EARTH OBSERVATION: STATE OF PLAY AND FUTURE PROSPECTS

Presented by
Sima Fishman, Managing Director
Euroconsult USA

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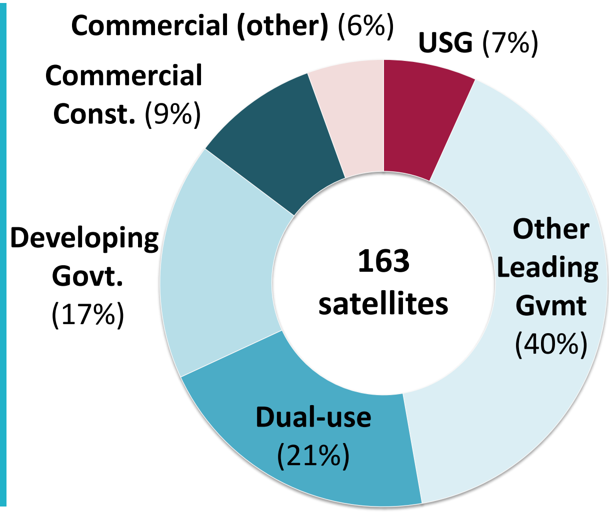
SNAPSHOT OF THE INDUSTRY

- 163 satellites (>50kg) launched for civil/commercial Earth observation and 31 for GEO/LEO meteorology over 2006-2015, from 35 countries
- To expand to over 400 satellites for civil Earth observation & over 50 for meteorology from 2016-2025 as further governments and commercial enterprises launch capacity
- In addition, up to 2,000 satellites <50kg , built in constellation will add to the overall supply: first constellations taking shape, some funding still required
- Majority of satellites launched from government space agencies; civil government investment topped $10 billion for the first time in 2015
- Commercial data market totaled $1.7 billion in 2015:
  - 5%, 5-year CAGR - defense remains the main growth driver
- Value-added services market reached $3.2 billion in 2015
  - 11%, 5-year CAGR environment monitoring and infrastructure projects lead.

