

Space Venture Europe 2022

Investment In the European
and Global Space Sector



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1 INVESTMENT IN EUROPEAN SPACE START-UPS

1.1 About Space Venture 2022

The European Space Policy Institute's (ESPI) Space Venture is the Institute's annual report on private investment in the space sector and is **now focusing solely on investment data for European, global, and Chinese markets**. A separate report will be published in Q4 2023, assessing the state of European start-ups.

The report highlights the nexus between the European, global, and Chinese investment markets. As Europe continues to develop and reinvigorate its space industrial base, **understanding global dynamics and leveraging the expertise of other regions, is crucial to remain competitive**. Policymakers must focus on fostering innovation, facilitating access to finance, creating incentives for investment opportunities, and increasing public support to stimulate private investment in space.

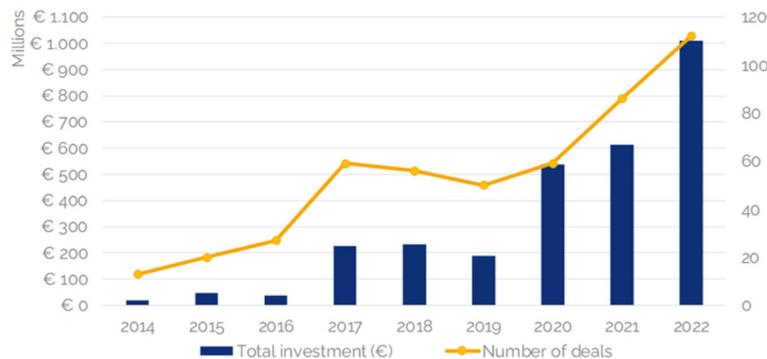


Figure 1: Investment value and number of deals in Europe since 2014

In Europe, the space sector saw significant growth of investment in 2022, with total investments reaching **€1 billion, up by 64% compared to 2021**. The majority of the funding came from venture capital, with the largest share of investments in satellite manufacturing and services. European companies, however, still face challenges, including smaller deal sizes and a concentration of capital in a handful of companies.

Globally, the sector experienced a **28% decline in total investments in 2022, amounting to a total of €8.8 billion**. This is primarily caused by the absence of Special Purpose Acquisition Companies (SPACs), following their short-lived boom in 2021. **Despite the decrease, the industry has maintained a healthy growth rate of 14% CAGR since 2019**. The United States remains the most significant player in global investments, with a 17% CAGR, followed by Europe and China. Furthermore, the **rest of the world** (outside of the USA, Europe, China and Japan) has seen **impressive growth, with an increase of more than 3000% in tracked investments since 2019**. This highlights the rapid expansion of the space sector worldwide.

While building on the heritage of previous editions, uninterrupted data collection, and continuous refinement, this year's edition once again opens new horizons, as it includes a special focus on China. **China's space sector has seen remarkable growth in investment, with over ¥50 billion (€6.5 billion) raised by more than 100 companies since 2014**. While still largely dominated by state-owned enterprises, an increasing number of commercial companies have entered the sector. The Chinese commercial space sector has attracted significant funding, with the launch sector receiving the largest share of investments, accounting for nearly 40% of the total amount.

In conclusion, by providing insights on market dynamics, deployed investment tools, and relevant actors, ESPI's Space Venture equips public & private actors alike, and policymakers in particular, with an **opportunity to strengthen Europe's space sector and ensure its continued growth and success** in the years to come.

1.2 Top deals in Europe

In 2022, the top five investment deals totalled approx. €411 million.

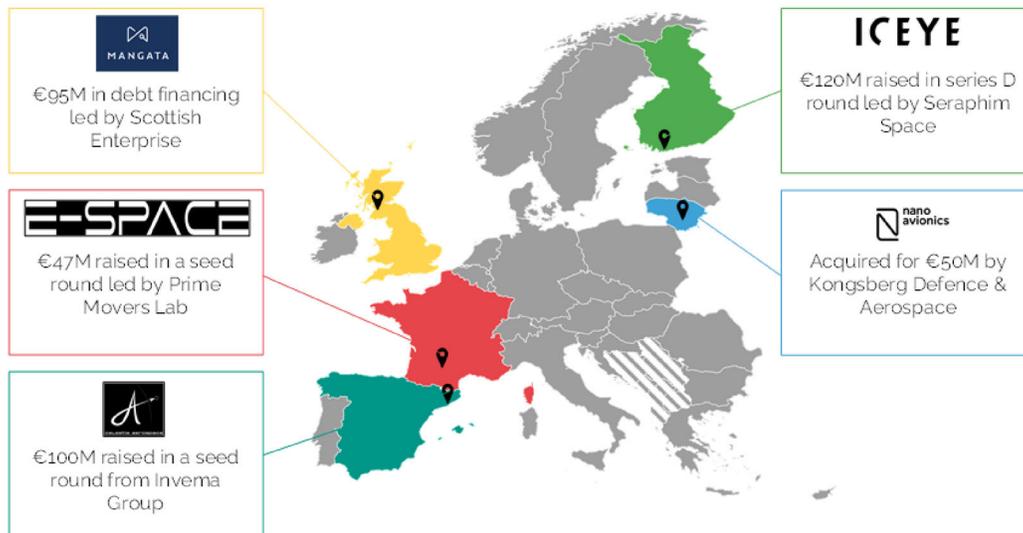


Figure 2: Top five European investment deals in 2022

ICEYE (€119.5 million): The Finnish SAR company raised €119 million in its Series D round. The investment round was led by Seraphim Space with the participation of BAE Systems and Kaijma Ventures. ICEYE also received public support in this round with the UK's National Security Strategic Investment Fund. The company plans to use the funds to grow its Natural Catastrophe Solutions business line, expand its satellite constellation, and make investments in its analytics services.

Celestia Aerospace (€100 million): The Spanish nanosatellite allrounder raised €100M in its seed round led by Invema, an investment management company. The funds will be used for a nanosatellite production facility and for the creation of an EO and Secure Communications constellation. The satellite plant with a planned capacity of 100 units per year will be located in Spain.

Mangata Networks (€95 million): The connectivity company received €95M in debt financing from mostly Scottish authorities including Scottish Enterprise and South Ayrshire Council. The deal was included as European, as the majority of the funds are earmarked to establish a facility in Prestwick, Scotland, to produce and test almost 100 satellites per year. Construction is set to begin in early 2023, with operations following in late 2024.

NanoAvionics (€50 million): Lithuanian smallsat integrator and bus manufacturer NanoAvionics was acquired by Norway's Kongsberg Defence & Aerospace for €50M. Specifically, Kongsberg acquired a 77% stake in NanoAvionics at a valuation of €65M. This acquisition expands Kongsberg's portfolio to include smallsat platforms in addition to its current offering of satellite subsystems.

E-Space (€46.7 million): The satellite communications company raised €46.7M in a seed round led by Prime Movers Lab. The funds go towards the launch of E-Space's test satellites, with mass production scheduled for 2023. E-Space is officially headquartered in Toulouse. In 2022 E-Space also acquired 5G Radio Access Network company CommAgility for roughly €14M.



1.3 Value of the top five transactions

The combined value of the top five deals in the European space industry reached **€411 million** in **2022**, accounting for a significant 41% of the total investment value. Interestingly, these top deals comprised only **4% of the total deal number**, yet generated a substantial portion of the overall value.

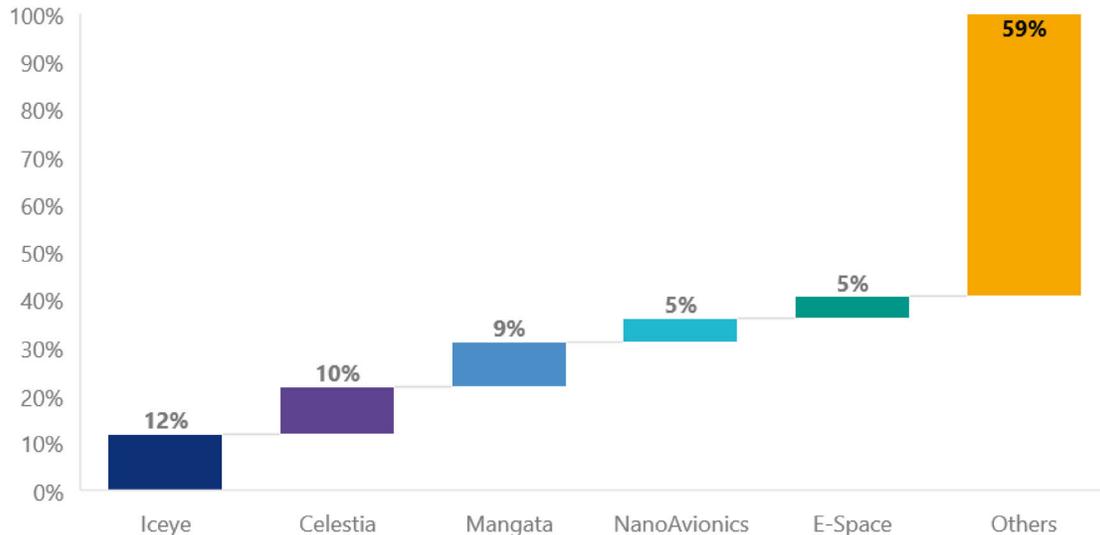


Figure 3: Share of total investment of top five deals in 2022

The analysis of the top five deals over time reveals two distinct trends: (i) an increase in the combined value of these top deals, alongside (ii) a decreasing proportion of their contribution to total investments. In 2014 and 2015, the top five deals accounted for over 90% of total investments. From then until 2020, the proportion fluctuated between 60 and 70%, with the exception of 2019, where it dropped to 37%. In 2021, the top five deals made up 45% of investments. Simultaneously, the absolute value of the top five deals rose from €332 million in 2020 to €411 million in 2022. These trends suggest that **although the frontrunners of European space ventures are securing increasingly larger funds, their share within the overall ecosystem is gradually diminishing** highlighting an increasingly strong and dispersed investment ecosystem.

