

REPORT ON THE SPACE ECONOMY 2024



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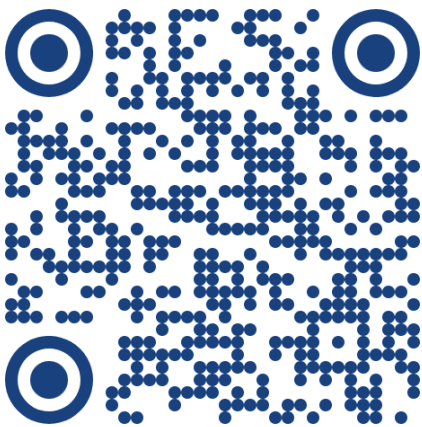


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1. Introduction

As published by the Organisation for Economic Co-operation and Development (OECD) in 2012¹, the space economy is the full range of activities and the use of resources that create value and benefits to human beings in the course of exploring, researching, understanding, managing, and utilising space. The definition, applied by the European Space Agency, and developed through the work of the OECD Space Forum², includes the value of the space sector itself, comprising of space upstream and downstream companies, as well as the value of impacts that space activities have on the economy, environment and society.

The scope of the present “Report on the Space Economy” is on the space sector’s economic value. It provides an annual update on the status and trends of the space industry, globally and for Europe specifically. The document is structured in two main chapters.

Chapter 2 presents key trends and figures for 2023, covering public and private investment in space, space activity, space industry’s revenues both upstream and downstream and the space sector’s workforce.

Chapter 3 highlights selected trends at the macro-economic level in 2024, providing context to the environment in which the space industry is evolving. It also presents preliminary insights on the space sector in 2024, covering anticipated public investment, trends in private investment, space activity and satellite manufacturing orders, based on data available as of 30 September 2024.

The document is based on a selected and carefully reviewed set of data to describe the status and main trends affecting the global and European space industries. This work is centred on the continuous assessment of the data presented in the report, notably by:

- Ensuring an in-depth understanding of the methodology used by the data producing entities;
- Identifying any changes of scope or approach to dissociate statistical growth from actual organic growth;
- Outlining clear definitions to avoid misleading comparison across different datasets; and;
- Conducting sanity checks with additional sources to validate orders of magnitude.

Since 2022, the entire set of quantitative data is originating from European entities. The work of the team builds on strategic partnerships with the OECD, but also Eurostat and has allowed significant improvement in key datasets and better alignment of various sources on core indicators.

¹ OECD, Handbook on Measuring the Space Economy, 1st Edition, 2012.

² For more information, please see [ESA Space Economy – Partnering with the OECD to develop international best practices](#), July 2024.

2. The Space Economy in 2023

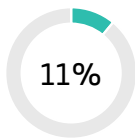
2.1. Overview

The Space Economy in 2023

Public Investment in Space

World **106b€** +11%

Europe **11.9b€** +1%

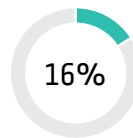


Europe's share of global space public funding

Private Investment in Space

World **6b€** -32%

Europe **977M€** -14%



Europe's share of global space private investment

Space Activity

221 launches +18%

67 Self-provisioned launches

2,940 satellites launched +17%

+48% of mass launched

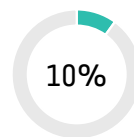
Space Upstream Market Value

World

53b€ -19%

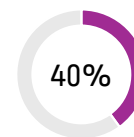
Manufacturing ↓

Launch ↓



Europe's share of global upstream market

Europe



Europe's share of its accessible upstream market

Space Downstream Market Value

World

358b€ +4%

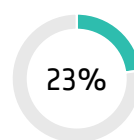
Satcom ↓

Navigation ↑

Earth Observation ↑

Europe

82b€ +4%



Europe's share of global downstream market

Figure 1: Space Economy in 2023 (all growth rates compared to 2022)³

³ Self-provisioned launched are launches carried out for satellites operated in-house.

2.2. Public Investment in Space

As shown in Figure 2, institutional space budgets (civil and defence) reached a new historic high of €106 billion in 2023⁴, posting an 11% increase compared to 2022 and continuing their growth path with an 8% CAGR over the past five years.

As in 2022, the defence spending is the main driver behind the growth of overall public space budgets in 2023 (18% growth from defence from 2022 to 2023 and 7% from civil).

While civil space remained the largest contributor to public space budgets worldwide since the early 1990s, the share of defence has been continuously growing and now exceeds civil space spending for the first time in 2023 (just above 50%).

Worldwide public budgets for civil space programmes keep being driven by long-term investment from established space nations in space exploration and in particular human spaceflight.

In Europe, the consolidated public space budget was €11.9 billion in 2023⁵, representing a 1% increase compared to 2022. The share of civil space budget in Europe is around 85% in 2023, displaying a completely different behaviour compared with other major space players.

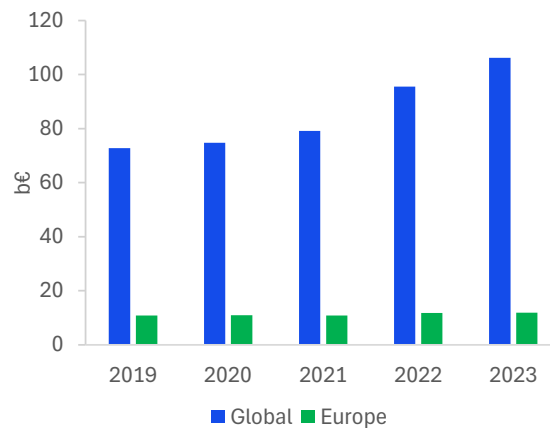


Figure 2: Institutional space budgets 2019-2023 (civil and defence)^{4, 5}

⁴ Euroconsult, Government Space Programs, 23rd Edition, December 2023.

⁵ Eurospace, Facts and Figures, Press Release, 28th Edition, July 2024; European Commission.

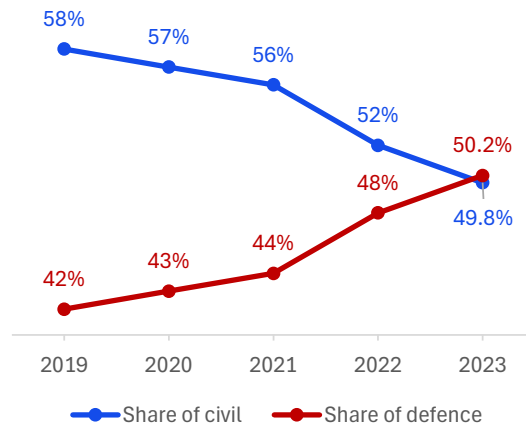


Figure 3: Evolution of civil and defence share of global space budgets, 2019-2023⁴

Figure 4 presents the distribution of institutional space budgets among the main space-faring nations and Europe. In 2023, the US remained the largest single space budget by far, yet its share of the global space budget has been gradually decreasing, from over 75% in 2000 to just above 60% in 2023. On the other hand, China keeps reinforcing its second place, going from an estimated 2% to 12% from 2000 to 2023 through ambitious long-term programmes in both civil and defence, and surpassing the overall budget allocated to space in Europe. The European share has remained rather stable, and accounts for 11% of the global space budget in 2023.

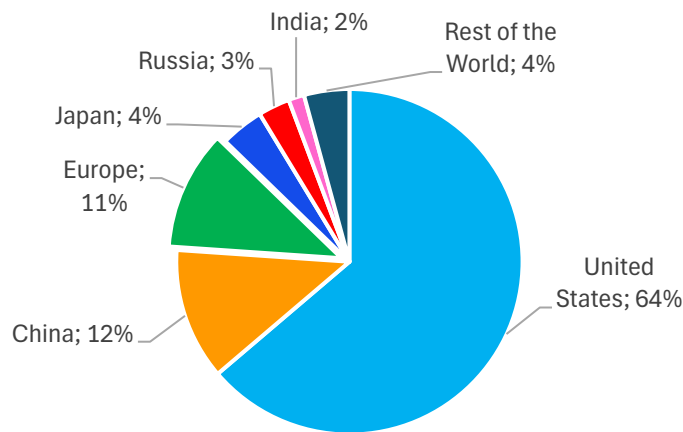


Figure 4: Distribution of institutional space budgets in 2023 (civil and defence)^{4, 5}

Given the width of their space programmes and notably their respective launch capabilities, it is acknowledged that the Russian and Chinese space budgets are most likely underestimated (due to the unavailability of public information), which makes the budget comparison a challenging exercise.

The mass launched by major space players provides a complementary view of the budget comparison and has the advantage of being based on publicly available data.

Figure 5 below shows the mass launched by production region, for government programmes, over the period 2014-2023. The figure outlines a very different distribution of space activity between the major space players, with the US, China and Russia accounting respectively for 33% and 32% and 22% of the total mass launched for government programmes, while Europe accounts for 8%.

Beyond the funding gap, a significant difference between Europe and its competitors is related to human spaceflight. Across the 2014-2023 period, human spaceflight accounted for about 20% of the total mass launched, and 30% when removing Starlink.

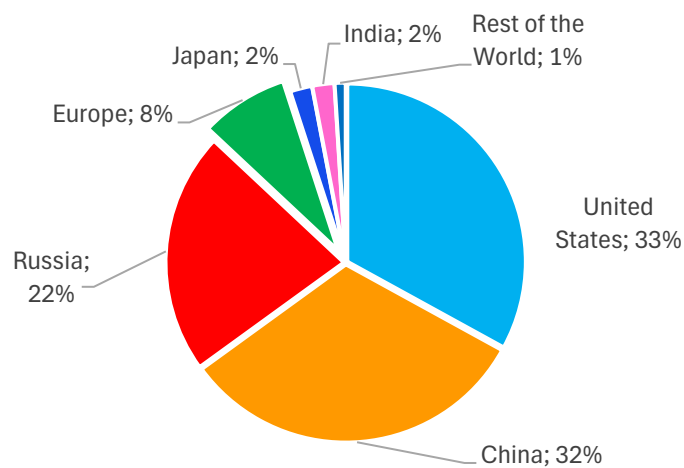


Figure 5: Mass of spacecraft launched, by production region, 2014-2023 (tons, civil and defence, government programmes only)⁶

⁶ Eurospace, 2024 Facts & Figures Global Context, *upcoming publication*.