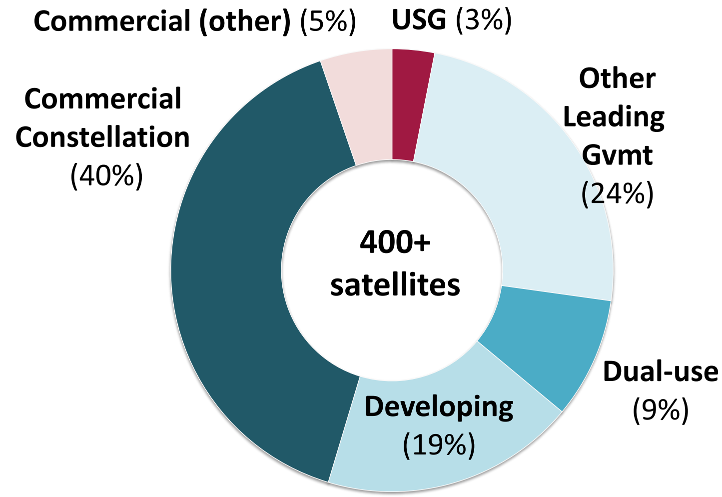
SATELLITES LAUNCHED BY CLIENT TYPOLOGY*

SAT. LAUNCHES

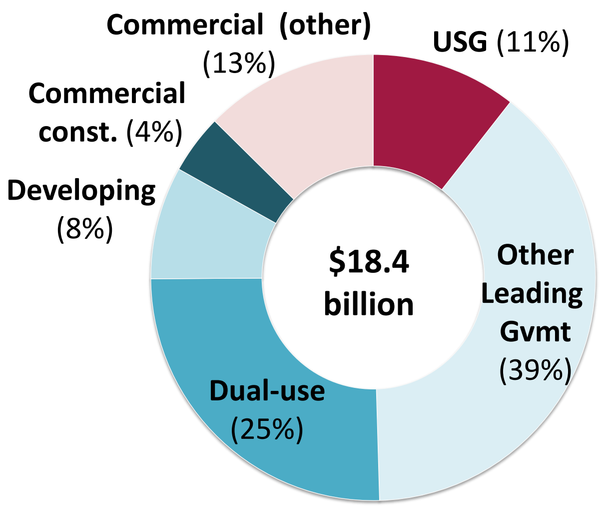
2006-2015

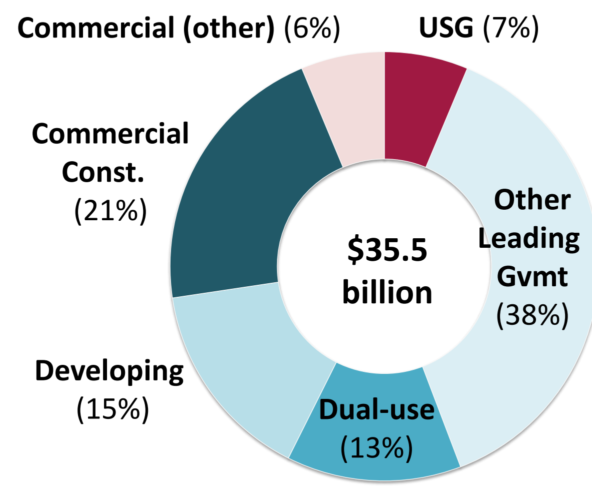


2016-2025



MARKET VALUE



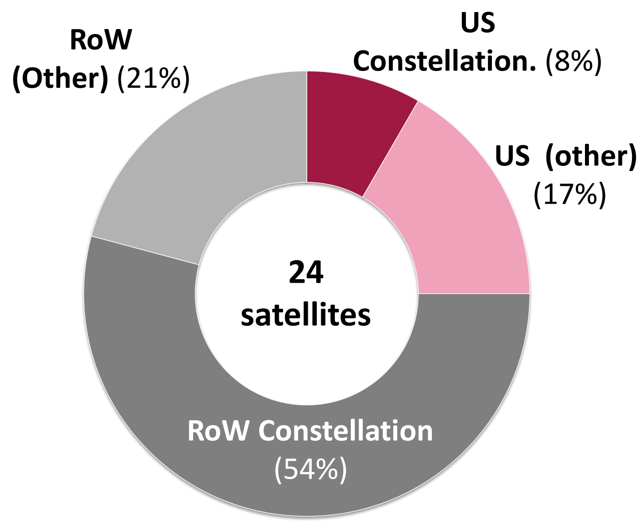


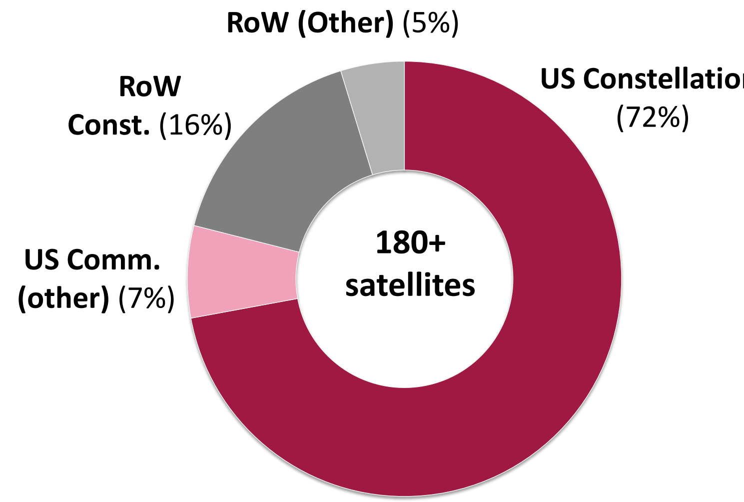
