75th International Astronautical Congress
14-18 October 2014, Milan, Italy

2014-2024, the good old days in New Space:
Facts and figures, lessons learnt and new trends in Earth Observation

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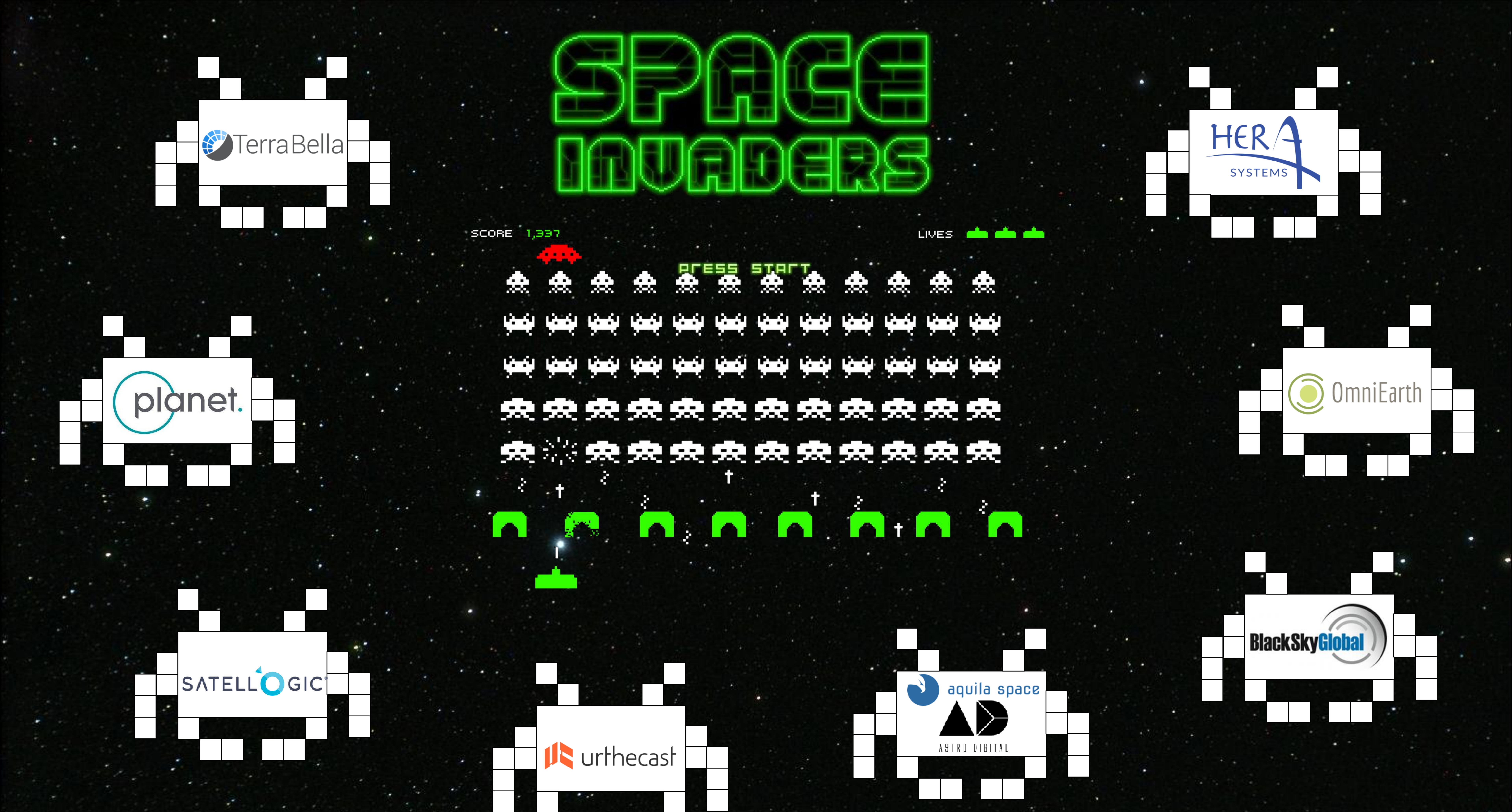
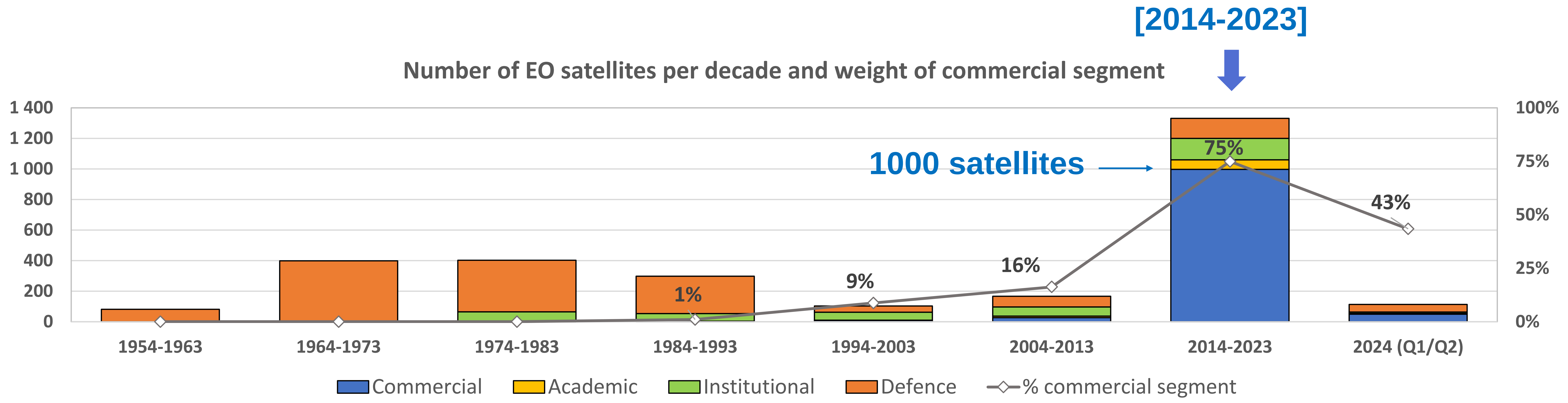
Get the Moon with EO satellites:
Moon seen by Pléiades Neo 3
(copyright Airbus DS)

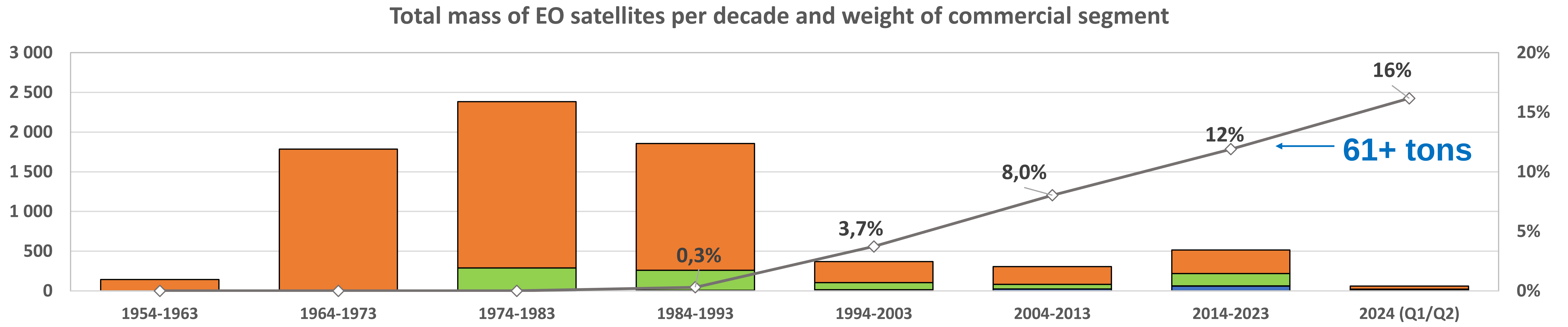
Get the Moon with Earth Observation satellites

Moon seen by Pléiades Neo 3
(copyright Airbus DS)


SPACE INVADERS
SCORE 1,337
LIVES
PRESS START
TerraBella
HERA SYSTEMS
planet.
OmniEarth
SATELLOGIC
BlackSkyGlobal
urthecast
aquila space
ASTRO DIGITAL

