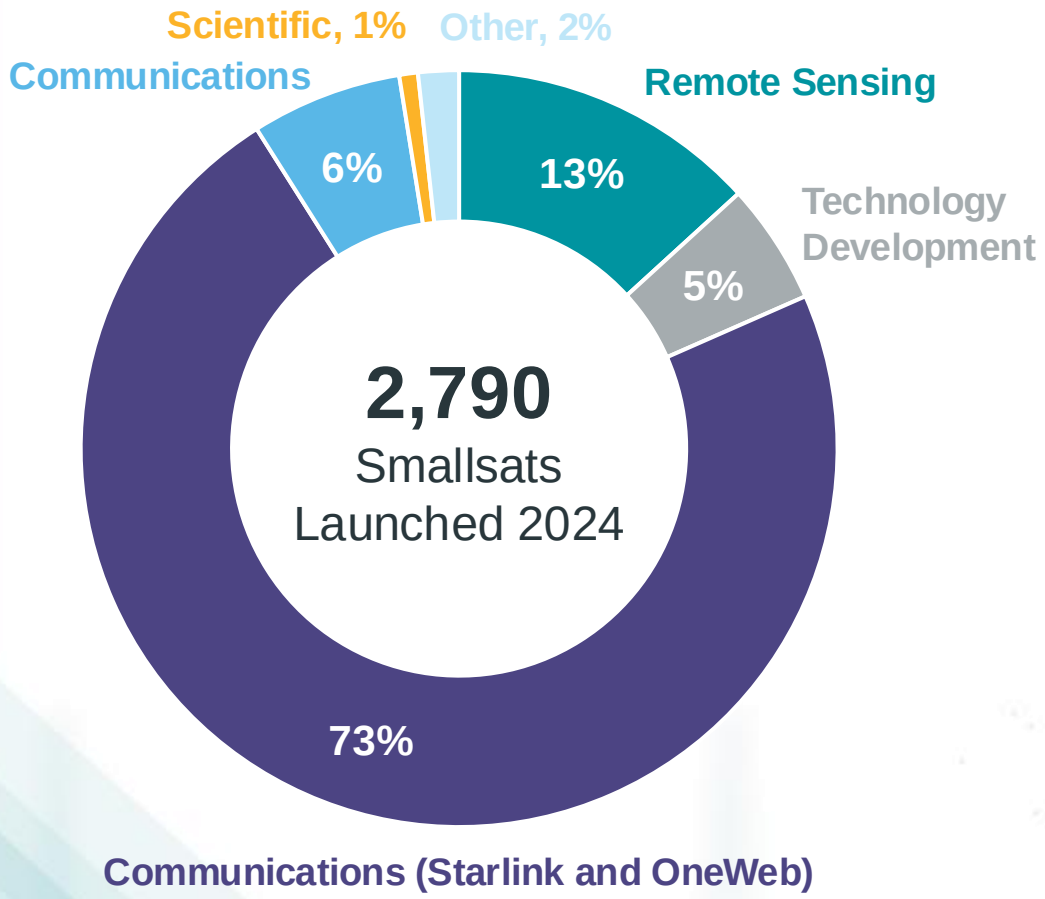
Smallsats by the Numbers 2025

March 2025

2024 Smallsat Highlights



Smallsats by Mission Type

Smallsats Launched in 2024

Smallsats defined by having mass of ≤1,200 kg

97% of all spacecraft (2023: 97%)

81% of spacecraft upmass (2023: 63%)

199 of 259 orbital launches (2023: 164)
Launches with at least one smallsat

222 different operators (2023: 267)

6% launched on small or micro launch vehicles (2023: 5%)

Introduction

- Smaller satellites continue to transform in-space architectures
- Bryce's *Smallsats by the Numbers* presents historical information on smaller satellites launched 2015 – 2024
  - Definition of mass at launch of 1,200 kg and under reflects the six smallest mass classes defined by the FAA
  - Report includes all smallsats launched regardless of operational status
  - Due to the large quantity of LEO broadband telecommunications smallsats launched in 2024, this report provides data views that both include and exclude these systems
  - Views excluding LEO broadband telecommunications smallsat systems provide insight into trends in other types of systems

	Mass Class Name	Kilograms (kg)
Smallsats	Femto	0.01 – 0.09
	Pico	0.1 – 1
	Nano	1.1 – 10
	Micro	11 – 200
	Mini	201 – 600
	Small	601 – 1,200
	Medium	1,201 – 2,500
	Intermediate	2,501 – 4,200
	Large	4,201 – 5,400
	Heavy	5,401 – 7,000
	Extra Heavy	> 7,001

Adapted from FAA AST

Smallsats in Context

Operator and Mission Type Trends

Smallsat Mass Trends

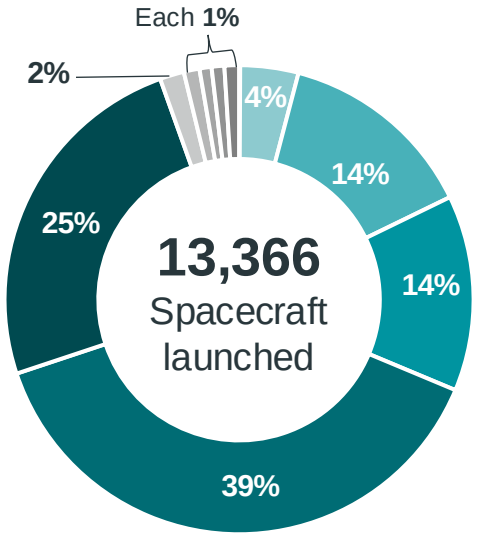
Smallsat Launch Trends

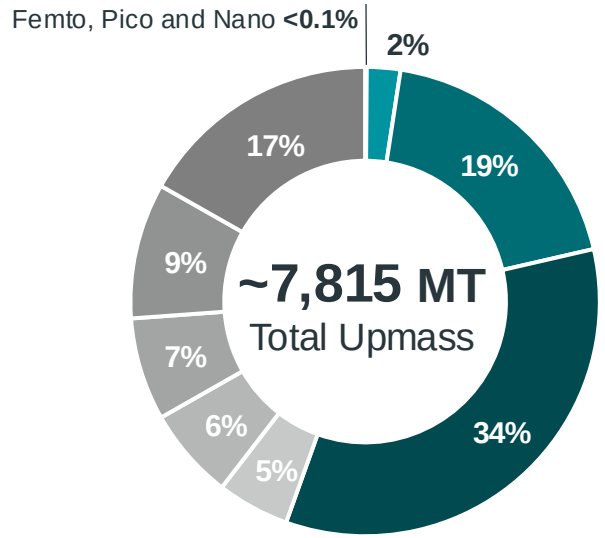
Looking Forward

Smallsats in Context

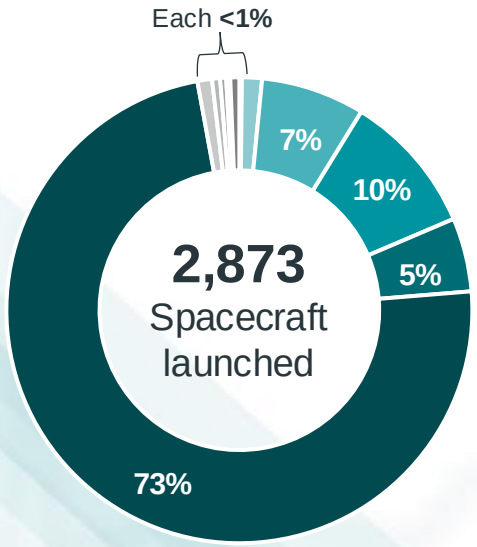
Spacecraft Launched and Total Spacecraft Upmass 2015 – 2024

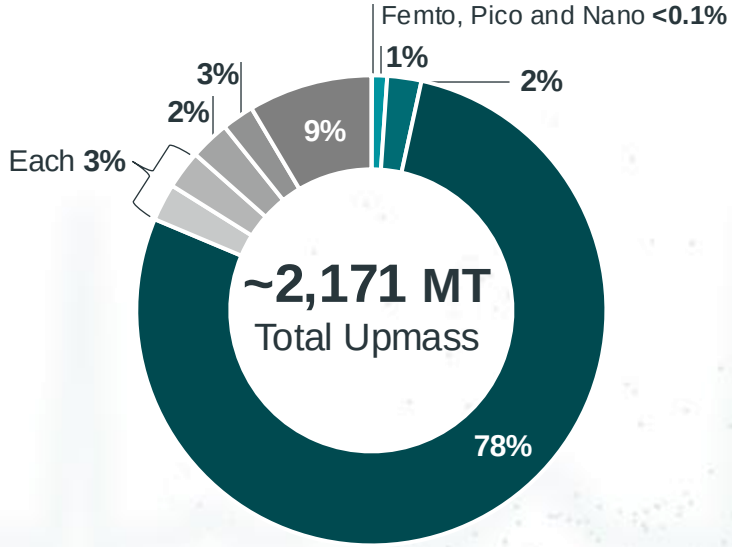
2015 – 2024





2024





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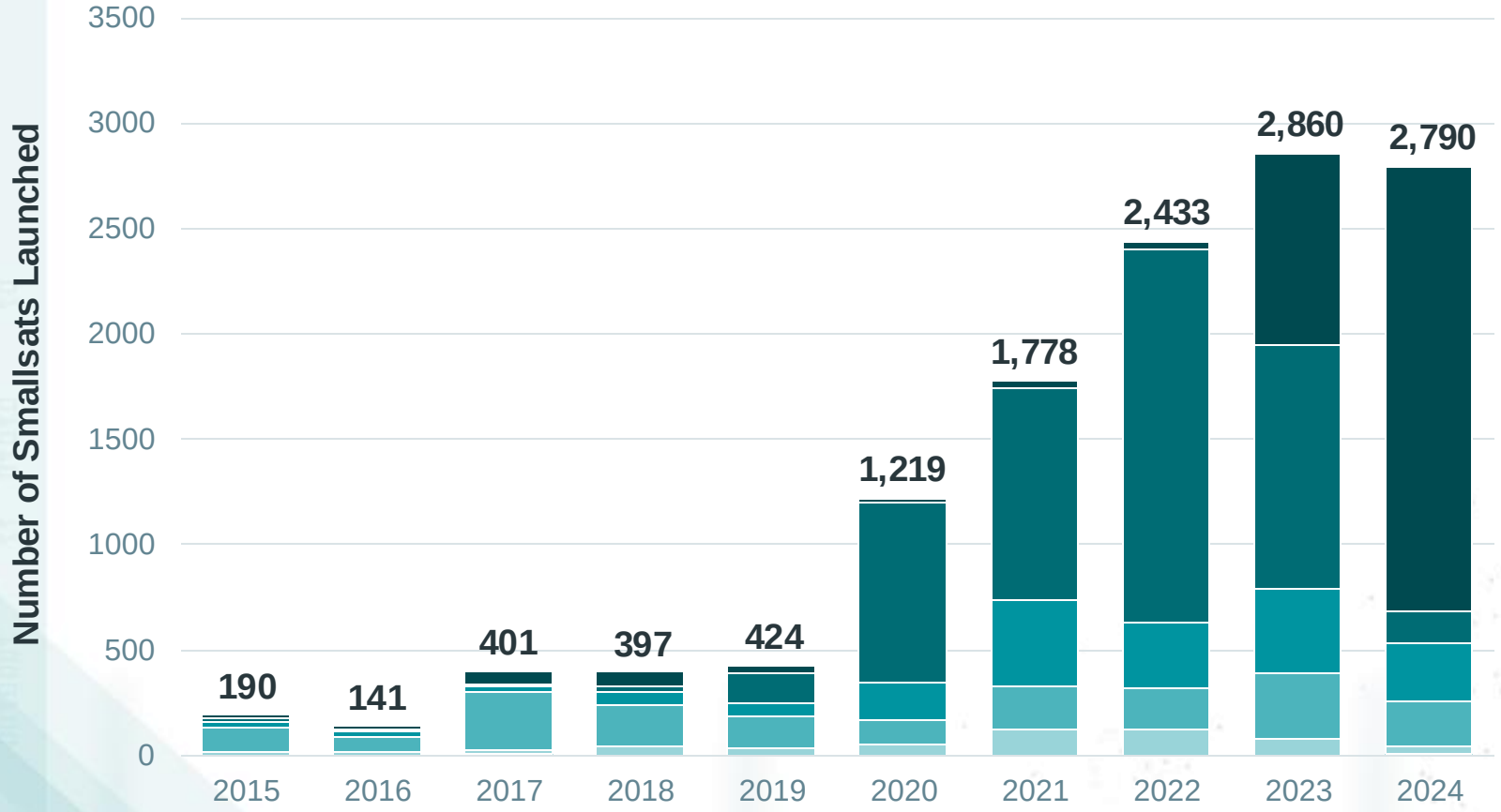
- Smallsats represent 95% of spacecraft launched 2015 – 2024, 55% of total upmass
- Smallsats represent 97% of spacecraft launched in 2024, 81% of total upmass