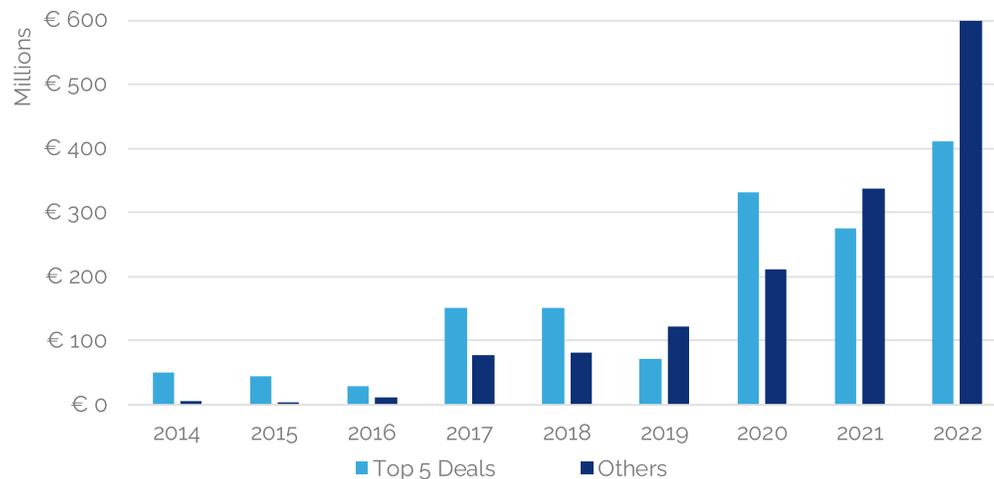


Figure 4: Share of top 5 deals in Europe in 2014



1.4 Overview and key indicators

In 2022, investment in European space start-ups continued an accelerated growth to a record-breaking **€1,009 million (approx. 1 billion), distributed across an all-time high of 112 deals**. This remarkable growth represents a 65% increase in investments and a 30% uptick in the number of deals compared to 2021.

These figures provide a relatively **conservative estimate** of the total investment volume, as they exclude deals involving ventures that do not meet the ESPI definition of "European space start-ups" (see Annex A). Moreover, the total does not include investment in OneWeb, which is discussed in greater detail separately. However, this **exclusion does not impact the 2022 figures**, as OneWeb did not receive any investments that year. It is also important to note that the **value of 23 transactions remained undisclosed in 2022**.¹

After a period of stagnation with investments plateauing at around €200 million per year from 2017 to 2019, 2022 solidified the accelerated growth trend that began in 2020, setting a new record high. Concurrently, the number of deals recorded in 2022 marked a continuation of the departure from the plateau that had characterized the European space investment landscape since 2017, which typically fluctuated between 50 and 60 deals per year. This number has almost doubled and this shift underscores the increased momentum and wider interest in the European space industry.

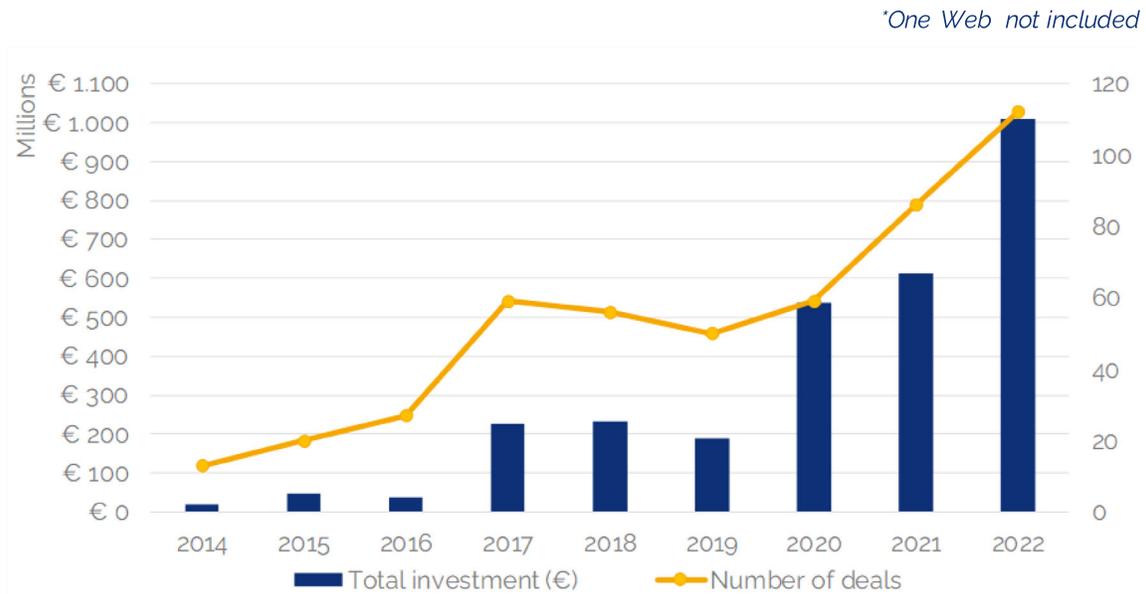


Figure 5: Investment value and number of deals per year 2014-2021

From 2014 onwards, 482 private investment deals involving European space start-ups, totalling €2.9 billion have been recorded. Notably, 2022 alone accounted for 35% of all investments since 2014. The growth of investment into European New Space is even more striking when realising that 2022 alone represents significantly more than the total invested from 2014 to 2019.

¹This signifies a significant rise compared to prior years, with 15 deals remaining undisclosed in 2021 and 8 in 2020

1.1.1 About OneWeb



ESPI has historically not included OneWeb within the “European space start-up” category for two overarching reasons:

- OneWeb operations mainly take place outside Europe:** although OneWeb is headquartered in London, a vast majority of the company’s activities, in particular related to satellite manufacturing, take place in the United States under the umbrella of its subsidiary OneWeb Satellites, a joint venture between OneWeb and Airbus. Europe has stakes in OneWeb but, until now, the investment in the company cannot be considered as an investment in the “European space sector”. ESPI monitors the development of the situation following the investment by the UK Government and European companies after OneWeb bankruptcy proceedings, in particular with regard to a relocation of OneWeb activities.
- OneWeb is no longer a start-up according to common definitions:** although OneWeb is still focusing on the deployment of its constellation and provision of initial services, the company cannot be qualified as a “start-up” from a structural standpoint. Until filing for bankruptcy, OneWeb and OneWeb satellites counted with almost 1000 employees, far above the threshold of an SME (250) which is usually considered as a criteria to qualify as a start-up in Europe. While the company has scaled down since 2020, they still employ approx. 600 employees to this day.

Although the “European” and “start-up” nature of OneWeb could be argued, ESPI decided to keep investments in the company separate from the general estimation to account for the specific case of OneWeb and to focus on the situation of European space start-ups.

OneWeb has raised **over €5 billion** to date, a completely different order of magnitude when compared to private (and public) capital raised by other space companies in Europe. The following figure shows the evolution of investment when including OneWeb. In 2022, OneWeb did not raise further investments however it is in the process of combining with Eutelsat in a merger of equals.

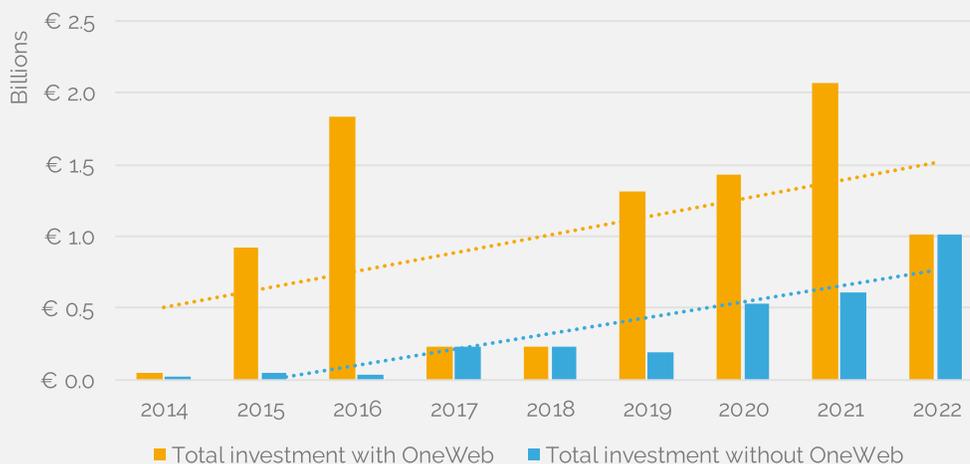


Figure 6: Total Investment including OneWeb



1.5 Investment type

Venture Capital (VC) played a dominant role in funding European space start-ups during the 2014-2022 period, accounting for a substantial **76% of the total investments**. This trend continued in 2022, with VC deals comprising the majority of transactions (80) and representing 77% of the overall invested value. Some other big changes include the overall lack of SPACs in Europe as well as an increase in debt financing deals (both in number and volume)

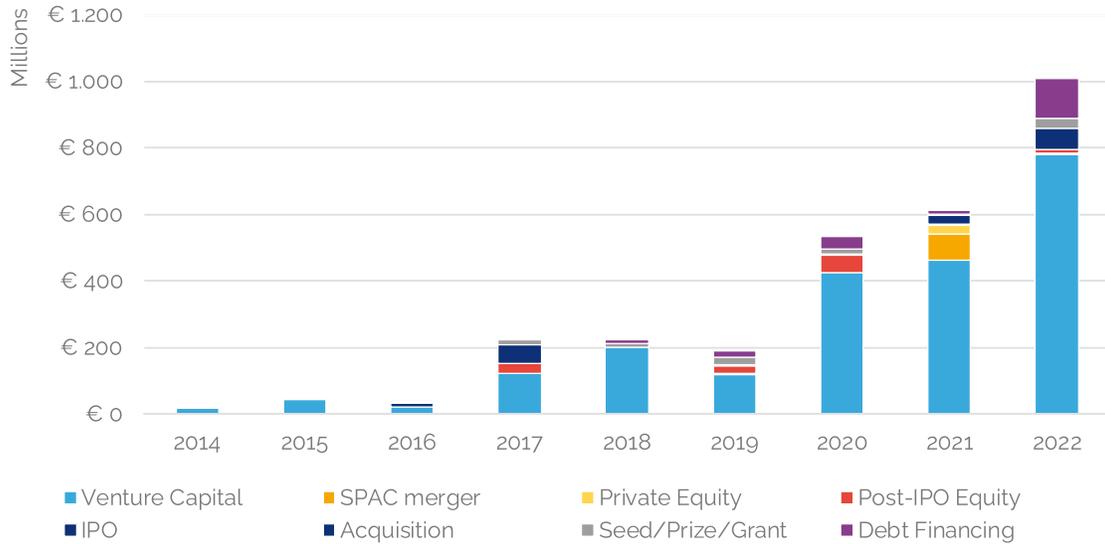


Figure 7: Investment type 2014-2022

Compared to 2021, the number of Venture Capital deals experienced a moderate increase from 67 to 72 (71% of deals) in 2022. While the number of Venture Capital investments remained relatively stable at around €420 million in both 2020 and 2021, the **volume of investment in 2022 saw a significant surge**, reaching €780 million (77%).

