
**November 22, 2024**

# Satellites and Growth

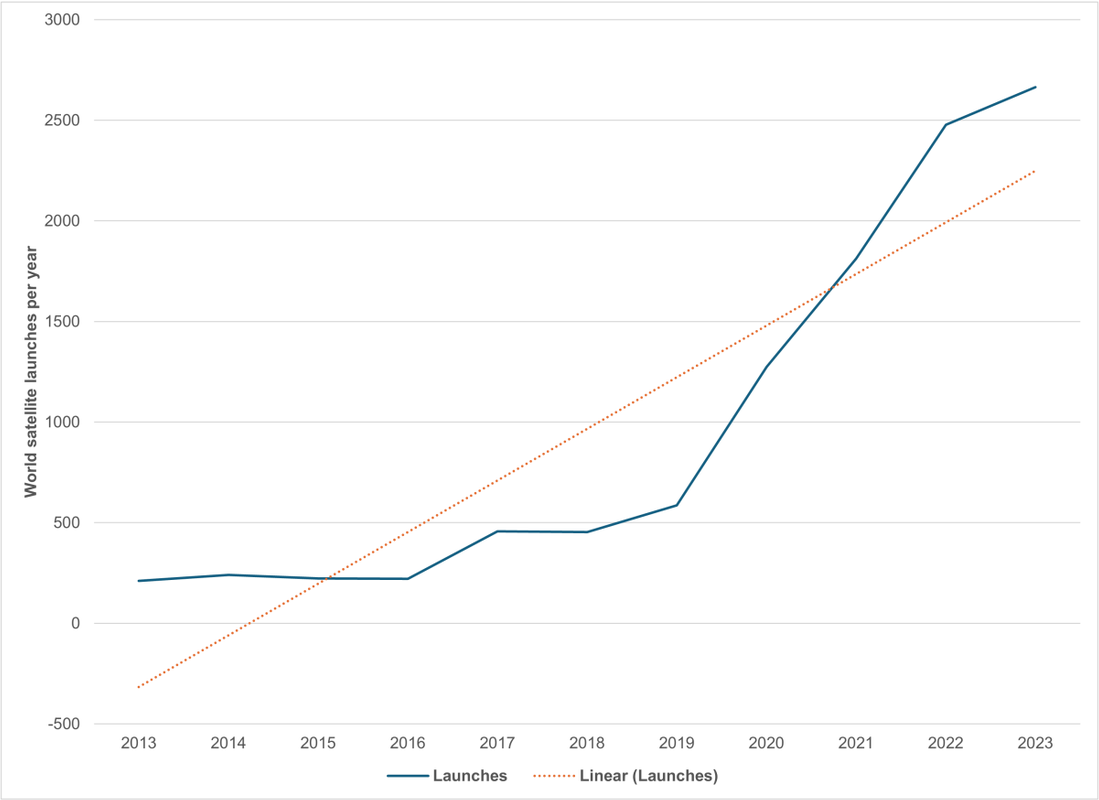
- **One area for growth in 2025 and beyond is space**. The space economy is predicted to be $1.5 to $1.8trn by 2035. The link between the commercial use of satellites and technology will challenge our energy policies and be critical for data communications.
- **The cost of a space race should be part of the outlook for the next 10 years**. The hopes for building out a moon-based station for interplanetary travel and new mining/tech production will require more, not less global coordination.
- **The traffic jam in space is just starting**, with wider implications for global rules and for national defense.
- **There is a correlation to AI and data warehousing**, as just one autonomous car produces 4 terabytes an hour of data volume – with much of that volume using satellites. One hour in a self-driving car is equal to 335 iPhone users in a month. Energy use follows.

“It’s going to be like an interstate highway, at rush hour in a snowstorm with everyone driving much too fast, except that there are multiple interstate highways crossing each other with no stoplights.” – Harvard Astrophysicist Jonathan McDowell on what will happen to satellite orbits if all mega-constellation plans come to fruition.

While most investors are caught up in the speculation around balancing growth and inflation in the new Trump administration, with tariffs and tax cuts driving FX and bonds, and lifting equities on the back of a Republican sweep, there are some areas of the new government that aren’t well covered but are just as important to global macro investing in 2025. The role of government and private companies in space in 2025 and beyond stands out as an opportunity and a risk. Growth and fiscal spending on space worked in the higher inflation 1960 and 1970s. Will it work now? There are a number of pieces on space and growth opportunities. Euroconsult’s recently released report titled “Prospects for Space Exploration” indicates that global space exploration alone is likely to touch $31bn in the next decade. McKinsey sees space as a $1.8trn growth opportunity, with a key focus on aerospace and defense. The potential for investors over the longer term looks significant. The valuation of the entire industry is $450bn while the estimates for private companies like SpaceX are now over $200bn.