Smallsats in Context

Smallsats 2014 – 2023, by Mass Class



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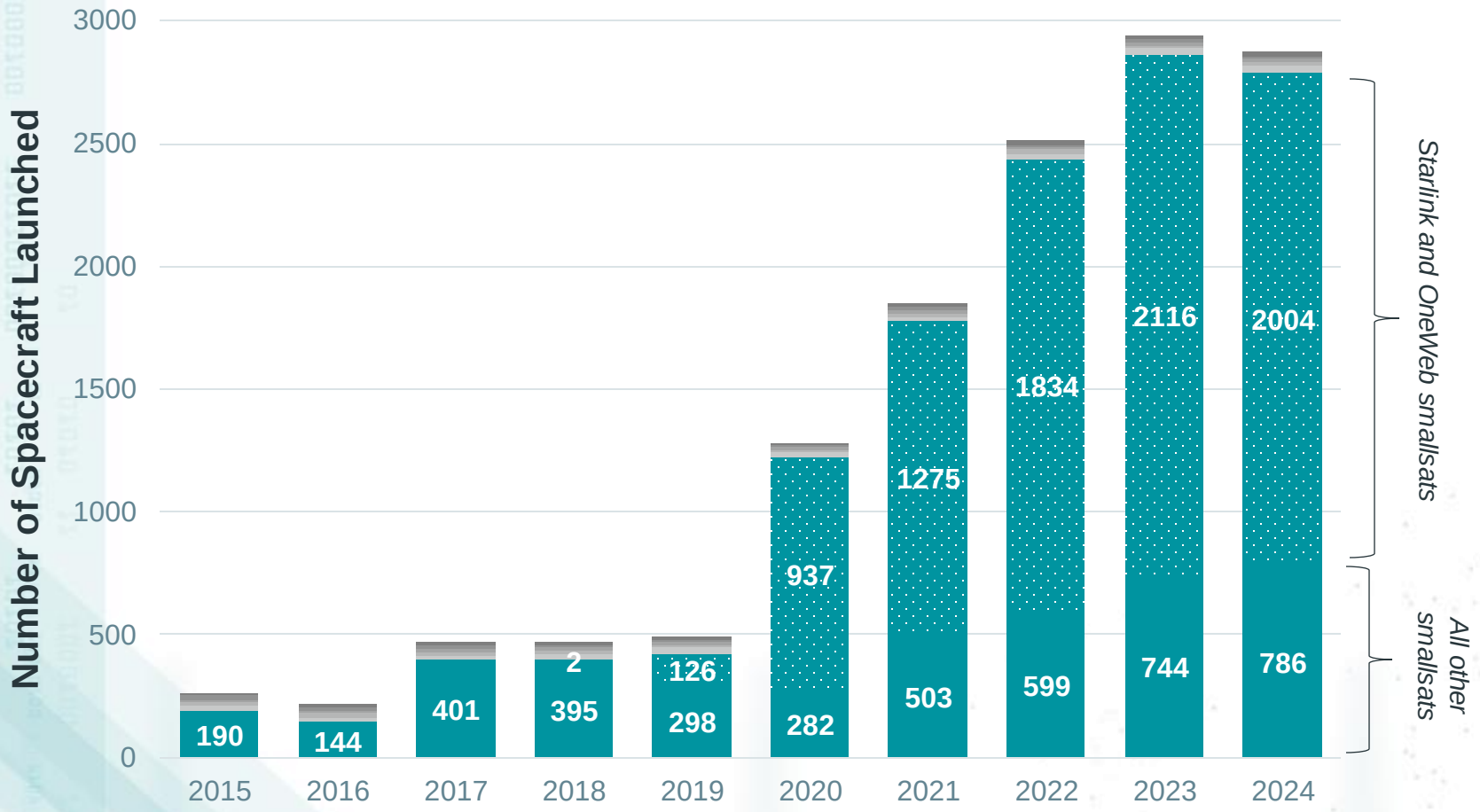
Until 2022, mini mass class dominated smallsat deployments. Those systems, largely from SpaceX and OneWeb, have grown to small mass class since 2023

Smallsats in Context

Spacecraft Launched 2015 – 2024, by Mass Class



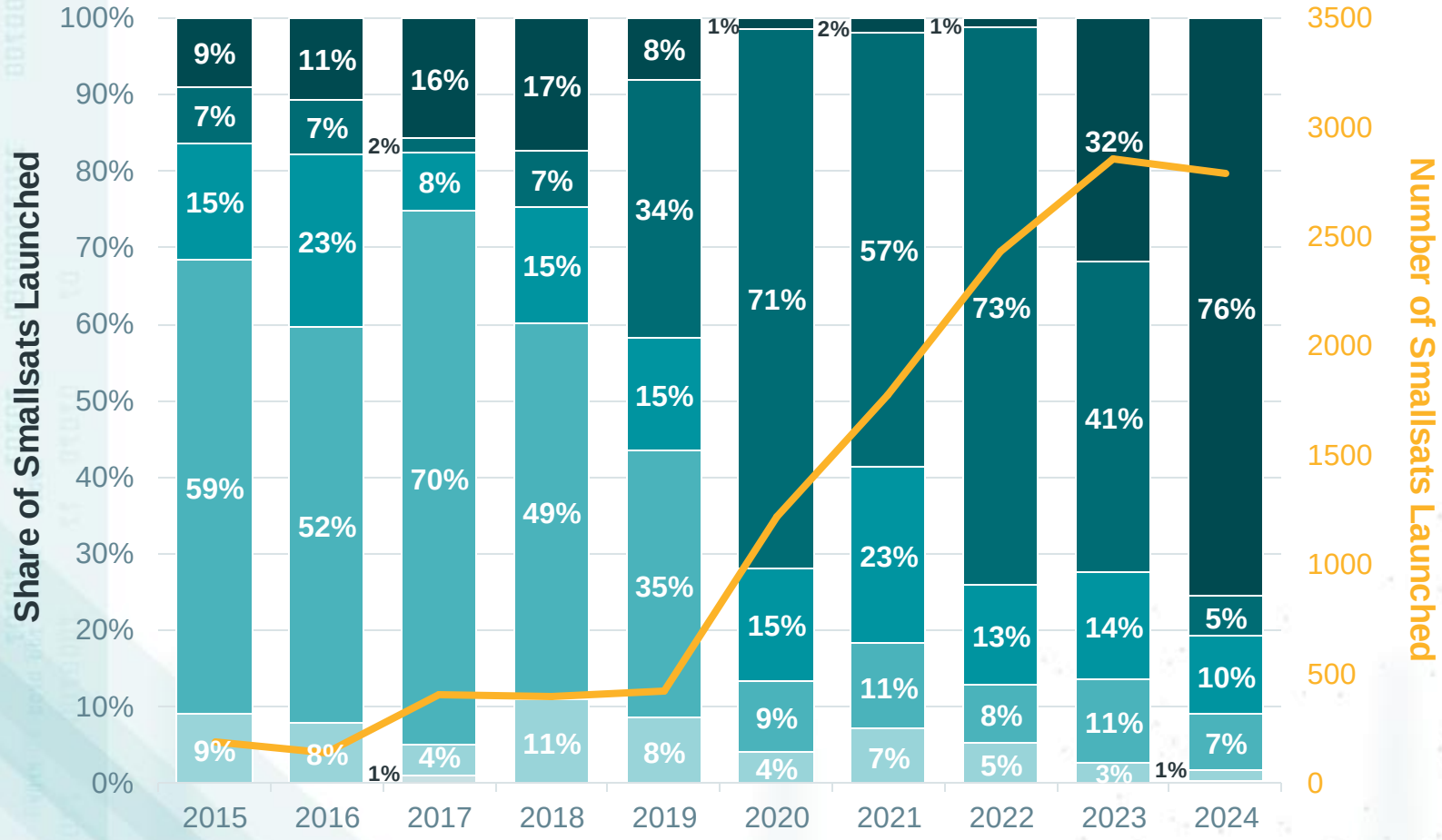
Mass Class Name	Kilograms (kg)
Smallsats	≤1200
Medium	1,201 – 2,500
Intermediate	2,501 – 4,200
Large	4,201 – 5,400
Heavy	5,401 – 7,000
Extra Heavy	> 7,001

Starlink and OneWeb Smallsats

While broadband smallsats have dominated the market since 2020, earth observation and remote sensing smallsats are steadily increasing

Smallsats in Context

Share of Smallsats 2015 – 2024, by Mass Class, Including Starlink and OneWeb



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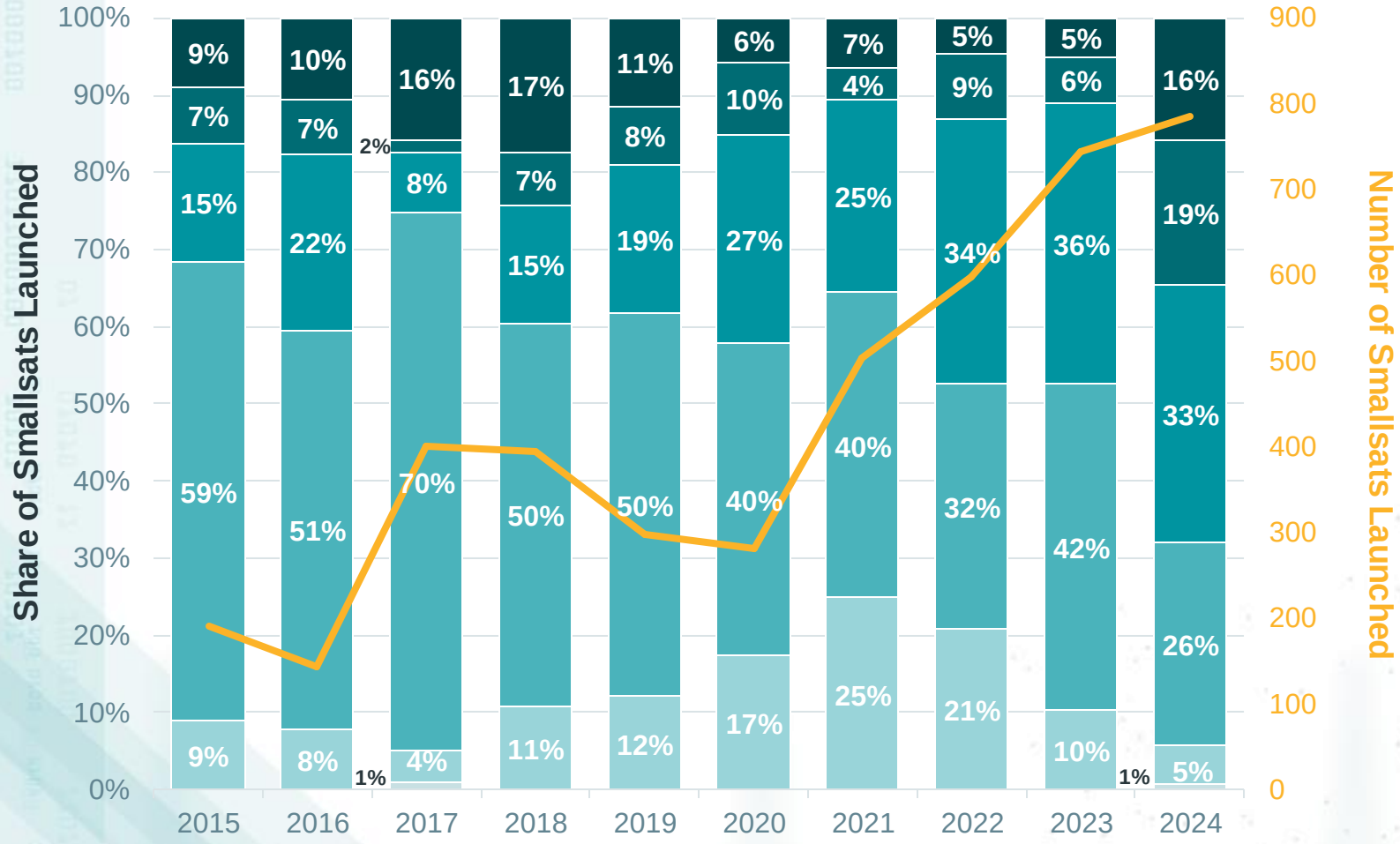
Small satellite mass class constituted the largest share in 2024 as smallsats are growing