2014-2023: *a new era for commercial Earth Observation*

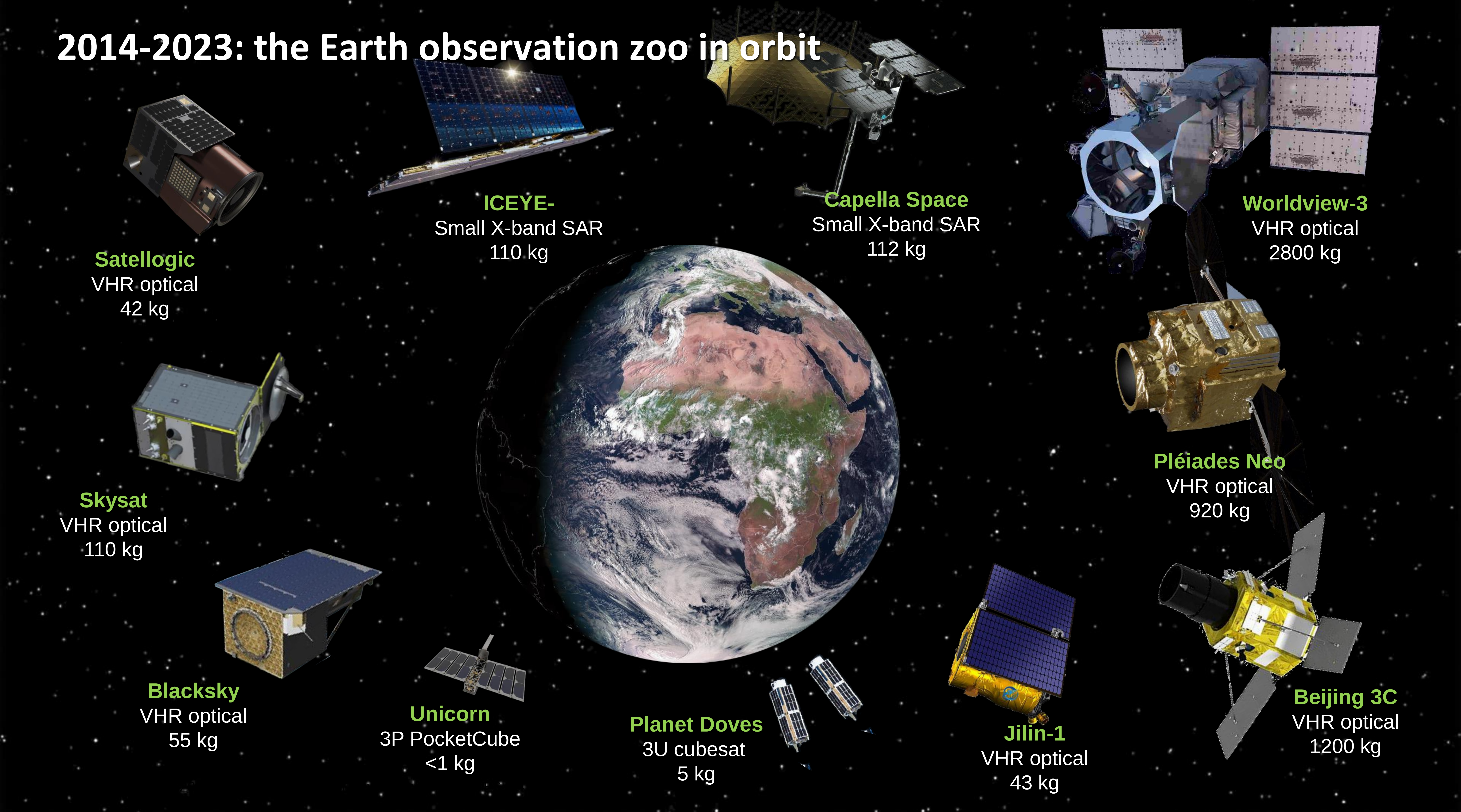




Reference year for decades: 2024

Data source : GCAT

2014-2023: the Earth observation zoo in orbit



Early days in Earth observation and evolution towards commercial EO

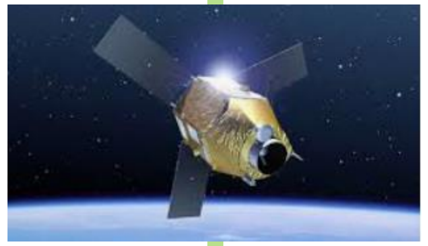
Early days in EO:

- Until 1969 (first race to the Moon**), EO satellites = spy satellites** (USA and USSR).
- 1962-1989: 35 large military satellites per year (>245t per year).
- 1972: **ERTS-A** aka “Landsat 1”.
- 1986: **SPOT 1**, first commercial satellite, Chernobyl and the beginning of a success story in France. “The Invader” (Wall Street Journal).
- 1992: **Failure of EOSAT company** and **Land Remote Sensing Policy Act**. Landsat-7.
- Other institutional programmes: **Resurs** or **Kanopus** in Russia, **IRS** and **Cartosat** in India, **JERS** and **ADEOS** in Japan.
- In China: **ZiYuan** (1990), **Huanjing**, **Shiyan**, **TianHui**, **Haiyang**, **Yaogan**, **CHEOS.**
- In Europe: **ERS-1** (1991), ERS-2, **Envisat** (2002), paving the way for **Copernicus (9 sentinel missions in orbit since 2014)**.

~~SECRET~~

THE WHITE HOUSE

US Policy on Foreign Access to Remote Sensing Space Capabilities



Below 1m: US leadership in commercial EO

- March 1994: Presidential Decision Directive-23 (Clinton Administration**). Policy on Remote Sensing Licensing and Exports**. Allows 1m resolution.
- Sept. 1999: **Ikonos-2** launch.
- 2003: **NGA framework contracts** (Clearview, NextView and Enhanced View) Framework programmes, awarded to Digital Globe and Space Imaging.
- 2011: **Pléiades-1A Launch**. Pléiades-1B in 2012.

1 Earth, 1m, 1d? Key Hole and Google Earth

- 2001: **Earthviewer** (Keyhole). EO imagery everywhere?
- 2003: US invades Iraq.
- 2004: **acquisition of Keyhole by Google**.

Skybox and Planet Labs: emergence of New Space

- May 2009: **Skybox Imaging** (Stanford students)
- Dec. 2010: Cosmogia (**aka Planet Labs**)
- Apr. 2013: **Dove-1** and **Dove-2** in orbit.
- Nov. 2013: **Skysat-1**.

Facts and figures on New Space in Earth Observation

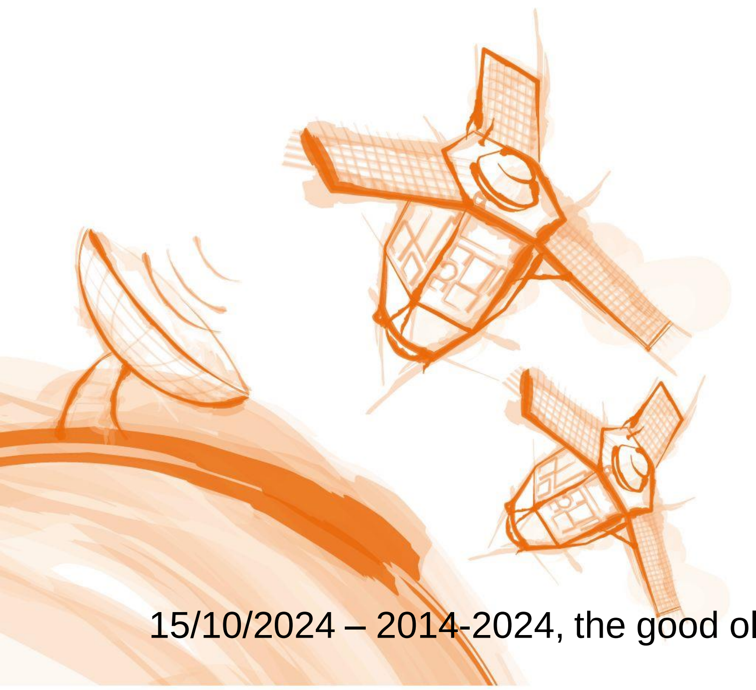
Presentation of OSINT data used in the study

Technical information (EO satellites in orbit)

- **General Catalog of Space Objects** (GCAT) compiled by Jonathan Mc Dowell (CC-BY). First version in Aug. 2020. Monthly updates.
- **Celestrak satellite catalog** (T.S. Kelso).
- **Gunther Space Page**, one of most comprehensive online resources dedicated to space missions.
- **Un autre regard sur la Terre**, a French-language blog on Earth observation.
- Company web sites, specialised newspapers, forums, social media and newsletters on EO.

Business and financial data

- **Annual reports** (e.g. SEC) when available.
- **Stock price** for publicly traded companies.
- **Investment** (VC and PE) reported by the emerging companies or specialized web sites when publicly available.
- **Market forecast and global activity** of space companies: Euroconcult, NSR, Bryce/SIA (public executive summaries).
- Press releases and social media.



5 categories:
commercial, civil institutional, defence / intelligence and academic / amateur / education and other non-profit satellites.

Main challenges of OSINT approach:

- Access to specific technical information (e.g. satellite mass accuracy, satellite status)
- Detailed financial data and market forecast not publicly available.
- Legacy EO operators less “visible” than mature startups.

The last ten years in commercial Earth Observation by the numbers:

2014-2023: a wind of change in LEO

997 commercial EO satellites:

- 75% of total EO satellites (2014-2023).
- 50% still active in 2024.

53 nations own 1+ EO satellite:

- 22 nations own a commercial satellite.
- 10 countries = 98% of $\sum$M, 95% of $\sum$sats.

Mass in orbit: 61+ tons

- 12% of total EO satellites (2014-2023).
- From <1kg to 4000kg.

New commercial operators:

- 23 significant operators (>10 sats, $\sum$ M > 400kg).
- 11 large operators: 3 legacy and 8 “old” startups ($\sum$M > 1500 kg).

2024 (End Sept.)

- 4 first **Maxar Legion** satellites.
- 3 batches of **Starshield** satellites (65) for NRO.
  A game changer? Payload TBC.
- Smaller satellites: Planet (36), Satellogic (3), Iceye (7), Capella (2), Umbra (2), Synspective (1) and QPS (1).