2.2.1. Public Space Budgets as Share of GDP

The ratio of public space budget to the Gross Domestic Product (GDP) provides a view on public space funding intensity. As presented in Figure 6, the share for Europe (EU27, Norway, Switzerland and the UK) was 0.06% in 2023, slightly below the 2022 level (0.058%), mostly due to a slight increase in European GDP compared to a rather stable European public space budget. Reaching 0.135% in 2023, Luxembourg remains the highest share of public space budget per GDP in Europe. At the global level, Luxembourg ranks third, behind the US (0.262%) and Russia (0.169%).

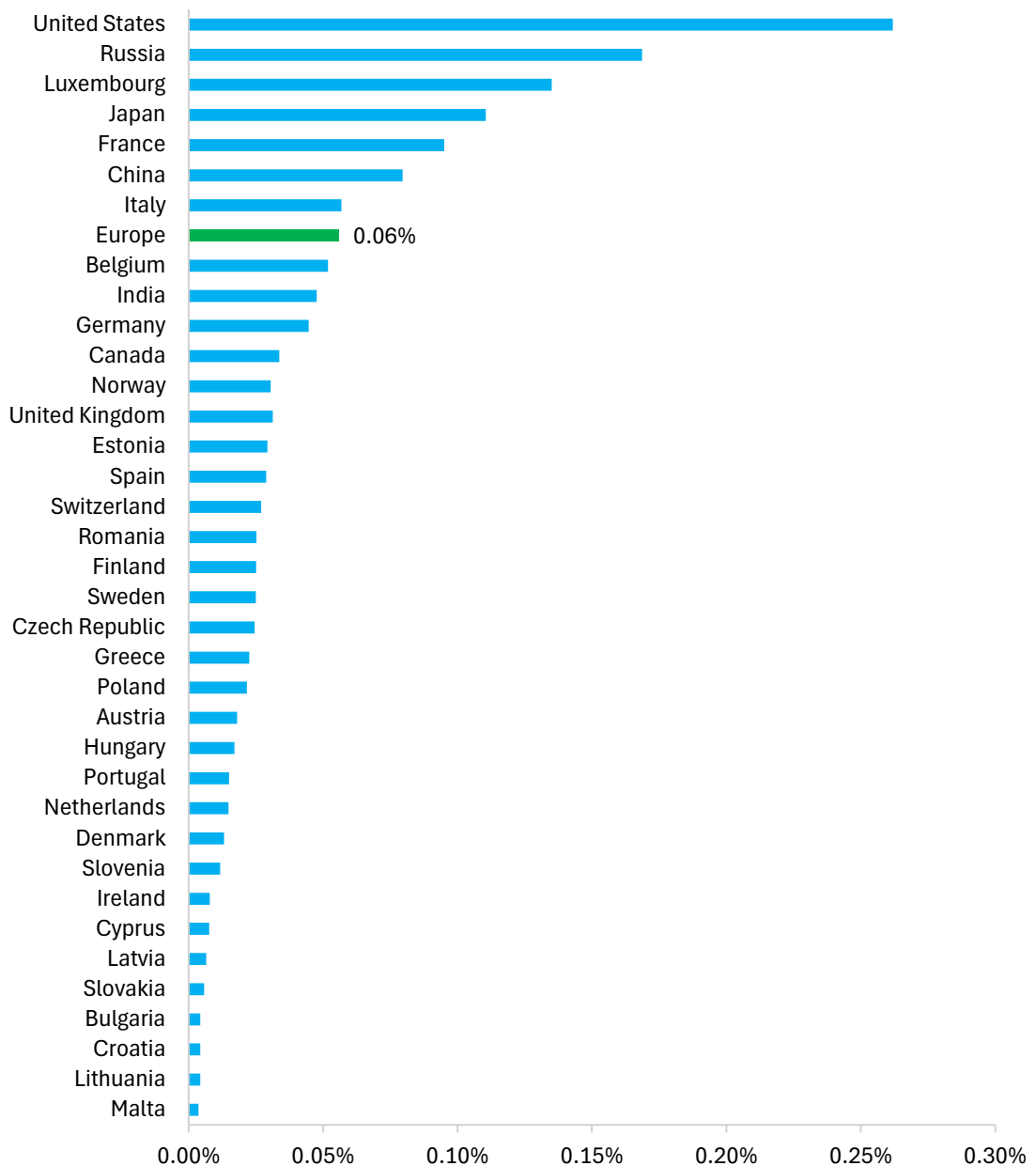


Figure 6: Selected institutional space budgets as share of GDP in 2023^{4, 5, 7}

⁷ Eurostat, UK Office of National Statistics, US Bureau of Economic Analysis and World Bank, national accounts databases, GDP at current prices, extracted in August 2024.

2.2.2. Public Space Budgets as Share of Government Expenditures

As shown in Figure 7, the share for Europe (EU27, Norway, Switzerland and the UK) of space budget to total government expenditures was 0.12% in 2023, stable compared to 2022. Similarly to the share of space to GDP, Luxembourg ranks first with a value of 0.281%, followed by France (0.167%), Italy (0.103%) and Belgium (0.095%).

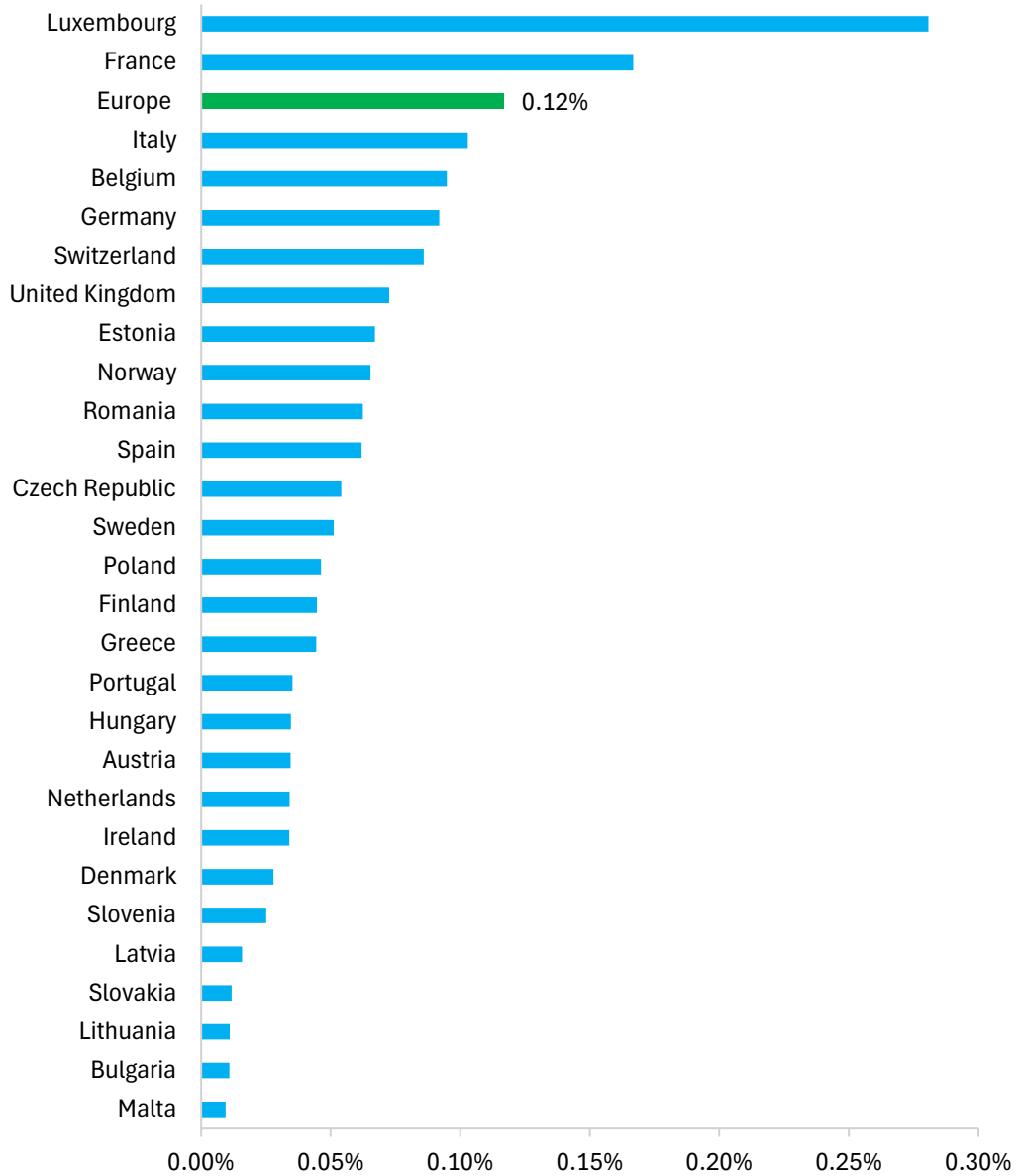


Figure 7: Selected institutional space budgets as share of government expenditures in 2023^{5,8}

⁸ Eurostat and UK Office of National Statistics, national accounts databases, extracted in August 2024.

Highlight: European government defence expenditures⁹

In the period from 2018 to 2022, the level of defence expenditures in Europe has remained stable around 1.3% of GDP and 2.6% of total public expenditures. In comparison, public expenditures in space in Europe accounts for about 0.06% of GDP and 0.12% of government expenditures.

In absolute terms, European defence expenditure reached €204 billion in 2022, up from €163 billion in 2021, posting a 25% increase in five years. From 2021 to 2022, among the broad categories of government expenditures in Europe, defence posted the second-strongest increase (growing 11% year-on-year).