Smallsats in Context

Share of Smallsats 2015 – 2024, by Mass Class, Excluding Starlink and OneWeb



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Pico	0.1 – 1
Nano	1.1 – 10
Micro	11 – 200
Mini	201 – 600
Small	601 – 1,200

2024 saw ~10% share growth in both mini and small mass class size, indicating smallsats are getting larger

Smallsats in Context

Operator and Mission Type Trends

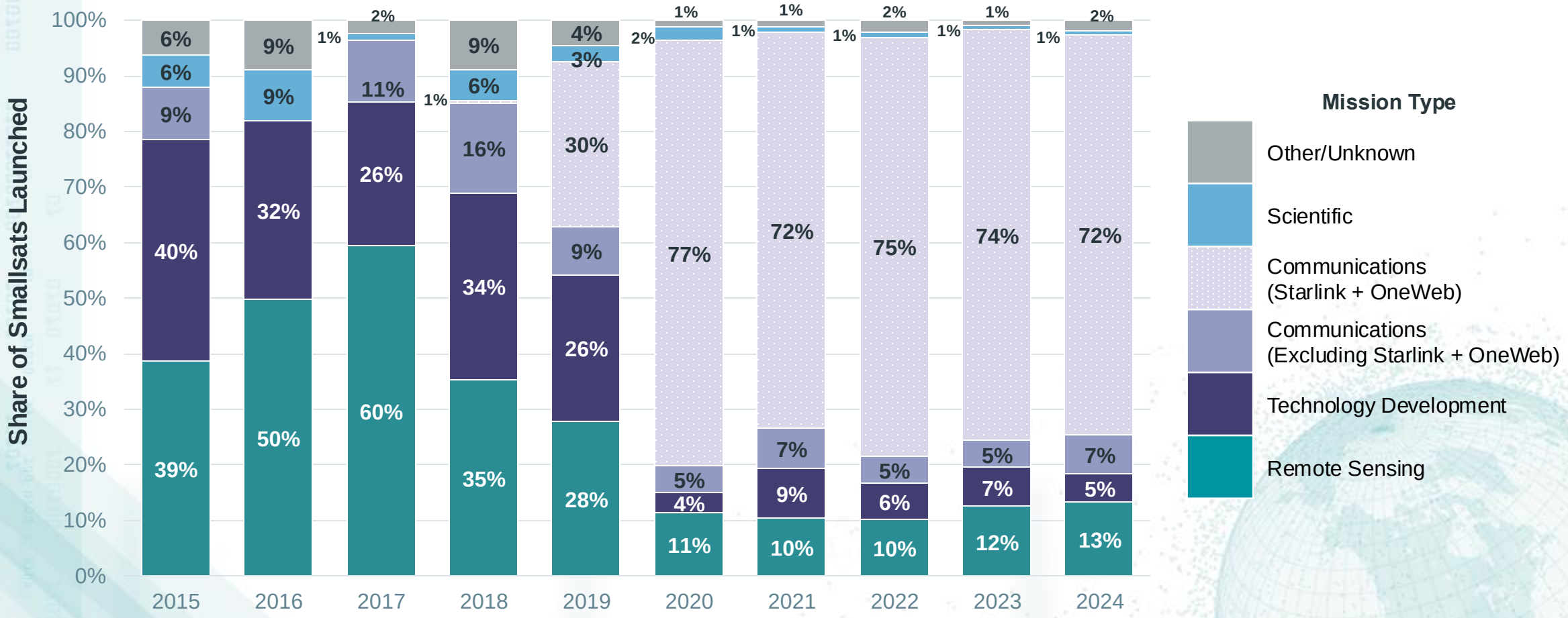
Smallsat Mass Trends

Smallsat Launch Trends

Looking Forward

Operator and Mission Type Trends

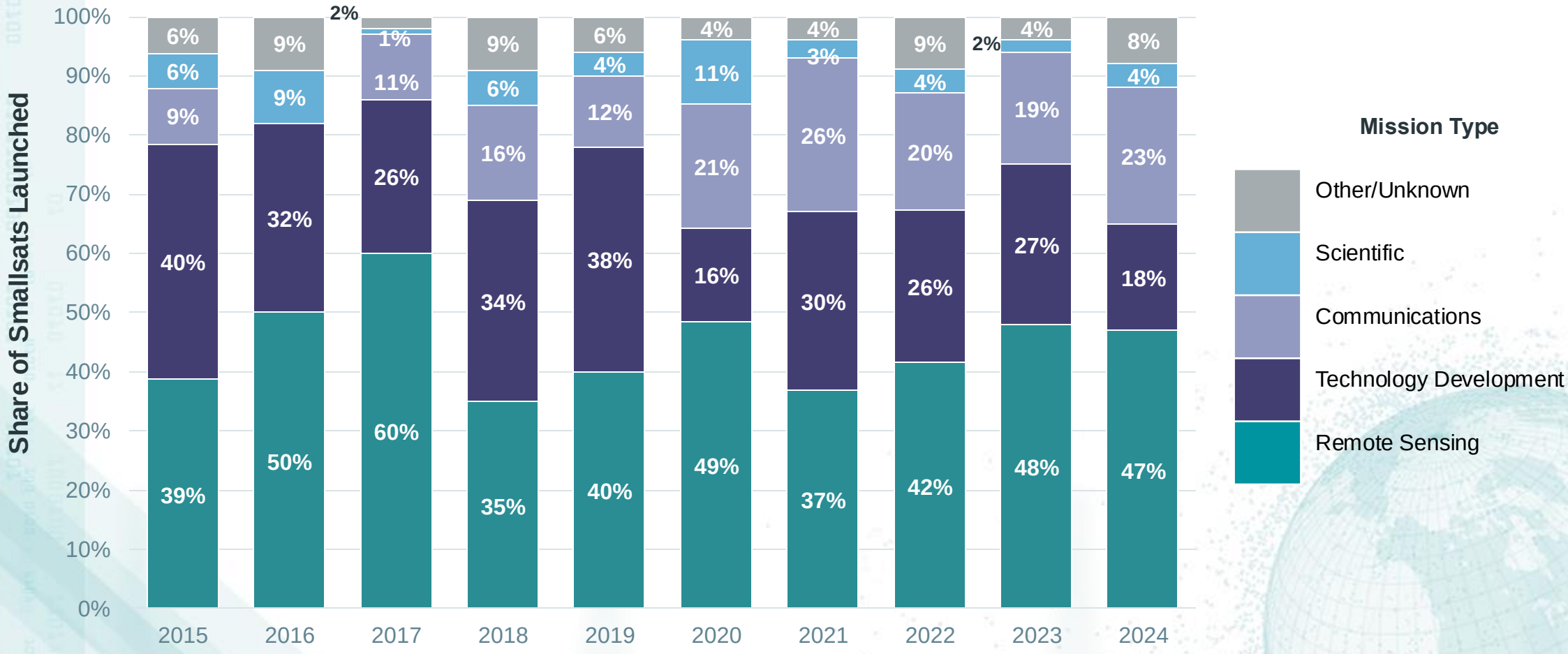
Smallsats 2015 – 2024, by Application, Including Starlink and OneWeb



2023 and 2024 saw growth in share of remote sensing satellites

Operator and Mission Type Trends

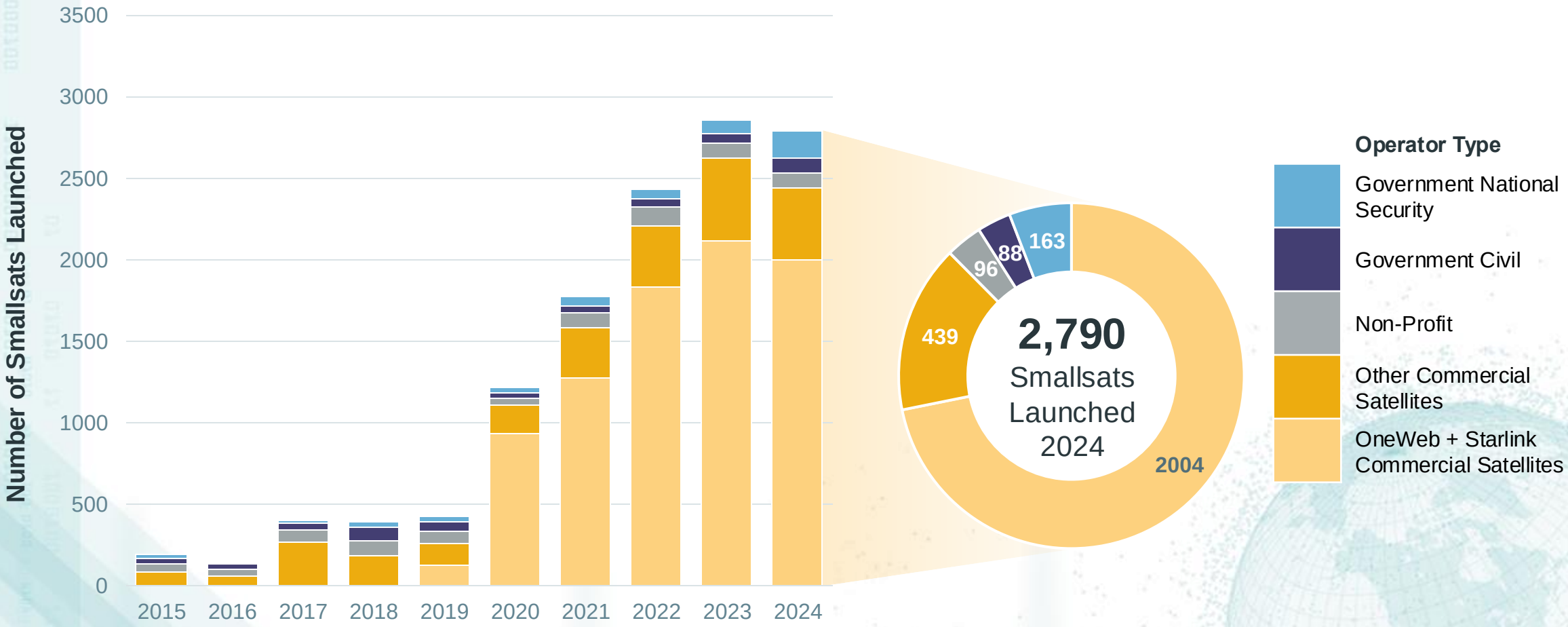
Smallsats 2015 – 2024, by Application, Excluding Starlink and OneWeb



Since 2016, remote sensing smallsats constituted the largest share by application

