Satellite Demand for Small Launchers

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WHO WE ARE

CONSULTING

- Business strategy support
- Commercial due diligence
- Executive Training
- Operations manageme nt services

Supported decisions on **$30b+** investment

RESEARCH

- Strategic reports
- 10-year market forecasts
- Proprietary databases
- Profiles of leading organizations

Expertise at each level of the **Value Chain/Ecosystem**

SUMMITS & TRAINING

- High-level programs
- Executive-level networking
- Business deals
- Market insight

Promoting forward thinking, facilitating projects & deals for over **1,000** executives

TEAM

+ Senior affiliate consultants in **>40** countries

UNIQUE COMBINATION OFFERED BY EUROCONSULT AND SATCONSULT

AGENDA

Overview of Ecosystem

Small Launch Prospects

Small Satellite Outlook

ECOSYSTEM COMPONENTS

Six Applications

- Earth Observation
- Security
- Telecommunications
- Technology
- IT
- Science / Exploration

Six Types of Orbit

- LEO
- GEO
- SSO
- HEO
- MEO
- ESC

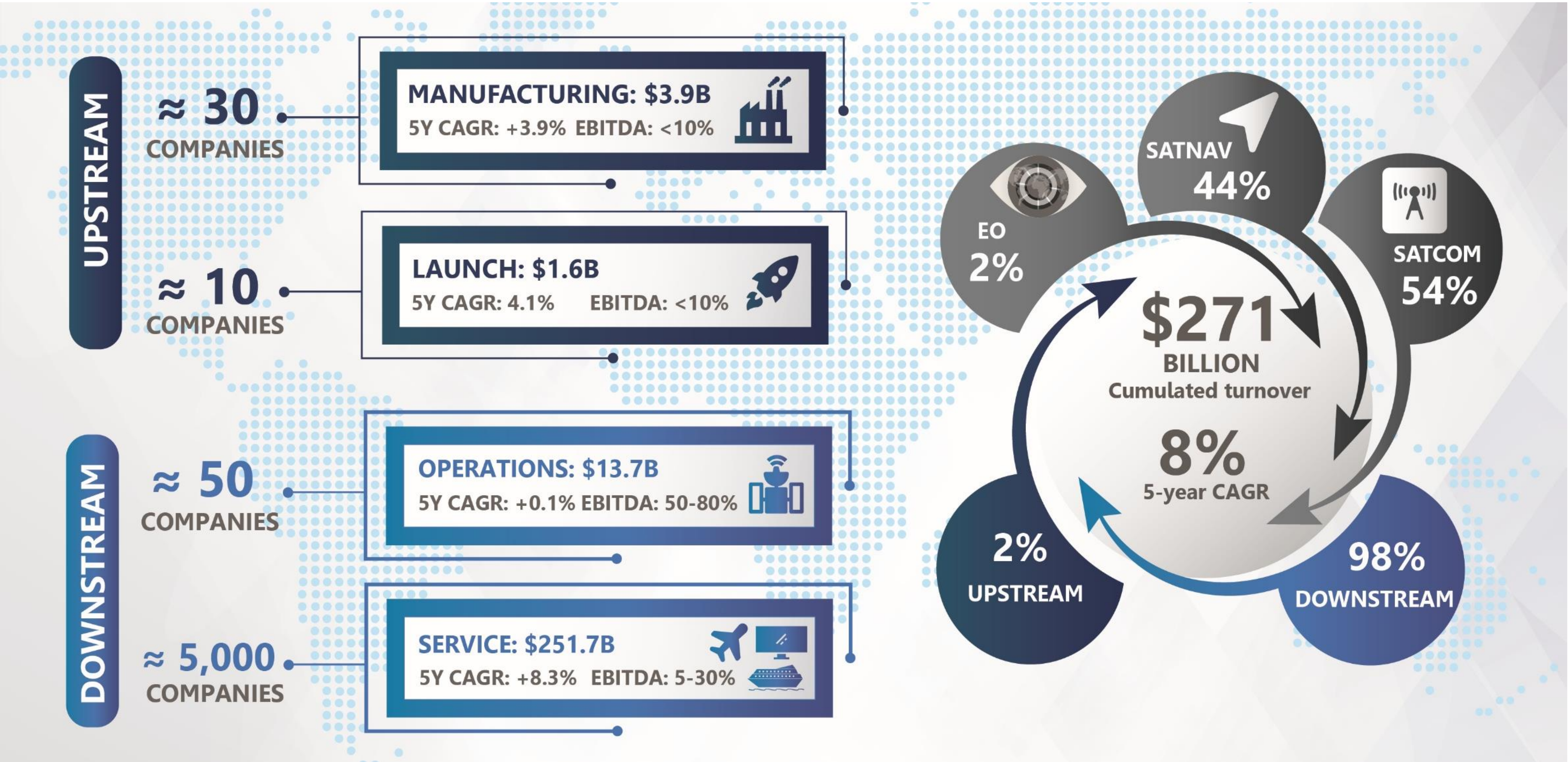
Five Launcher Types

- Micro: <500 Kg
- Small: 500 Kg to 2 Tons
- Medium: 2 Tons to 6 Tons
- Heavy: 6 Tons to 30 Tons
- Super heavy: >30 Tons