---

**Exhibit #1: Satellite Launches**

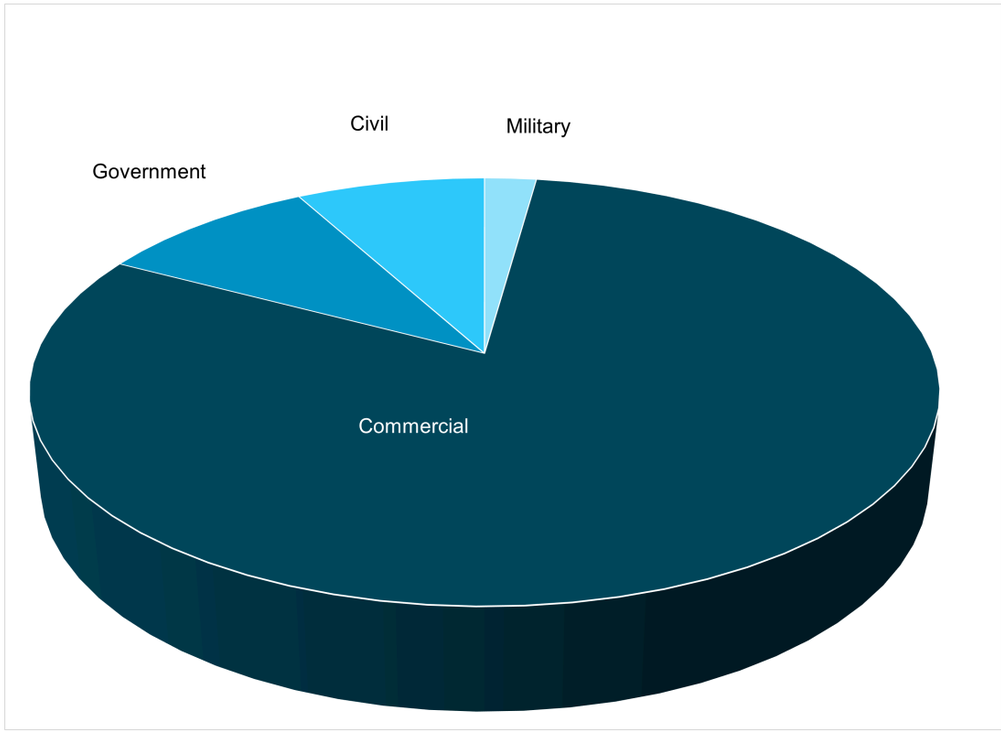



Source: UCS Satellites, BNY

Over the last five years, the number of satellites in space has doubled, and over 10 years it has seen a tenfold increase. The role of the communication services sector in driving this growth dominated, with most of the satellites launched linked to communications. While the trend may slow there is a baseline replacement need for the current 9,000 satellites estimated at 2,500 per year. The role of defense and national security interests in space has remained stable, while the number of nations involved has more than tripled over the last 20 years.

There are four key takeaways from this growth: **1) The collision risk for satellites is higher** and with it costs for insurance and more inventory. **2) The lifespan of satellites has dropped** as the purpose and orbit has been lowered, adding to collision risks. **3) The focus of space as the next growth opportunity** has been part of US and China policy toward the moon. Without guardrails from supranational entities like the UN this race will include other nations**.** The need for more data and more communications as the world adapts to AI use will only increase the demand. **4) The need for more missiles to get to space has added to defense spending** and development interests for rocket and other technology globally. There is a connection here between rockets/satellites and the overall connection of the aerospace sector to other parts of the economy – like utilities, materials and insurance.

**Exhibit #2: Use of Current Satellites**




Source: UCS Satellites, BNY

**Collisions:** The risk of space collisions is going up – with 2021 up 58% from 2020 and 2022 134% higher – exceeding 4 million according to University of Southampton Professor Lewis. Beyond the academic reports, we have government data as well. Take SpaceX's Starlink as an example. According to information that the Elon Musk-owned company submitted to the US Federal Communications Commission (FCC) in December last year, SpaceX's autonomous collision-avoidance system performed 26,037 orbital avoidance maneuvers with its Starlink satellites in the two-year period between December 1, 2020, and November 30, 2022. As all these data points highlight, the risk of unfettered satellite launches will lead to more risk of disruptions and more competition between nations for orbits to service their populations.