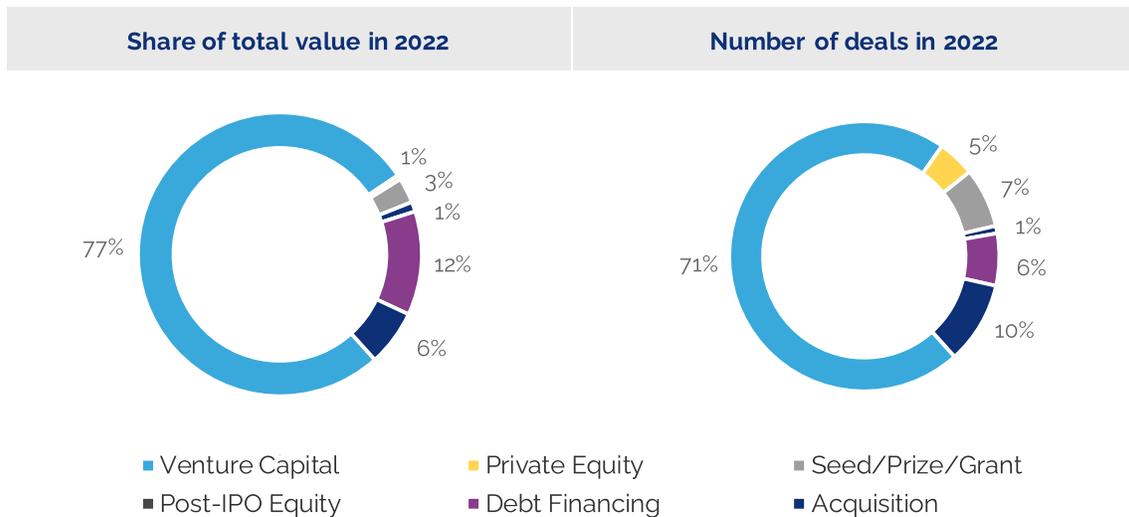


Figure 8: Distribution of investment by category in 2022

Following VC, **Debt Financing** emerged as the second largest type of investment in terms of



volume, amounting to approximately €120 million. However, the majority of this funding went to Mangata Networks, receiving €95 million. Despite this concentration, debt financing has become an increasingly important investment vehicle for European start-ups. This is notably evidenced by the fact that four of the seven debt financing deals remained undisclosed, **suggesting a potentially larger impact on the industry than currently disclosed.**

Acquisitions ranked as the third most significant type of investment in 2022, with a total volume of around €65 million. This figure is primarily based on the acquisitions of NanoAvionics for €50 million and CommAgility for €15 million. In **total, eleven acquisitions were recorded, but only two had their values disclosed.** Similar to debt financing, the large proportion of undisclosed deals likely results in a significant underrepresentation of the importance of this investment type in the European space start-up ecosystem

1.6 Investment stage

Regarding the relative distribution of funding rounds within Venture Capital (VC) financing from 2014 to 2022, two primary observations can be made. First, the **volume of Seed and Series A funding rounds has consistently exhibited an upward trend year-on-year.** This is particularly true for Seed rounds, which represented the largest VC round in both number and combined value in 2022. Seed funding accounted for €264 million across 47 deals, although more than half of this value stemmed from just two rounds by Celestia Aerospace and E-Space. Excluding these deals, Seed funding still recorded a year-on-year growth of 37%, extending the increase in Seed funding that began in 2020.

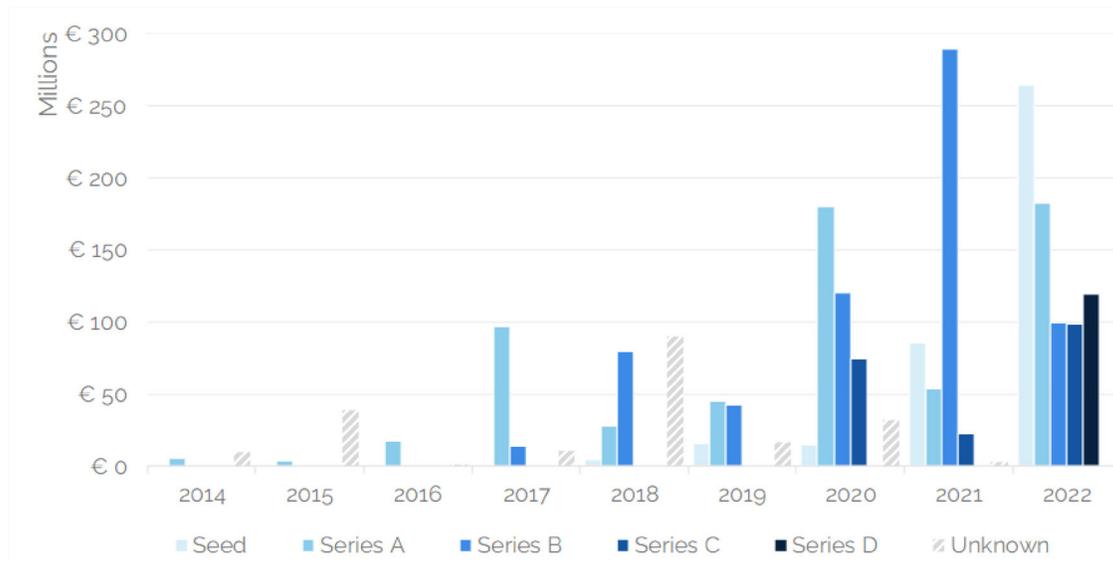


Figure 9: Yearly volume of Venture Capital investments by round from 2014-2022

The second observation concerns the **remarkable increase in both volume and value of late-stage VC rounds.** In 2022, there were four Series C rounds, compared to just one in each of 2020 and 2021, as well as the first-ever Series D round in European space start-ups. In 2022, Series C and D rounds accounted for €218 million or 27% of the total VC volume. This represents a significant increase from 2020 when a single Series C deal was valued at €74 million.

Furthermore, the upward trend in late-stage funding is complemented by a diversification of companies receiving the investments. Until 2022, ICEYE was the only company to have received late-stage funding, with Series C rounds in both 2020 and 2021. However, in 2022, ICEYE raised the first Series D round, while four other start-ups securing Series C funding.

1.7 Support to investment from public institutions

European and national public institutions continued to develop financial instruments to foster entrepreneurship and accelerate investment into space start-ups in 2022. With these instruments, public institutions have shown their ambition in having a progressively more prominent role in supporting the growth and development of the European space start-up ecosystem.

In 2022 the primary element to be highlighted is the **growth in direct public investments** (i.e., where the lead investor is a recognized public investment institution). ESPI tracked a total of **14 led public investment deals** out of which the **main investment type used has been debt financing**. These 14 deals represented 16% of the total investment in European space ventures in 2022, which is a **700% increase in the total share** in comparison to 2021. The notable increase in funding for European space start-ups, which raised 65% more in 2022 compared to 2021, adds to the impressiveness of this achievement.

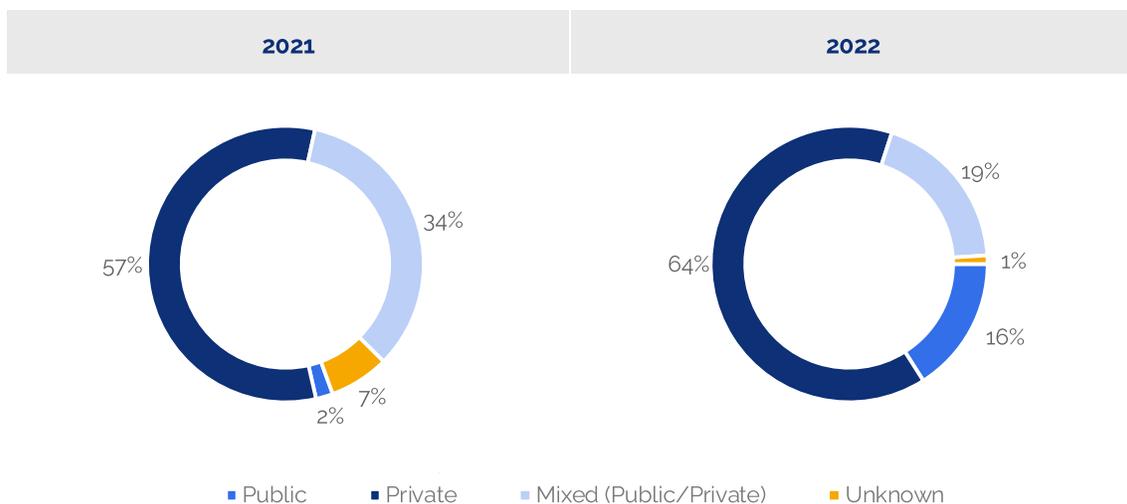


Figure 10: Public support to New Space Investments

While direct investment from public investors saw a considerable increase, the **mixed round of investments decreased by 44%** year-over-year. The ecosystem also saw a considerable increase of private investors moving from 57% of the total share to 64%.

While the year over year investment trends can underline a high variability in the type of public support to New Space investment (whether public or mixed), over the past three years the European ecosystem has seen **an average of 43% of all investments originate either from a lead public investor or from a mixed public/private consortia**.

This appears to be a direct consequence of the new public approach and ambition adopted by institutional stakeholders at a European and National level towards investment in the space sector, as well as the support of New Space initiatives. This approach strongly relies on **ambitious partnerships between public and private actors** with the aim of fostering new investment dynamics in the European New Space ecosystem.