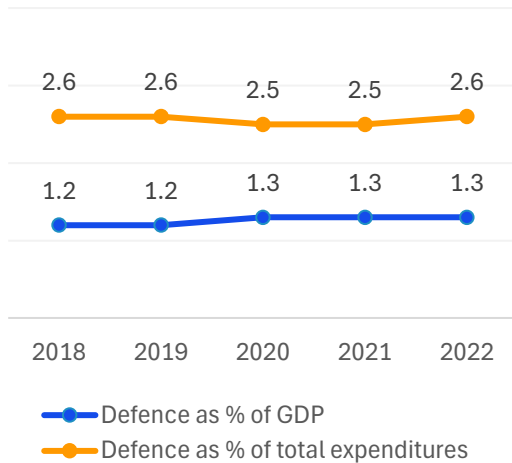


Figure 8: European Government defence expenditures, as share of GDP and total government expenditures, 2018-2022

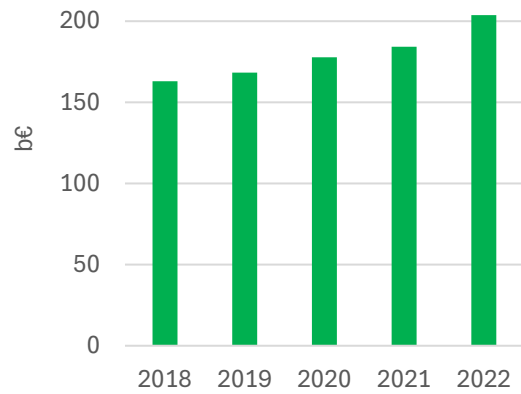


Figure 9: European Government defence expenditures, 2018-2022

⁹ Eurostat, [Government expenditure on defence - Statistics Explained](#).

2.3. Private Investment in Space

2.3.1. Private Investment in the Global Space Sector

Private investment in space continued its decline in 2023, reaching €6 billion¹⁰. This represents a 32% drop from 2022, and a 51% decrease compared with the historical high of €12 billion that marked 2021. Worldwide space companies received investments through 266 funding rounds in 2023, a 9% decrease of the volume from 2022.

As anticipated, Europe also experienced a decrease in 2023, with private space ventures receiving just below €980 million, a 14% drop compared to 2022. While the value still outlines outstanding growth in the past decade, compared with €18 million raised by European space startups in 2014, the decline marks a likely change in the investment decision, towards the most promising but also most mature business opportunities.

Although the US drives most of the decline at global level in 2023, its space sector still attracts most investments (60%), followed by Europe (16%) and China (9%).

An important observation relates to the 'Rest of the World' (countries which are not the US, Europe, China and Japan)¹¹, which has seen a growth of almost 250% in deals' value over the past three years, a trend that is expected to continue.

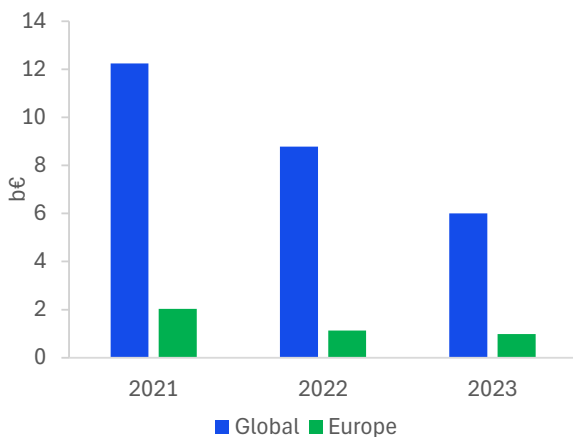


Figure 10: Private space investment, 2021-2023¹⁰

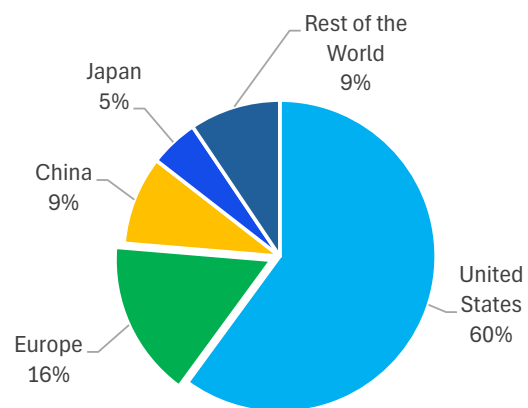


Figure 11: Distribution of private space investment in 2023¹⁰

Several factors are driving the decline at global level, including the decreased access to Venture Capital (VC, dropping by 18% from 2022 but still accounting for 73% of the total value of deals in 2023), and the sharp drop of the SPAC (Special Purpose Acquisition Company).

¹⁰ ESPI, Space Venture Europe 2023, 2024.

¹¹ According to ESPI analysis, the value of deals in the 'rest of the world' is predominantly originating from Canada, India, Israel, and Australia.

Additionally, there was a notable absence of major acquisition in 2023, with only 20 transactions recorded (19 fewer than in 2022). Debt Financing increased by 53% from 2022, highlighting a notable change in the fundraising of space companies.

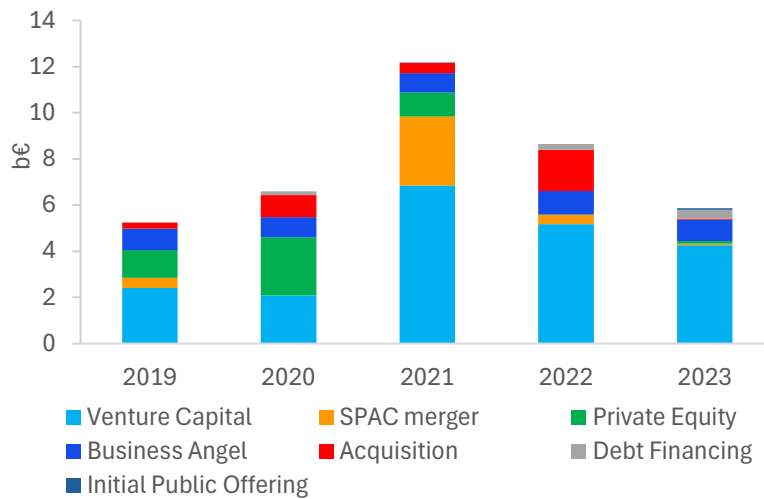


Figure 12: Global space private investment value, by type 2019-2023¹⁰

2.3.2. Focus on the European space startups

The level of private investment in European space startups¹² reached €942 million in 2023, a 7% decrease over 2022, reversing the trend of the past years. 78 European private investment deals were recorded for space startups in 2023, a 30% decrease in volume.

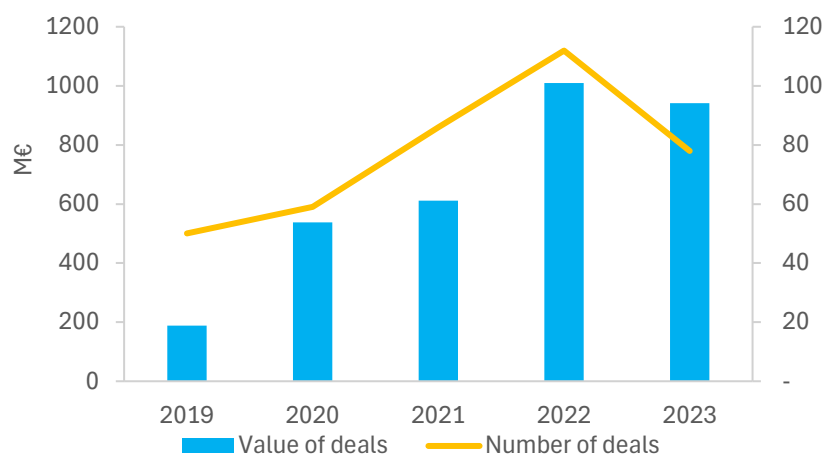


Figure 13: Number and value of deals in European space startups, 2019-2023¹⁰

¹² Since 2014, ESPI has been collecting and reporting data on the private investment received by space startups in Europe, a perimeter much narrower than other data sources. The objective has been to allow monitoring the focused evolution of the *New Space* industry. Since 2021, ESPI also provides data for Europe along a broader perimeter, allowing comparison with global figures, but also with other major players, such as the US.

While European investors remain the most important source of financing for European space startups (European lead investors represented 79% of all deals in 2023), the value of deals led by non-European investors has been increasing, from 16% in 2021 to 28% in 2023. In 2023, the US share of deals accounted for 14%, a number relatively stable across the past three years. The trends therefore show that foreign investment in European space startups is becoming more concentrated on fewer deals, but of increased value.

Similar to previous years, the largest share of investment value originates from Venture Capital (91%), followed by Debt Financing (5%), and Acquisition (4%). ESPI analysis highlights that mergers and acquisitions are overall complex to track, with values rarely publicly disclosed or emerging only well after the completion of the transaction. A large proportion of deals for Debt Financing remains undisclosed as well. This results in a probably significant underrepresentation of the importance of this investment types in the European space startup ecosystem.

Similarly to previous years, the upstream launch and manufacturing segment received the majority of funding. Upstream companies raised 61% of the total investment value in 2023, with €334 million across 5 deals in the launch segment (manufacturing of launch vehicles and provision of launch services) and €232 million across 21 deals in the manufacturing segment (manufacturing of spacecraft).

A continuously growing number of institutions at European and national levels aims at developing financial instruments to foster entrepreneurship and accelerate investment into space startups. This has resulted in strong support from public institutions in Europe, either directly through participation in funding rounds, and indirectly through the provision of capital or guarantees to VCs. For the first time in 2023, more than 50% of the funding was raised by a mix of public and private investors, such as Isar Aerospace €155 million Series C (with the participation of Bayern Kapital, which is a subsidiary of LfA, the development bank of the German State of Bavaria) and the €58 million Series B raised by Exotrail, led by BPI France with the participation of other private investors. Examples of public funds supporting private VC funds include VSquared Ventures, which participated in Isar's Series C, supported by InnovFin Equity, with the financial backing of the European Union under Horizon 2020 Financial Instruments and the European Fund for Strategic Investments (EFSI).