**Lifespan**: There is a 25-year limit to satellites by world agreement, but most new satellites are designed for 5+ years. The key factors for longevity – orbit friction, solar storms and mission – mean low earth orbit (LEO) satellites have a 25-year lifespan. Starlink satellites are designed for 5+ years with limited fuel for orbit adjustments.

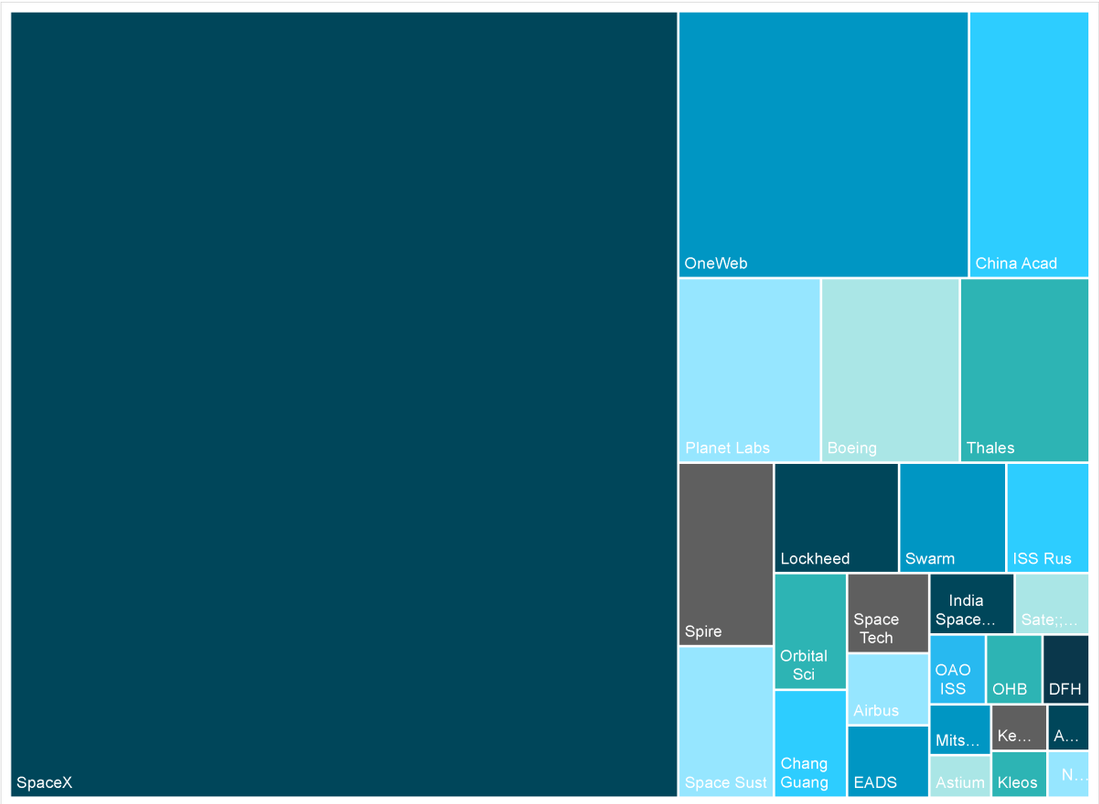
> **1. Orbit**: Low-orbiting satellites below a few thousand kilometers are low enough that drag from the air has a big effect, and over time, the orbit will decay. So, the drag from the air slows the satellite down, the satellite loses energy, and the size of the orbit gets smaller and smaller until it gets into a part of the air where friction builds up so much that the satellite just burns up. In higher orbits particularly out toward around 36,000 kilometers – what we would call a geostationary orbit – in principle, they could stay up there forever. The orbit will tend to shift over time, but it will stay orbiting the Earth in the same way that the Moon still orbits the Earth after millions of years.
>
> **2. Equipment and fuel**: It is hard to design them to last much longer than that, either because the solar arrays stop working or because they run out of fuel to allow them to maintain the orbit that they are supposed to be in. So, when they hit the end of their useful life, we want to move them out of the way, so they are not interfering with things, and we will move them into what is known as a graveyard orbit.

**Space race**: As of May 2023, the number of active satellites in orbit rose to 7,561, with Starlink accounting for over 4,000 of them. The US has dominated the satellite race with 65% of the total. The top ten satellite nations are the US (5,200), China (625), the UK (1,150), Russia (200), Japan (95), India (61), Canada (59), Germany (57), Luxembourg (56) and Argentina (46). Of all the satellites in orbit, most (5,525) are used for communications. The orbit of these satellites matters to their age and function. LEO satellites account for the majority (6,768), while medium earth orbit (MEO) satellites account for 143, elliptical 59, and geostationary earth (GEO) 590.