1.8 Geographical distribution of recipients

1.8.1 Geographical distribution of investment in 2022

The figure below shows the geographical distribution of the total value of investment operations in space start-ups according to the location of their headquarters.

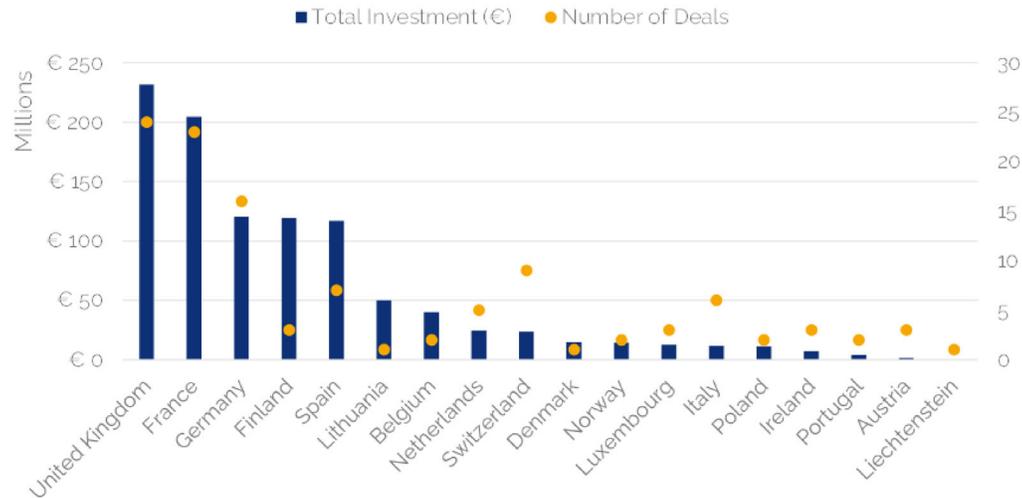


Figure 11: Geographical distribution of investment in Europe in 2022

Although investment remains widespread across European countries, the majority of deals and volume in 2022 continued to take place in countries that have historically invested heavily in the space sector (the top five countries accounted for 79% of the total value, up from 66% in 2021).

- United Kingdom:** 2022 was another strong year in terms of financing for the UK space start-up ecosystem, with €231 million in total funding raised over 24 recorded deals. While the UK maintains its leadership position, other countries have caught up: In 2021, the difference between the UK and the second-ranked country (Germany) was 102%, while this year it is just 12%. Furthermore, it should be noted that 40% of investments into UK companies went to Mangata Networks (which will invest the money in the UK).
- France:** France stood out with a record year totalling €205 million spread over 23 deals. This is a significant improvement over 2021 when French companies raised €30 million. This takes France to the second position in Europe. French companies accrued one-fifth of investments in European space start-ups. In addition, the French ecosystem is less dominated by few large deals and instead exhibits a more even distribution of deals compared to some of its peers. French success stories include a €48 million seed round by E-Space, €49 million raised by Kayrros in a Series B, and Cailabs €26 million Series C.
- Germany:** Germany saw a 48% rise in investments from €81 million in 2021 to €120 million. The same is true for the deal number, which increased from 11 to 16. German success stories include a €28 million Series A raised by Morpheus Space and a Series B by LiveEO close to €20 million.
- Finland:** Finland closely follows Germany, having raised just under €120 million in three deals in 2022. The Finnish space sector remains highly dominated by ICEYE, which accounts for a large majority of all investments recorded.
- Spain:** Spanish companies raised a total of €117 million, notably thanks to a €100 million investment in Celestia Aerospace and a €10 million in Sateliot.

1.8.2 Geographical distribution of investment since 2014

Since 2014 the **UK** has outperformed all other European countries by a significant margin. Furthermore, it has been able to sustain private space investment on a regular basis year over year, **exceeding the €1 billion mark of cumulative investments since 2014**. Furthermore, with more than 170 deals over this period (2014-2022), the UK has more than twice as many deals as the next-ranked country (France).

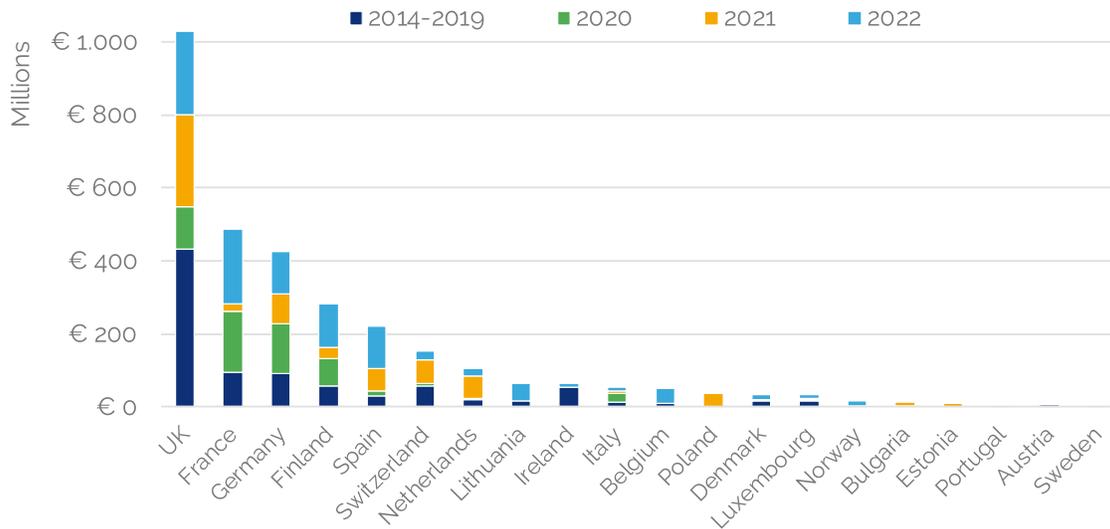


Figure 12: Share of European private space investments since 2014

- The second-best performing country in Europe is France, in which New Space start-ups have raised a total of €487 million since 2014.
- The third best-performing country regarding New Space investments in Europe is Germany with a total raised of €328 million since 2014.
- Finland comes fourth in terms of investment since 2014. Thus far, Finnish start-ups raised €282 million, 97% of which was from ICEYE.
- The fifth-best performer in Europe since 2014 is Spain with a total raised by New Space companies of €221 million, **more than half of which was raised in 2022**.
- The 6th best-performing country since 2014 is Switzerland which has raised a total of approximately €150 million.

1.8.3 Geographical origin of lead investors

Another interesting factor to assess is the distribution of investments according to the origin of the lead investor. In the case of funding rounds involving more than one investor, only the origin of the lead investor is represented in this case.² The share of undisclosed lead investors in Europe was 4% in 2022.

The geographical distribution of investors offers insights into the **weight of European and foreign funds in the overall private investments landscape** for space start-ups in Europe. Recent years

² The ESPI investment database records the list of all disclosed investors for each investment deal but does not record the respective investment shares of each investor.

have been marked by growing concerns over the acquisition of strategic European start-ups by foreign organisations. One example of such an attempted takeover was by French geo-intelligence company Preligens, which in 2020 was approached by In-Q-Tel, the VC “arm” of the CIA.³ The recent EU GNSS investment report from EUSPA and the EIB points out concerns over the foreign acquisition of European companies involved in the GNSS domain, which serves both commercial and military needs⁴.

Notwithstanding, the majority of investments made in European space start-ups in 2022 were still mainly led by European investors. The share led by European investors increased from 72% in 2021 to 78% in 2022. In context, this represents a higher share when compared to the observed ratio over the 2014-2021 period, where 68% of all investments were led by European investors.

European investors still represent the most important source of financing for European space start-ups.

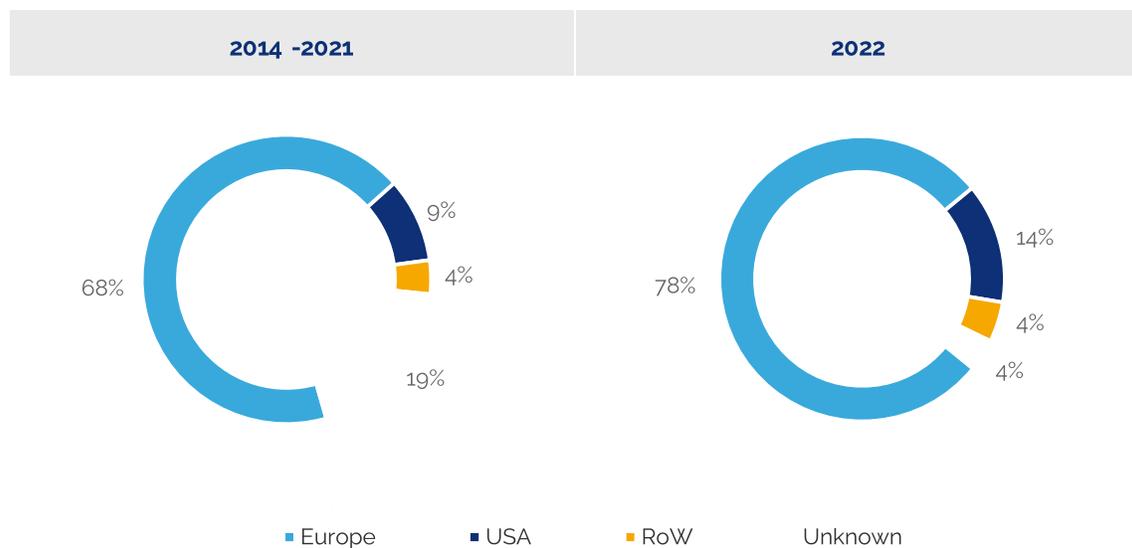


Figure 13: Geographical distribution of lead investors up to 2022

The overall portion of non-European investors remains largely unchanged at 18% (2021: 19%). However, the proportion of US-Investors decreased from 18% in 2021, to 14% in 2022. Nevertheless, the **general trend of an increasing interest of US-Investors over time remains valid**.

While this still constitutes a comparatively small portion of the overall number and volume of investments, the **share of investment deals led by foreign investors, in particular from the United States, has steadily increased in the past years**. Three-fourths of non-European investment deals originated from the U.S. The same is true for their aggregate value, which decreased to €67 million (2021: €83 million).

