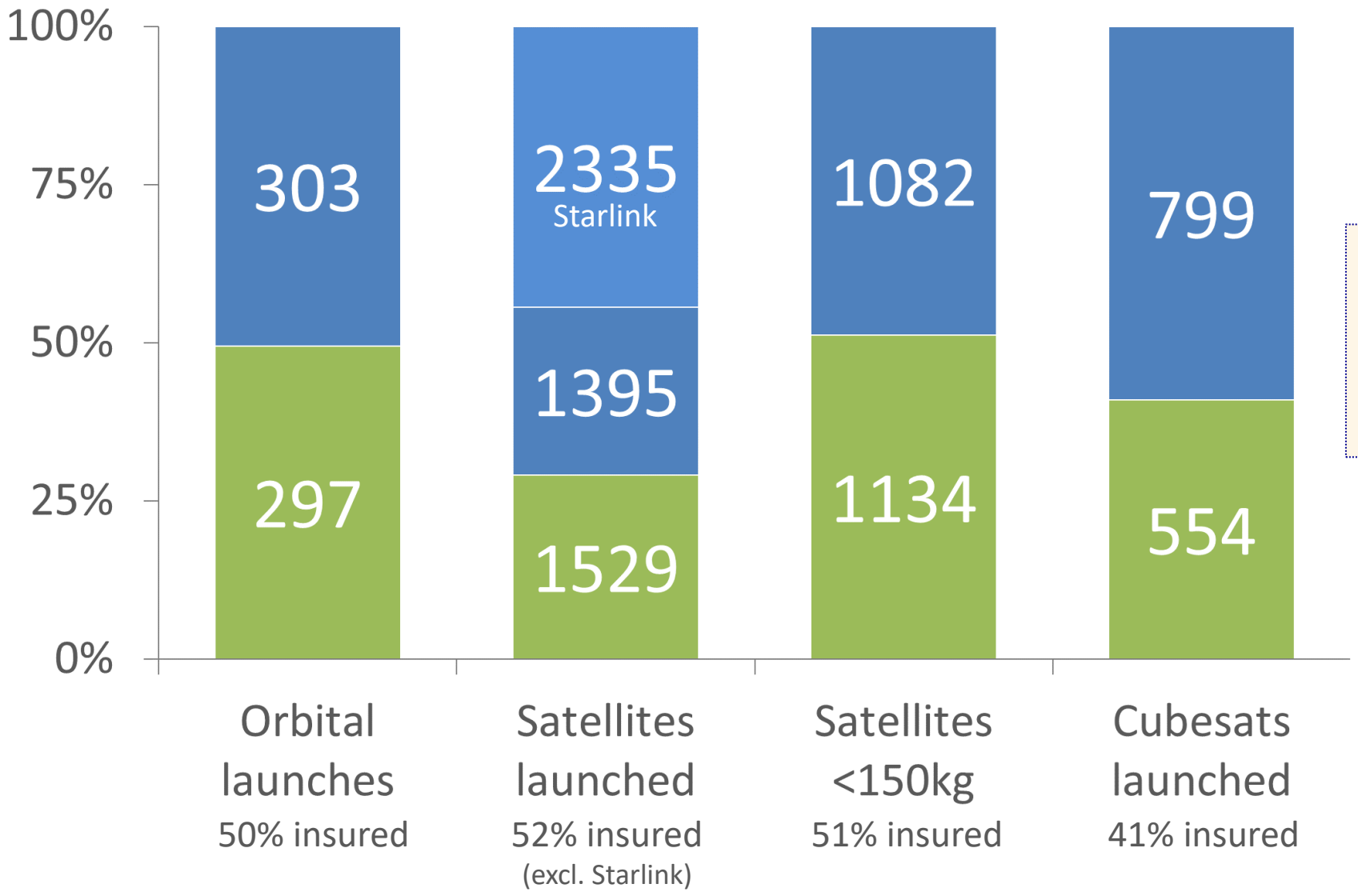
Launches and Satellites since 2017

Market insured vs. uninsured during launch



←Uninsured during launch

Half of all launch activity is insured

← Insured during launch

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Active Satellites In Orbit

Number and value, insured and uninsured

AXA XL analysis *as of 1 Jan 2022*	Active Satellites	Calculated Value	Insured Satellites	Insured Value	Uninsured Satellites	Uninsured Value
LEO	4,079(1)	$35.2b	48	$2.6b	4,031	$32.6b
MEO & HEO	200	$4.1b	16	$0.6b	184	$3.5b
GEO	577	$41.3b	218	$21.0b	359	$20.3b
Total	**4,856**	**$80.6b**	**280**	**$24.2b**	**4,574**	**$56.4b**