Legacy players, startups and new national ambitions

A new landscape

MAXAR INTELLIGENCE
2 satellites – 5.3 tons

AIRBUS
3 satellites – 2.6 tons

e-geos AN ASI / TELESPAZIO COMPANY

planet.
560 satellites – 5.1 tons

SATELLOGIC

BLACKSKY

CG SATELLITE
131 satellites – 10.8 tons

AT

SPACEWILL

ICEYE
27 satellites – 2.5 tons

UMBRA

Capella Space

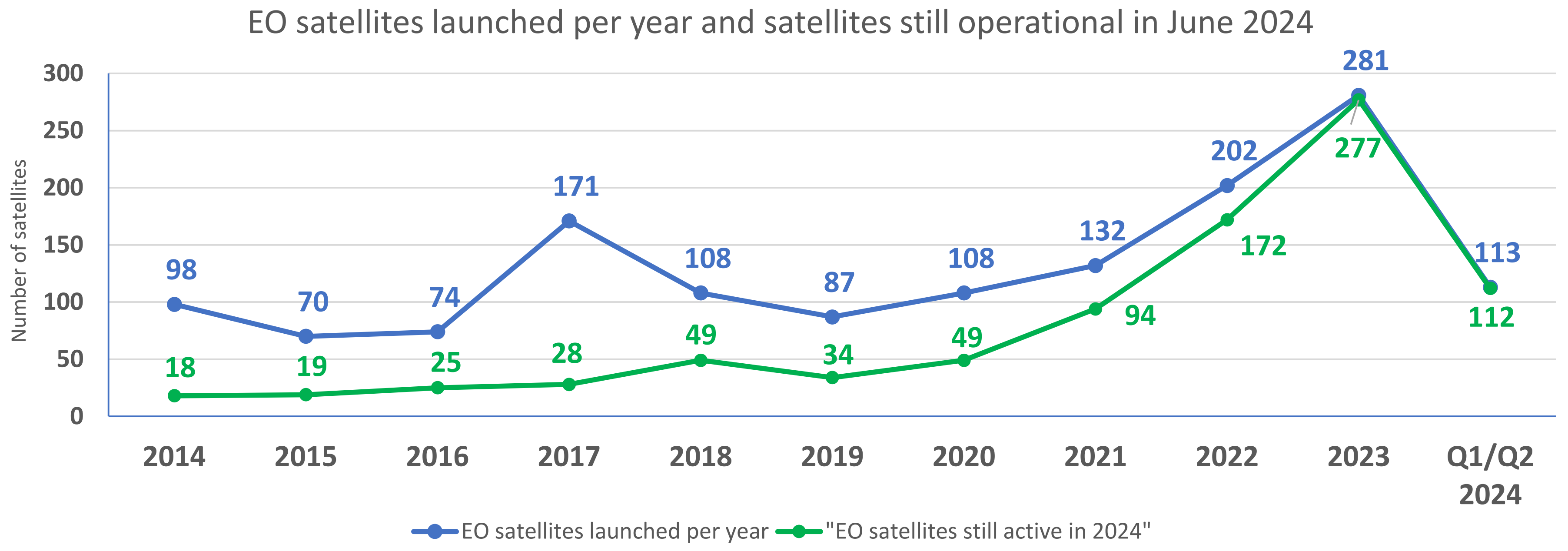