³ Les SPAC américains a la conquête des start-ups françaises du spatial (available at : <https://www.epge.fr/les-spac-americains-a-la-conquete-des-start-ups-francaises-du-spatial/>)

⁴ EUSPA and EIB, GNSS Investment Report 2021 (available at: https://www.euspa.europa.eu/sites/default/files/uploads/gnss_investment_report_2021.pdf)

1.9 Investment across the space value chain

The figure below shows the distribution of the total value of investment according to the core business of the start-up (bars) and the number of deals concerned (dots).⁵

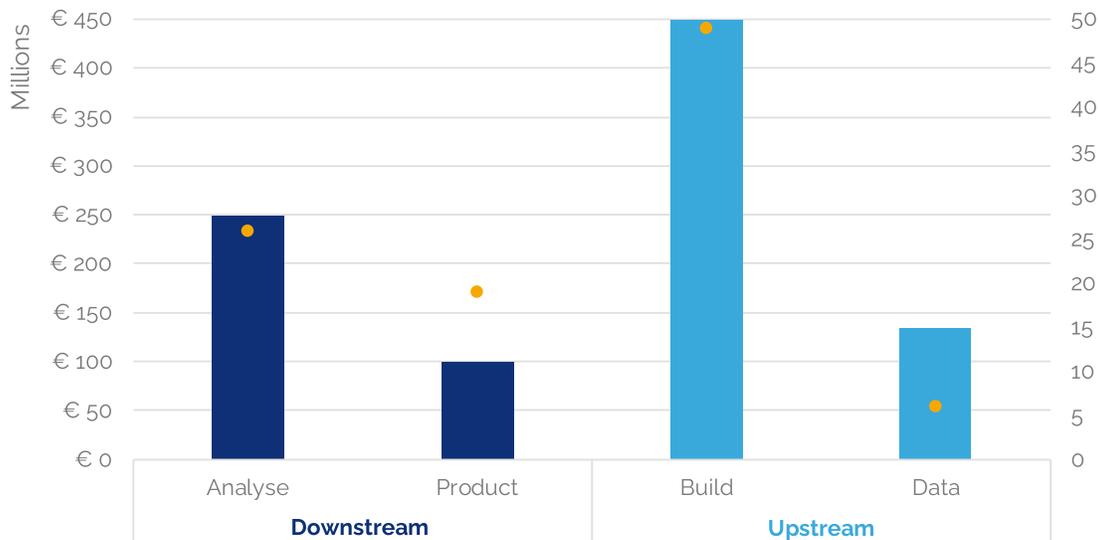


Figure 14: Volume and number of deals across the European space value chain in 2022

The upstream sector accounted for 59% of the total investment (2021: 58%). With €595 million invested over 57 deals, the average value per deal for the upstream segment was €10.4 million.

- The **Build segment**, which involves the development and manufacturing of space systems, accounted for the largest share of deals both in number and volume in 2022, with over 50 deals raising a total of €461 million. Within this segment, companies focused on the development and manufacturing of space hardware contributed more than half of the deal value (€309 million). However, two deals, Celestia Aerospace (€100 million) and NanoAvionics (€50 million), made up a significant portion of the total.
- The **Data segment**, which involves the operation of space systems to lease or sell satellite capacity data, contributed €134 million in six deals, representing 22% of the Upstream sector value. This growth was primarily driven by Mangata's €95 million debt financing.

The downstream sector accounted for 40% of the total investment (2021: 42%). With €392 million invested over 50 deals, the average value of a deal was €8.1 million.

- The **Analyse** segment continued to be the largest downstream segment, accounting for one-fourth of the total volume. This segment provides value-adding solutions for the exploitation of space data and saw key deals for ICEYE (€120 million), and Kayrros (€40 million).
- The **Product** segment, which offers space-enabled products to end-users, represented 10% of the total, up from 7% in 2021. This segment had already grown by 93% to €47 million in 2021 and experienced a further growth of almost 114% to €100 million in 2022. The key deals in this segment were Sylvera (€37 million) and LiveEO (€19 million).

⁵ Note: the value of investment in downstream start-ups is probably underestimated due to the inherent difficulty to track investments in the downstream sector, which involves companies whose business is often only partially related to space. With a growing cross-fertilization between space and terrestrial technologies, the distinction between investments within and outside the space sector is poised to become increasingly blurred.

2 SPACE INVESTMENT IN A GLOBAL CONTEXT

In 2021 the ESPI Investment Database was expanded to cover global investment in space start-ups since 2019. In similar fashion to European deals, information on foreign deals is sourced from a combination of online public resources, financial databases such as Crunchbase and Pitchbook and private information sources. All deals are reported in euros using World Bank exchange rates averaged on a monthly basis.

Just like for the European segment of this report, a space company is defined as a company providing analytics originating primarily from space-based systems, or manufacturing ground and/or upstream equipment and provides services that rely on such systems.

To provide comparable metrics with already established sources such as BryceTech and Seraphim capital, ESPI uses a broader “New Space” perimeter in this chapter, compared to the previous chapters, that features a less stringent definition of “start-ups” and includes companies such as SpaceX or OneWeb.

2.1 Global investment dynamics

Global investment in space ventures in 2022 totalled **€8.8 billion**, which represents a **28% decline from the previous year's peak of €12.2 billion**. However, it is important to note that 2021 was an exceptional year and should be seen as an outlier. The **difference in volume between 2021 and 2021 can be almost entirely attributed to the lack of SPACs**. Despite the year-on-year downturn, the industry has maintained a healthy growth rate of 14% CAGR since 2019. Furthermore, the number of deals increased from 272 in 2021 to 293 in 2022, indicating that the interest and the amount of capital raised for New Space companies worldwide remained strong in 2022.

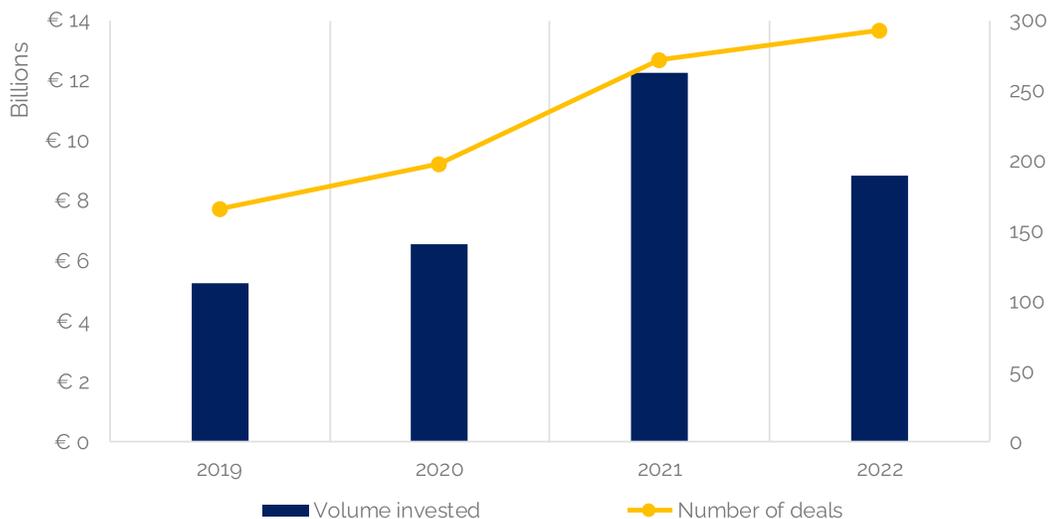


Figure 15: Global Investment & Deals

Venture Capital accounts for the largest share of financing worldwide. In 2019 this share was 45%, slightly decreasing in 2020 to 31%. In 2021 and 2022 the share remained at just above 55%. The most notable difference between 2021 and 2022 is the absence of SPACs. This investment type accounted for €3 billion over ten SPACs in 2021, which decreased to €400 million over two deals in 2022. Another notable trend is the increase in acquisitions total value, which reached €1.8 billion,



up from the previous record of €955 million in 2020. ESPI also accounts the self-capitalization into Blue Origin from Jeff Bezos which is approximately \$1 billion per year and is included as an "Angel" investment.

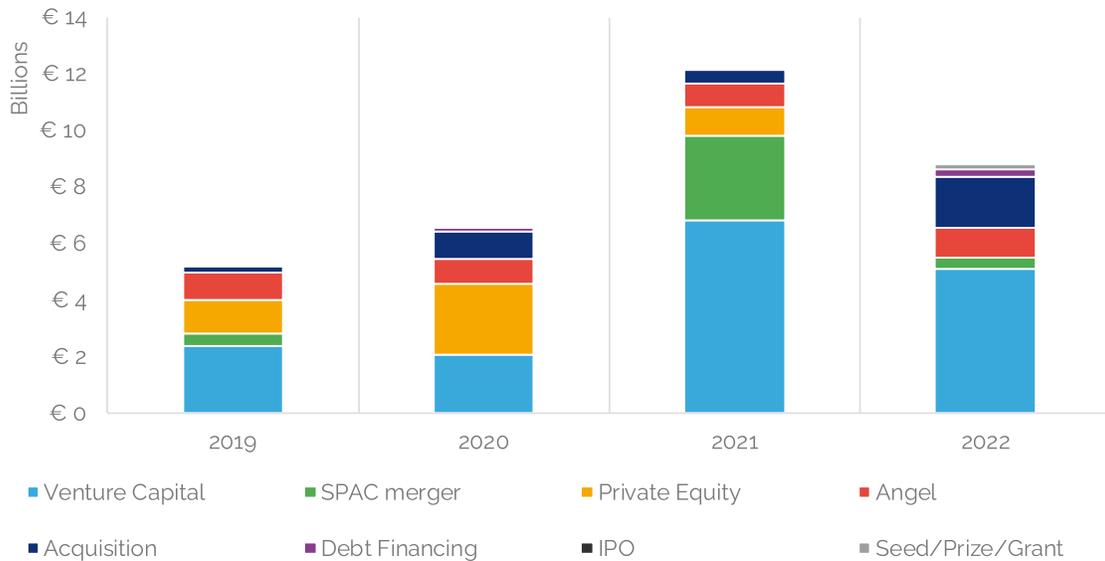


Figure 16: Investment type for global New Space ventures

Another interesting index to analyse is the share of the top five deals with regard to total investment. What can be seen is that while the **USA has raised considerably more capital than Europe, the top five deals regularly represent more than 75% of the total raised** in the country. In Europe, this average is considerably lower, with the **top five deals only representing on average about 45% of the total** In 2019.