Highlight: A decade of private investment in European space start-ups¹⁰

2023 saw a year-on-year decline of €68 million, and the number of deals was back to pre-2021. Yet, Europe is currently experiencing its best investment cycle to date, with the last two years (2022 and 2023) bringing more than half of all investment since 2014.

The average deal value grew by 34% from 2022, reaching €12 million in 2023, and recording the highest value ever.

The top five European space startups investment deals reached €411 million in 2023, with Isar Aerospace raising €155 million, D-Orbit €100 million, Exotrail €58 million, Sylvera €52 million and Open Cosmos €46 million. Together, the top five deals in 2023 represented 44% of the total, a level similar to 2022, but much lower than a decade ago (where it averaged around 90%).

The trend is driven by the fact that the combined value of the largest deals is growing while their share within the overall ecosystem is gradually diminishing.

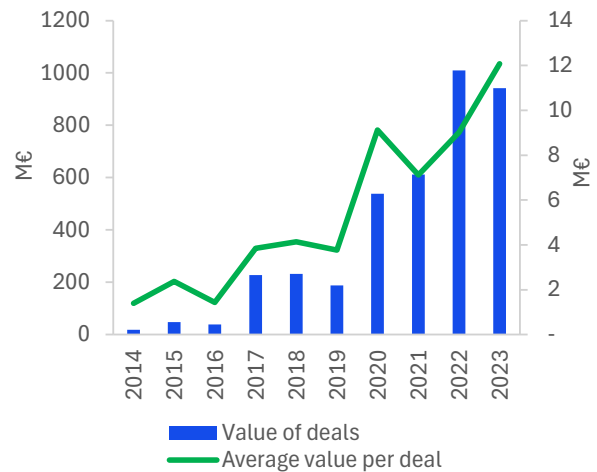


Figure 14: A decade of private investment in European space startups, 2014-2023.

2.4. Space Activity

As shown in Figure 15, there were 221 orbital launches in 2023, an 18% increase over 2022, marking a third consecutive double-digit growth rate (28% in 2022; 27% in 2021)¹³. A total of 212 launches were successful.

Launches for commercial and export customers accounted for more than half of the total (116 launches, 53%), of which 67 were self-provisioned launches (63 operated by SpaceX for Starlink and 4 by CASIC for China's national GuoWang LEO broadband mega-constellation project).

A total of 8 inaugural launches occurred in 2023, of which 3 succeeded, including the SSLV small-lift launch vehicle developed by ISRO and Firefly's small-lift rocket, Alpha.

2023 also experienced a large increase of the mass launched (48%), reaching 1,400 tons. Starlink satellites account for almost 70% of the total mass launched in 2023.

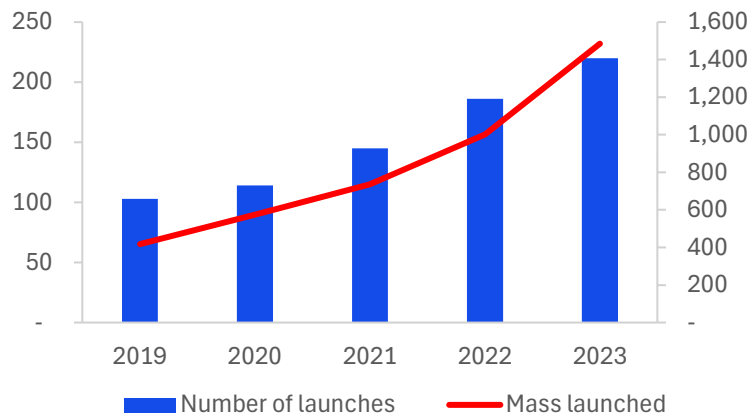


Figure 15: Number of launches and mass launched, 2019-2023^{13, 14}

The US conducted more than half of the launches (114, of which 96 by SpaceX), posting a growth of 31% compared to 2022. China accounted for 30% with 67 launches, a 5% increase from 2022, and Russia for 19 launches.

The European launch service provider conducted 3 launches in 2023: JUICE (Jupiter Icy Moons Explorer), Europe's first mission to Jupiter, Germany's Heinrich Hertz communications satellite aboard the last Ariane 5 launch vehicle and Vega VV23 mission, carrying two primary payloads (THEOS-2 and FORMOSAT-7R/TRITON) and ten small secondary payloads.

¹³ Source: ESA Internal.

¹⁴ Eurospace LEAT database.

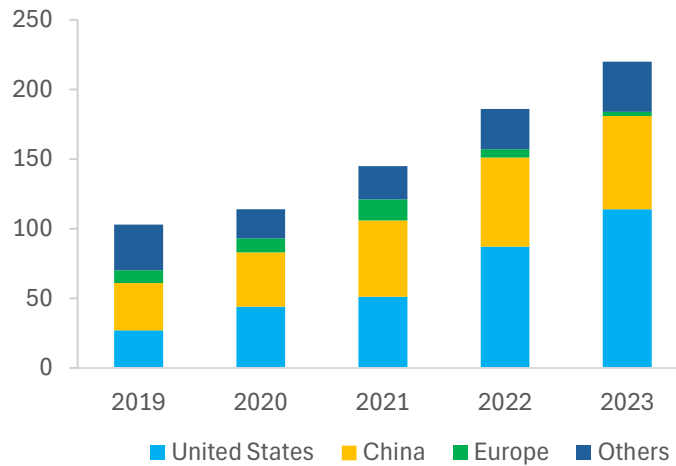


Figure 16: Number of launches, by origin of Launch Service Provider, 2019-2023¹³

In total, 2,940 spacecraft were put into orbit in 2023, setting another all-time record with an increase of 17% compared to 2022¹⁵. The US accounted for 80%, largely due to the launch of Starlink satellites (1,984 Starlink satellites launched in 2023). In line with the trend in the public space investment (section 2.2), the number of satellites launched for defence customers has doubled in the past five years.

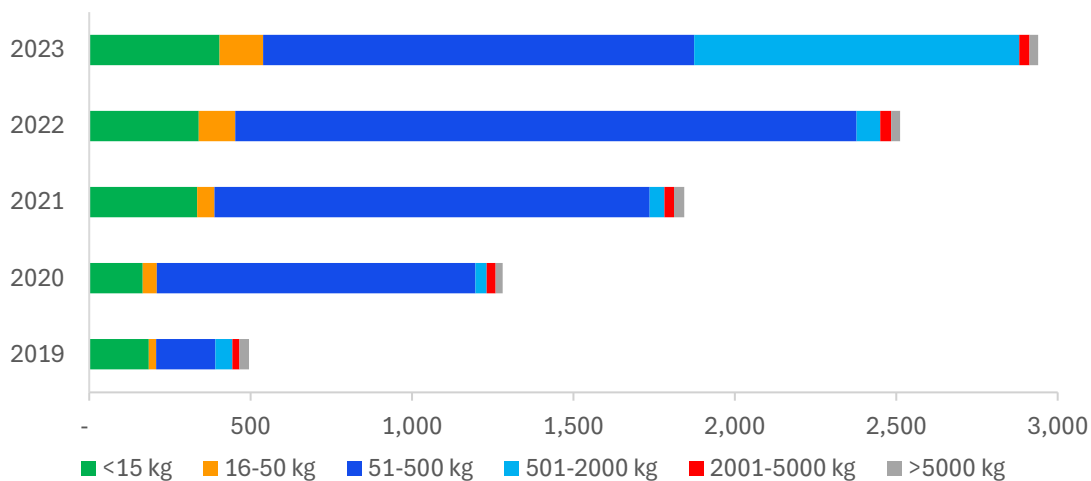


Figure 17: Satellites launched worldwide, by mass category, 2019-2023¹⁵

63% of the 2,940 satellites launched in 2023 weighed less than 500kg compared to 95% in 2022. A key driver lies in the significantly higher mass of Starlink satellites. In February 2023, SpaceX launches the first set of upgraded Starlink satellites, for the second generation of the constellation. This “V2 Mini” version of the satellites is significantly larger and more powerful than the first generation (from about 300kg to 800kg)¹⁶. According to FCC filing, a next version of the second-generation satellites, that would weight around 2,000kg, and is expected to be launched by SpaceX Starship¹⁷.

¹⁵ Euroconsult, Satellites to be built and launched, 26th Edition, January 2024.

¹⁶ [SpaceX launches first upgraded Starlink satellites - SpaceNews](#), 28 February 2023.

¹⁷ [FCC approves Starlink first generation upgrade plan - SpaceNews](#), 20 August 2024.

Highlight: The development of launch rideshare opportunities¹⁸

In addition to dedicated launches and increased customisation of launch services, a complementary space transportation market trend is seen in the increased offer of rideshare launches, accommodating multiple smaller satellites from different operators on a single launch. This offer has been developed initially to provide lower-cost launch solutions, in particular to institutional customers. With the increasing use of LEO orbits by commercial operators, the development of more performant small satellite busses, standardised CubeSat formats, and of satellite constellations, the demand for rideshare opportunities has been steadily increasing. While initially offered occasionally and on an opportunistic basis by launch vehicles such as the Indian Polar Satellite Launch Vehicle (PSLV), the decision by US institutional customers to fund the development and procurement of rideshare services, as well as the success of SpaceX rideshare scheme, have been instrumental in encouraging other launch service providers to follow suit. From six launches on average per year over the period 2019-2021, the number of rideshare launches has increased to 14 launches in 2023 using several types of launch vehicles (Falcon 9, Electron, LauncherOne, Ceres 1, Long March 2, Zhuque 2, Kinetica 1, PSLV and Vega). Their customers have been both commercial and institutional, with most payloads conforming to the CubeSat format and about half of the rideshare launches filled with constellation payloads.