(1) 54% are Starlink and OneWeb

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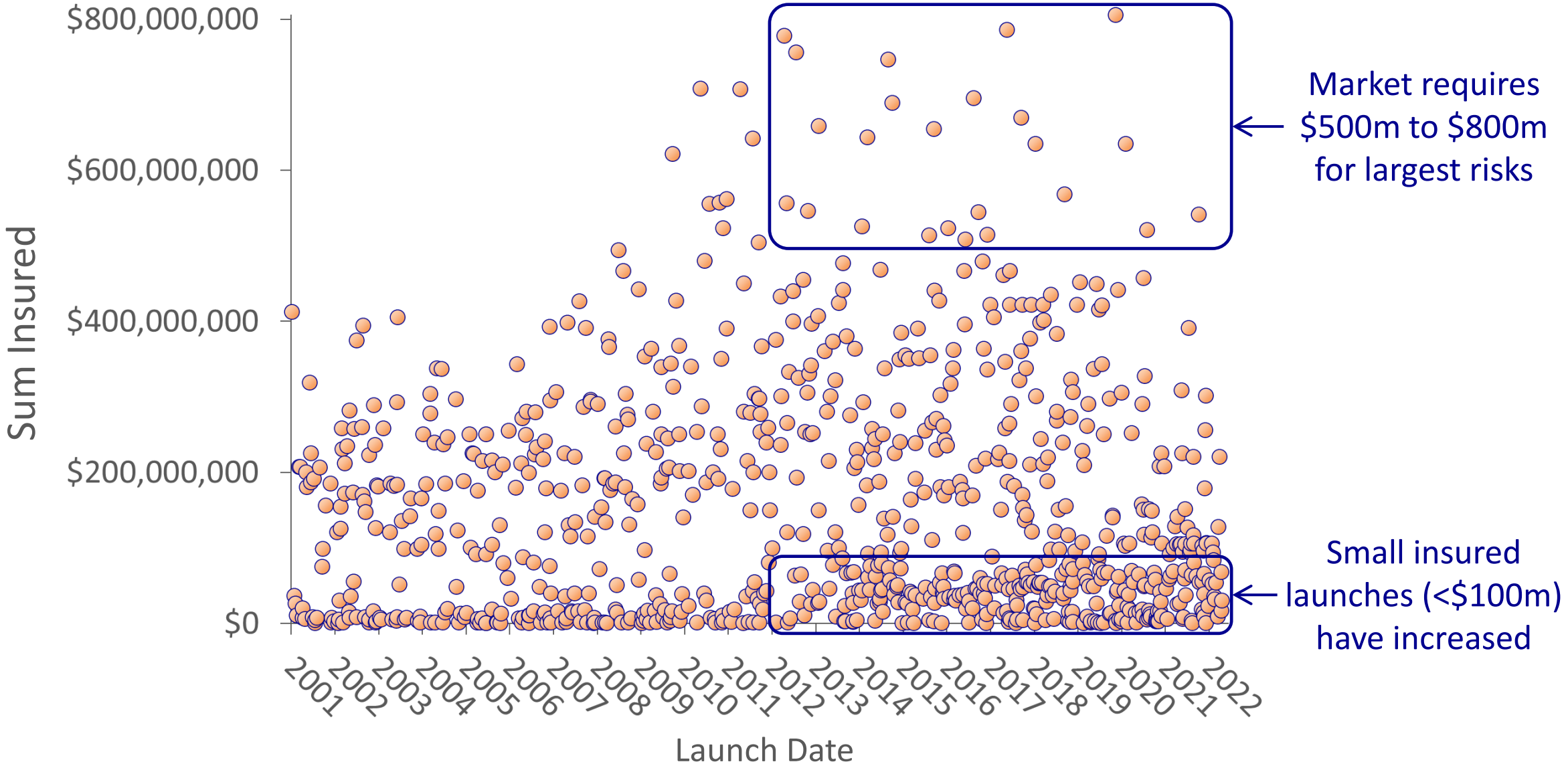
Insured Values During Launch