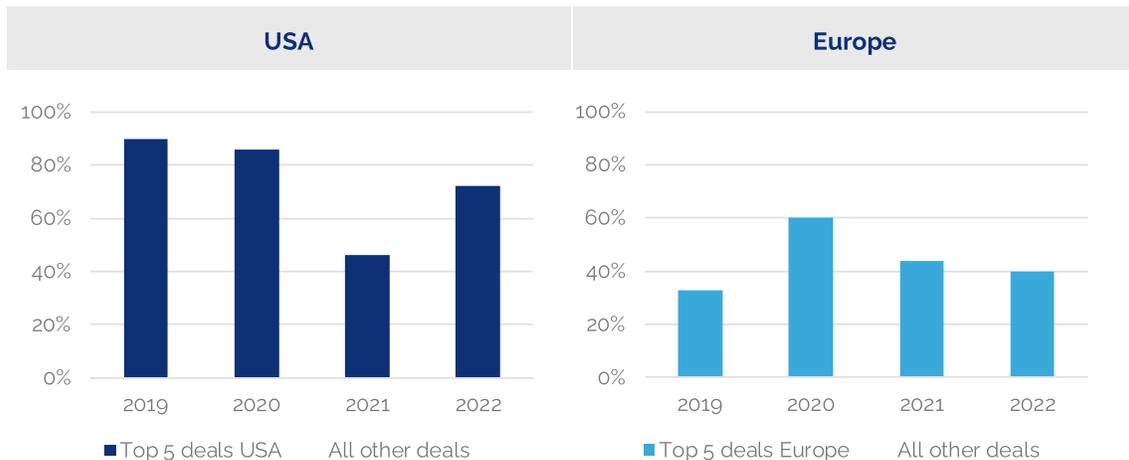


Figure 17: Weighting of top five deals - US vs Europe⁶

2.2 Global distribution of investment

The USA has historically been the most active country for New Space investment and ventures. The United States has also seen significant growth over the past three years, going from €3.2 billion in

⁶ One Web is excluded from Europe in this graphic

2019 to €9 billion in 2021 and then decreasing to €6 billion in 2022. This represents a **17% CAGR**.

Europe remains the second region attracting the most investment into New Space ventures. China has seen steady growth, with an increase of 90% between 2019 and 2022.

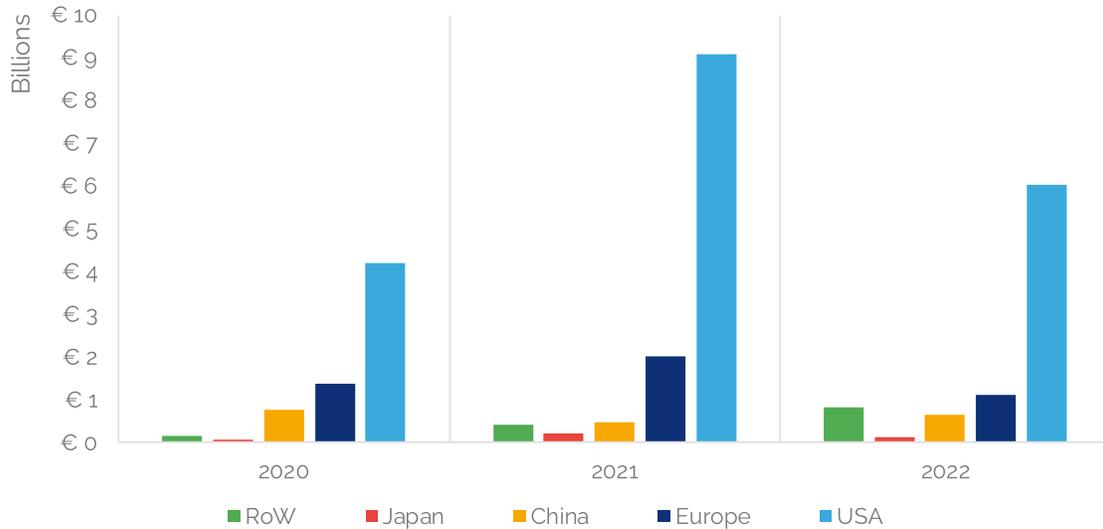


Figure 18: Investment volume per region

The biggest growth in investment over the past years has been seen throughout the rest of the world (RoW). Outside of the United States, European countries, China, and Japan, the total investment in space in the rest of the World has increased from **€24 million in 2019 to €837 million in 2022** (majority originating from Canada, India, Israel and Australia). This represents an incredible **3379%** growth over three years.

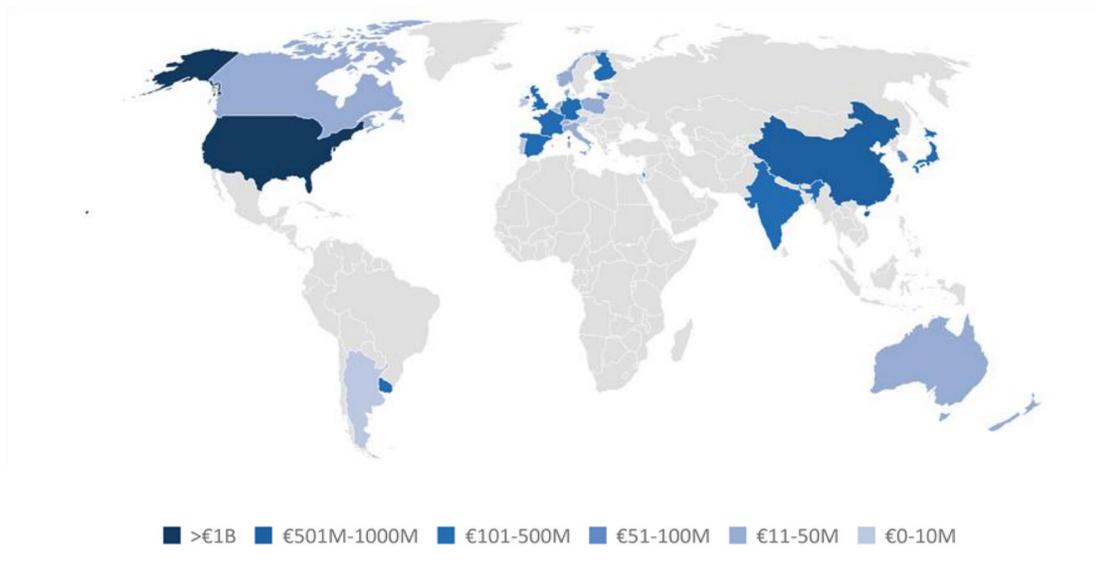


Figure 19: 2022 investment map

Europe has averaged 89 deals over the past 3 years compared to 106 for the USA. As such, **while there is only a 17% difference in deal number between the EU and the US, there is a 124% difference in investment volume** between both regions (Europe has averaged €1.5 billion over 3 years as compared to €6.5B for the USA).



The US saw 111 deals in 2022 for a total of €6 billion. This makes an average deal size of €55 million. In comparison, Europe saw a total of 114 deals totalling approx. €1.1 billion, which makes an average deal size of €10 million. The size of certain US deals can affect this average significantly.

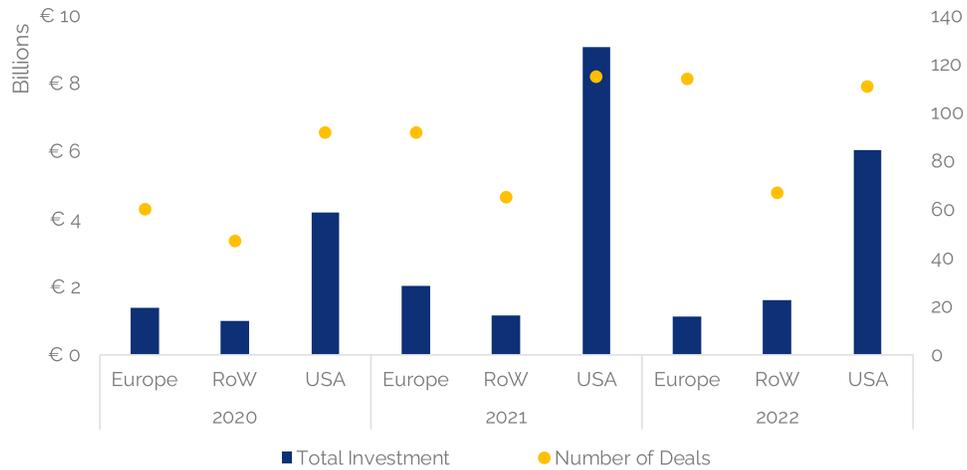


Figure 20: Volume and deals per region

Another interesting factor when considering the role of private investments globally is the ratio between public space budgets and private investment. While **public budgets and private investments are inherently different in nature and in purpose**, it is important to understand that the ratio tends to be relatively consistent across continents. Over the past 3 years, the average was 14% in US and 13% in Europe. It confirms that public sector support remains a key enabler to stimulate private investments. With increased private investment the level of public support is also required to step, including to ensure policy direction for investments in space.