Synspective

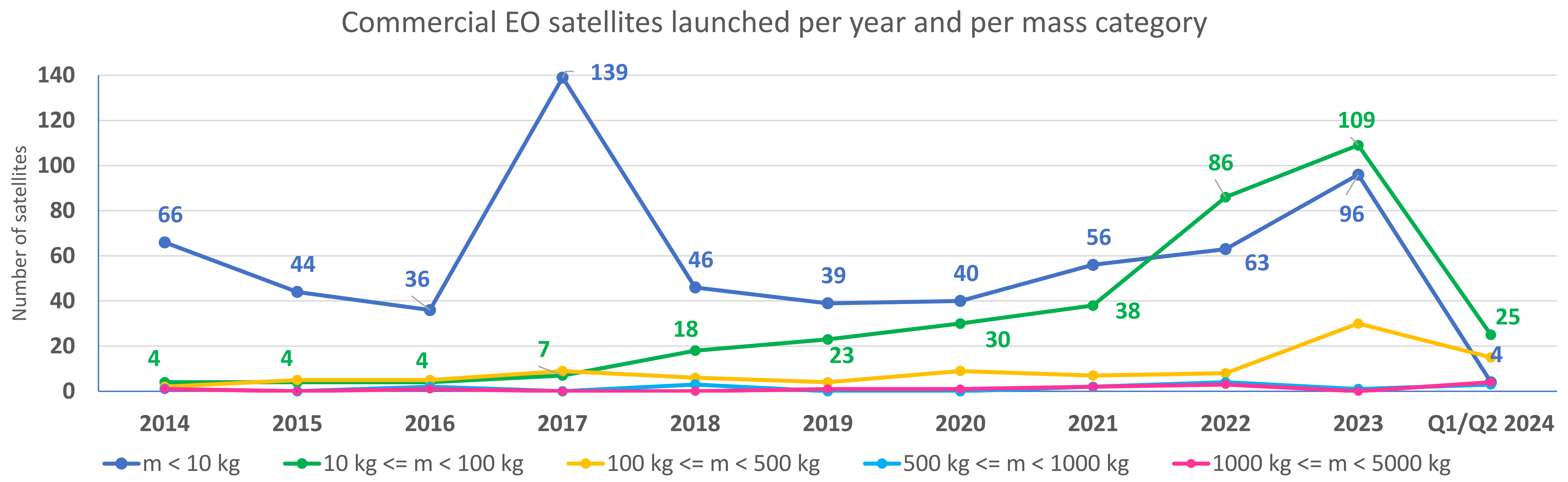
AXELSPACE

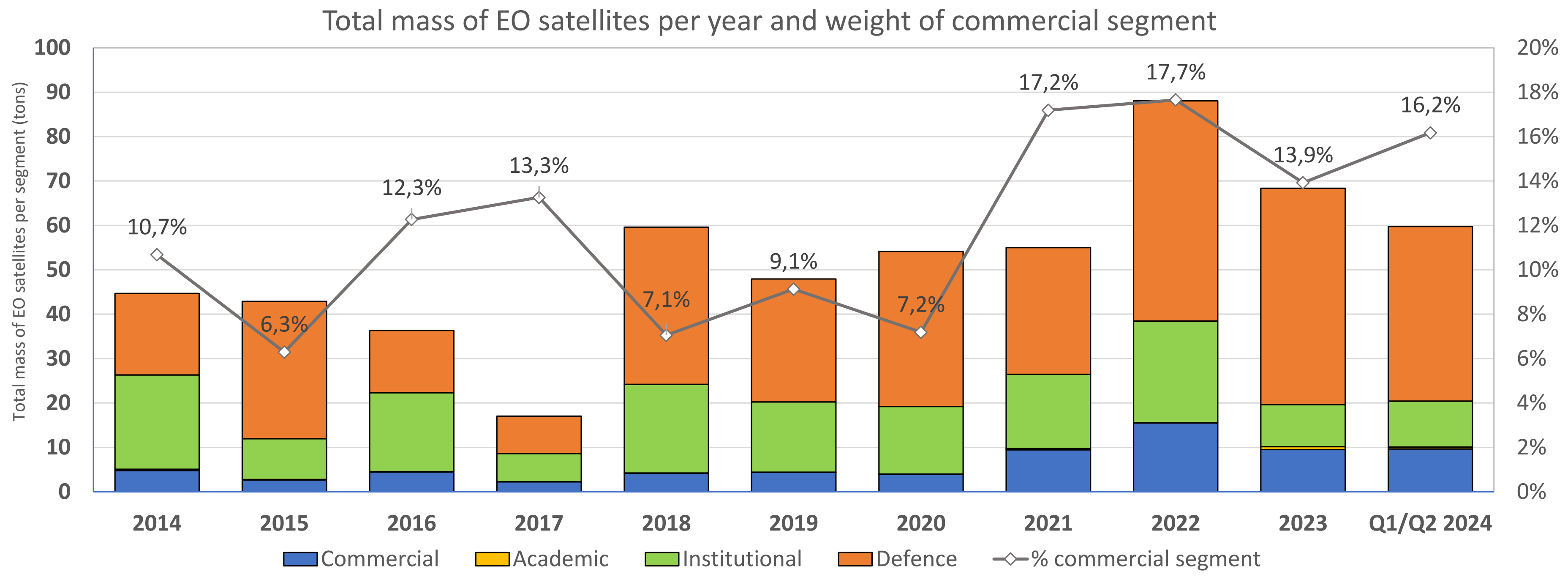
iQPS

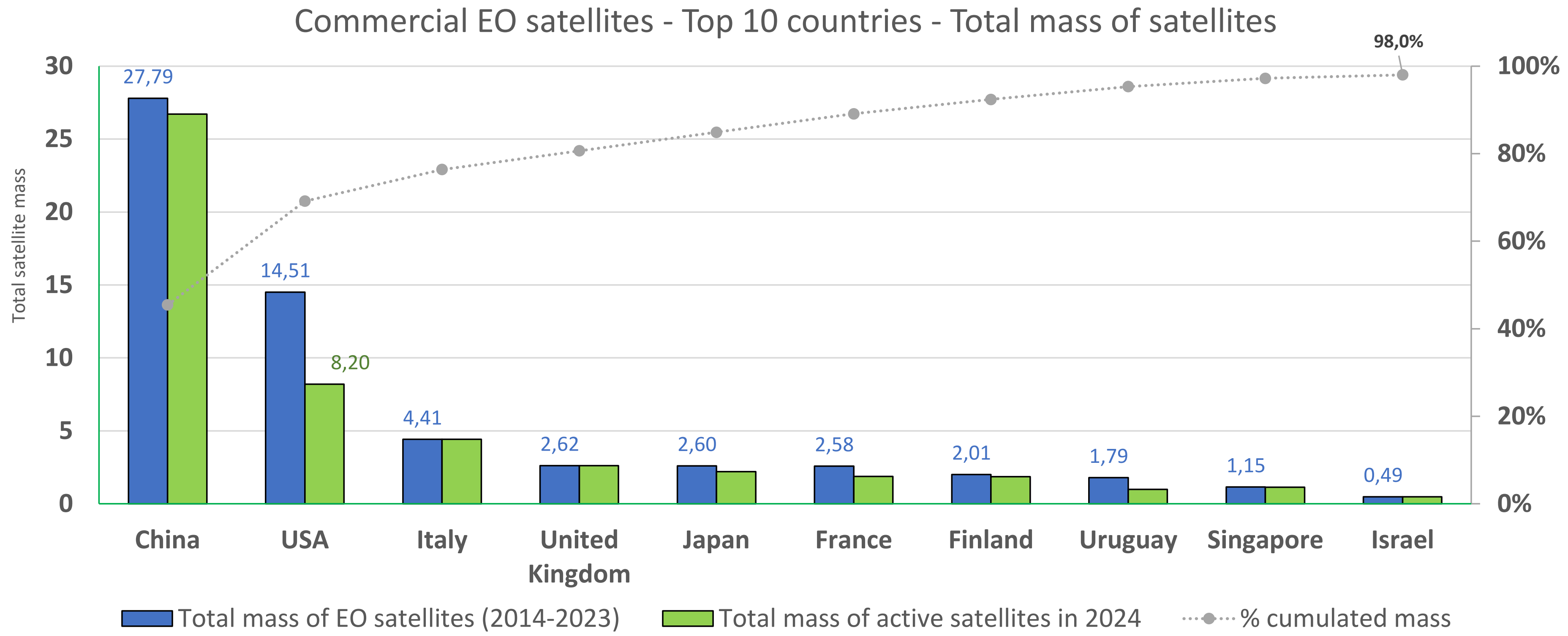
Commercial EO satellites in orbit:

What do we learn from technical data?



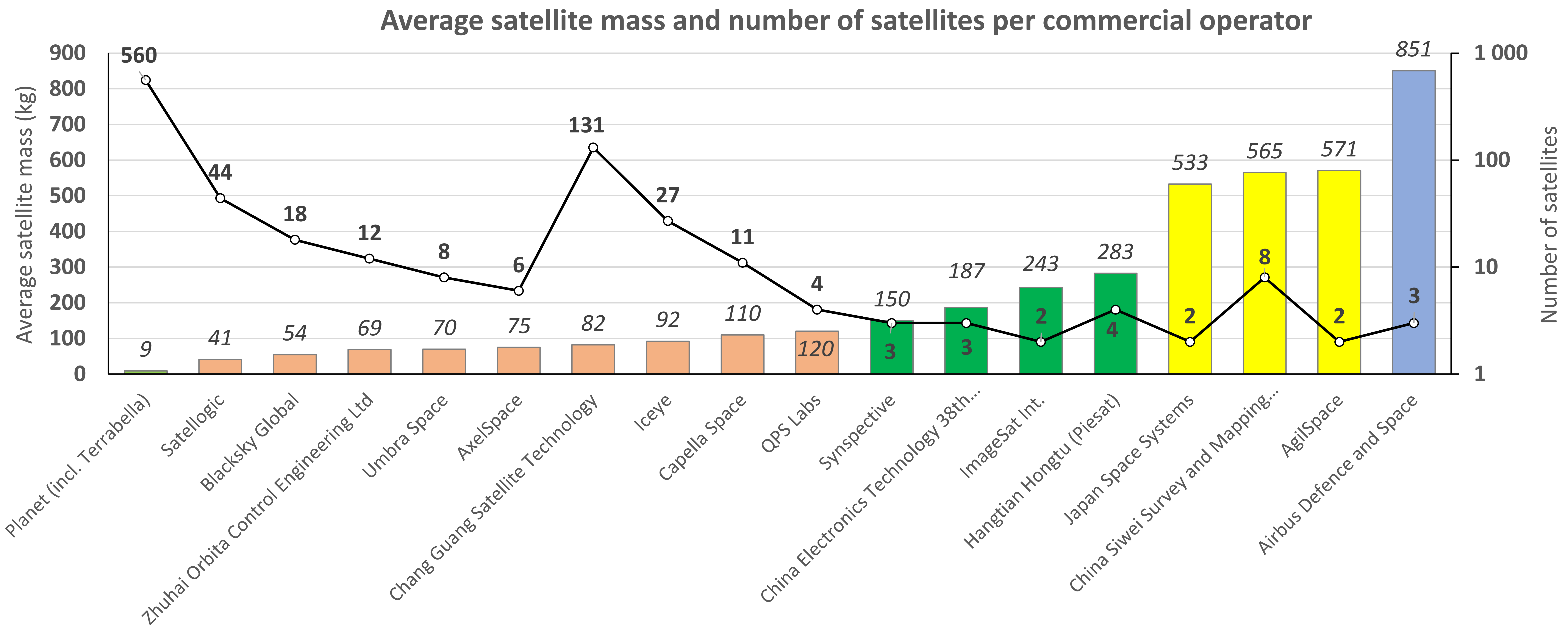






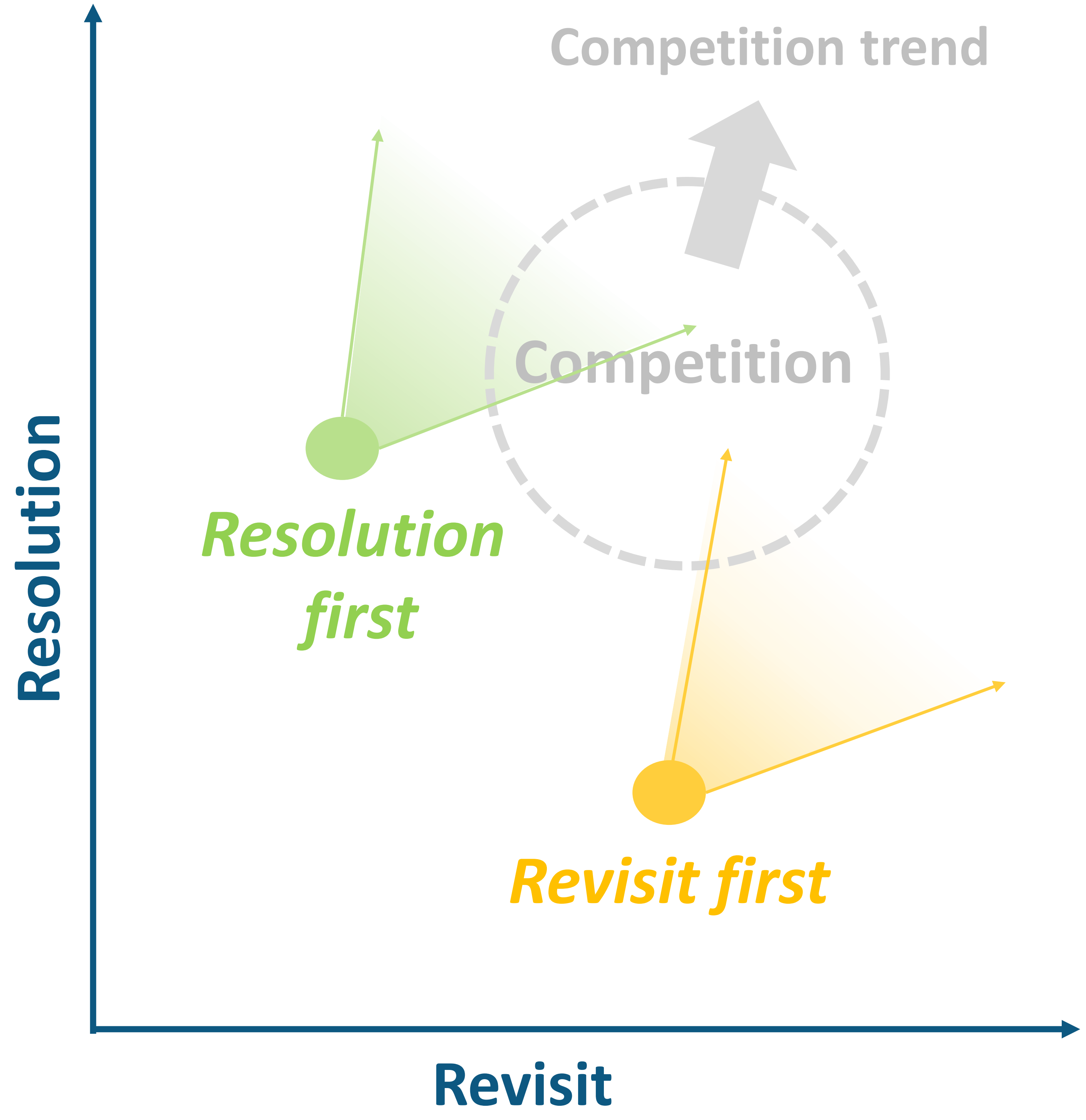
Commercial EO satellites in orbit:

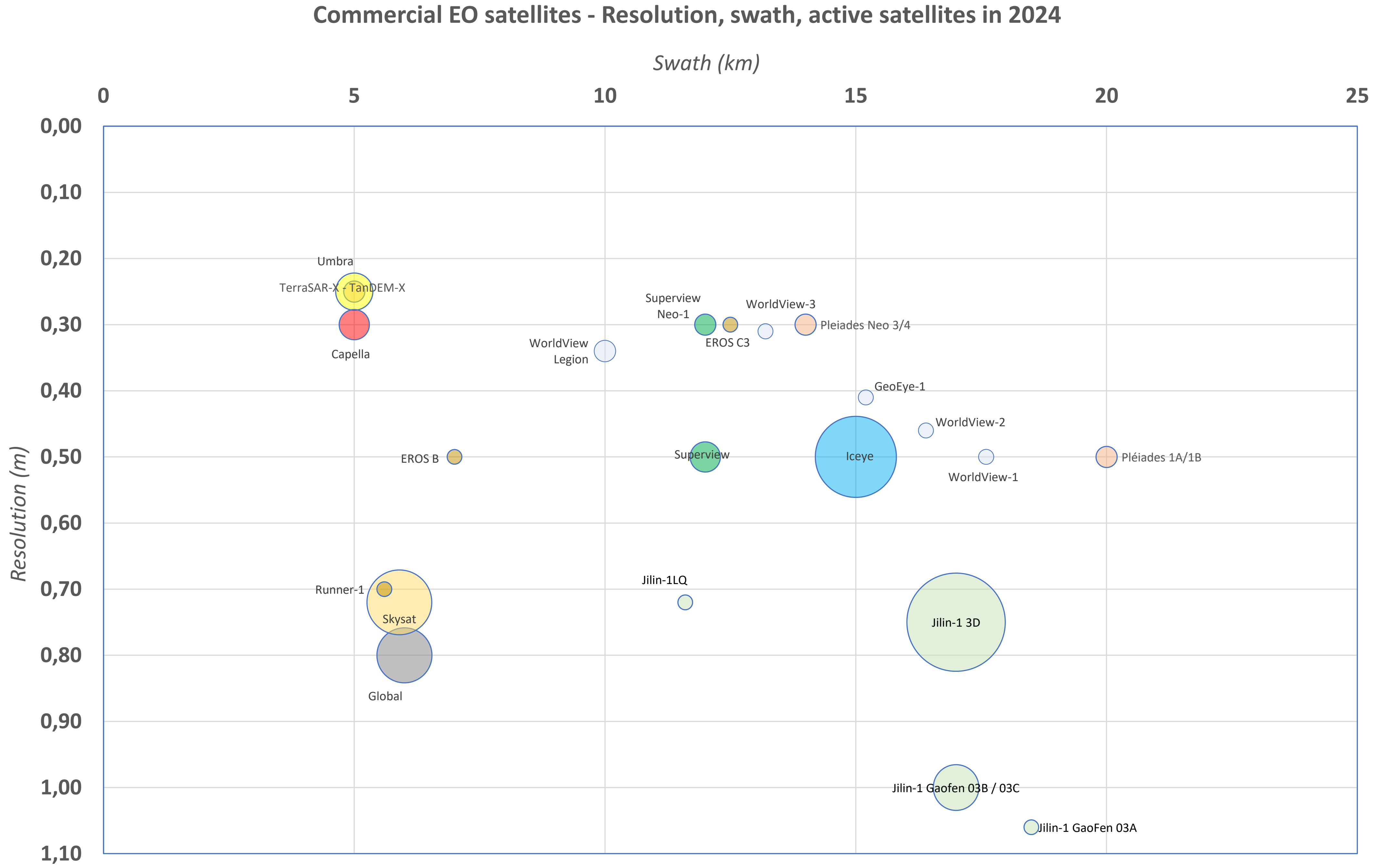
Average satellite mass and number of satellites per commercial operator

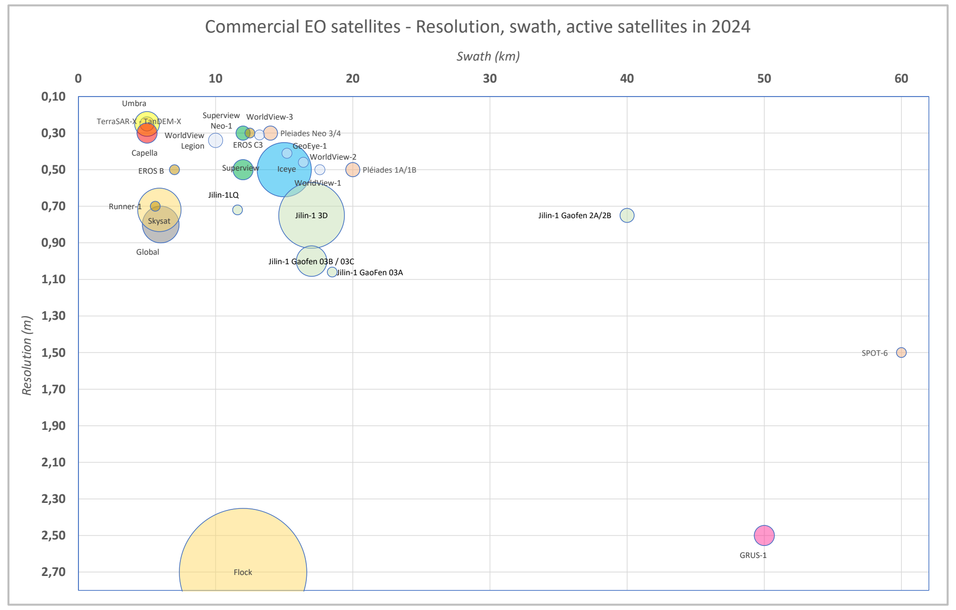


Resolution against revisit

And the winner is…



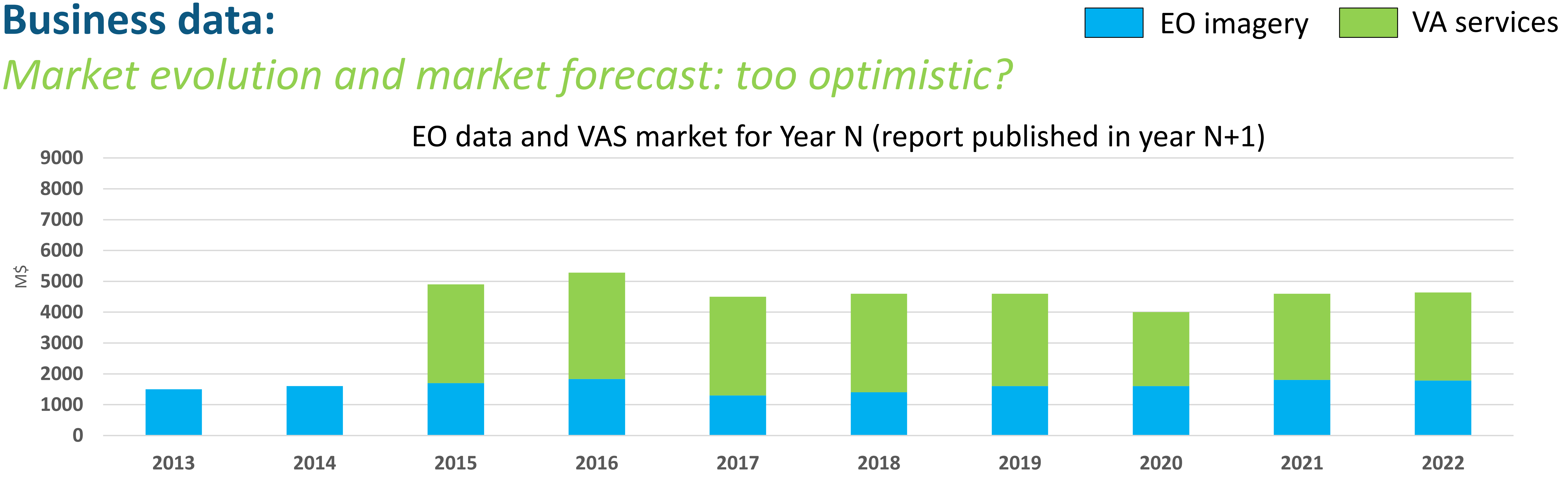


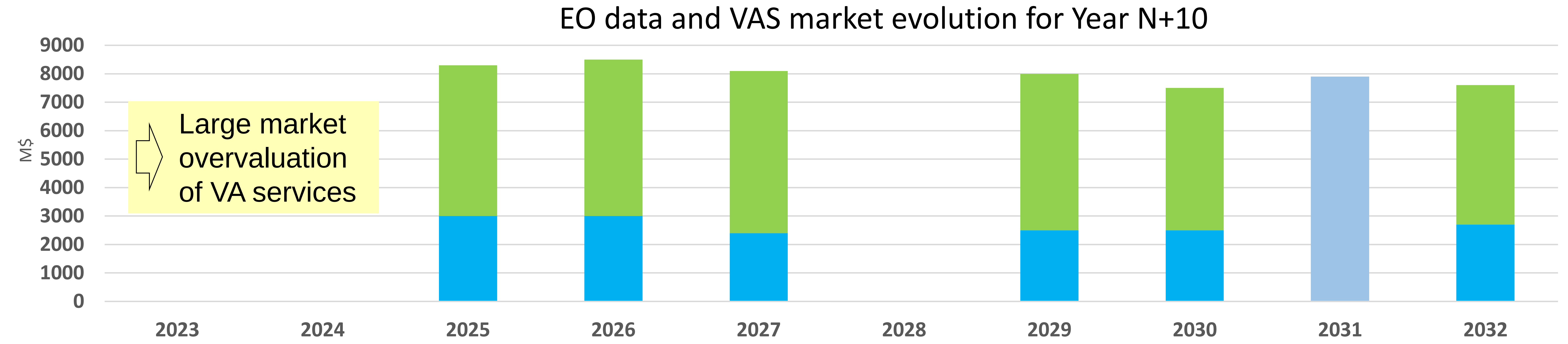


+ some attempts to have the best of the two worlds, e.g. Superview (China): GSD 0.5m / swath 130km

Business data:

Market evolution and market forecast: too optimistic?