*civil and commercial only

SATELLITES BY CLIENT TYPOLOGY: COMMERCIAL

2006-2015 | **2016-2025**

SAT. LAUNCHES





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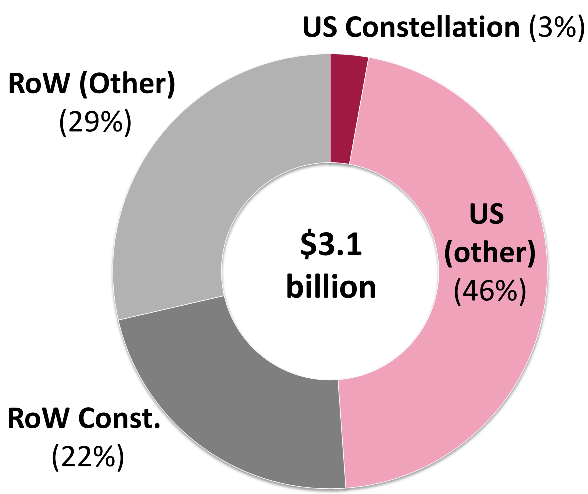
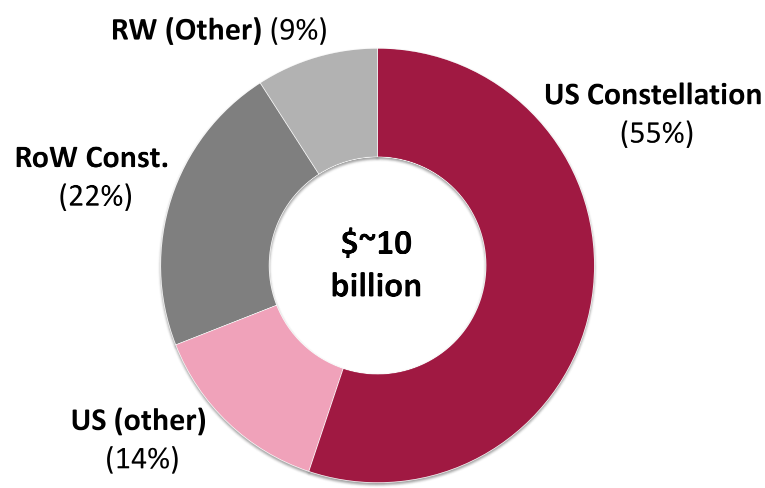
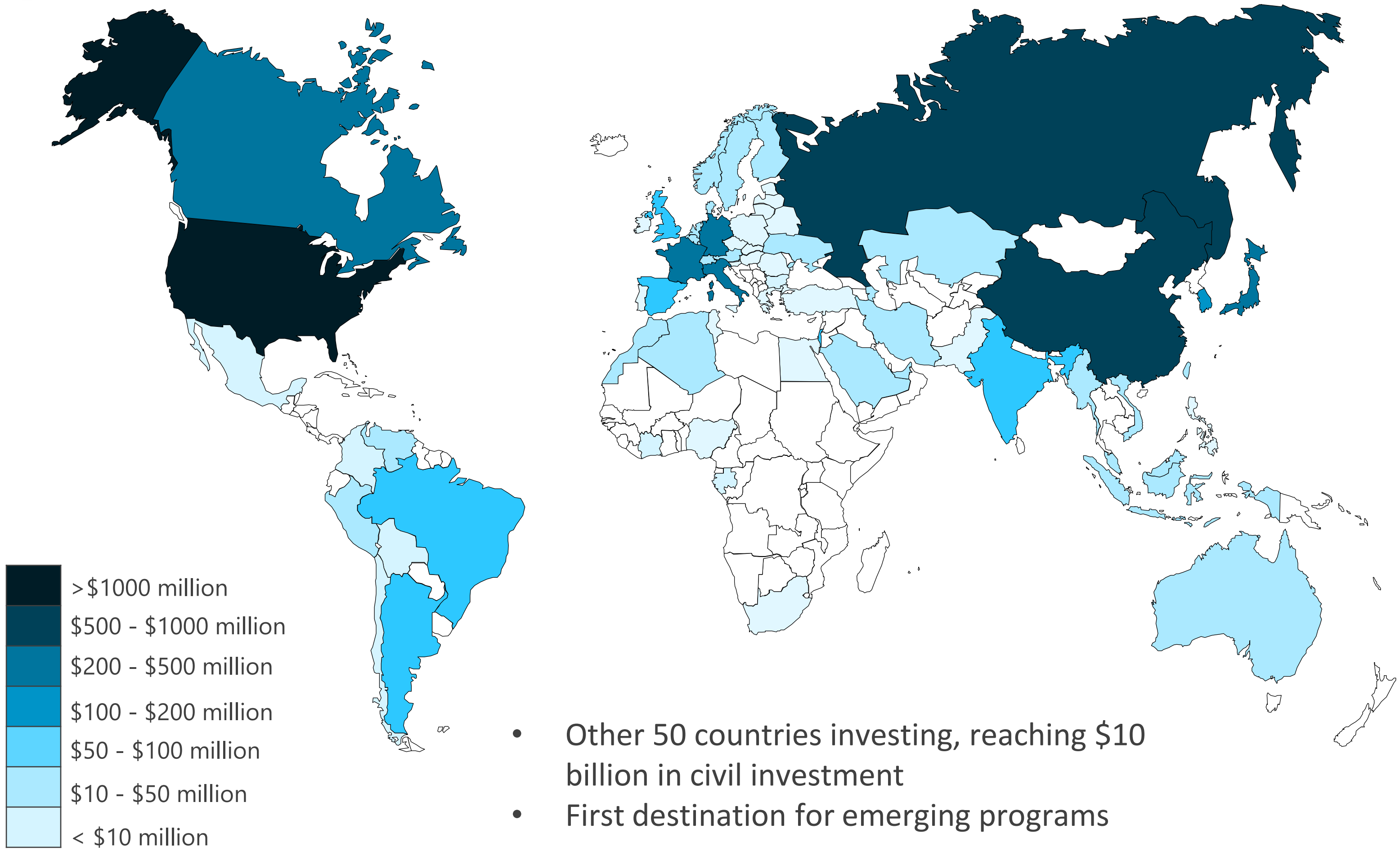