Operator and Mission Type Trends

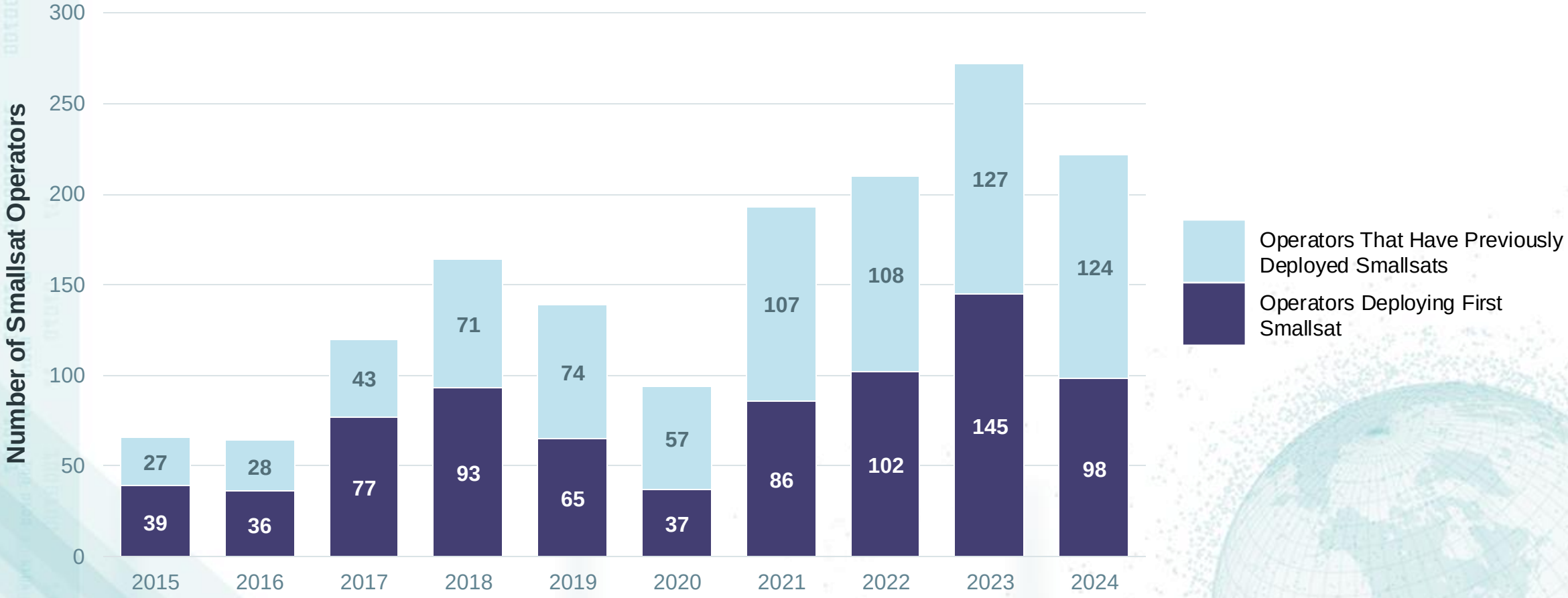
Number of Smallsats 2015 – 2024, by Operator Type



The largest growth seen by operators is in the commercial sector followed by national security

Operator and Mission Type Trends

Operators Deploying Smallsats 2015 – 2024

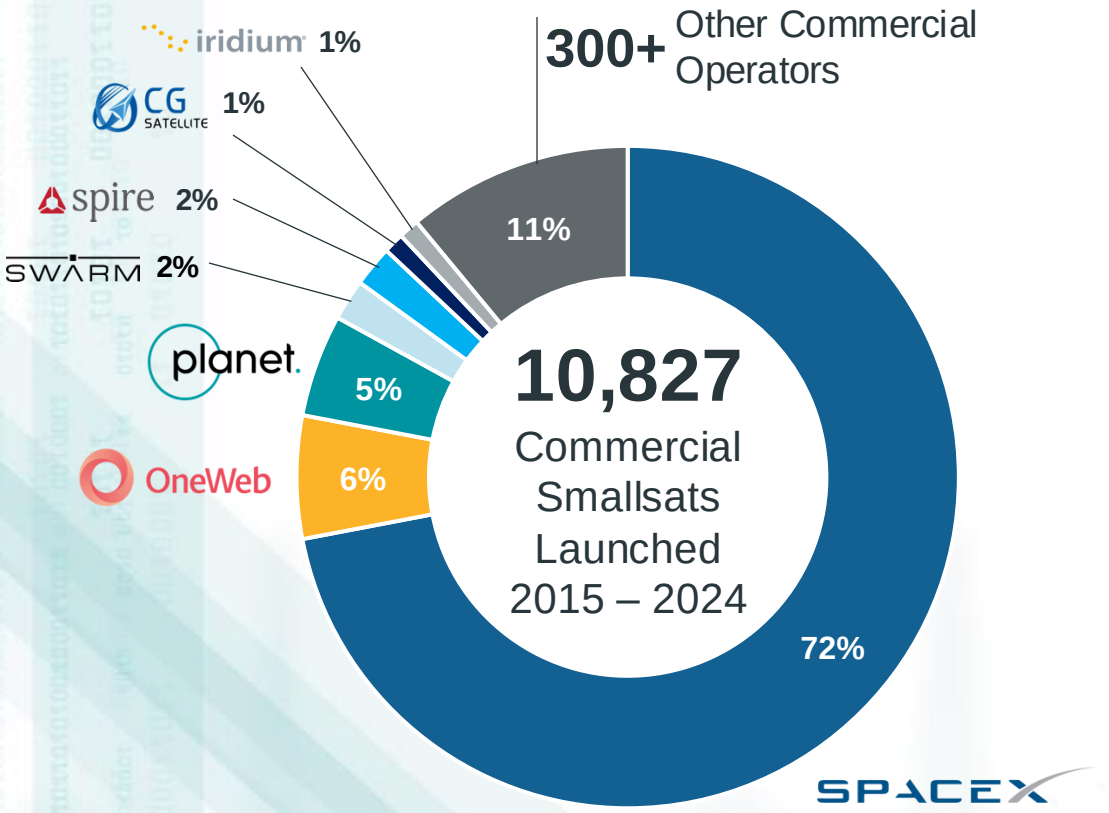


While 2024 experienced a drop in new operators, recent years have shown market interest with new entrants consistently deploying smallsats

Operator and Mission Type Trends

Commercial Smallsat Operators 2015 – 2024

89% of commercial smallsats launched 2015 – 2024 are owned by 7 operators



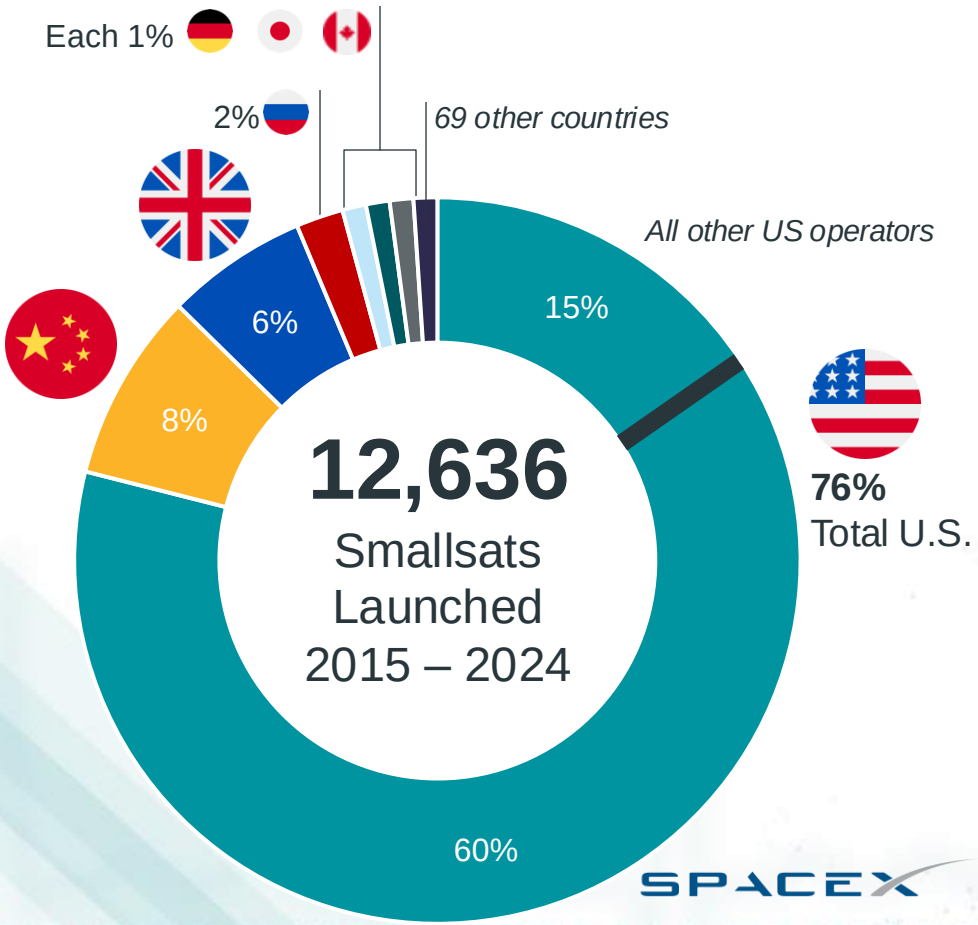
Commercial Operators with >20 smallsats

Operator	# of Smallsats
Shanghai Spacecom Satellite Technology (SSST)	54
Sitronics Group	52
Satellogic	47
ICEYE	40
Guodian Gaoke	33
HawkEye 360	33
Geespace	32
Tianjin Yunyao Aerospace Technology Co., Ltd	26
Kepler Communications	23
Xioyong Microelectronics Park	22
Astrocast	20
Spacety (Tianyi Research Institute)	20
BlackSky Global	20