Dedicated rideshare programmes with regularly scheduled launches have been

put in place not only by SpaceX (Transporter, Bandwagon) but also by China Great Wall Industry Corporation (CGWIC, on Long March Express), NewSpace India Limited (NSIL, on PSLV), Glavkosmos (on Soyuz 2), JAXA (RAISE on Epsilon S) and the Chinese CAS Space (Innovation X Scientific Flight on Kinetica 1). The slots on these launches are today sold directly by the commercially active launch service providers but also increasingly through launch service aggregators. They often include the use of dispensers or tugs developed by the latter (60% of payloads launched in 2023 were lodged in a deployer, 19% deployed via a tug and only 21% launched on a classical payload adapter). As a result, the customer interface is increasingly shifting towards operators of Orbital Transfer Vehicles (OTV) who in turn interface with the launch service provider (16 OTVs launched in 2023). In parallel, institutionally sponsored rideshare schemes for institutional (often educational) light satellites have been put in place by NASA and ISRO.

With the growing success of LEO rideshare launches, a possible miniaturisation of certain payloads and the development of super heavy lift launch vehicles, other rideshare solutions are already tentatively offered and may become more common place if their commercial success is proven. This includes the development of SpaceX Starship rideshare scheme, a first lunar lander rideshare launch slot sold in March 2023 by SpaceX, as well as announced plans by Impulse Space for a GEO rideshare scheme.

¹⁸ Source: ESA Internal.

2.5. Upstream Market Value

The global launch and manufacturing market was estimated at a value of €53 billion in 2023, posting a decrease of 19% compared with 2022^{14,19}. Spacecraft manufacturing accounts for about 80% of the total and the launch segment 20%.

While the deployment of Starlink drives the number of launches, satellite launched and mass launched, due to its vertically integrated structure it represents a much lower share of the upstream market in value, accounting for an estimated 17% of the launch value and 6% of the manufacturing value in 2023.

Despite the fact that since 2022, the share of mass launched procured by commercial operators has surpassed the one procured for government programmes, the upstream remains a market largely driven by institutional demand, primarily from US and China.

In 2023, institutional customers accounted for 80% of the launch and manufacturing demand value. When excluding Starlink deployment, the combination of Chinese captive demand for defence and human spaceflight programmes (including the development of their own space station) represents almost all of the upstream growth (99%, in mass and value) in the past five years.

This trend negatively affects Europe's market share of the global market, which was 10% in 2023, down from 15% in 2018 and 21% in 2008.

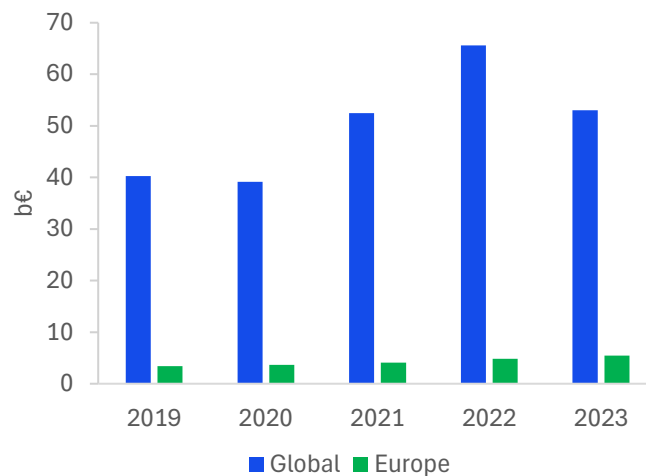


Figure 18: Manufacturing and launch value, 2019-2023¹⁴

¹⁹ Eurospace LEAT database builds primarily on open-source data, tracking orbital launch activity on a quarterly basis. A parametric model based on hard data and estimates (particularly for military activity for which data availability is scarce) then provides quantitative figures for the value of the launch and manufacturing segments. Contrary to industry surveys which measure industry final sales in a given year (such as the annual Eurospace Facts and Figures), the model allocates the value of the complete spacecraft as well as the value of its launch in the launch year. The advantage of the model is to provide a tool that allows comparison of upstream activity, and competitiveness analysis of individual space players, at the global level.

In the past 20 years for the launch segment^{20,21}, about two-thirds of the global launch and manufacturing market are not accessible to European primes (European launch service provider and spacecraft manufacturers) because of captive demand from institutional programmes, in particular human spaceflight (e.g. US, China, Russia) and from vertically integrated constellations (e.g. Starlink).

In 2023, Europe captured about 40% of its accessible market, a share which has been degrading over time, from an average 50% in the decade 2004-2013 to 42% on average in the past decade (2014-2023). As further detailed in the highlight below, the European space industry is impacted by several trends, and in particular the decline in the GEO satcom market demand.

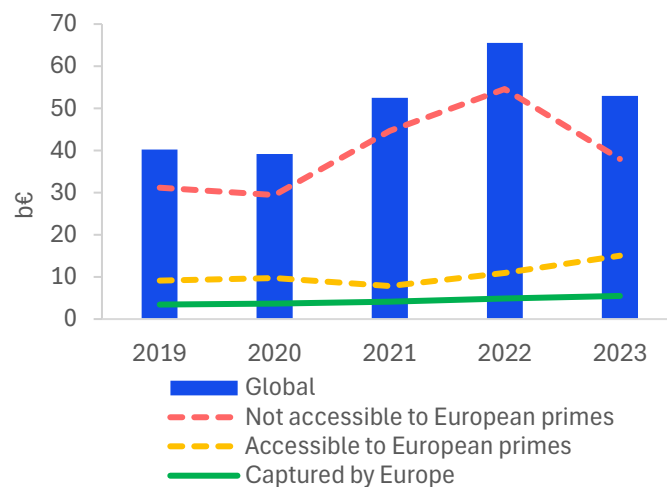


Figure 19: Manufacturing and launch market accessibility, 2019-2023¹⁴

One important factor and particularity of the European space industry is that its accessible market is commercially accessible to all space industries in the world. In addition, it does not benefit from the sizeable demand base provided by other large space powers (notably US, China, Russia or Japan) to their domestic launch providers and spacecraft manufacturers, resulting in fewer opportunities for cost efficiency. These factors result in the European space industry being the most exposed to the commercial market variations, with the urge to constantly remain competitive to maintain its level of industrial activity.

²⁰ Source: ESA Internal.

²¹ Source: ESA Internal.

Highlight: Evolution of the European space industry sales²²

According to Eurospace 2023 survey, the European space industry posted sales worth €8,458 million in 2023.

The primary customer segment for the European upstream space industry is its domestic institutional market, that accounted for almost 70% of total final sales in 2023. Within this segment, ESA is the single largest customer, accounting for 44% of the total and 63% of sales to European institutional customers.

In line with the European public space investment trend (section 2.2), sales for European military programmes accounted for 9% of total final sales in 2023, a share which has remained relatively stable in the past five years.

The second market segment is related to commercial and export customers, which accounted for 27% of total final sales in

2023 and continues to suffer from a consistently declining trend. The main driver is the loss of about €1 billion of revenues from the GEO satcom market in the past five years, which affected both satellite manufacturers and launchers.

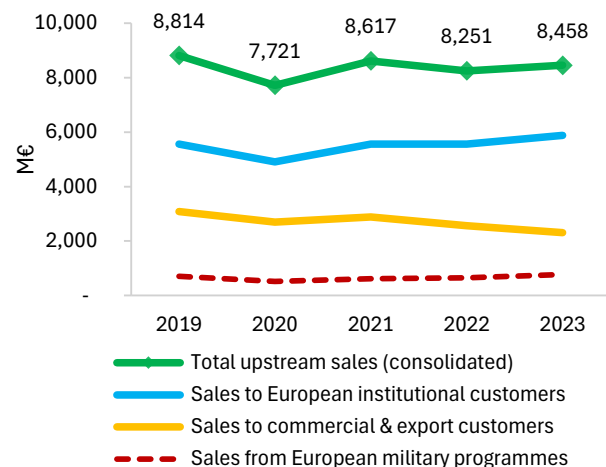


Figure 20: European upstream industry sales

²² Eurospace, Facts and Figures, 28th Edition, The European space industry in 2023, July 2024.

2.6. Downstream Market Value

In 2023, the global downstream market for space was estimated at €358 billion, posting a 4% increase compared to 2022^{23,24,25}. With an estimated €82 billion in 2023, Europe accounts for 23% of the total downstream market. Contrary to the upstream space market, the majority (>90%) of the downstream market is commercial and therefore accessible to the European industry.

At least 80% of the currently available market estimate for the downstream space segments is generated by businesses that use space as a key input to deliver such services. The scope of the downstream, and in particular the boundary between the part that should be considered within the space industry and the part that relates to the impacts of space, is a topic currently subject to discussion.

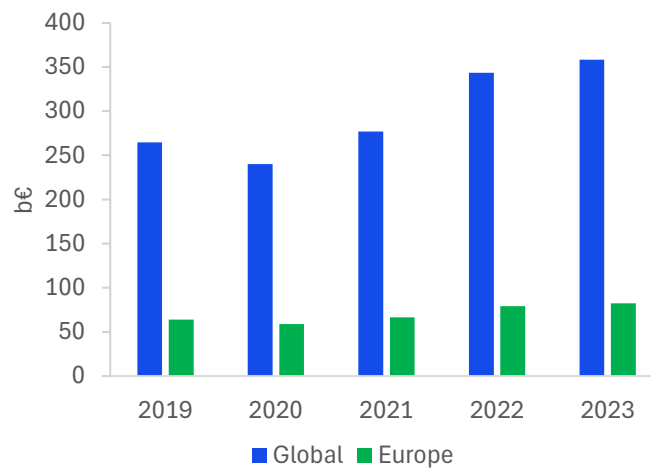


Figure 21: Downstream space market value, 2019-2023

The downstream space market value covers revenues across three application segments: Earth observation (EO), satellite communications (satcom) and satellite navigation (GNSS).