The largest and most clear-cut area for growth in space will continue to be in satellites. Part of this is due to the trend of covering the earth with nationally controlled systems, part has to do with the aging of satellites and part with collision risks. There are 20 major suppliers for satellites worldwide – this basket has been tracked by BNY. The key manufacturers of satellites are Airbus, OHB, Boeing, Invap, JSC Info, Lockheed Martin, Northrop Grumman, Raytheon, Maxar and Thales – most of which are based in the US or the EU. The largest player is SpaceX, which is a private company. Comparing satellite makers to the communication and the insurance sectors highlights the correlations between sectors – like utilities compared to data centers and IT. The aerospace industry will require significant support from communications companies, insurers and governments in the next decade should the plans of the US, China and the rest of the world play out.

---

**Exhibit #3: Satellite Makers by Current Use in Space**




Source UCS Satellites, BNY

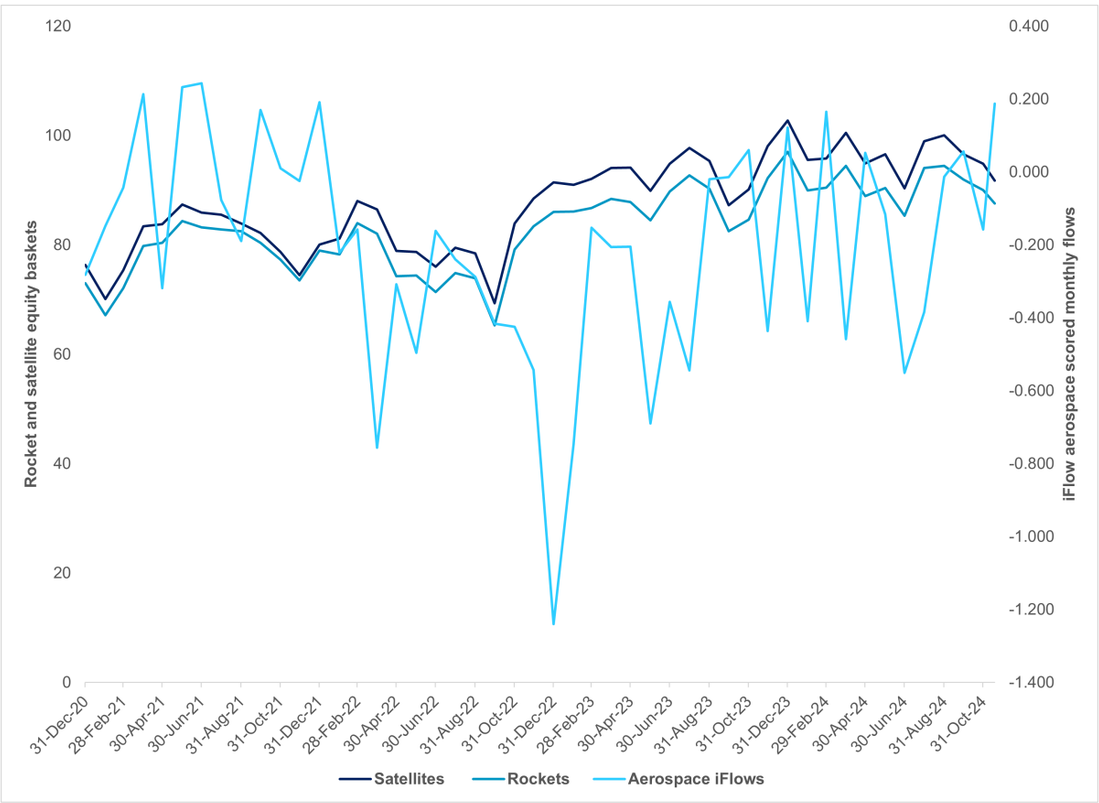
---

**Rockets and energy use**. Getting satellites into space has been the key issue for changing the costs of satellites. Launching rockets has been one tool, the Space Shuttle another, and SpaceX recycling parts of Falcon 9 rockets a third. The size of a satellite and its orbit determine the launch. The makers of rockets are different from the makers of satellites and the launching pads and control of them also matter. The

race for space is both a private and government one, with Russia, India, China, Japan and Europe all vying for a role alongside NASA and SpaceX.

As we can see from building out an equity rocket basket along with a satellite basket, the performance of the largest makers has been mediocre, but our flows suggest a clear belief in future growth. The optimism is there for more. There is also a lot of noise in these baskets and mean-reversion reflecting defense spending in general.