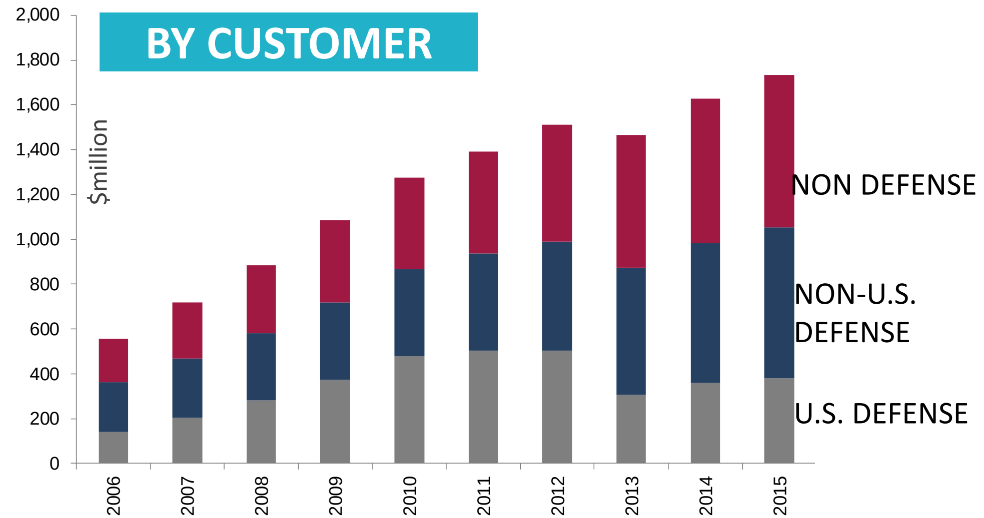
GOVERNMENT EO PROGRAMS

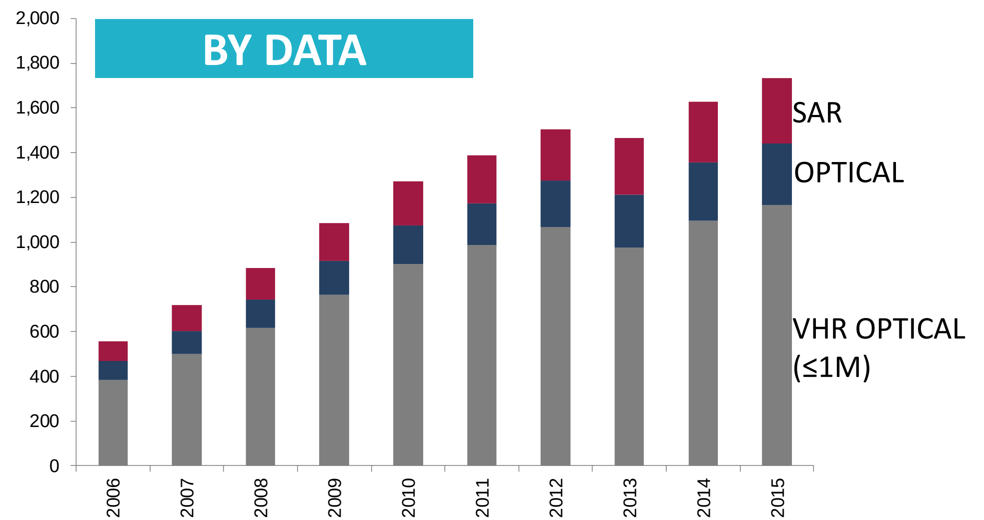


- Other 50 countries investing, reaching $10 billion in civil investment
- First destination for emerging programs