2.6.1. Downstream EO market

Considering Earth observation, the downstream value consists of revenues from commercial data sales (including data acquisition and basic preprocessing) which accounts for 38% of the EO downstream value, as well as revenues from value-added services (from advanced calibration to analytics), representing 62% of the total EO downstream value in 2023²³.

Europe is the second largest market for EO data and services, with a market share of 22%, behind North America (US and Canada) that accounts for 45% of total EO downstream revenues in 2023.

²³ Euroconsult, Earth Observation Data & Services Market, 16th Edition, November 2023

²⁴ Euroconsult, Space Economy Report, 10th Edition, January 2024

²⁵ EUSPA, EO and GNSS Market Report, Issue 2, 2024

The EO data market is structurally highly concentrated, with the two primary suppliers (Airbus and Maxar) capturing more than 40% of the demand.

The EO service market has been growing at a higher pace than the data market, posting a 9% CAGR in the past five years (compared with 6% for the data market). Governments, and particularly defence, are the primary customers of EO downstream products and services.

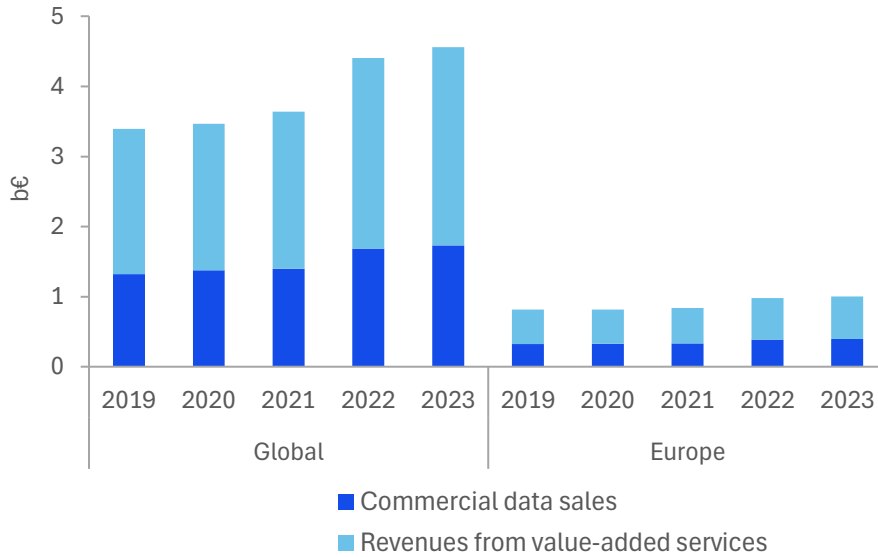


Figure 22: Downstream EO market value, global and Europe, 2019-2023²³

2.6.2. Downstream satcom market

The satcom downstream value consists of operators' revenues (from both FSS-Fixed Satellite Service and MSS-Mobile-Satellite Service capacity), which accounts for 10% of the total satcom downstream value, as well as revenues from services (video, telecom and mobility), which represent 90% of the total satcom downstream value in 2023²⁴. In the present report, the revenues from satcom user terminals are included in the service market.

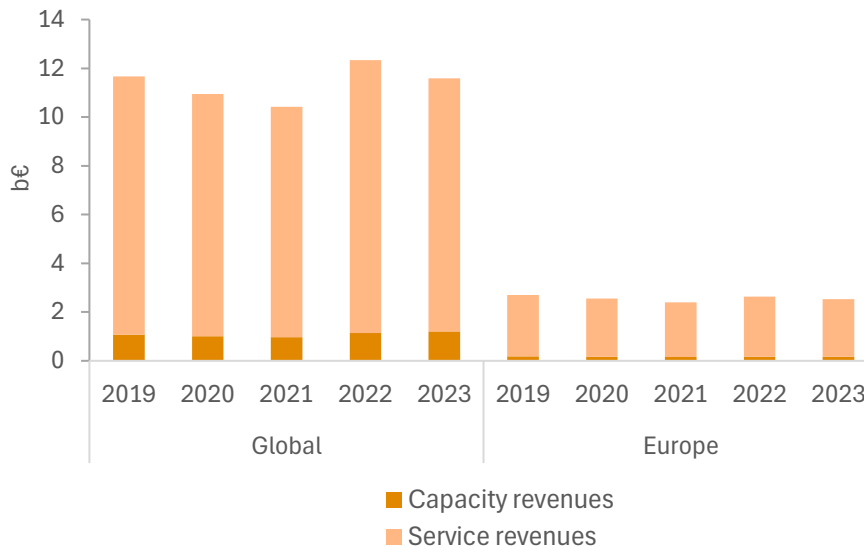


Figure 23: Downstream satcom market value, global and Europe, 2019-2023²⁴

The sector continues to go through significant evolutions, led by large NGE0 constellations (non-geostationary orbits, also called NGS0) such as Starlink and OneWeb which address the demand for universal connectivity (and particularly consumer broadband). The provision of broadband internet access is the fastest growing satellite service market segment of the past three years, a growth led by SpaceX’s Starlink. Since 2020, the number of broadband subscribers for Starlink has grown from 5,000 to more than 2 million in 2023.

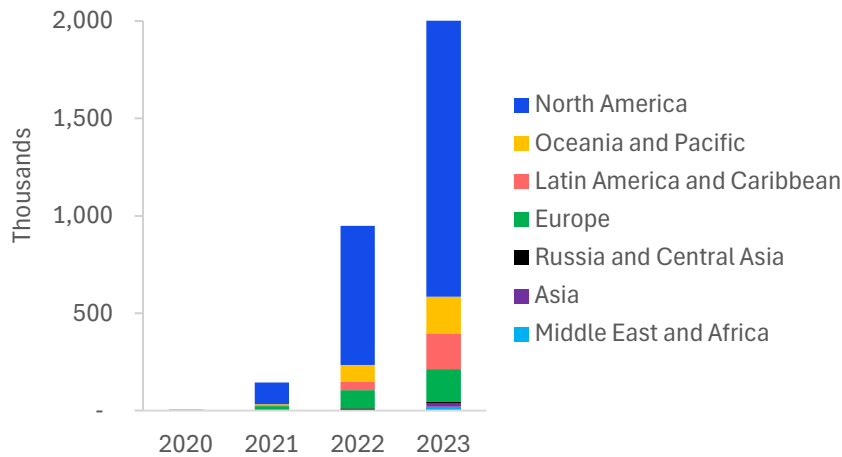


Figure 24: Starlink broadband subscribers, 2019-2023

The jump in capacity supply and consequent decrease of capacity prices drive significant strategy shifts of the operators. The segment experiences a strong trend of both vertical and horizontal integration, through partnerships or collaborations (e.g. SES with Starlink, but also Hispasat, Intelsat, Eutelsat, and OneWeb).

Highlight: Direct-to-Device (D2D), a vehicle to position satcom into the much larger mainstream telecommunications market²⁶

Direct-to-Device (D2D) is the direct communication between a consumer-type devices and a satellite communication system. This new and disruptive type of service recently enabled by lower orbit satellites (LEO) represents the ultimate form of connectivity which capitalises on both, terrestrial and satellite networks, providing the ultimate ubiquitous coverage and seamless connectivity everywhere, anytime and to everyone. As such, D2D represents a utmost concrete vehicle to position satcom into the much larger mainstream telecommunications market; inherently

relevant not just to the consumer-type smartphone use cases but to multiple mobility-related vertical business segments such as automotive, aviation and maritime.

This service is however emerging in a context of a satcom market in turmoil and a European ecosystem in stand still with limited investment capabilities while new and prominent players are emerging outside of Europe such as Apple and Mobile Network Operators (MNO) like T-Mobile with Starlink in the US, as well as entire Chinese ecosystem.

²⁶ Source: ESA Internal.

2.6.3. Downstream GNSS market

The GNSS downstream market has been measured by the EU Agency for the Space Programme (EUSPA) since 2010²⁵. The market value consists of revenues from the sales of GNSS devices, which accounts for 27% in 2023, and services revenues (including both augmentation services and other services attributable to GNSS) representing 73% in 2023. The services attributable to GNSS are based on the fact that they rely on GNSS for their functionalities.

The markets of consumer solutions (previously called location-based services, LBS) and road transportation largely dominate the GNSS downstream market, making up for 59% and 35% respectively of the total estimated value in 2023 (together accounting for almost 95% of the total). In particular, revenues from smartphone apps (including for example personal banking, ride-hailing apps, in-app purchases for games and social media applications) represent a significant component, representing over 60% of the service revenues, and over 40% of the total revenues.

2.7. Space Workforce

There are currently no surveys or published analysis on the total employment in the global upstream and downstream space markets. Estimates of space workforce are instead published within industry surveys with specific perimeters that allow time-series and understanding of evolution over time, but do not enable global overview or comparison.

The annual survey of the European space upstream industry²² has been providing the employment level within the launch and manufacturing industry segments in Europe for more than 20 years. In 2023, it is estimated to have reached 62,659 Full Time Equivalent (FTE) in 2023. This represented a 9% increase compared to 2022, a growth trend which has been sustained since 2005.