Four Types of Manufacturer

- Large integrators
- Pure smallsat manufacturer
- In-house
- Academia

SATELLITE VALUE CHAIN (ENTIRE MARKET)



Figures include commercially-active companies with at least 1 satellite in operation or under construction, satellites equal to or greater than 50kg.

SELECTED TRENDS IN VALUE CHAIN

SATELLITE MANUFACTURING

- Increasing focus on cost savings
- Industry 4.0: automation, 3D manufacturing
- Innovations: electric propulsion, In-orbit servicing, flexible payloads, etc.
- Small satellites and mega constellations

LAUNCH

- Low-cost approach
- Reusability, higher launch cadence for smallsats and mega constellations
- New entrants aiming to challenge incumbents
- Impact of launch brokers and new spaceport development

OPERATIONS

- Price pressure (bandwidth and data)
- Transition from wholesale/data to services
- Specific innovations: Electric propulsion, Flexible Payloads, etc.
- Hybrid infrastructures (GEO / MEO / LEO / HAPS / drones, etc.)

SERVICES

- Terrestrial competition/opportunities (5G)
- AI and Big Data analytics to unlock new markets
- Rise of OTT services challenging traditional broadcast
- New service models and infrastructures (mobility, cloud, subscription)

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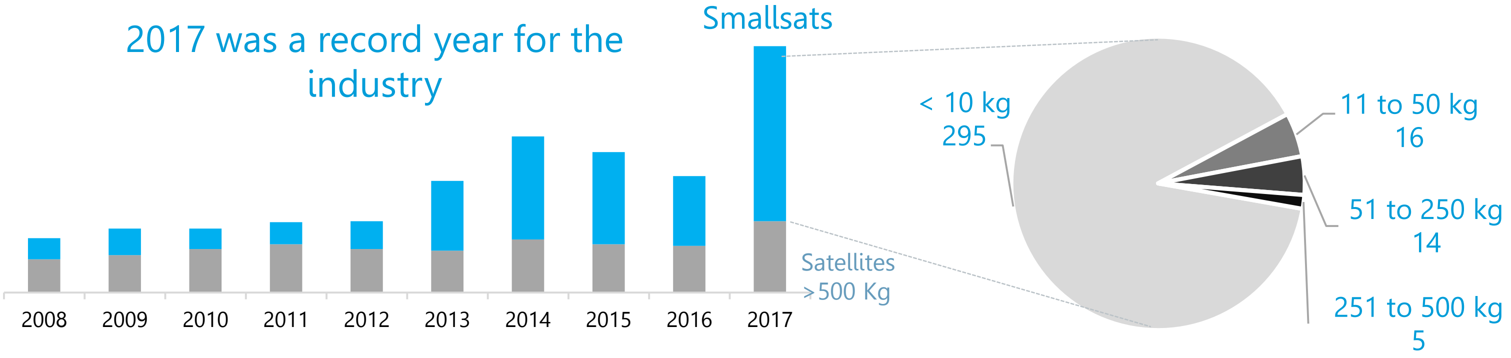
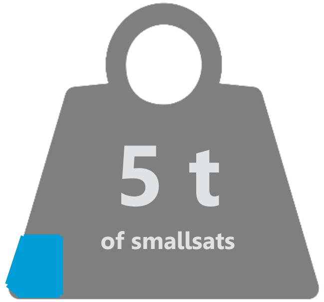
SMALL LAUNCH MARKET OVERVIEW

2017 was a record year for the industry



planet.