Should the public sector wish to attract more capital into the ecosystem, there is a need for more public support. **The ratio of public space budgets to private space investments had been continuously growing until 2021. In 2022, this ratio decreased in both Europe and the US.**

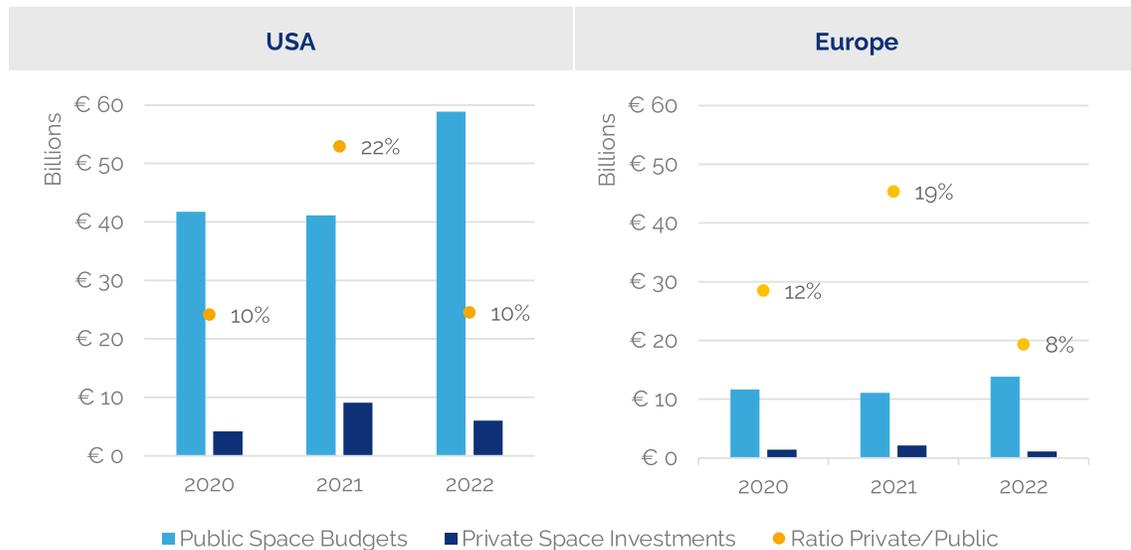


Figure 21: Ratio public space budgets to private investments



2.3 Focus on private investment in China⁷

As Europe strives to develop, reinvigorate and scale its space industrial base, it is essential to comprehend global dynamics and capitalize on the expertise and progress achieved by other actors to maintain a competitive edge. China has made great strides through **clear policy & programmatic direction** over the past decades and is now considered a full-fledged space power in its own right. While the majority of these achievements were attained through somewhat traditional public programmes, perhaps epitomized by the 2022 completion of the Tiangong space station, recent years have seen a **notable increase in the number and diversity of private companies active in the sector**.

This is matched by an **increase in private investment** as well as the **emergence of publicly backed investment vehicles** that share objectives & characteristics of the aforementioned. As further shown by the analysis, a large share of this investment originates with provincial and city governments, often linked to non-space policy objectives, as set out in China's 2022-published white paper on space.⁸

Policymakers need to develop a deeper understanding of the support provided to the space sector in other regions, beyond traditional public programmes. This knowledge will facilitate decision-making in nurturing innovation, generating more substantial investment opportunities, and providing further impulse for the development of new mechanisms, blended financing tools, and private investment incentives that will further complement existing public support in their domestic space sector.

Sections 2.3.1 – 2.3.4 were developed by Blaine Curcio⁹, founder of Orbital Gateway Consulting.

Orbital Gateway Consulting is the leading source for Chinese space industry data and analysis. Headquartered in Hong Kong, the team of Chinese-speaking analysts has been tracking the development of the Chinese space sector for nearly 10 years. It offers a comprehensive suite of data products including Chinese space industry funding, company information, satellite and launch manufacturing information, and supply chain information.



2.3.1 About the Chinese space sector

China's space sector is the second largest of any individual country in the world. In 2022, China saw more than 60 rockets send nearly 200 satellites to orbit. While still largely dominated by state-owned enterprises (SOEs), the past decade has seen an increasing number of commercial companies enter the sector, and the past several years have seen an evolution in the role that commercial firms are allowed to play.

Investment into commercial space began in 2014 with the passing of the **Guiding Opinions of the State Council on Innovating the Investment and Financing Mechanisms in Key Areas and Encouraging Social Investment**¹⁰, more commonly referred to as Document 60. Document 60

⁷ Analysis done by Orbital Gateway Consulting. Numbers and outcome can differ from ESPI database/research

⁸ *China's Space Program: A 2021 Perspective* (The State Council Information Office of the People's Republic of China, 2022); European Space Policy Institute, "Governments eager to boost space commercialisation and business development" in *ESPI Yearbook 2021* (ESPI, 2022).

⁹ info@orbitalgatewayconsulting.com

¹⁰ <https://ppp.unescap.org/resources/guiding-opinions-state-council-innovating-investment-and-financing-mechanisms-key-areas>



called for, among other things, private investment into civilian space infrastructure, which was not possible up until then. In the 9 years since roughly ¥50B (€6.5B) has been raised by more than 100 companies across the entire space industry value chain.

This funding has come from a variety of sources including Central Government investment funds, Provincial and City Government entities, institutions such as the Chinese Academy of Sciences, and a plethora of private investors. As the sector has evolved, multiple “generations” of companies have been established, and investor sentiment has closely followed government priorities.

2.3.2 How has investment evolved in the Chinese space sector

Total investment into Chinese commercial space firms has been **nearly ¥50B since 2014 and exceeded ¥7B (€1B) every year from 2019-2022**. In the early years of 2015-2018, funding rounds tended to be smaller and more numerous—for example, 2018 saw some 58 funding rounds raise ¥4B, while 2020 saw 51 rounds raise nearly ¥12B. This occurred as the earliest startups—those founded in 2014-2016 or so—began to mature, and subsequently require larger funding rounds. Most of the earliest-stage Chinese commercial space companies were focused on big, mostly upstream systems and technologies — manufacturing rockets, manufacturing satellites —and did not have very detailed business plans.

This has improved but **in general Chinese commercial space companies tend to pivot their commercialization strategies often, with this partly due to uncertain and sometimes changing institutional context towards commercial space**. For example, China’s state-run space industrial base is largely run by China Aerospace Science & Technology Corporation (CASC), a major SOE. The China National Space Administration (CNSA, the Chinese equivalent to NASA or ESA) has far fewer resources to support commercial space companies, and as such, these companies are to some extent reliant on CASC, with CASC more unlikely to support companies that might be considered as potential long-term competitors.

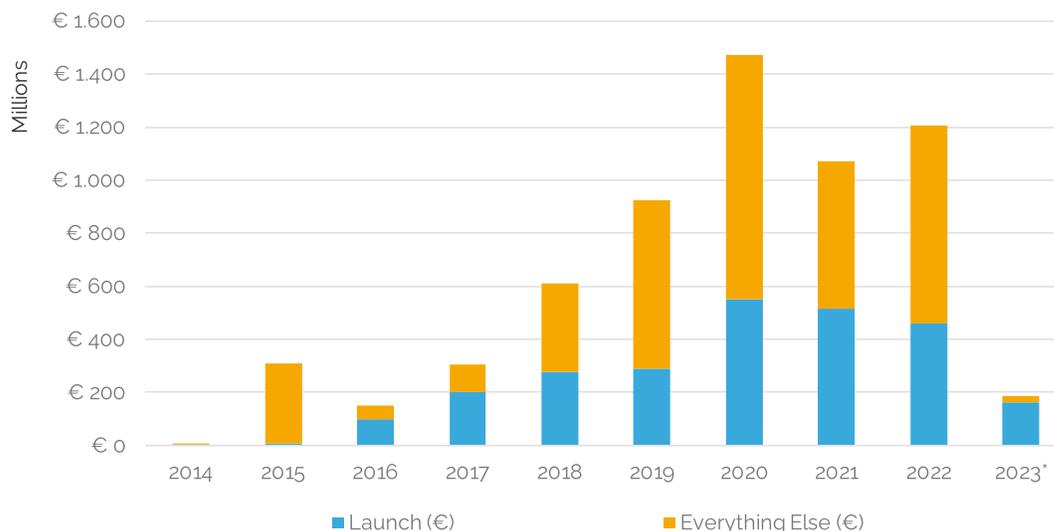


Figure 22: Chinese funding in space start-ups (source OGC)

Despite commercial uncertainties, these enterprises have attracted substantial funding over the past decade. The **launch sector has been the largest recipient of funding by far, with approximately 20 commercial launch companies in China collectively raising about ¥19.673 billion**, accounting for nearly 40% of the total amount. Furthermore, commercial launch



companies such as Expace, LandSpace, iSpace, Galactic Energy, Space Pioneer, and CAS Space have experienced the most sizable funding rounds, each raising more than ¥1 billion.

In addition to the launch sector, satellite manufacturing, satellite communications, and remote sensing have garnered considerable interest, representing cumulative investments of approximately ¥10 billion, ¥6 billion, and ¥7 billion, respectively. Other industry segments are not as thoroughly documented; however, this is partly because investments may be directed further down the value chain. For instance, investment in commercial satellite navigation firms is relatively low at ¥2.5 billion, but this figure does not take into account investments in location-based services companies or other enterprises utilizing space infrastructure in downstream applications.

2.3.3 Dynamics of investment

Since 2014, several waves of investment have been observed in the commercial space sector. The so-called "**first generation**" of Chinese commercial space companies, founded between 2014 and 2017, consisted of visionary entrepreneurs who **took significant risks** to establish these businesses. It is crucial to acknowledge that during this time, "**commercial space**" in China was **virtually non-existent**, and Document 60, while providing some guidance, was far from a guarantee that commercial space would become a viable business in China at any point in the foreseeable future.

These early companies were typically founded by teams from CASC or the Chinese Academy of Sciences (CAS), complemented by finance or commercial professionals. The initial funding for these ventures sometimes came from co-founders, and they often received support from universities, small city governments, or investment funds.

Occasionally, significant investments occurred, such as when China Aerospace Science and Industry Corporation (CASIC), a "sister company" to CASC, invested approximately ¥1.2 billion into its commercial launch subsidiary, Expace, in 2017. When such sizable investments took place, it **signalled that a highly influential figure was supportive of commercial space, making the broader investment community in China more comfortable** with committing their capital to the sector.

As the 2010s drew to a close and the 2020s began, commercial space in China became increasingly mainstream. High-profile investors started to allocate their capital to this sector, and the types of companies receiving funding have diversified. Numerous startups now focus on cutting-edge technologies such as laser communications, next-generation propulsion systems for satellites and rockets, and synthetic aperture radar (SAR) remote sensing satellites.

While commercial business cases remain somewhat uncertain, **city and provincial governments are being directed by the Central Government to undertake initiatives such as "digitizing provincial agricultural sectors."** In response, commercial Earth observation (EO) companies are poised to assist these provinces and cities.