Operator and Mission Type Trends

Smallsats 2015 - 2024, by Operator Country

U.S. operators account for ¾ of smallsats launched since 2015

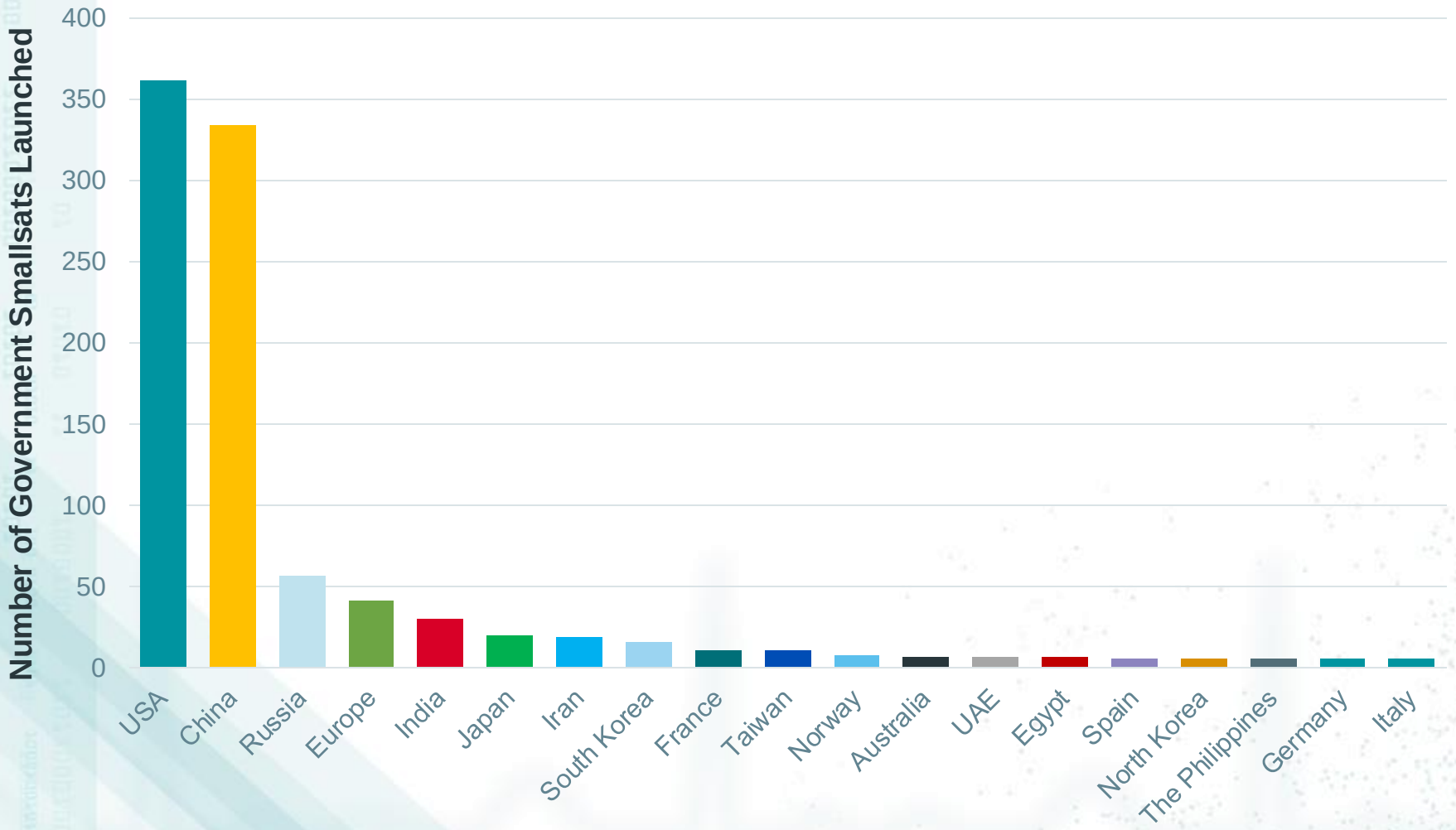


Operator Country	# of Smallsats >30
U.S.	9,550 (7,636 Starlink)
China	961
UK	700
Russia	232
Japan	139
France	70
Canada	67
Germany	66
Italy	59
Argentina	55
Spain	54
India	51
Finland	48
Europe	41
South Korea	41
Australia	35
Israel	31

Operator and Mission Type Trends

Number of Government Smallsats 2015 – 2024, by Country

Countries with More than Five Government Smallsats



Five or Fewer Government Smallsats	
Venezuela	Singapore
Turkey	Algeria
Thailand	Brazil
Canada	Vietnam
Indonesia	Kazakhstan
Ethiopia	Colombia
Sweden	Mexico
Morocco	Poland
Belgium	Ukraine
Netherlands	Kenya
Peru	Pakistan
Rwanda	Malaysia

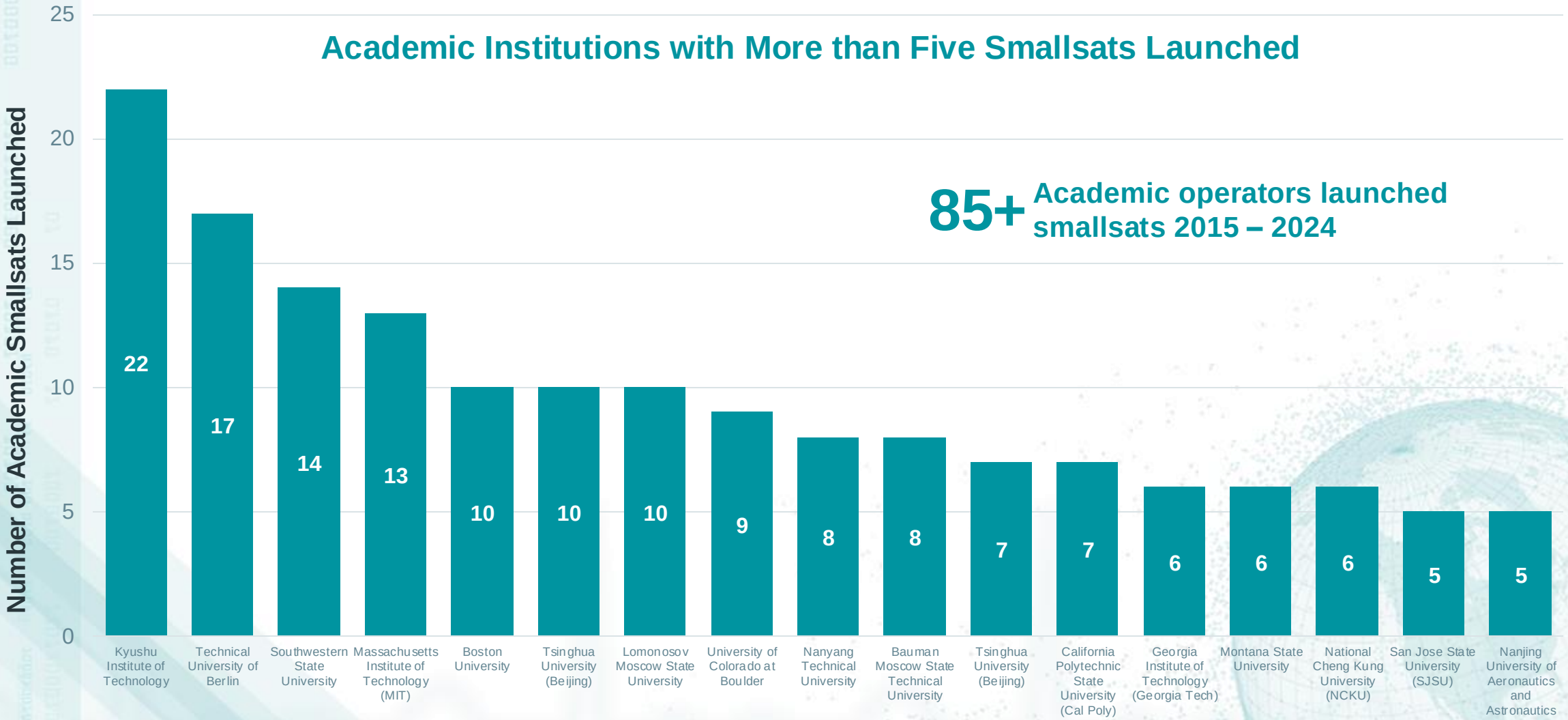
Operator and Mission Type Trends

>10 Launched Smallsats, Government Smallsat Operators 2015 - 2024

>10 Launched Smallsats Government Operators Open-Source Data	Country	# of Smallsats Launched
People's Liberation Army (PLA)	China	133
National Reconnaissance Office (NRO)	U.S.	120
National Aeronautics and Astronautics and Space Administration (NASA)	U.S.	76
United States Air Force (USAF)/United States Space Force (USSF)	U.S.	64
Russia Ministry of Defense	Russia	32
Chinese Academy of Aerospace Navigation Technology	China	32
Indian Space Research Organisation (ISRO)	India	28
Spaceopal GmbH (for European Commission)	Europe	24
Defense Advanced Research Projects Agency (DARPA)	U.S.	21
China Academy of Space Technology (CAST)	China	21
European Space Agency (ESA)	Multi	17
Chinese Academy of Sciences (CAS)	China	17
China National Space Administration (CNSA)	China	17
China Aerospace Science and Industry Corporation (CASIC)	China	13
Iranian Space Agency	Iran	13
Los Alamos National Laboratory (LANL)	U.S.	13
National University of Defence Technology (NUDT)	China	12
Roscosmos (Russian Space Agency)	Russia	12
Japan Aerospace Exploration Agency (JAXA)	Japan	12