Was the largest operator with 44% of all the smallsats launched



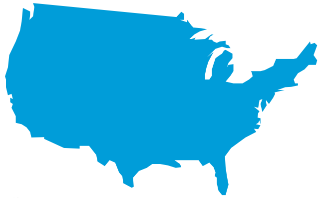
Accounting for 1% of the total mass launched

330 smallsats* launched in 2017

of which 65% for constellations

** With a launch mass < 500 kg*

EO was the 1st application with 2/3 of the demand



With 231 units, The U.S. was the 1st country

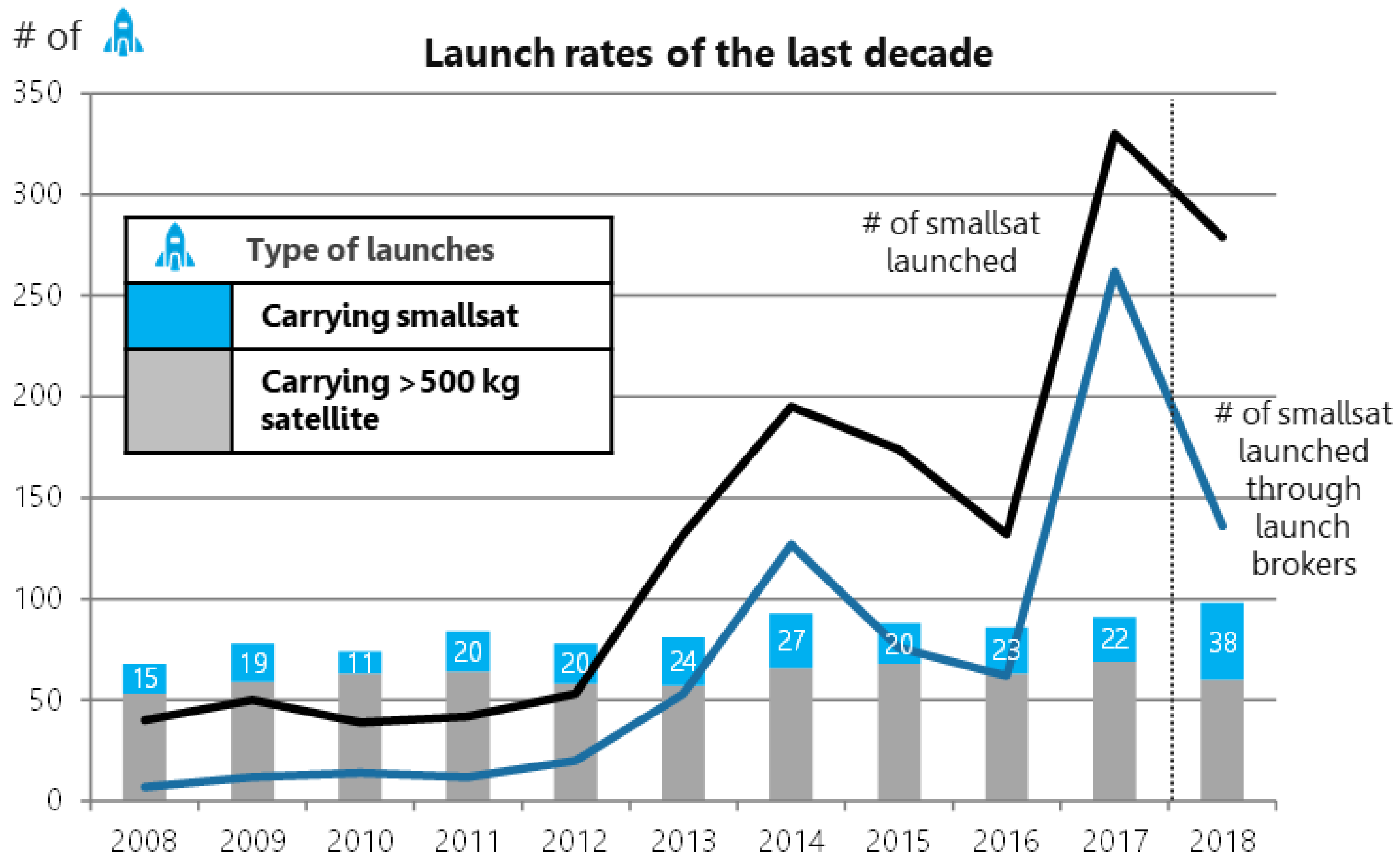
PSLV was the most used launcher with 133 smallsats launched of which 102 in one flight, a new world record