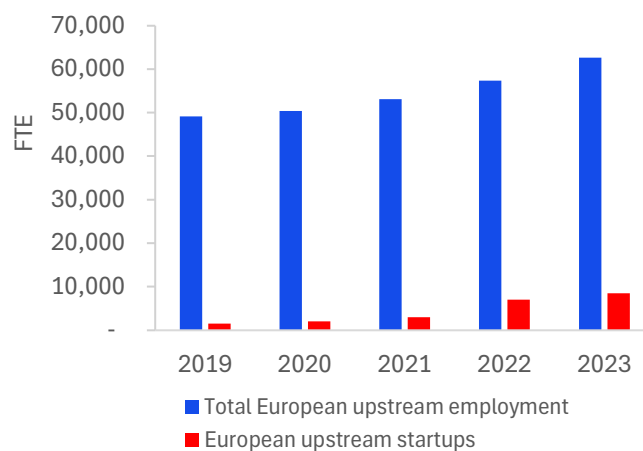


Figure 25: Employment in the European space upstream industry, 2019-2023²²

The survey notably highlights the rapid growth of the employment in European space startups²⁷, estimated to account for more than 8,500 FTEs in 2023, representing 14% of total European space employment. While the segment has had the most impressive growth in terms of employment, the majority of these new players remain unable to cover their costs with sufficient revenues, resulting in additional funding needs until businesses become mature.

²⁷ Eurospace defines startups as new space players, or companies that are pure space players that were created after 2010 with the financing of private equity. While most of these newcomers still qualify as SMEs, their business dynamics is different than the legacy or established SMEs since they lack a mature product or market.

Highlight: A decreasing US space employment²⁸

The US Bureau of Economic Analysis (BEA), a division of the US Department of Commerce, provides US macro-economic and industry statistics. Since 2020, it has developed a set of statistics specifically assessing the US space economy. In June 2024, the BEA released updated estimates for the period 2017-2022, notably highlighting the contributions of space-related industries to GDP, gross output, but also employment.

The data, classified using the North American Industry Classification System (NAICS), revealed a decline in total US space economy employment from 383,000 in 2017 to 347,000 in 2022, with the sharpest drop occurring in 2021, followed by a slight recovery in 2022.

Space economy employment within the US manufacturing industry accounts for slightly less than 30% of the total and has remained stable, while space-related employment in the US information industry experienced a steep decline, falling from 110,000 to 76,000 jobs over the period.

In contrast, space economy employment within Professional and Business Services showed resilience, recovering in 2022 and surpassing 2017 levels.

The US upstream sector can be considered as the combination of space-related Manufacturing and Professional and Business Services, leading to US space upstream employment estimated at around 155,000 in 2022, compared to 57,300 FTEs in the European space upstream industry the same year. Looking at overall evolution from 2019 to 2022, the US upstream employment decreased from 158,000 to 155,000. In contrast, European upstream employment grew from about 49,000 in 2019 to more than 57,300 in 2022, notably driven by the rapid expansion of startups, which surged from 1,500 to 7,000 over the same period.

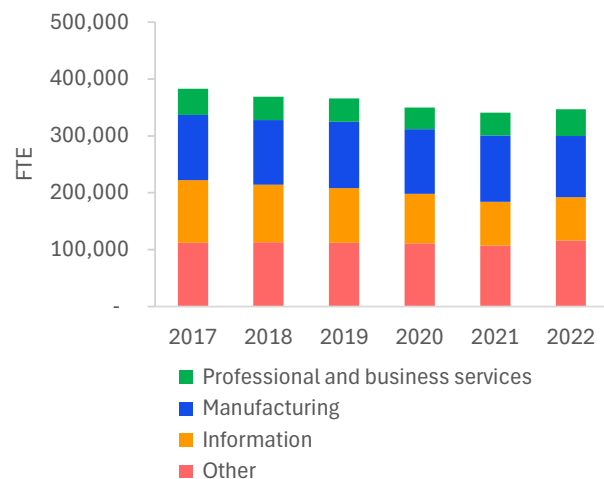


Figure 26: US space economy employees by industry

²⁸ US BEA, [New and Revised Statistics for the U.S. Space Economy, 2017–2022](#), June 2024.

3. The Space Economy in 2024: First Insights

3.1. Macro-Economic Context

3.1.1. Key Figures at Global Level

Worldwide GDP is expected to increase by 3.1% in 2024, a further slight deceleration compared to last year's 3.3%²⁹. GDP growth forecasts at national level vary from 1.3% for China (1.2% in 2023), 2.6% for the United States (2.5% in 2023) and 0.8% for the Euro Area (0.7% in 2023). Russia's GDP is predicted to slightly decrease to 3.2% in 2024 (-0.4% compared to 2023). Looking ahead, a steady increase in GDP is expected, suggesting a cautiously optimistic outlook.

Last year's surge in inflation has moderated in 2024. This resulted in a decrease in core goods prices globally. Service price inflation has proven to be more resilient, keeping core inflation above initial predictions³⁰. In advanced economies, inflation is expected to continue decreasing, despite a slow down at the end of this year and the beginning of next year, with the objective to reach a 2% target by the end of 2025.

Following recent shocks such as the COVID-19 pandemic and Russia's invasion of Ukraine, countries are reassessing their trading relationships with a focus on economic resilience and national sovereignty. This reassessment also redirects foreign direct investment along geopolitical lines, making the global economy increasingly fragmented into geo-economic blocs with growing barriers to international trade. Examples include China's export controls on critical materials (2024) and the US export restrictions on advanced technology to China (2024)³¹. This fragmentation could hinder global economic integration, reducing capital, goods, and labour flows between nations, and potentially diminishing global cooperation.

According to the International Labour Organization (ILO), global employment is projected to have a positive but modest growth of 0.8% in 2024, slowing down from the 2.2% growth rate in 2023³². A concerning trend is expected in high-income countries³³, where employment rate evolution is expected to become negative by the end of 2024 with only modest improvements anticipated in 2025. In contrast, employment growth is expected to be consistent and massive in low and lower-middle income countries.

²⁹ IMF, World Economic Outlook, 2024 (July update).

³⁰ OECD defines core inflation as price inflation that excludes food and energy prices.

³¹ IMF, Geopolitics and its Impact on Global Trade, May 2024.

³² ILO, World Employment and Social Outlook – Trends, 2024.

³³ ILO refers to the World Bank grouping of income countries, accordingly, "low-income economies are defined as those with a GNI per capita of \$1,145 or less in 2023; lower middle-income economies are those with a GNI per capita between \$1,146 and \$4,515; upper middle-income economies are those with a GNI per capita between \$4,516 and \$14,005; high-income economies are those with more than a GNI per capita of \$14,005". The World Bank, Country Classification, July 2024.

3.1.2. Key Figures in Europe

Europe's economic recovery is lagging behind the global average, with GDP growth rate predictions of 0.8% for the Euro Area (1.0% for the EU-27), and uneven progress among European countries. Although posting a slight decline from a 2.5% growth rate seen in 2023, Spain is experiencing one of the highest growth rates, with a projected 2.1% increase in GDP for 2024. Germany, whose GDP growth rate was 0.3% in 2023, is experiencing a slow recovery with a forecasted GDP growth of 0.1% in 2024. Other major economies are also expected to face economic stagnation, with growth rates projected at 0.6% for the United Kingdom, 0.9% for Italy, and 0.7% for France³⁴.

European inflation forecasts show an average rate of 2.5% for 2024, which is expected to decrease to 2.2% in 2025 and further to 1.9% by 2026. To counter inflationary pressures, the European Central Bank (ECB) implemented significant rate hikes from July 2022, reaching the highest level by September 2023, with the main refinancing rate at 4.5%. In June 2024, the ECB began easing rates, lowering them by September 2024 to 3.65% for refinancing and 3.50% for deposits. The tightening of monetary policy significantly affected the economy, particularly private investments in the Euro area. Since 2022, private investments declined by about 10% as central banks raised interest rates, making borrowing more expensive and reducing credit availability. While the ECB has begun lowering interest rates, businesses remain hesitant due to inflation concerns and past tight monetary conditions³⁵.

In response to both the pandemic and energy shocks, public debt ratios in Europe increased significantly and remain higher than before the COVID-19 outbreak in most countries. While debt stabilisation will depend on achieving ambitious fiscal consolidation and sustained growth, important medium- to long-term spending pressures are expected, notably from defence and climate transition³⁶.

The employment rate in the Euro Area has demonstrated resilience amidst recent economic challenges. Unemployment rate has remained stable at 6.4%, its lowest level since the euro's inception³⁷.

³⁴ European Central Bank (ECB), Spring Economic Forecast, 15 May 2024. [Spring 2024 Economic Forecast: A gradual expansion amid high geopolitical risks - European Commission \(europa.eu\)](#).

³⁵ European Investment Bank (EIB), Investment Report 2023/2024.

³⁶ IMF Working Paper, Taming Public Debt in Europe, August 2024.

³⁷ European Commission, Unemployment statistics, July 2024.

3.2. Preliminary Trends of the Space Sector in 2024

3.2.1. Public Investment in Space

According to preliminary estimates, institutional space budgets are expected to reach €121 billion in 2024, which would lead to a 7% growth compared to 2023³⁸. Defence expenditures in space continue to grow faster than civil spending, expected to account for 53% in 2024. 47% of public space investment are expected to be dedicated to civil spending in 2024, an evolution of 5% compared to 2023.

In Europe, public space investment in 2024 still benefits from the results of ESA Ministerial Council in November 2022, as well as the current 2021-2027 EU long-term budget (Multiannual Financial Framework, MFF). Important next steps will occur with ESA Ministerial Council in 2025 and the new EU budget for 2028-2034.

3.2.2. Private Investment in Space

Private space investment shows signs of resilience in 2024. While venture capital is expected to remain a leading source of funding for space private ventures, 2024 is seeing very large debt operations. Significant deals included:

- Shanghai Spacecom Satellite Technology (SSST) raising \$994 million in February 2024 in Series A funding for the construction of the 12,000 satellite G60 mega-constellation for communication³⁹;
- SES securing a \$3.2 billion financing package in debt in June 2024 to fund the acquisition of satellite operator Intelsat, marking a deal between two of the major GEO satellite operators^{40, 41};
- Telesat finalising its funding agreements with the Canadian and the Quebec governments to fund the LEO Lightspeed satellite network, reaching a Canadian \$2.54 billion loan in September 2024⁴².