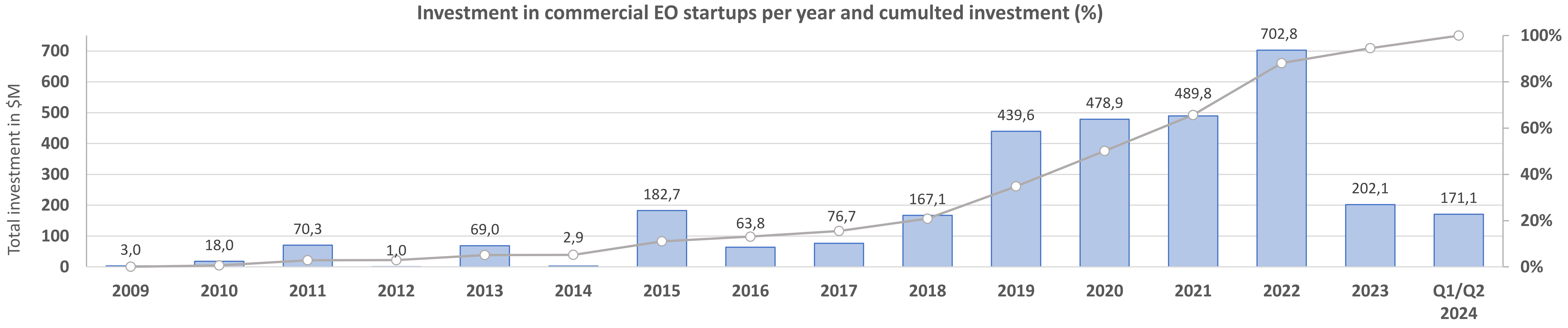


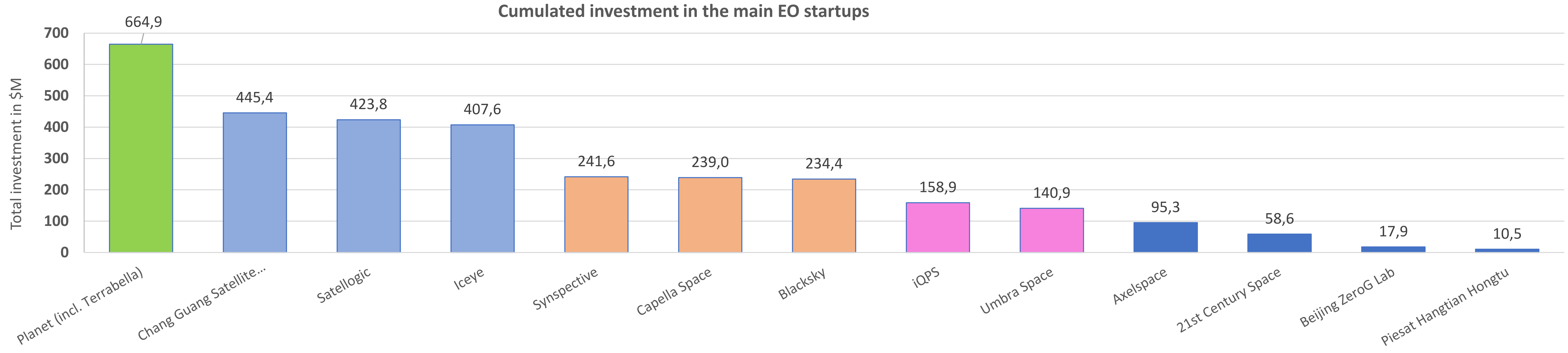


Source: Euroconsult reports (public summaries when available)

Business data:

Evolution of private investment in EO startups and main beneficiaries

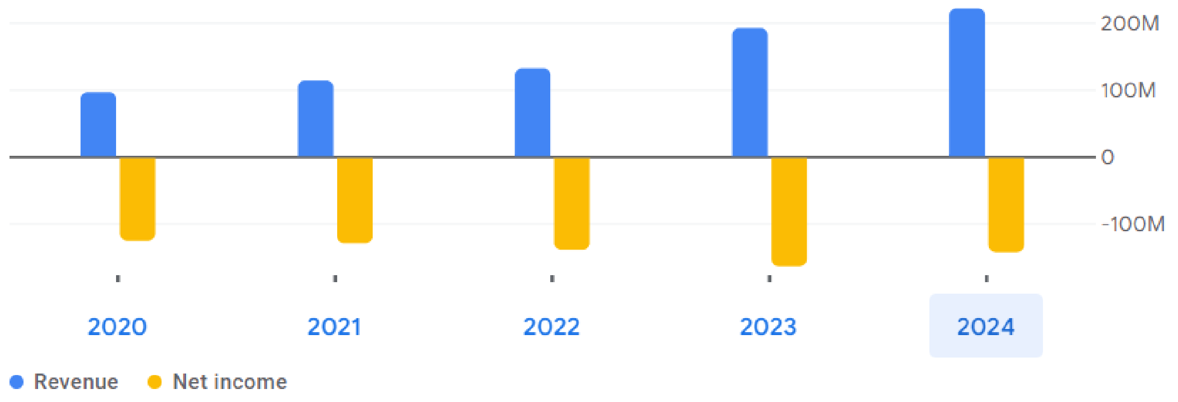


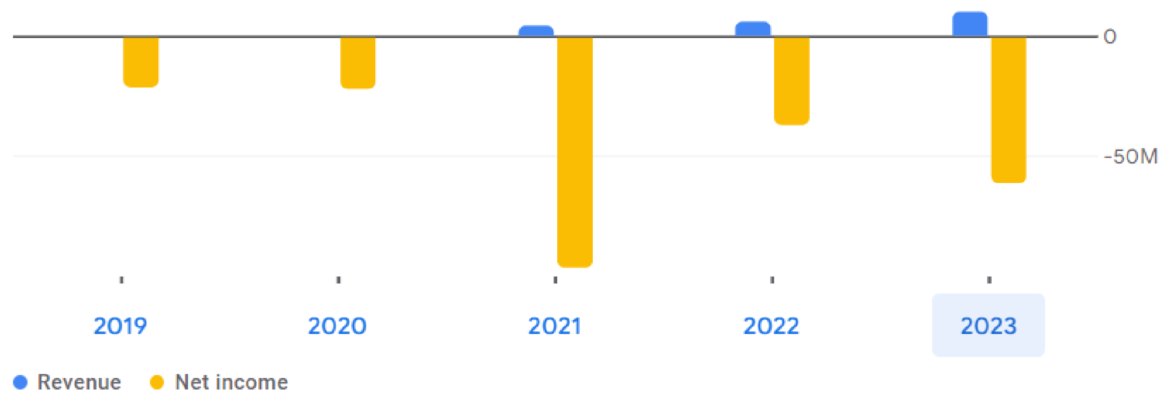


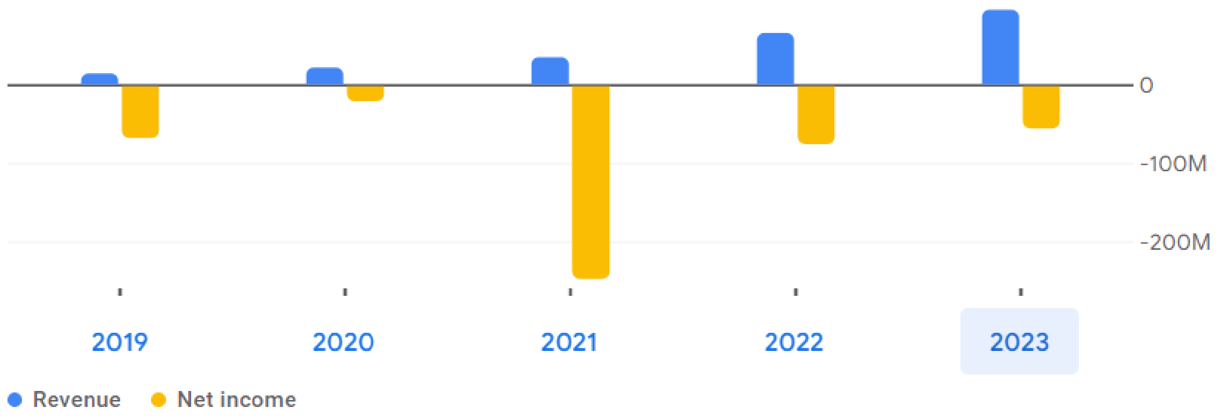
Business data:

Stock price and financial results

Stock price: Oct. 15th







Commercial EO: the promises and the state of play in 2024

The glass seems half full or half empty…

- Almost **thousand new satellites** launched between 2014 and 2023.
- **Trend still positive in 2024**.
- **Tens of new commercial companies**, backed by private investors.
- **EO market growth**: probably around 15% or 20% of the imagery market value in 2023. Not addressed before by legacy players.
- Significant **impact at satellite and payload manufacturing level**.