Soyuz was the most available launcher with 3 flights

ÅAC Microtec CLYDE SPACE

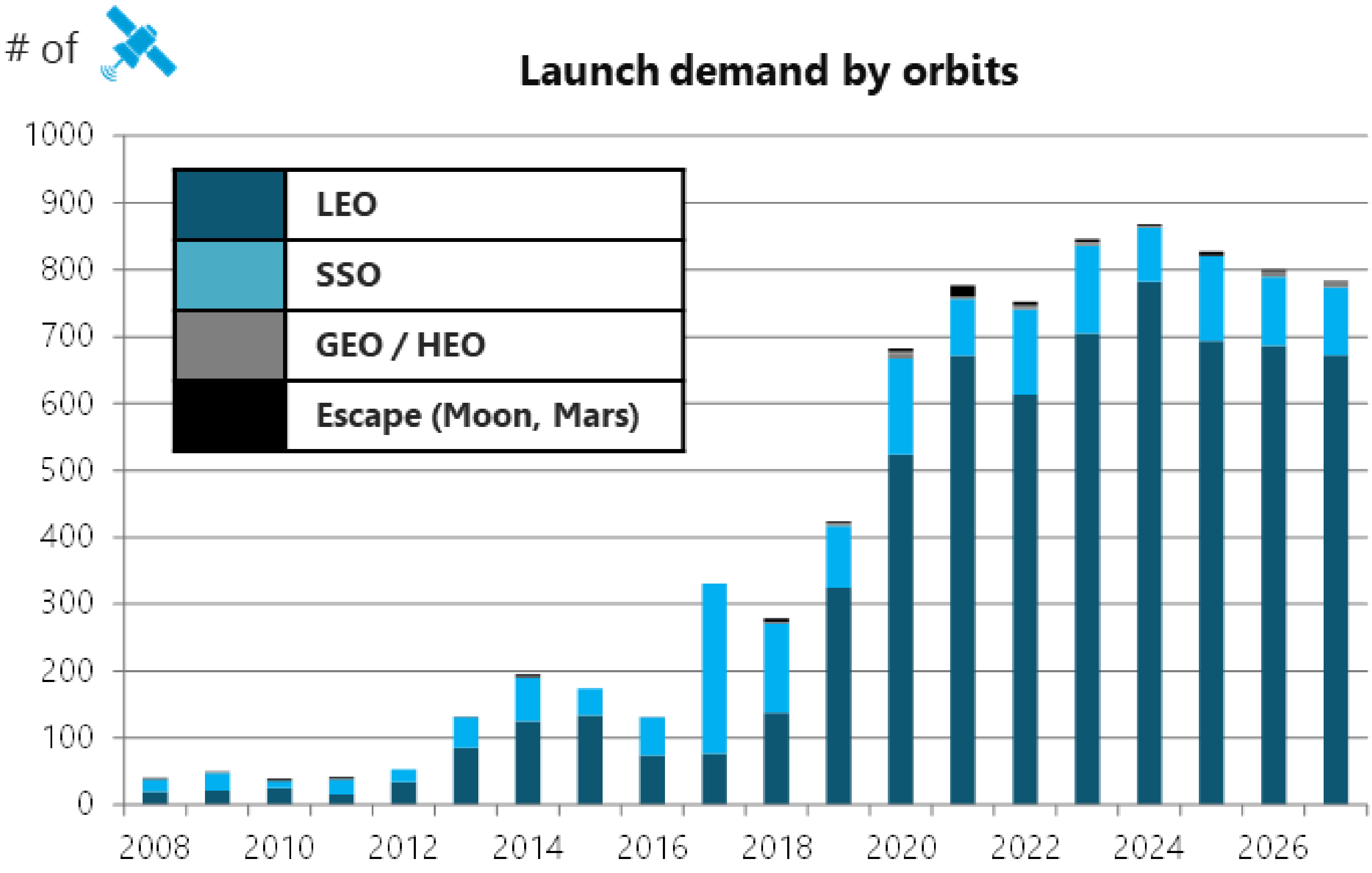
M&A was the biggest M&A of the year

LAUNCH ACTIVITY



- 1,100 satellites launched on 200 launches, 2008-2017
- 19% growth in number of satellites, 9% growth in number of launches
- 79% of smallsats launched in 2017 through brokers (v 18% in 2008)

WHERE ARE THEY HEADED?