**Exhibit #4: Rocket and Satellite Equity Performance vs. Aerospace iFlow**




Source: iFlow, Bloomberg, BNY

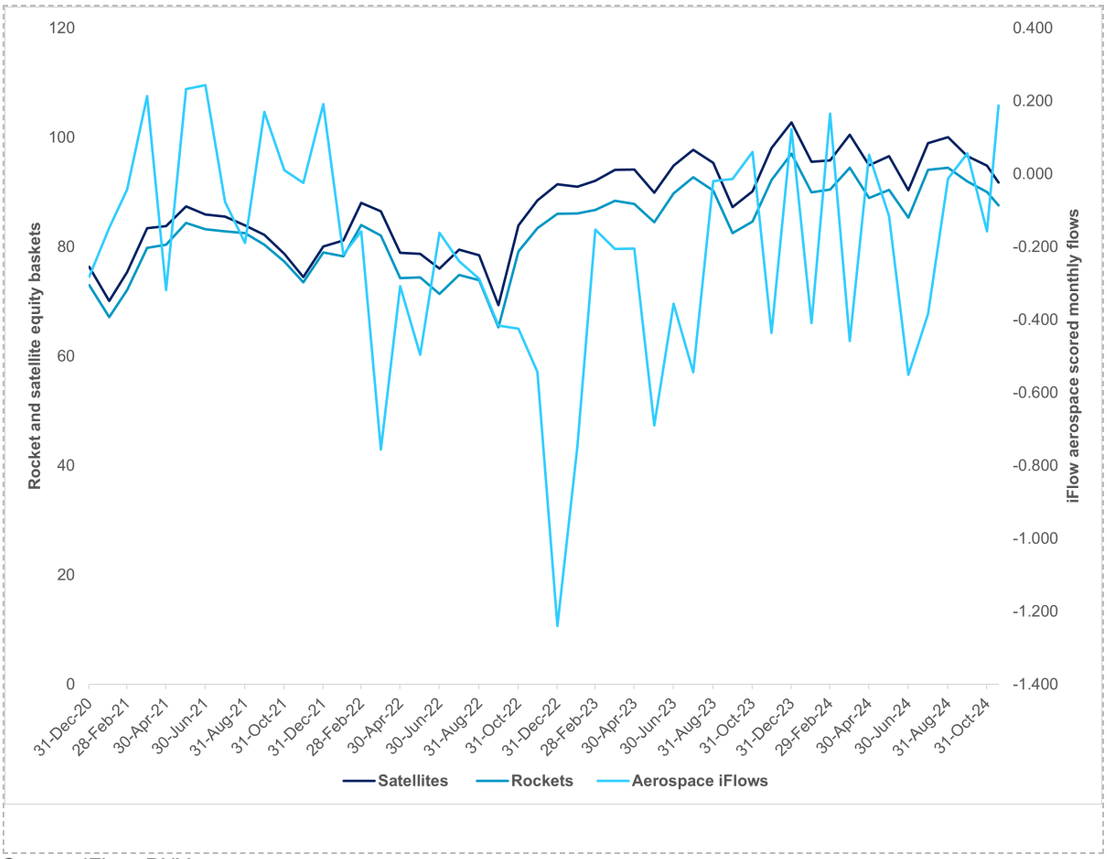
There is a knock-on effect in space investments to other sectors – insurance given the expense and risk of the satellite launch and collisions, energy given that it remains the key variable for cost and interconnects to the demand of satellites from data centers, and, finally, the communication sector, where the demand for satellites starts. Finally, there is the IT sector, which supports and benefits from the entire enterprise. The research into orbital microfabrication is an example of this. When you look at how correlated flows are to each sector there is little evidence this matters. Over the last year, the correlation of utilities and communications to the aerospace sector was significant, but the beta of the sector was lower than IT and communications reflecting the lower market capitalization.

**Bottom Line:**

There is an opportunity in space but, as with all investments, the key is timing. The best way to think about when to consider such an investment requires diverse data that shows holdings, flows and shorts as they mix in the present price. The buying of aerospace and defense industries has seen a boost in the last month and some of that comes at the expense of other sectors that feed them. This means there is a

rotation plan to consider for space investments into the next year along with how the rest of the world pushes into the market.

**Exhibit #5: Uptick in Aerospace but IT Lags in iFlow**




Source: iFlow, BNY

Disclaimer & Disclosures

**Please direct questions or comments to:** iFlow@bny.com

**Bob Savage**
HEAD OF MARKETS STRATEGY AND INSIGHTS

CONTACT BOB

This message was sent from an unmonitored email box. Please do not reply to this message.

.