As in 2023, SpaceX has not raised capital so far in 2024. With a cumulated amount close to \$10 billion raised to date, is contributing to the downward trend.

³⁸ Euroconsult, Government Space Programs, estimates as of 30 September 2024.

³⁹ [Shanghai firm behind G60 megaconstellation raises \\$943 million - SpaceNews.](#)

⁴⁰ [SES to acquire Intelsat for \\$3.1 billion - SpaceNews.](#)

⁴¹ [SES Secures Financing for Intelsat Acquisition - Via Satellite \(satellitetoday.com\).](#)

⁴² [Telesat secures \\$1.9 billion government funding for Lightspeed - SpaceNews.](#)

Highlight: A slowdown of general private investments

Economic challenges such as the COVID-19 pandemic, inflation, rising interest rates, and geopolitical tensions have led to reduced business confidence and a slowdown in capital expenditures.

In Europe, private investments suffered from a decline of 3% from 2022 to 2023⁴³. This contraction is attributed to rising costs, higher interest rates, and an overall cautious economic outlook.

While some growth is expected beyond 2024, investment is predicted to remain constrained due to ongoing economic uncertainties⁴⁴.

In contrast, North America experienced a more severe contraction in private

investments, recording a striking decrease of 22% from 2022 to 2023⁴³.

By 2024, private investment is expected to continue decreasing, reflecting sustained economic uncertainty and higher costs of financing⁴⁵.

Such scenario is reflected in Venture Capital (VC) evolution analysis. According to OECD data, both Europe and North America experienced a sharp decrease in VC investments in the 2022-2023 period⁴⁶.

Namely, both Europe and North America showed a decrease of 31%. This analysis confirms the trends in the above-mentioned dynamics of private investment in North America and Europe.

⁴³ McKinsey & Company, Private markets: A slower era, McKinsey Global Private Markets Review, March 2024.

⁴⁴ ECB, What do recent surveys reveal about euro area business investment in 2024? May 2024.

⁴⁵ European Commission, Spring 2024 Economic Forecast: A gradual expansion amid high geopolitical risks, May 2024.

⁴⁶ OECD Database, Venture capital investments, Structural and Demographic Business Statistics.

3.2.3. Space Activity

As of end of Q3-2024, a total of 181 launches have occurred, a 14% year-over-year growth from September 2023. The US accounts for more than 60% of the launches (110 by end of September), with 64 launches operated by SpaceX to launch Starlink satellites (35% of the total). China operated 46 launches (25%), a similar number compared to September 2023. 2024 saw the successful launch of Ariane 6 on 9 July from Europe's Spaceport in French Guiana⁴⁷.

With a total of 421 tons launched to orbit in Q3-2024 (28% less than in Q2-2024), the quarter's total launch mass marked a decrease for the first time since Q3-2021, putting an end to eleven quarters of uninterrupted growth⁴⁸. While this decline is due to an exceptionally reduced launch cadence of SpaceX's Falcon 9, the total mass launched for 2024 as of end of Q3-2024 already exceeds the total of 2023.

In total, 2,006 satellites had been launched by 30 September 2024, a year-over-year decrease of 12%. Yet, 3,119 satellites are expected to be launched by the end of the year, a number slightly above the total of 2023 (2,940) but with a much lower growth rate than previous years (6% increase).

As of end of Q3-2024, 1,412 Starlink satellites were launched, expected to reach 1,868 by the end of the year, an estimated decrease of 6%.

3.2.4. Satellite Manufacturing Orders

As of end of Q3-2024, a total of 169 satellite manufacturing orders were registered, a year-over-year decrease of 58% compared with end of Q3-2023⁴⁷. The sharp decline is driven by the commercial customer segment, with 41 orders placed as of 30 September 2024, compared with 297 last year at the same period. Orders from defence customers remain stable (91 in both end of Q3-2023 and end of Q3-2024), and orders from public civil customers have been multiplied by three (36 orders by end of September 2024 compared with 12 orders by end of September 2023).

In contrast, the value of 2024 orders by end of Q3 displays an almost 20% growth compared to end of Q3 last year, reaching €8.3 billion. Lockheed Martin, L3Harris and Sierra Space together account for 33% of the value.

Similarly to previous years, defence customers account for the largest share of satellite manufacturing orders, reaching 66% as end of Q3-2024 (50% in Q3 of last year). Orders from government civil customers are posting the most impressive growth, multiplying by three the value of orders from last year at the same period. Significant orders have taken place, including:

⁴⁷ Euroconsult, Space Market Monitoring, estimates as of 30 September 2024.

⁴⁸ Eurospace, LEAT Quarterly Report – Q3-2024, October 2024.

- In June 2024, Lockheed Martin won a contract to build US geostationary weather satellites, three GeoXO satellites, for the National Oceanic and Atmospheric Administration (NOAA) with an estimated order value of almost \$2.3 billion⁴⁹.
- In June 2024, Airbus was contracted by Yahsat for two GEO communications satellites based on Eurostar Neo platform, Al Yah 4 (AY4) and Al Yah 5 (AY5). The full programme is estimated at around \$1 billion (also including two Low-Earth Orbit (LEO) satellite platforms based on the Airbus Arrow line⁵⁰).

As of 30 September 2024, European satellite manufacturers had been awarded 37% of total order value worldwide, compared to 11% by 30 September 2023. The total value of orders secured by Europe was multiplied by almost four from last year at the same period, going from €756 million in Q3-2023 to €3 billion in Q3-2024. Several orders include:

- In March 2024, ESA awarded a €76.6 million contract to a consortium led by OHB Italia to build and operate the Genesis mission. It also awarded two contracts of €78.4 million each for the LEO-PNT mission. The projects are led by GMV Aerospace and Defense and Thales Alenia Space (TAS) France and involve a consortium of more than 50 entities from 14 countries. The three contracts amount to almost a quarter billion of euros⁵¹.
- In May 2024, TAS secured a \$250 million order from SkyPerfect JSAT to build JSAT-31⁵².
- In May 2024, ESA signed a contract with Airbus Defence and Space UK worth €340 million for the development of the space weather spacecraft mission Vigil^{53,54}.

Highlight: A shift towards Micro-GEO on the satcom market⁵⁵

A noticeable shift is occurring in the GEO commercial satcom toward Micro-GEO satellites, with 36% of GEO orders since 2021 being for this smaller class of satellites.

In 2024, a total of five orders has been placed so far, of which two for Micro-GEO satellites. While the overall year-on-year

volume of satellite orders appears similar, Micro-GEO satellites tend to have a lower financial value compared to larger commercial GEO satellites.

Some European companies are active in this market, such as Swissto12, with its HummingSat product which has already captured several commercial contracts.

⁴⁹ [Lockheed Martin wins contract to build U.S. geostationary weather satellites - SpaceNews.](#)

⁵⁰ [Yahsat Orders Al Yah 4 and 5 Satellites from Airbus - Via Satellite \(satellitetoday.com\).](#)

⁵¹ [ESA awards three contracts for satellite navigation missions - SpaceNews.](#)

⁵² [SKY Perfect JSAT selects Thales Alenia Space to build a new cutting-edge software-defined satellite "JSAT-31" | Thales Alenia Space.](#)

⁵³ [Airbus awarded space weather spacecraft mission Vigil | Airbus.](#)

⁵⁴ [ESA - Airbus is the prime contractor for ESA's Vigil spacecraft.](#)

⁵⁵ Source: ESA Internal.

The US military's involvement in space technology dates back to 1958 and has evolved significantly to rely on space-based systems for intelligence, surveillance, reconnaissance; satellite communications; and position, navigation, and timing. However, advancements in space capabilities by strategic competitors, particularly China, have made the US traditional reliance on large, costly, and slow-to-deploy GEO satellites increasingly vulnerable. To address these concerns, the US government established the US Space Force in 2019, with its budget growing from \$15 billion in 2021 to \$30 billion by 2024.

A key element of the Space Force's modernisation efforts is led by the Space Development Agency (SDA). Formed in 2019 and later integrated into the Space Force, the SDA was tasked with rapidly developing and deploying new space technologies, with a particular focus on LEO satellite constellations. The SDA presents significant opportunities for the space industry, with its budget growing from under \$100 million to nearly \$5 billion annually in just five years. So far, the SDA has awarded contracts worth nearly \$11 billion to major defence contractors (such as Northrop Grumman, Lockheed Martin, L3Harris, and Raytheon, as well as to new entrants in the sector), to construct, launch, and operate 476 satellites.

The SDA's flagship initiative, the Proliferated Warfighter Space Architecture

(PWSA), aims to create a constellation of 400-600 LEO satellites to provide resilient missile defence, satcom, and PNT services, particularly in GPS-denied environments. LEO satellites offer enhanced resilience due to their large numbers, rapid production timelines, and high velocity.

A notable innovation in the SDA's approach is its adoption of a "spiral development" procurement model. This method partners with both more established and emerging satellite manufacturers to design, build, and launch satellites in four tranches, with new capabilities introduced every two years. This approach significantly accelerates deployment timelines compared to traditional military satellite programs, which could take a decade or more to deliver. The diverse collaboration has fostered innovation while driving down costs, with LEO satellites priced at approximately \$14 million each, compared to about \$1 billion for GEO satellites⁵⁸.

Tranche 0 satellites were launched in 2023, with subsequent tranches scheduled every two years, each incorporating more sophisticated technologies, presenting new business opportunities for both more established and emerging companies. In FY2024, the SDA has awarded \$4.4 billion in contracts and is expected to award an additional \$400 million to \$500 million contract by end 2024 for 20 Tranche 2 Transport "Gamma" variant satellites.

⁵⁶ Source: ESA Internal.

⁵⁷ [Stars, Stripes, and Satellites - by Space Case \(substack.com\)](#), 26 January 2024.

⁵⁸ [The Proliferated Warfighter Space Architecture \(PWSA\): An Explainer - Payload \(payloadspace.com\)](#), 5 December 2022.



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