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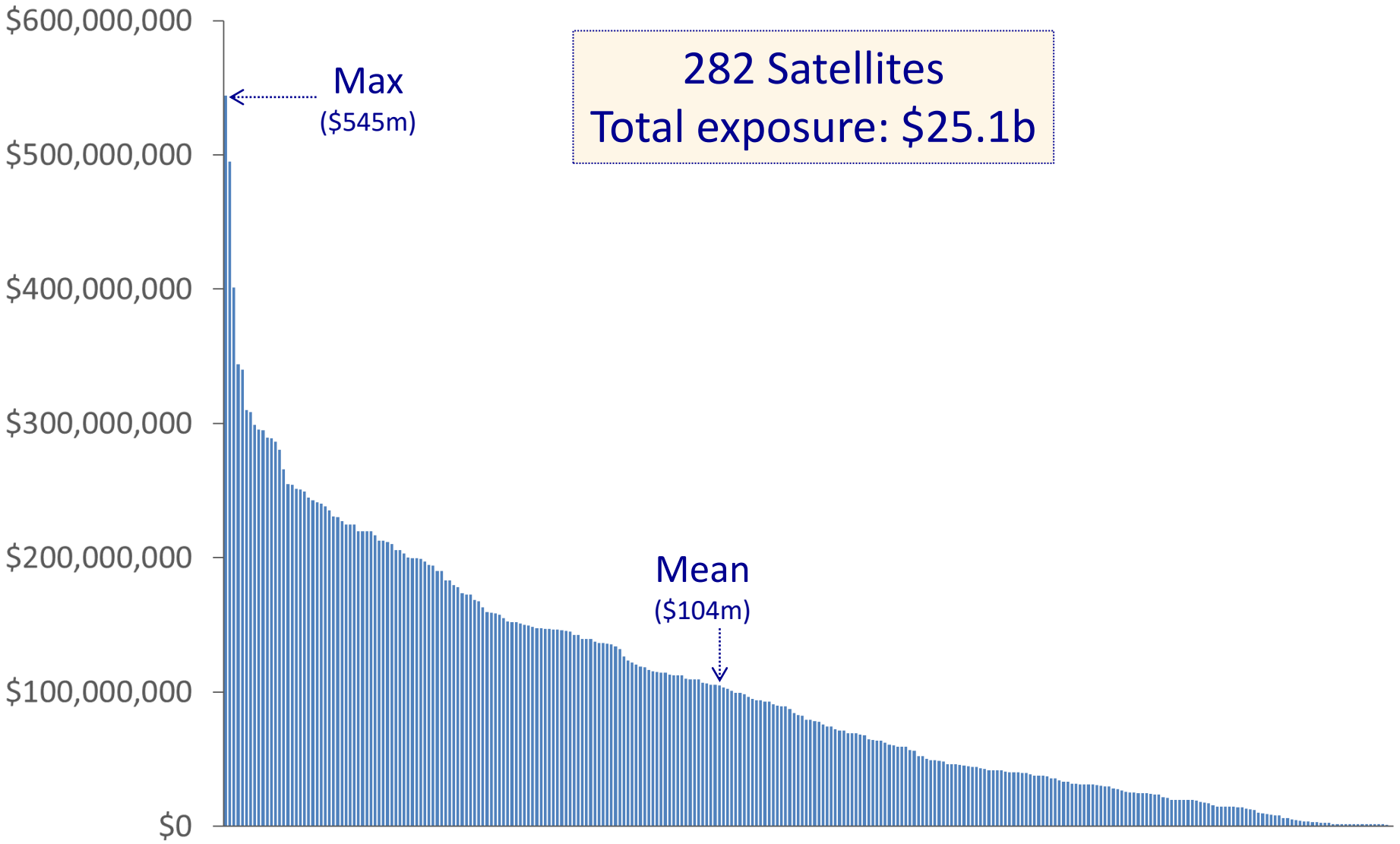
Market Exposures On Orbit