Operator and Mission Type Trends

Number of Academic Smallsats 2015 – 2024, by Institution



Smallsats in Context

Operator and Mission Type Trends

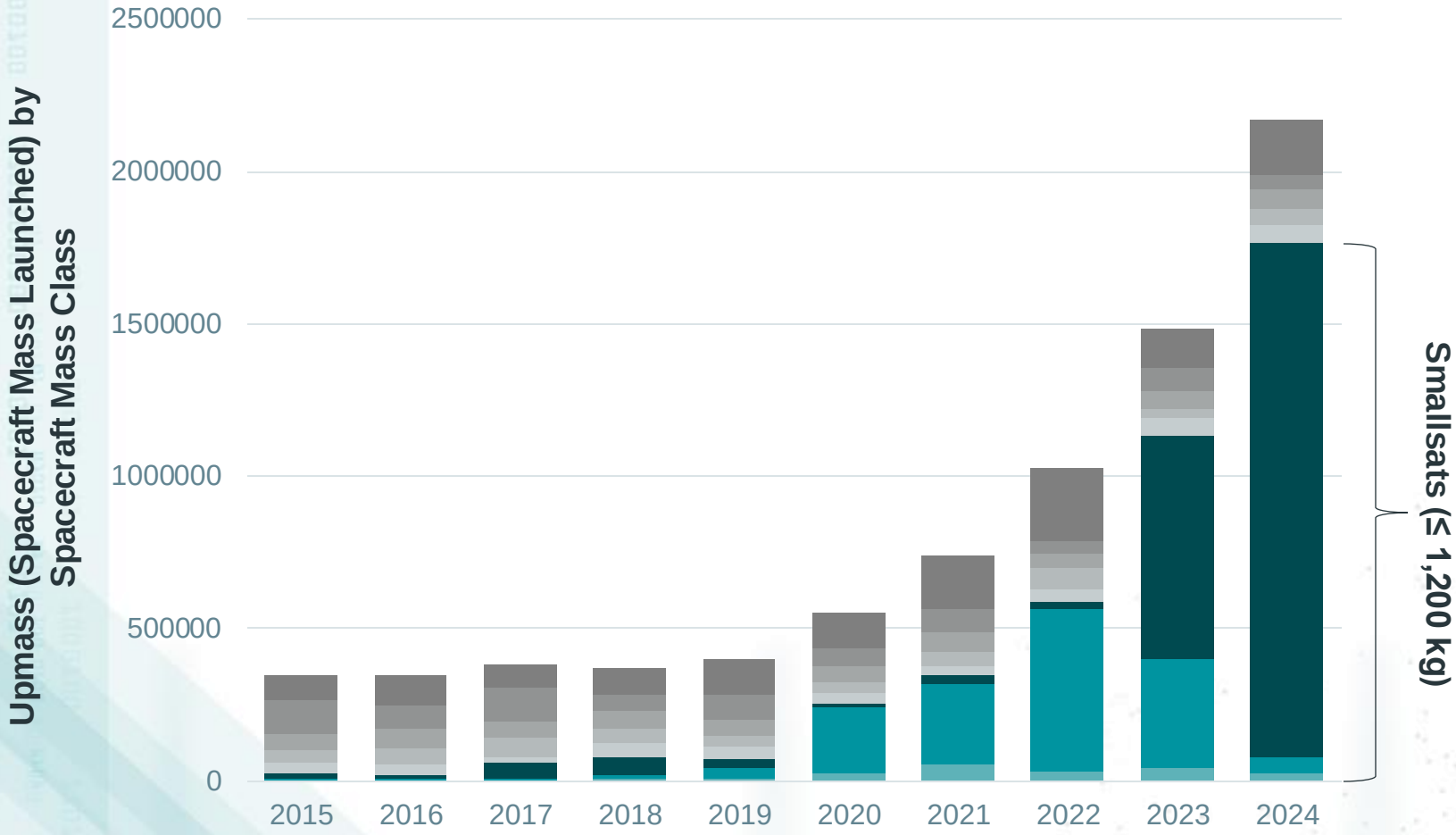
Smallsat Mass Trends

Smallsat Launch Trends

Looking Forward

Smallsat Mass Trends

Spacecraft Upmass 2015 – 2024, by Spacecraft Mass Class



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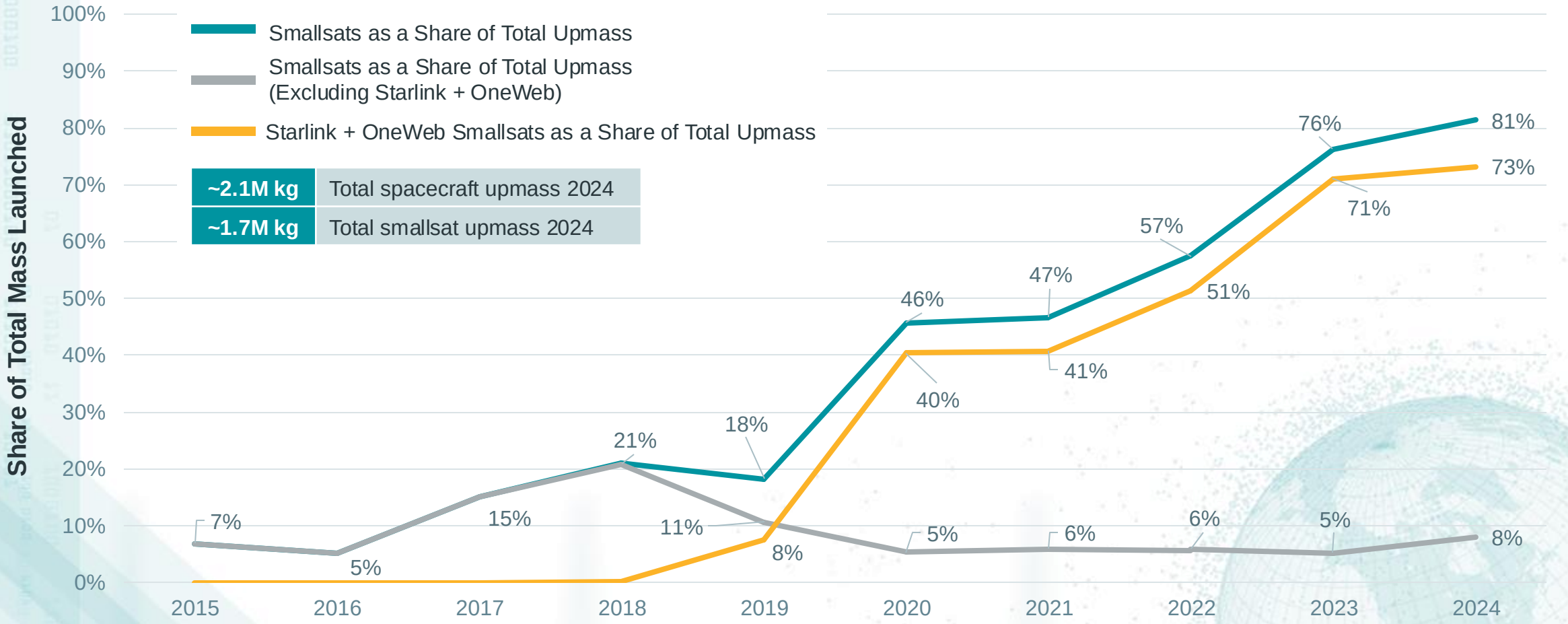
Large	4,201 – 5,400
Heavy	5,401 – 7,000
Extra Heavy	> 7,001

130% growth from 2023 to 2024 for small mass class due to increase in mass of Starlink satellites

Smallsat Mass Trends

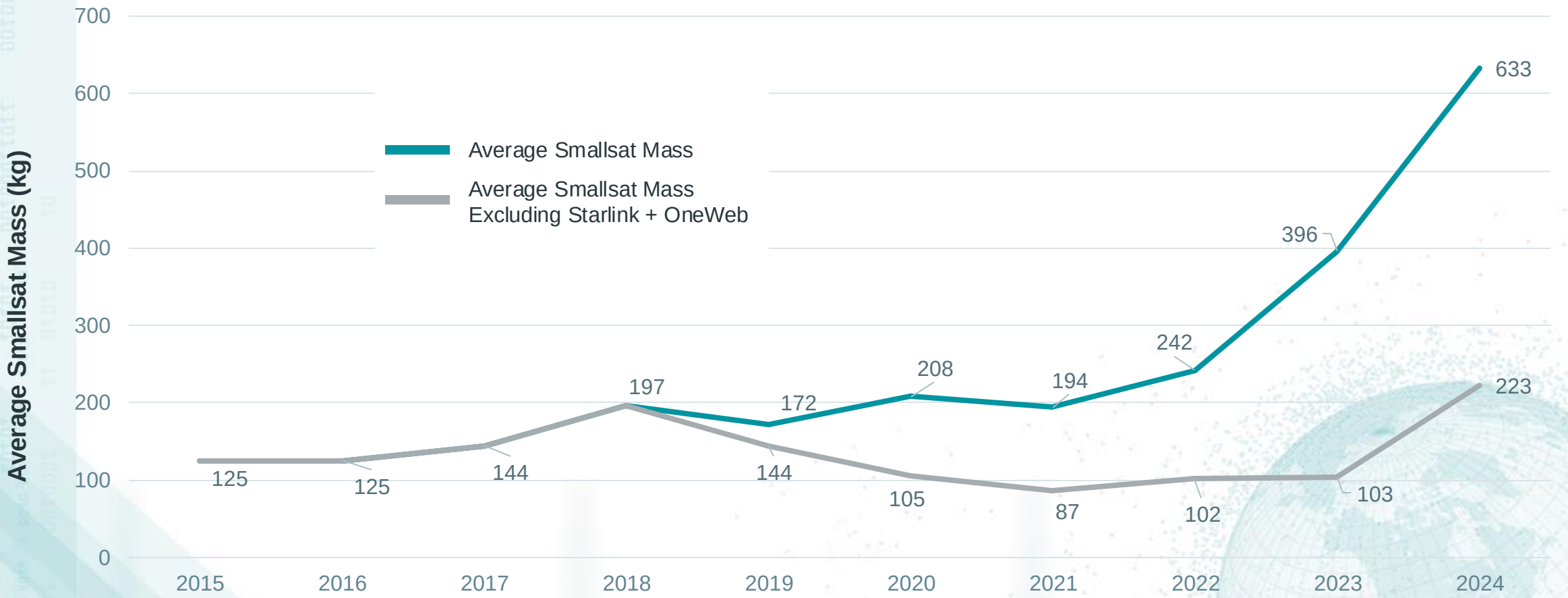
Smallsats as a Share of Total Upmass 2015 – 2024



Excluding Starlink and OneWeb, smallsats have accounted for <10% of total upmass since 2019

Smallsat Mass Trends

Average Smallsat Mass 2015 – 2024



Average smallsat mass has increased since 2021, with a new high of 223kg in 2024

Smallsats in Context

Operator and Mission Type Trends

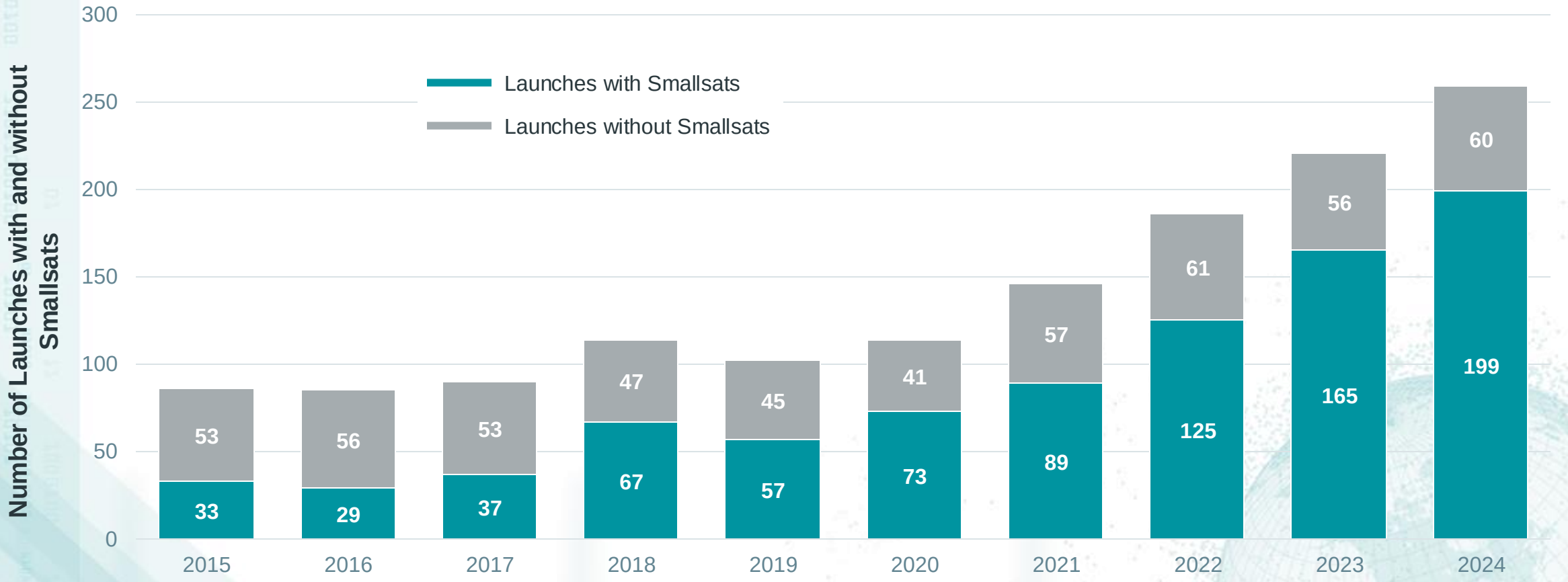
Smallsat Mass Trends

Smallsat Launch Trends

Looking Forward

Smallsat Launch Trends

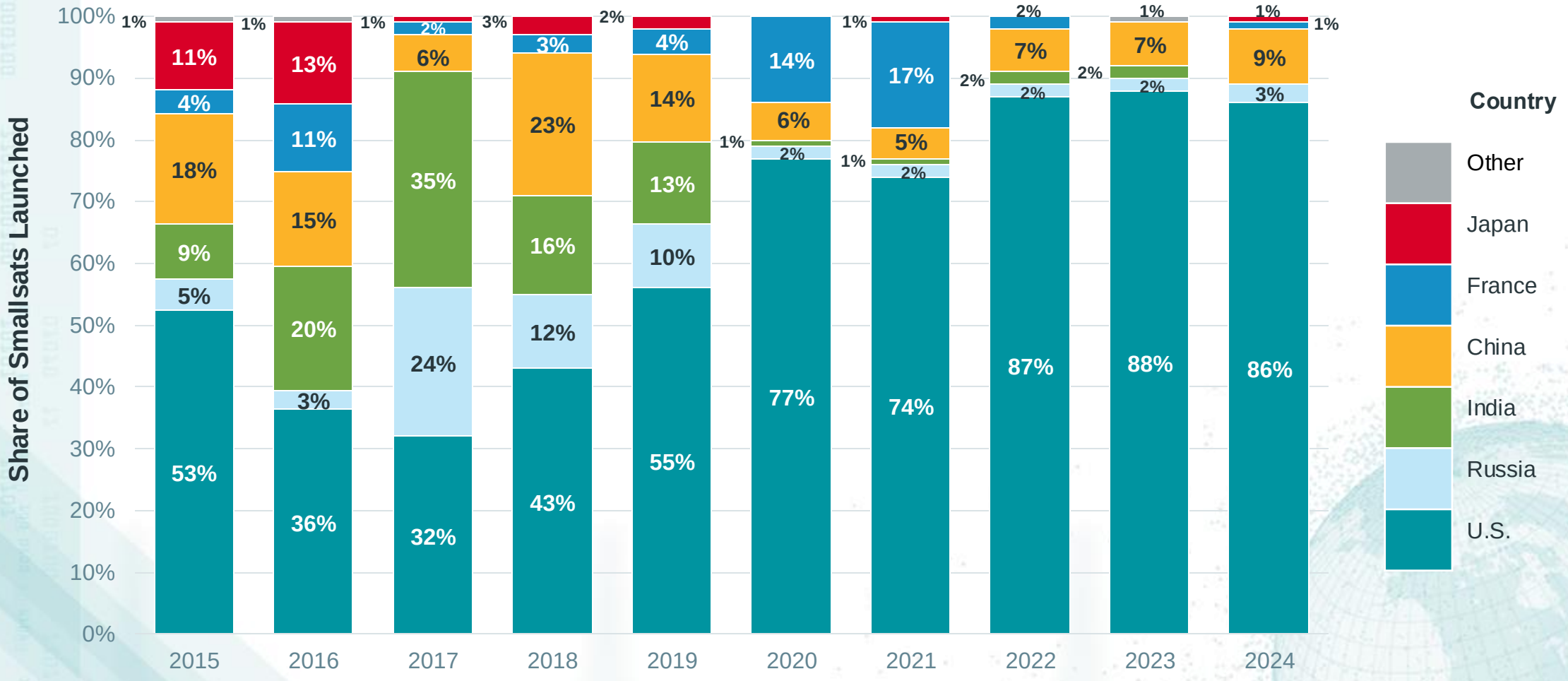
Number of Launches with Smallsats 2015 – 2024