EO COMMERCIAL DATA SALES

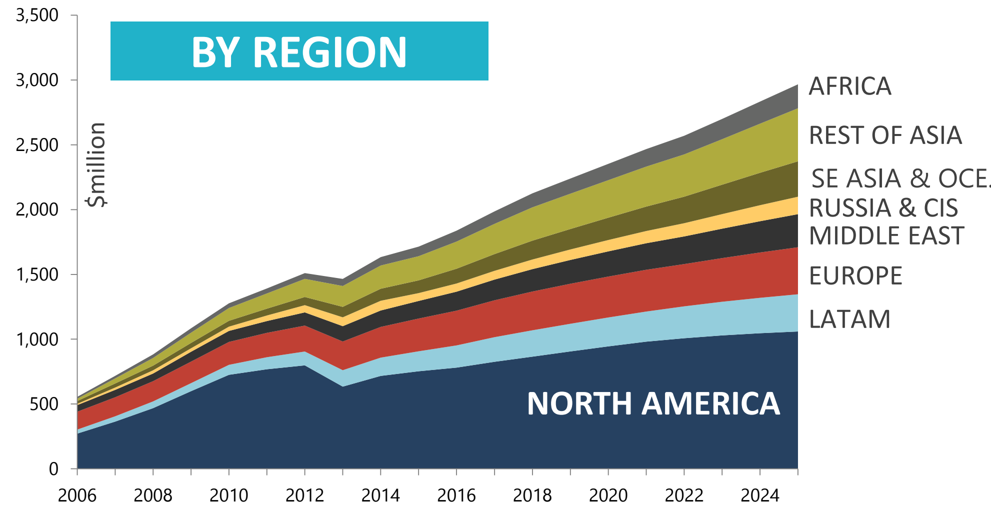
- Commercial data market reached $1.7 billion in 2015
- Defense markets dominate, topping $1 billion. Reflected in the procurement of VHR data
- Defense/maritime remains first destination for SA
- Non-US defense remains most significant growth driver (11% 5-year CAGR)
- Enterprise markets gaining traction – mainly going to support VAS development
- More moderate resolution datasets starting to slow (in revenue generation) – price pressure, greater availability of lower cost solutions

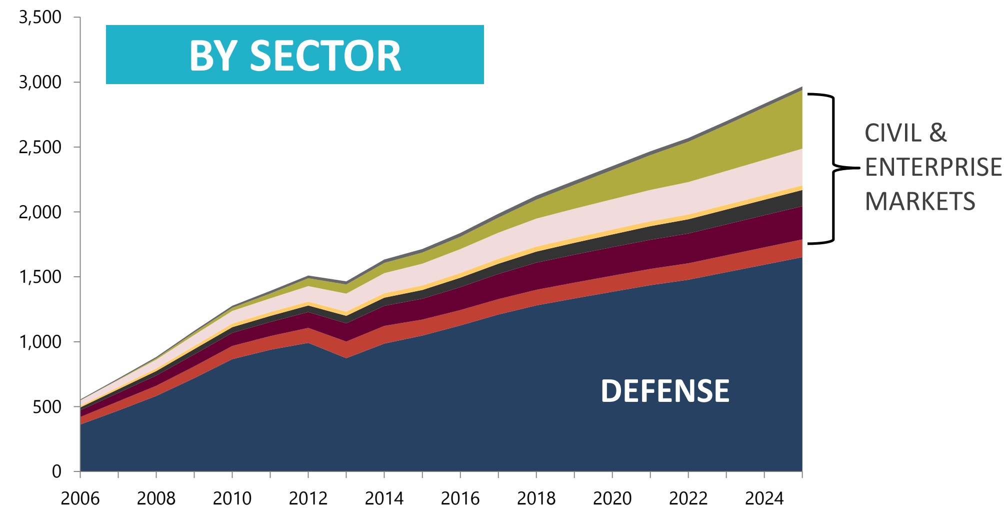




FORECAST COMMERCIAL DATA SALES

- Commercial data market to reach $3 billion in 2025 (6% CAGR)
- Lower figure on previous years:
  - Slowing regional markets (LATAM, Russia)
  - Oil and gas impact
  - Greater price pressure > higher usage, but at a lower data cost
- Regionally, Asian markets in double-digit growth, expected to become second area for data sales
- LBS markets fast developing – but expected to be greater emphasis on lower-cost data inputs to build VAS