Satellites in orbit, by individual risk

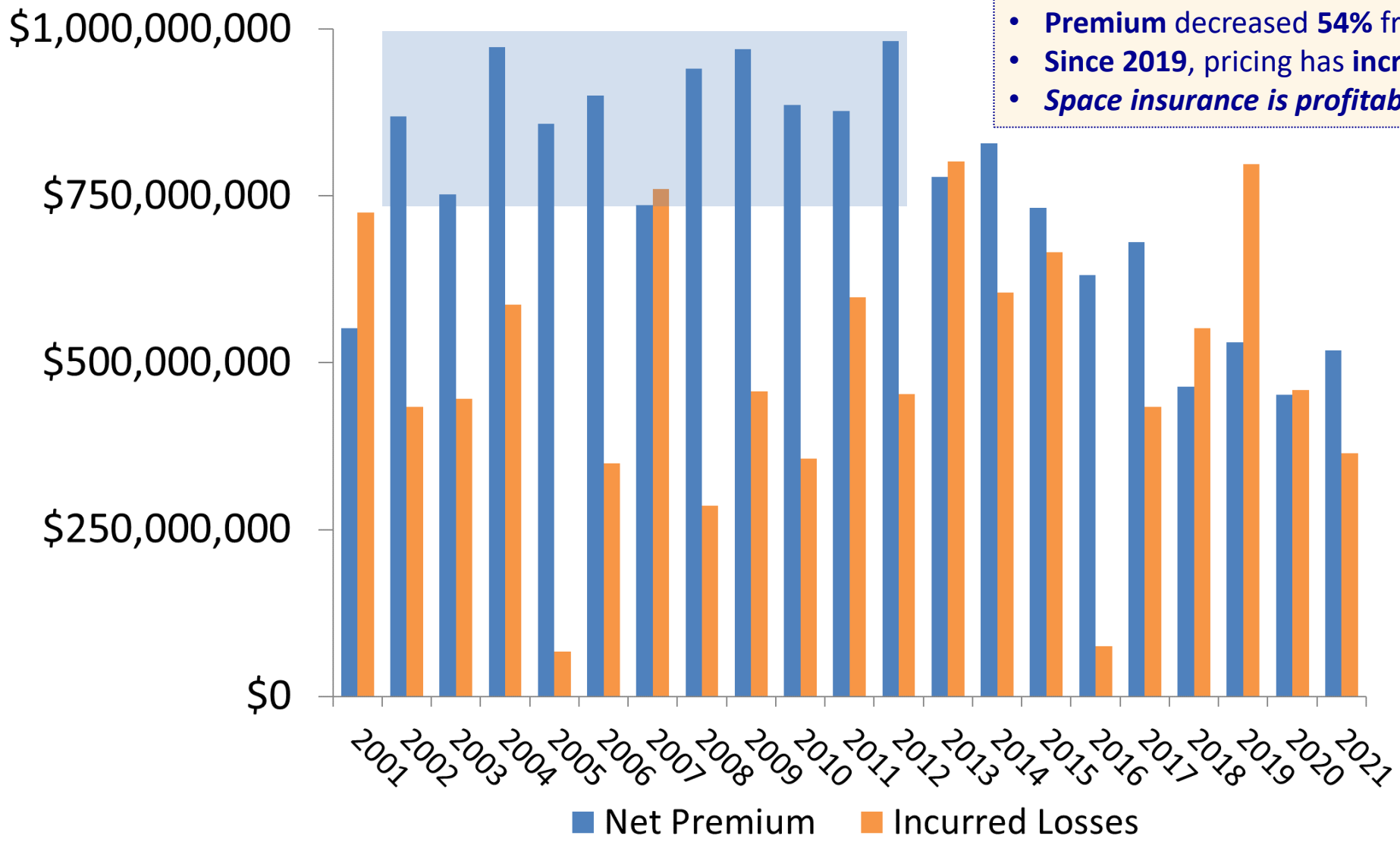


282 Satellites
Total exposure: $25.1b

Market Annual Premium and Claims

Net premium on risks attaching, losses at date of loss

- **Claims** since 2017 are **in family** for this class
- **Premium** decreased **54%** from 2012 to 2020
- **Since 2019**, pricing has **increased** by **2x to 3x**
- ***Space insurance is profitable if priced correctly***