As launch activity has increased, so has the number of launches carrying smallsats

Smallsat Launch Trends

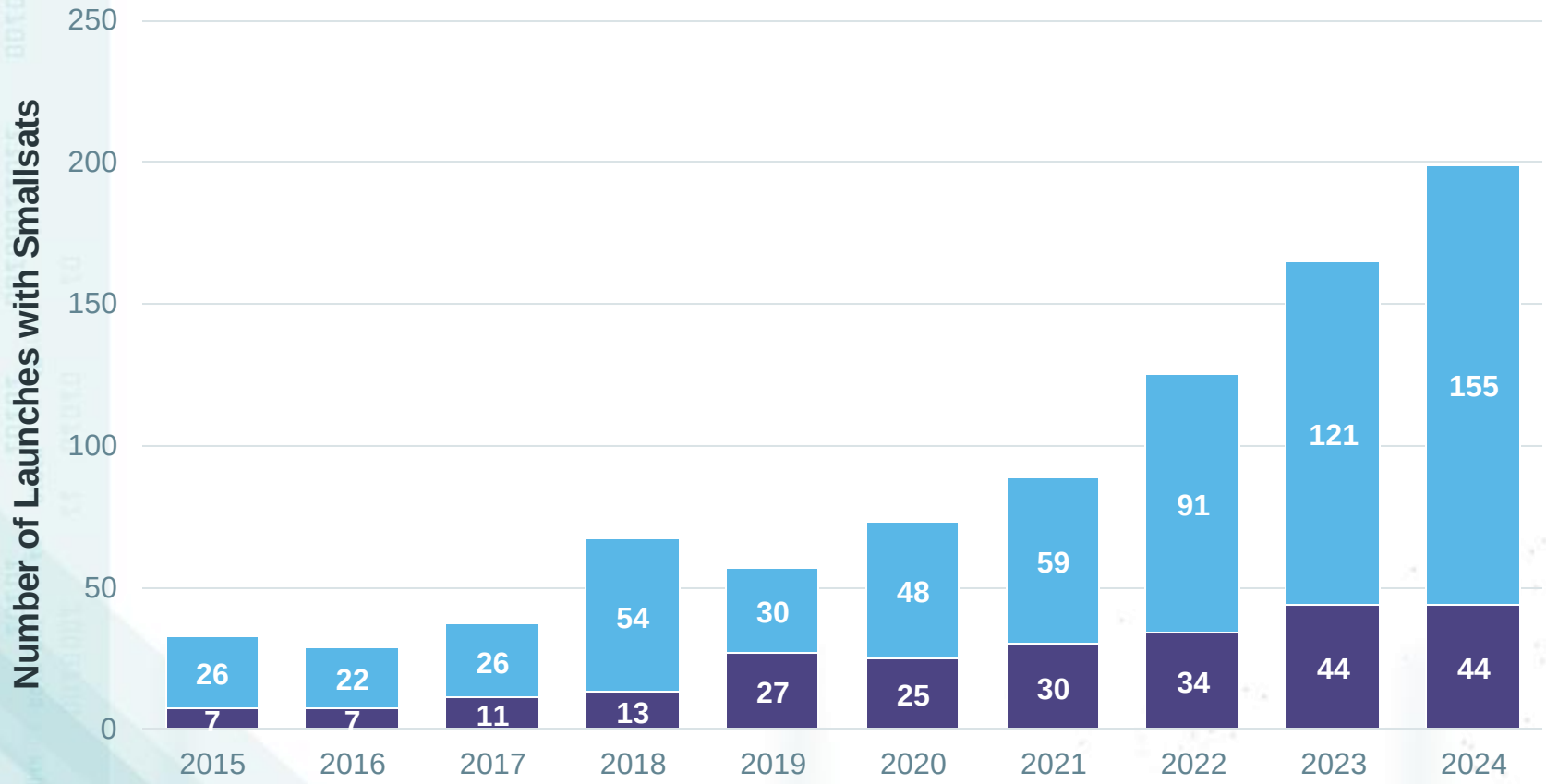
Smallsats 2015 – 2024, by Country of Launch Provider



Since 2019, U.S. has launched majority of smallsats, with non-U.S. share dropping below 15%

Smallsat Launch Trends

Number of Launches with Smallsats 2015 – 2024, by Launch Vehicle Category

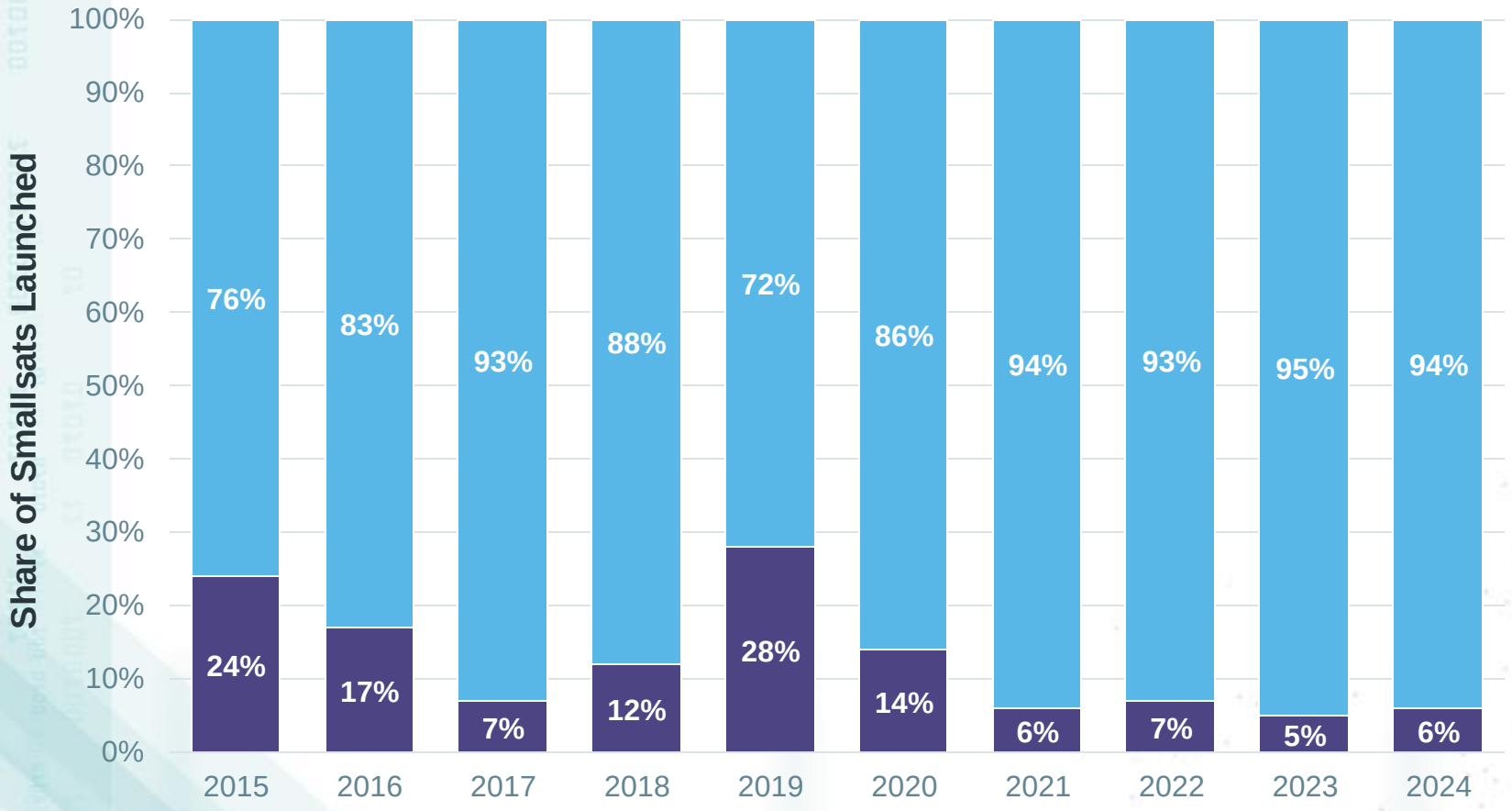


Launch Vehicle Category	Capacity (kg) to LEO
Micro	≤500
Small	500 – 2,268
Medium	2,269 – 5,443
Intermediate	5,444 – 11,340
Heavy	11,341 – 30,000
Super Heavy	>30,000

Number of medium to superheavy vehicles launching with smallsats in 2024 increased ~20% over 2023

Smallsat Launch Trends

Share of Smallsats 2015 – 2024, by Launch Vehicle Category



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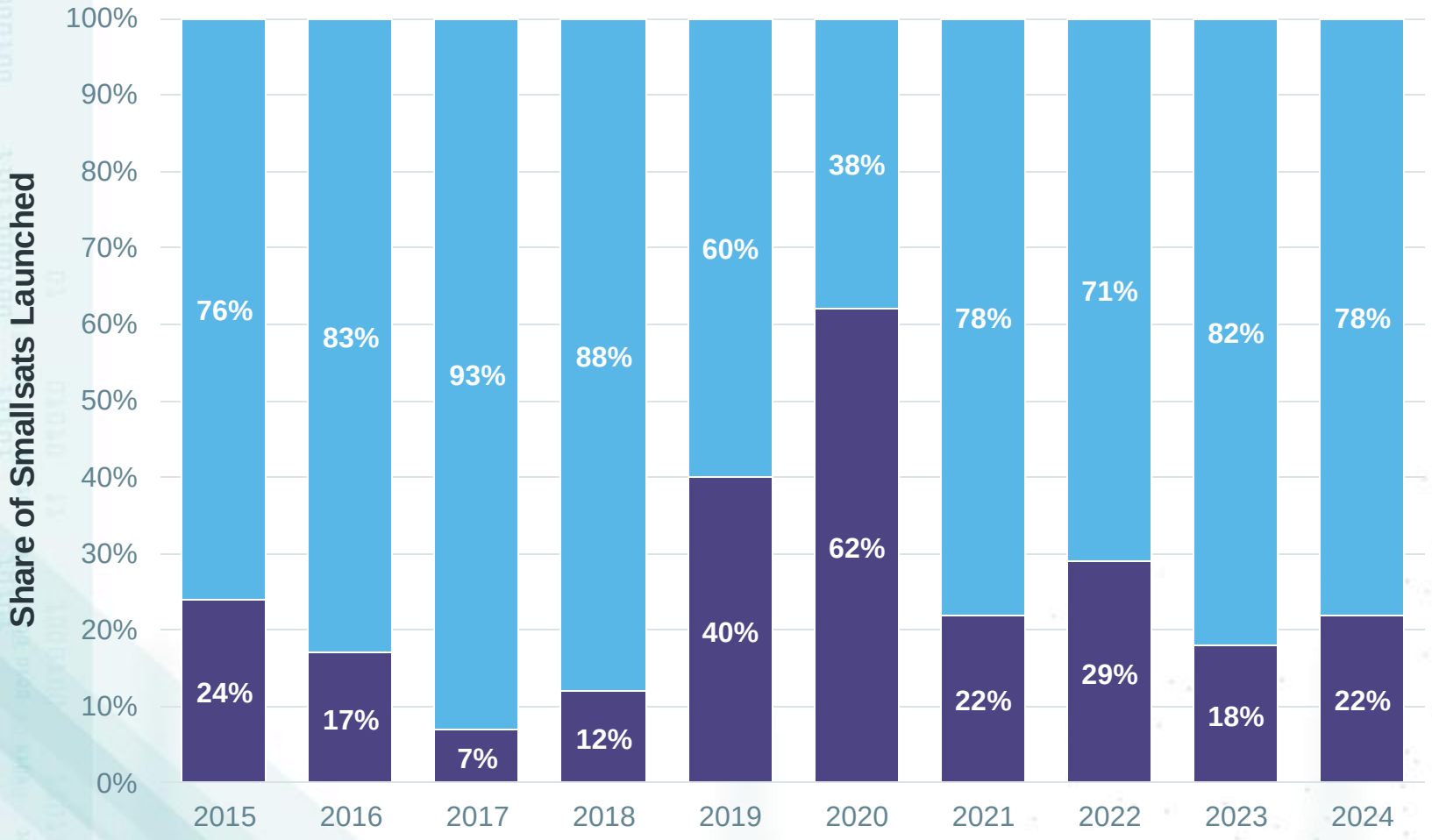
Share of smallsats launched on micro and small vehicles in 2024 remained low, despite a variety of small launch options