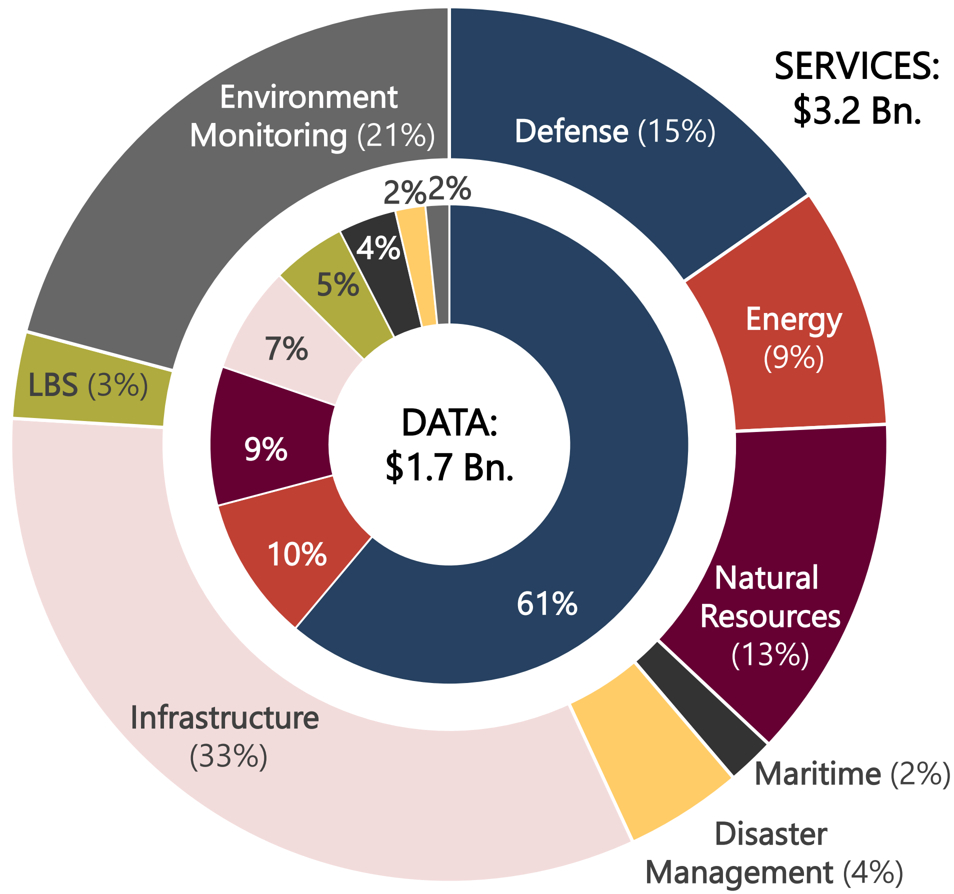




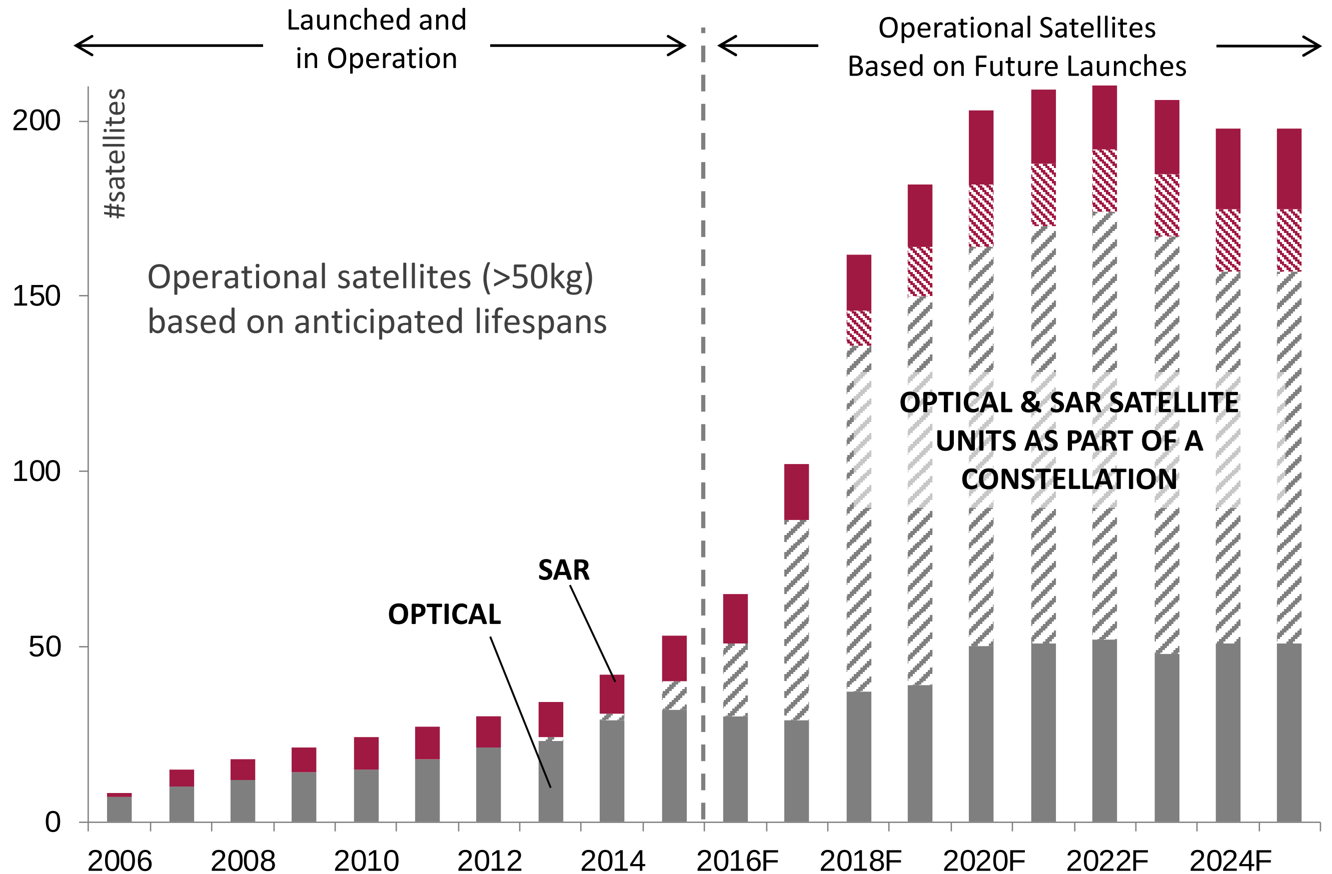
VALUE ADDED SERVICES MARKET

- Total VAS + Data market = $4.9Bn (of which $3.2 VAS)
- Key markets those which leverage lower-cost/free data sets
- Defense sector data sales do not translate in VAS > much work done in-house

- Current market forecast to reach $5.3 by 2025 (5% CAGR)
- However, potential for additional service areas to open up focused on high revisit location-based application
- Uptake can be significant – though entry in to new markets a challenge