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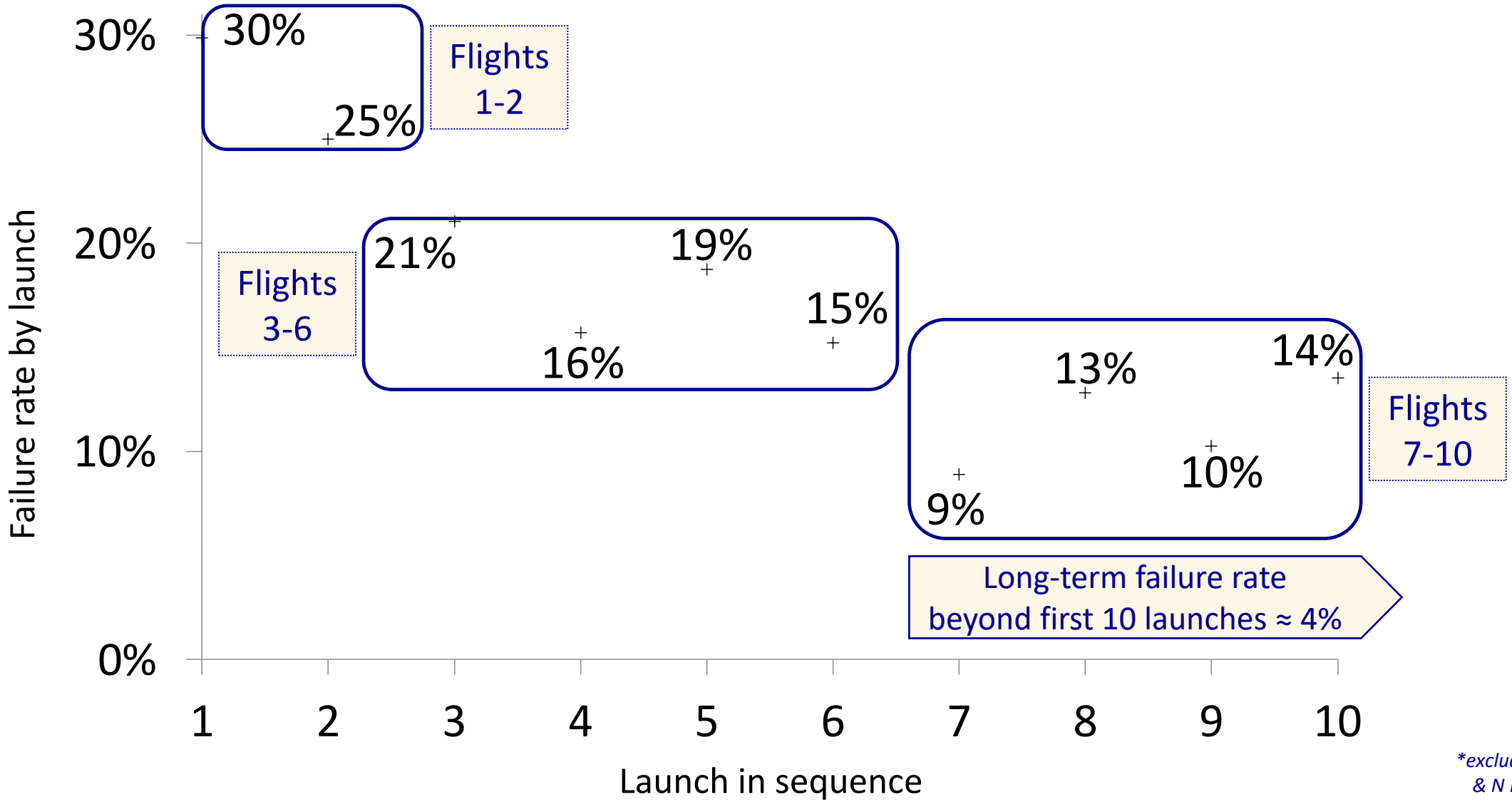
Launch Vehicle Failure Rates

Each launch, first 10 launches, all orbital launch vehicle families active since 2000*