- **Profitability is not yet forthcoming**: huge net losses, cash burn rate, lay-offs, etc.
- Main sources of revenue: **defence and intelligence** (B2D). Slow ramp-up of the business with commercial customers (B2C).
- **Value-Added-Services: missed projections**.
- **Stock prices**: far below the initial value.
- **Strategic pivots**: from service to satellite manufacturing.
- **Only one European start-up** among the 25 top EO companies.
- **Europe is far behind** USA and China in the new space race.

The huge potential of EO is still… a potential

Market disruption in commercial EO did not materialize: commercial suppliers / non commercial customers

Disruption or continuity? Evolution of EO today and omorrow…

Lessons learnt and scenarios for tomorrow

The profitability issue and its impact on competition

- **Business failures, M&A and alliances**, new strategies and a fiercer competition: the main ingredients in the short term.
- Impact at **pricing policy, products and commercial strategy** levels.
- **Cash crisis** and **loss of investors' confidence**.

A slightly bigger cake (or pizza) with many more guests around the table

Main customers of commercial EO: the usual suspects, like before?

- Instead of becoming B2B, commercial **EO is still mainly B2G or B2D**.
  - **B2D = 67% of imagery products**. 40-50% if Value-Added Services are included.
    - **Incentive mechanisms and frameworks contracts in the US** (DoD, NRO, NASA). Less true in Europe.
      - Satellite infrastructure: the supplier base and the manufacturing ecosystem grow.
        - **Europe: behind two giants?**

Tomorrow: pivots, new strategies and new developments…

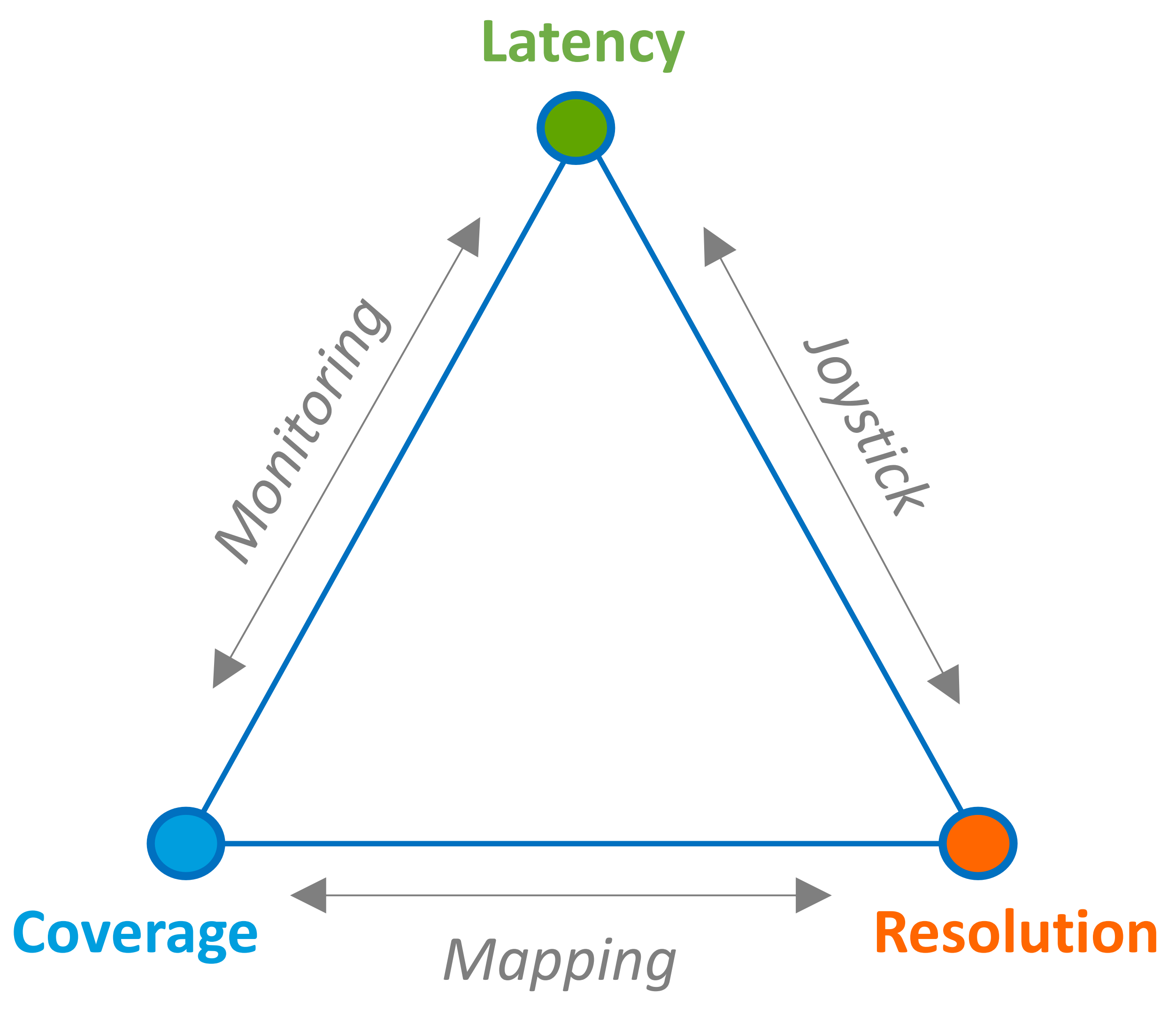
Three main options for all EO operators:

1. Target the most readily accessible market (defence and intelligence) or
2. Address new verticals.
3. Strategic pivots.

- **Development of new satellites** with higher resolution = **new investments**.
- **Sell satellites instead of just imagery** and value-added services (e.g. Satellogic, Blacksky or Iceye).
- An **upmarket positioning** of the most mature startups: a **new challenge for the legacy suppliers**.

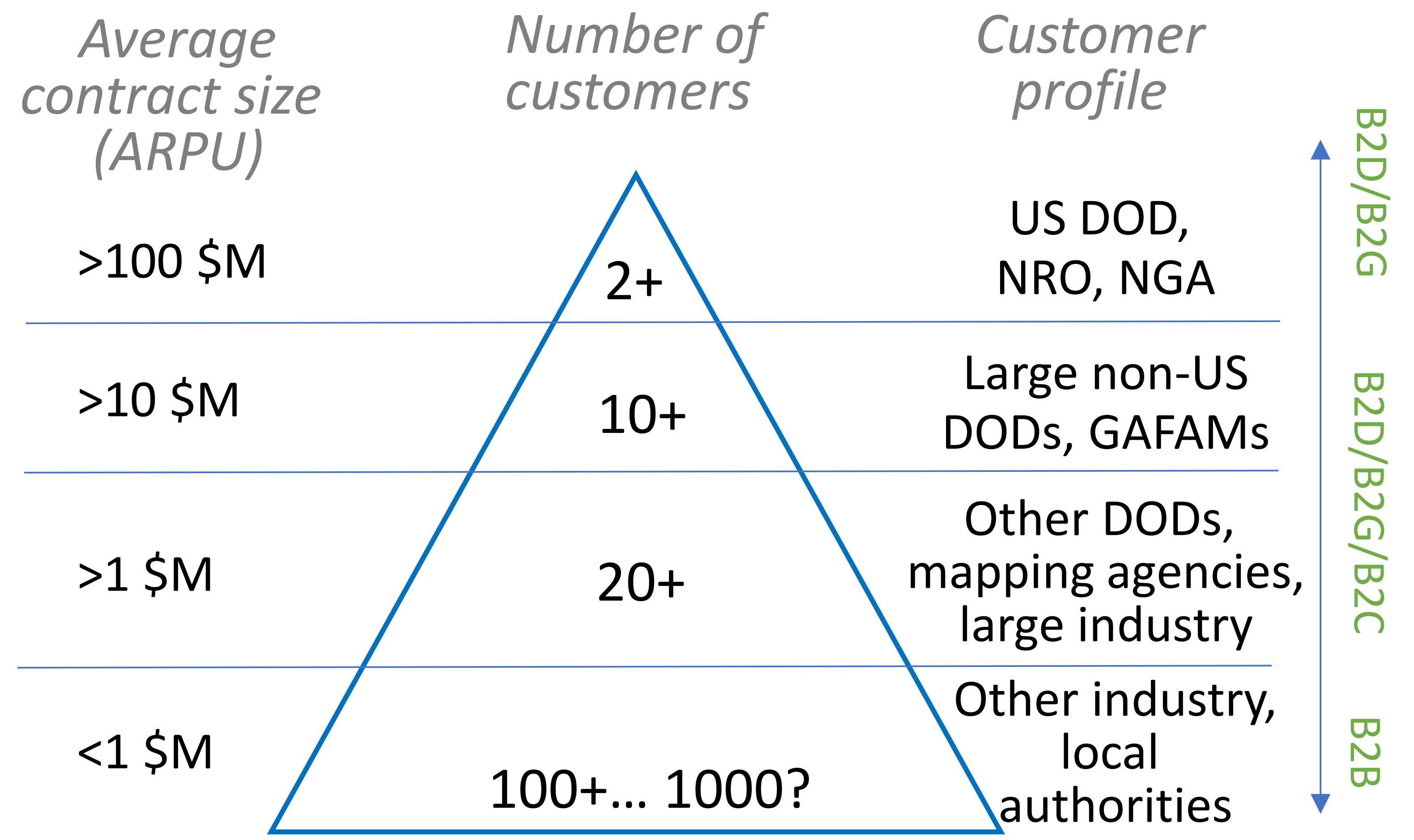
The 4 main challenges of EO business:

Strategic positioning



3 basic options
+ various trade-offs
(e.g. joystick model
for defence customers)

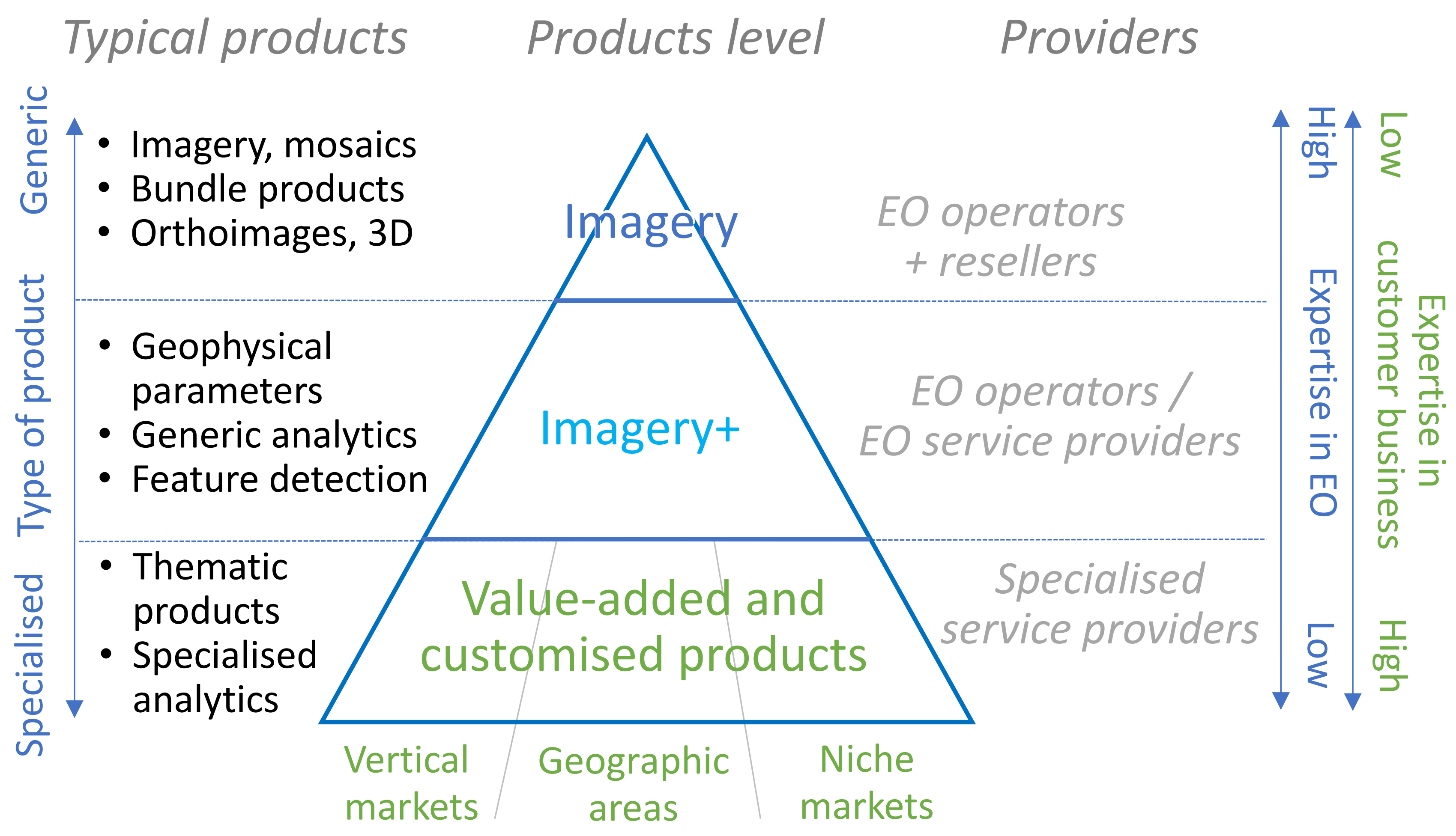
Number and heterogeneous population of customers



- "Low-hanging fruits": **few customers able to award large contracts.** EO expertise. Mainly in the defence sector and GAFAMs for LBS.
- New potential customers, **not interested by EO imagery**: **they need high level information derived from it** (VAS).
- **Market fragmentation** (geographic area, customer activity, niche markets): cost and legitimacy of the service providers.

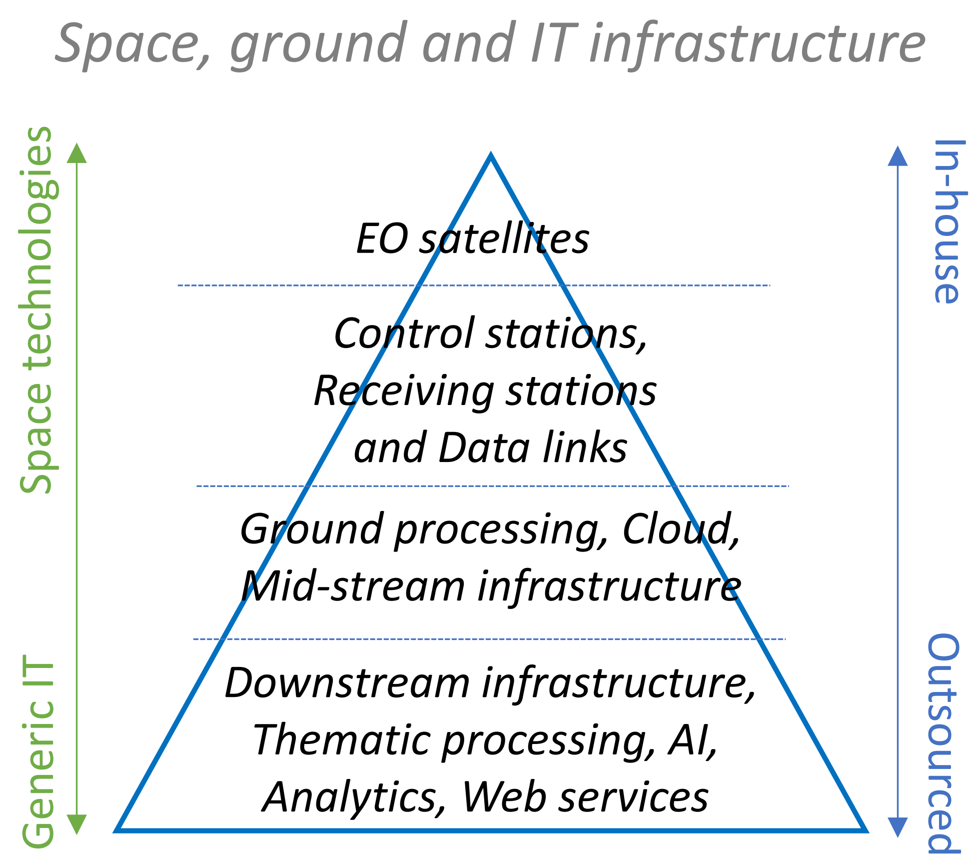
The main challenges of EO business:

The missing links between imagery and value-added services



- **Specific customer's requirements** vs product definition.
- **Dilution of the actual weight of EO data** (among other sources of information).
- **Tricky route** between a small number of vertical markets to a fragmented users base.

and between space and final user



- **A wide range of technologies**, from space to advanced IT.
- Dominant motto: **AI and analytics will close the gap**. **Partly true**…
- **Outsourcing and external suppliers can generate significant costs**.

Wrap-up

Beyond the retrospective analysis…

- Disruption in EO industry:
  initial promise of New Space is only partly met.
- New EO assets in orbit: **impressive achievements**. New ways of designing and manufacturing satellites. New services.
- Market size and customers' profile evolution is **below expectation**: the **usual suspects are still the main customers**.
- **Cash crisis**: substantial risk of bankruptcy (for the weakest actors).
- Strategic pivots are likely: **startups moving from services to satellite manufacturing.**
- **Support and incentives of governments** will remain essential (e.g. framework contracts, dual use schemes).
- **Is it truly a commercial business**? Strong influence of defence and governmental customers.
- Links between **private companies or investors** and **national and sovereignty stakes**.
- Future of EO: **Europe behind two giants**? Far from a level-playing field.


Thanks for
your attention