- 94% of smallsat launches in 2008-2017 targeted either LEO (53%) or SSO (41%)
- LEO typically orbit of choice for telecom; demand driven by telecom mega-constellations
- SSO most attractive for EO projects

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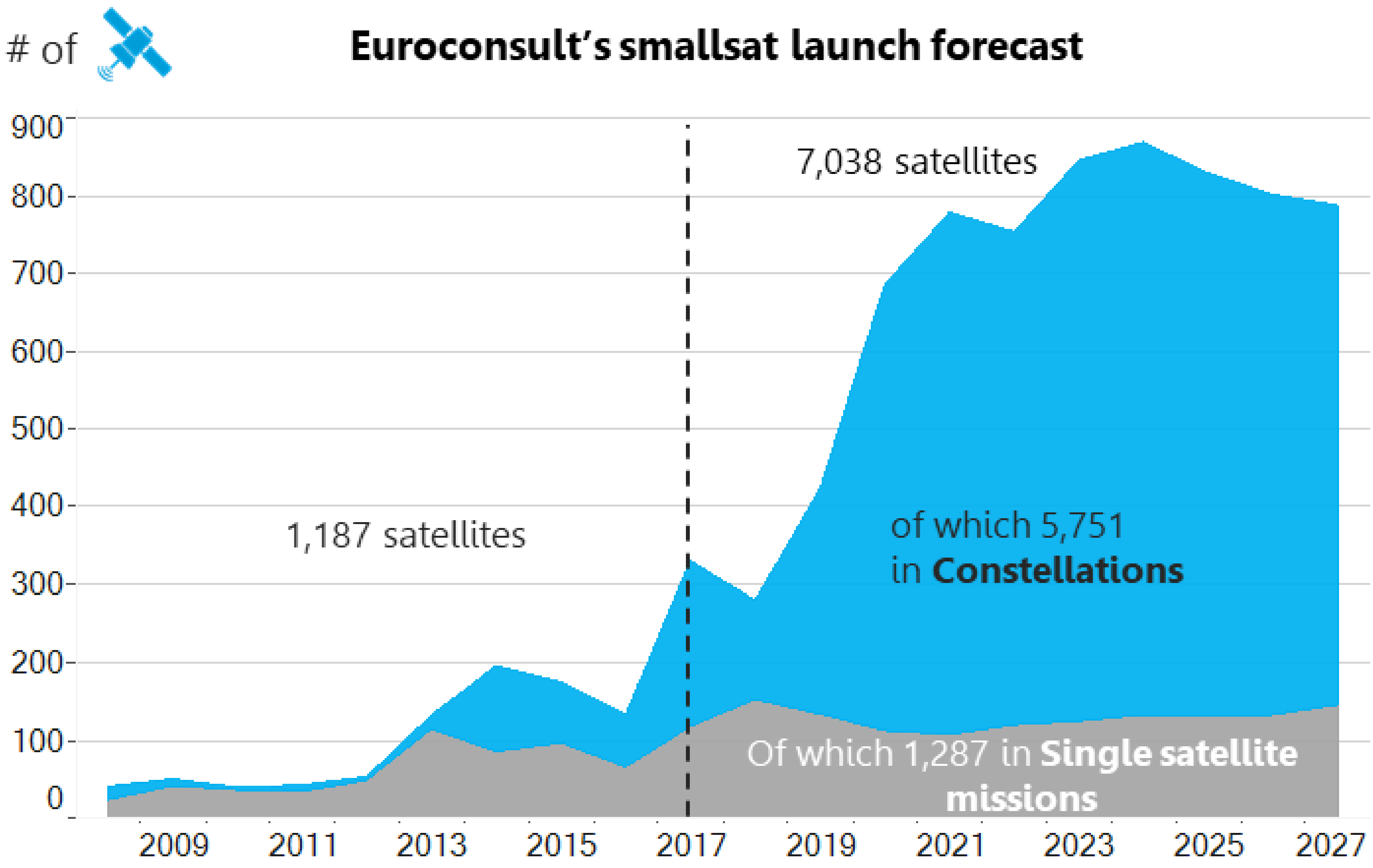
SATELLITES DRIVING SMALLSAT LAUNCH DEMAND



- Constellation demand tends to be lumpy, with small bump for proof of concept, larger bump for 1st gen, and similar large bump for 2nd gen, with smaller replenishment demand in between

BIG LEO CONSTELLATIONS

Telecom

Consumer Internet

Cell Backhaul

M2M/IOT

Earth Observation

Imagery

Video

Weather

Hyperspectral

SMALL LAUNCH MARKET OVERVIEW

Euroconsult

By 2027

In # constellations will account for 80% of the future demand

7,038

smallsats to be launched

60%

of the demand in value (manufacturing and launch) will be concentrated in North America

Smallsat demand in # by 2027

54% Commercial

23% Defense

22% Government

2% Academic

In # 72% of future demand is made by organizations which have never launched a satellite before 2018

Broadband telecom will overtake EO as the 1st smallsat application

Smallsats' mass

61 t

2008-2017

1,145 t

2018-2027

Muchas Gracias

谢谢

Danke

Thank you

MERCI POUR VOTRE ATTENTION

Շնորհակալություն

Shukran

спасибо

Дякую

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