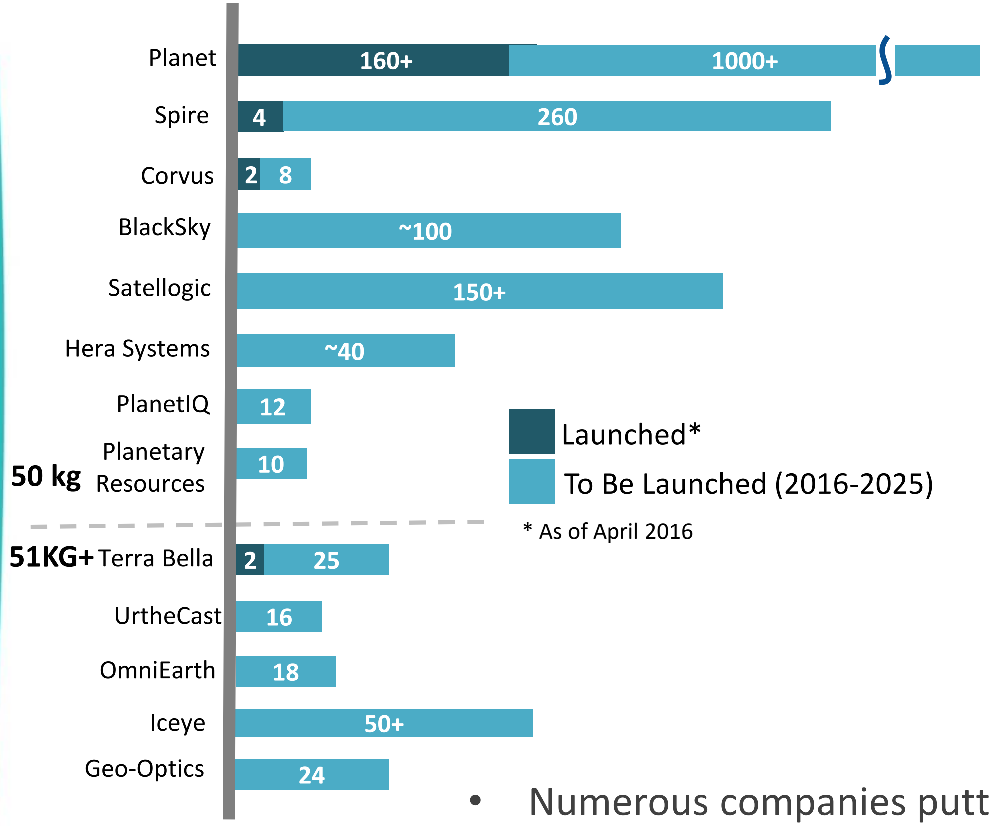


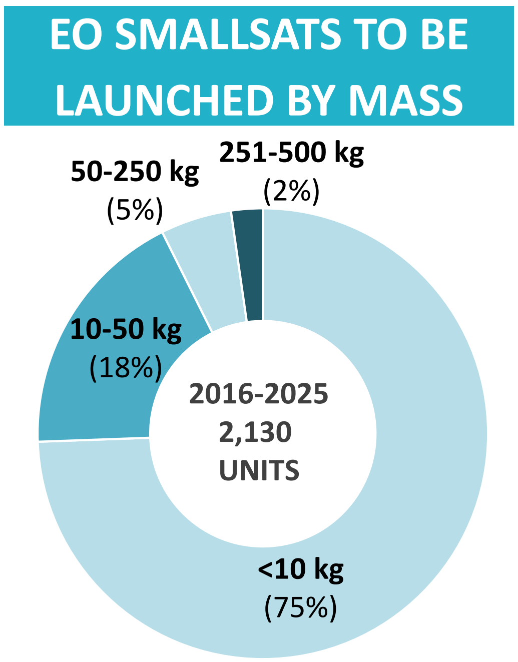
SIGNIFICANT COMMERCIAL SUPPLY EXPANSION



* Commercial refers to commercially operated and commercial data availability from government satellites with data <2.5m optical or <5m SAR

ADDING EVEN MORE INTO THE MIX

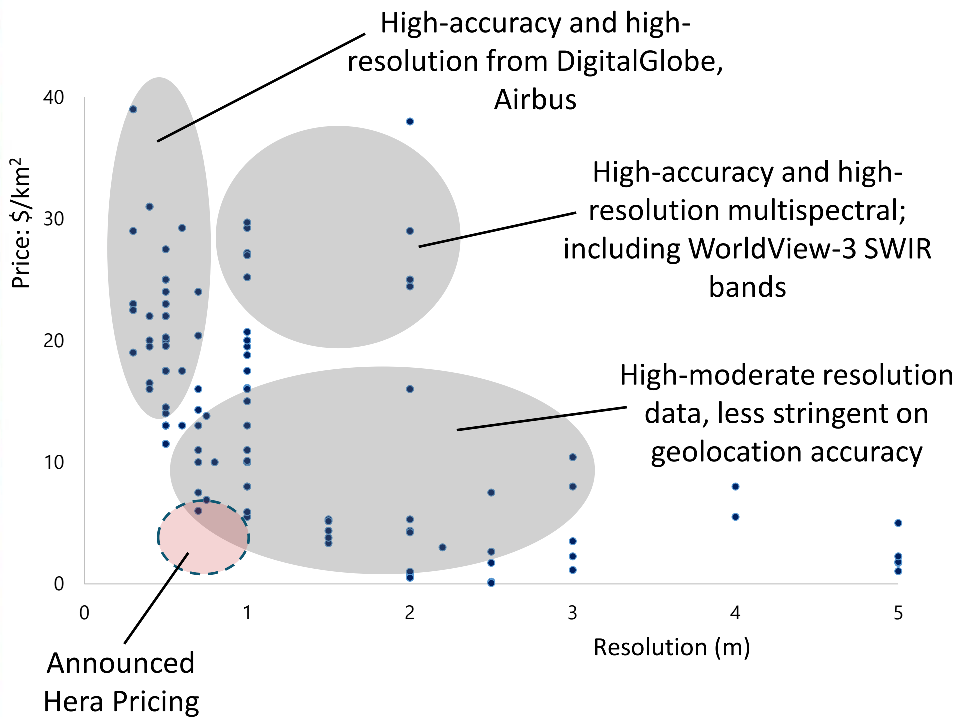




- Numerous companies putting forward constellation solutions
- Sector attracted >$500 million in investment other last few years, though slowed in last 18 months
- First full operations for several actors expected in next 2-3 years
- Further funding required to support more ventures

PRICING STRATEGIES

OPTICAL COMMERCIAL DATA PRICING



*Newly acquired level 1 data, data prices from the last 12 months

- Current prices for EO data range from free to over $100/km^2: Ranges due to GSD, spectral res., geolocation accuracy
- … 1m optical data can be acquired for $5/km^2 if there's compromise on accuracy.
- With competition prices are expected to fall at a faster rate than current: 3-5%/year
- New lower-cost solutions expected to challenge on price, albeit if challenged by platform stability
- Bringing the geolocation accuracy into the 10–20 m CE90 range would make the data suitable for most applications.

KEY TAKE-AWAYS

ON SUPPLY

- EO supply expected to expand rapidly in the coming 5-years; this will add competition and challenge on price, but growing commercial capabilities (in hyperspectral, GPS-RO, meteo…)
- Possible for supply to start outstripping demand… unless new markets are opened up?
- Investment into the sector slowing in the last year; a wait and see approach for emerging constellations? Further companies still requiring further funding

ON DEMAND

- VAS more commonly using lower-cost datasets, argument for allowing certain data types to go for free (as supported by Copernicus, Landsat)
- Two differing markets? Or two tiers of data? One for high-end data to support defense, lower-cost, high revisit data building services?
- Defense expected to remain first market for commercial data; infrastructure, environment and emerging LBS for value-added services