*excludes Iran & N Korea

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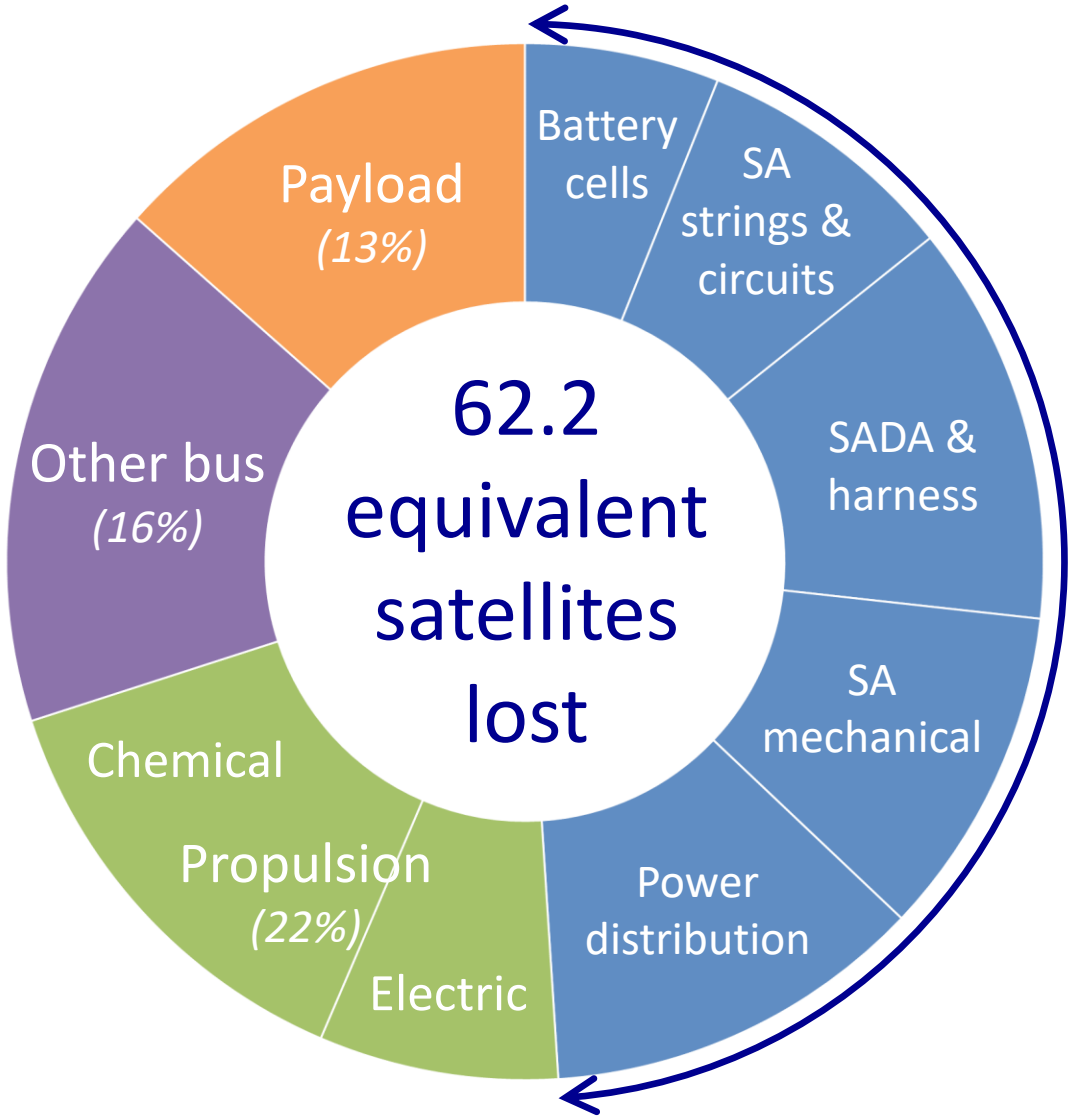
Causes of Satellite Losses by Subsystem

GEO satellites launched since 2000

- 660+ satellites launched
- 3,100+ satellite-years of health data on 430+ satellites
- 5,400+ anomalies on 390+ satellites
- 480+ “critical anomalies” on 140+ satellites
- 1,200+ anomalies resulting in loss of redundancy



Electrical power subsystem anomalies account for ~50% of loss of capability

On-Orbit Servicing Opportunities

GEO satellites launched since 2000

86 GEO satellites launched since 2000 have suffered major anomalies that could have benefitted from on-orbit servicing		
Type of Servicing	Opportunities since 2000	Annualized opportunities
Re-orbit / De-orbit	32	1.4
Inspection / Repair	63	2.8
Life Extension	61	2.8

- ✓ 36 of these 86 (42%) had their major anomalies in the first two months after launch
- ✓ Some of these satellites would have benefitted from more than one type of servicing
- ✓ Many other satellites could have benefitted from life extension or end-of-life disposal

Thank you!