Smallsat Launch Trends

Smallsats 2015 – 2024, by Launch Vehicle Category, Excluding Starlink and OneWeb



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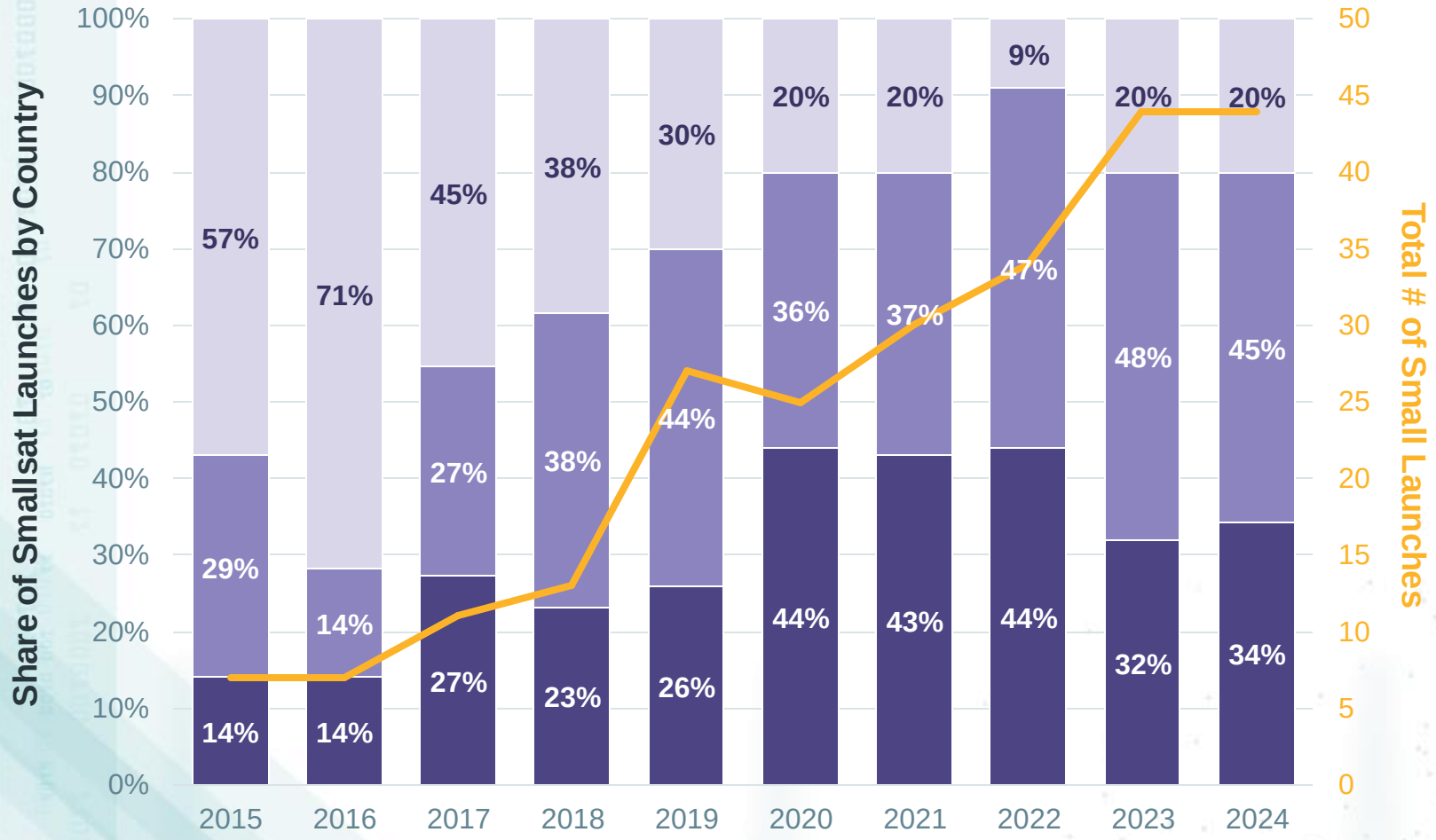
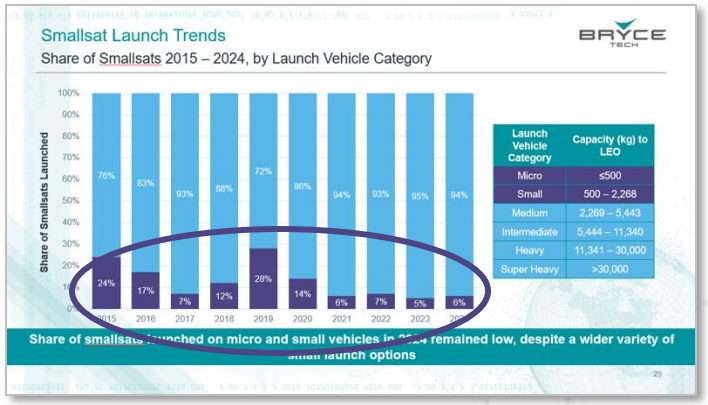
Average of 100 smallsats launched on small vehicles over the past 10 years

Smallsat Launch Trends

Share of Small Launches by Launch Country 2015 - 2024



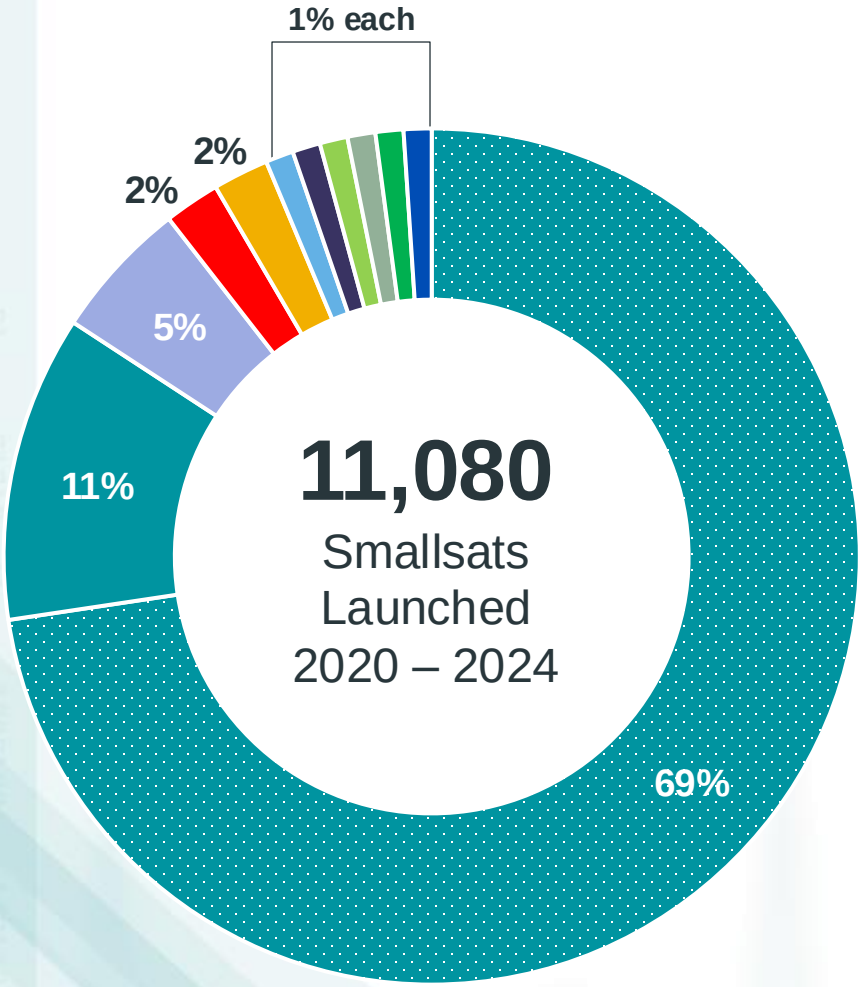


Other

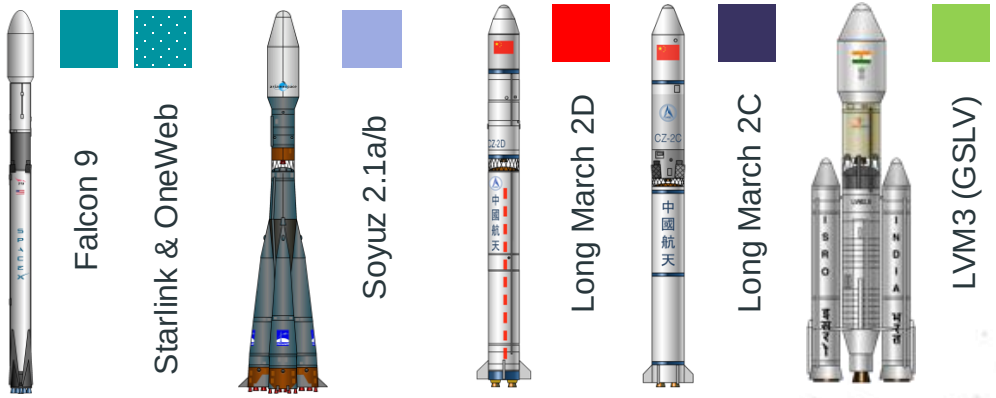
Chinese launch providers had the largest share of micro/small vehicle launches in 2024

Smallsat Launch Trends

Smallsats 2020 – 2024, by Launch Vehicle



Medium – Super Heavy Launch Vehicles



Micro – Small Launch Vehicles

76 other vehicles (<60 smallsats each launched over period)

Launch vehicle diagrams not to scale.

Smallsats in Context

Operator and Mission Type Trends

Smallsat Mass Trends

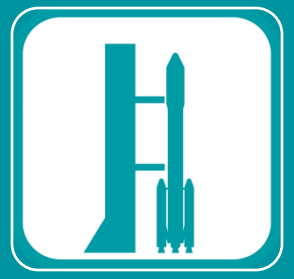
Smallsat Launch Trends

Looking Forward

Looking Forward: Areas to Watch

Government Use of Smallsats

- Space Development Agency (SDA) and NRO continuing to launch proliferated constellations through 2029
- Increasing government adoption of smallsats drives market growth



Launch Options

- Smallsat mass increasing and primarily deploying on medium to heavy launch vehicles
- Orbital Transfer Vehicles (OTV) and dispensers may further increase selection of medium to heavy launch vehicles
- Market share of small launch unclear and most likely to remain small as operators develop more medium to heavy vehicles

Constellation Deployments

- Smallsat telecommunications operator's continued deployments planned in 2025 as initial constellations complete and expanded constellations are authorized
- Impact of international growth from anticipated smallsat constellations of various sizes from Europe, Japan, South Korea, and others
- Growth in smallsat mass may affect overall size of future constellations

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