Central Government initiatives have actively influenced commercial space investment, with the most notable example being the National Development and Reform Commission's **addition of Satellite Internet to the list of "New Infrastructures" in early 2020**. In the subsequent months, several commercial satellite manufacturers secured funding from prominent sources with the aim of developing enhanced internet satellites.

2.3.4 Who has been investing

Chinese space industry investment can be broken up into three broad categories:

- 1) **Central Government investment**, which includes major SOEs, Central Government investment funds, major university endowments, the Chinese Academy of Sciences, etc.
- 2) **Provincial and City Government investment**, which includes provincial and city development funds, land grants, tax breaks, and other financing
- 3) **Private investment**, which includes Chinese venture capital firms, western VC's China affiliates (i.e. Sequoia China, Matrix Partners China, etc.), and individual investors

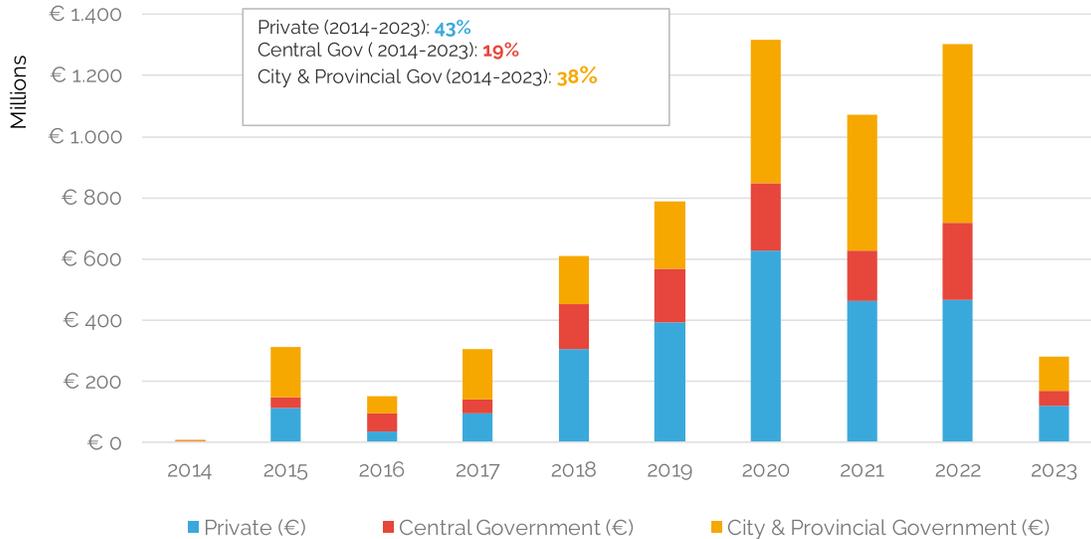


Figure 23: Origin of New Space investment in China (source OGC)

City and Provincial governments typically invest in commercial space companies in an effort to develop their own industrial bases. Recent months have seen more cities getting involved in this trend, with notable examples including the Chongqing Xiyong Microelectronics Park partnering with companies to launch 6 satellites earlier this year, and the Meishan subdistrict of Chengdu partnering with CGSTL to deploy >10 remote sensing satellites in late 2022.

The Chinese commercial space sector is rapidly expanding, supported by an increasing range of state resources. As companies and technologies mature, a commercial ecosystem is emerging, exemplified by the development of commercial launch sites. Although state dominance is expected to persist, the current landscape for commercial players is broadening, bolstered by significant policy, regulatory, and financial momentum.



3 SPACE VENTURE 2022 TAKEAWAYS

Investment in Europe

- **Record investment in 2022 in Europe**, with €1009 million (approx. 1 Billion) invested in European space start-ups, €398 million more than in 2021 (65%). This investment was distributed over an all-time high of 112 deals
- **Massive growth since 2014 (CAGR-45%)** in Europe, with annual investment growing from €50 million to €1 billion in just 8 years
- **Biggest investment round for a European start-up in 2021:** ICEYE (€119,5 million) Series D raised to fund its natural catastrophe solutions offering, expand its satellite constellation and make investments in its analytics services
- **Top five deals in Europe reached** €411 million in 2022, or 41% of the total raised by European space start-ups
- **Venture Capital accounts for the largest share of investment value**, with 77% of investment originating from VC's

Investment Worldwide

- **Global investment into space ventures decreased** from €12.2 billion in 2021 to €8.8 billion in 2022. However investment remained very strong, with the only big change (decrease) being the quasi disappearance of SPAC's
- **Venture Capital accounts for the largest share of financing worldwide** with 55% of the total or for approx. a total of €5 billion
- **The acquisition of space companies globally** reached €1.8 billion in 2022, underlining some changing sectorial dynamics
- **The U.S. is the region attracting most investments**, followed by Europe and China.
- **The rest of the World (RoW)**, has seen a growth in investments of **3379%** over the past three years. This is a trend that is expected to continue as more countries pursue their increasingly ambitious national space strategies

Investment in China

- **Chinese companies have raised approx.** €6,5 billion since 2014 over 100 companies
- **Chinese commercial space companies tend to pivot** their commercialization strategies often, with this partly due to uncertain and sometimes changing institutional attitudes towards commercial space
- **Launch companies in China** have attracted the majority of investment (40% of total)
- **The three main investors into commercial Chinese space ventures have been:**
 - Private investors (**43% of total** btw 2014-2023)
 - The Chinese central government (**19% of total** btw 2014-2023)
 - The City and Provincial Governments (**38% of total** btw 2014-2023)



ANNEXES

Annex A – ESPI Space Investment Database

Dataset and sources

The assessment of investment statistics provided in this report is based on information collected by ESPI in a proprietary database. The ESPI Space Investment Database includes all deals from 2014-2022. The dataset includes publicly available data on announced operations and deals and information is collected by screening a high number of sources including investment firms', incubators' and accelerators' portfolios, articles and specialized news outlets or specialized sources such as CrunchBase. Furthermore, due diligence was made to appropriately filter all press and governmental releases as well as events. Cross-checking was systematically performed.

Perimeter and definitions

This study focuses on European space start-ups and aimed to collect data on investment received by these companies and to gather views of these companies on their business, the environment in which they evolve and their expectations from public actors. The following definitions and categories were applied to delineate the perimeter of the analysis.

European space start-ups

- **Start-up:** A start-up is defined in Europe as a company younger than 10 years, whose business tends to feature innovative concepts and models and who has not yet reached business maturity (defined according to the business stage: Public Offering, annual turnover or a number of employees). For the purpose of this study and given the usually longer timeframe required in the space sector to reach business maturity (as compared to other industrial sectors), ESPI included companies founded after the year 2000. Business maturity (end of the start-up stage) is considered achieved if the company meets one of the following criteria (adapted from start-up and SME definitions by the European Commission):
 - Acquisition or Public Offering: the company has been acquired or listed on a stock market.
 - Turnover: the annual turnover of the company exceeds €50 million, or the annual balance sheet total exceeds €43 million.
 - Number of employees: the total number of employees exceeds 250.
- **Space company:** A company is considered a space company if the main business of the company (in revenue share) is part of the space value chain. For this definition, the study followed the space market segmentation provided by Seraphim's Spacetechnology Market Map 2019, which divides space activities into three segments:
 - Upstream: Build, Launch, Satellites;
 - Downstream: Downlink, Analyse, Store, Product;
 - Beyond Earth: Space Exploration, Space Resources, Space Logistics, Space Research.
- **European company:** A company was considered European when the headquarters of the business organization are based in Europe (EU Member States + ESA Member States), or if a majority of its business operations are conducted in Europe, a feature that implies, for instance,



the eligibility for EU funds as those provided by the Horizon2020 program. Some exceptions exist for companies with multiple headquarters.

In a number of cases, the classification of a company as a European space start-up required an arbitration because of the business setup (e.g. multiple headquarters addressing different regional markets), the situation of the company (e.g. dormant company founded before 2000 but with a net business acceleration after 2000 and following a start-up behaviour) or the nature of business (e.g. space is part of the products and services portfolio but not a core market).

For example, the study partially includes, or totally excludes, deals involving companies that reached business maturity during the period considered (2014-2018). This is for example the case of O3b Networks (today part of SES as SES Networks): the company is counted for a single investment in 2014 despite additional investments in 2016 and 2017. According to the definition adopted for this study, the company reached business maturity in 2015, because of annual revenues exceeding by far €50 million. Comparably, companies like GOMSpace and AAC Microtec were excluded after 2016, as they both started to be publicly traded and their business structure did not match anymore a start-up model. The British company Reaction Engines was included despite its age, as the company is still actively trying to develop the product for which it was founded, the SABRE engine.

New Space perimeter for global statistics

In order to provide comparable metrics with already established sources such as BryceTech and Seraphim capital, ESPI uses a broader "New Space" perimeter for global statistics that features a less stringent definition of "start-ups" and includes companies such as SpaceX or OneWeb which already reached maturity according to ESPI definition.

To ensure coherence with existing authoritative studies, ESPI selected the categories used in Bryce's Start-Up Space report series to classify sources and types of investment.

Investor categories

- **Angel Investors:** individuals or families (to include family offices) that have accumulated a high level of wealth and seek potentially high returns by investing in ventures during their early stages. Such investors may also operate with venture capital firms or other so-called angels. They will typically invest via straight equity, ranging in value from \$50,000 to over \$1,000,000. There is also a class of "super angels", who work in deals of \$100 million or more (Jeff Bezos, as one example).
- **Venture Capital Firms:** VC firms represent groups of investors that invest in start-up, early-stage, and growth companies with high growth potential, and accept a significant degree of risk. The trade of risk for potentially high returns results in a high failure rate. Their investment form is equity, typically preferred stock, and comes in a series of rounds, traditionally Series A, B, C, etc.
- **Banks:** Banks are financial institutions that can support investment through a variety of instruments including, in particular but not only, loans and debt financing.
- **Private Equity Firms:** Private equity firms or groups are formed by investors to directly invest in companies. They typically invest in established companies, rather than start-ups, through large transactions and often acquire an entire company or a group of related companies that can merge.
- **Corporations:** Corporations have different methods of engaging in investment. They frequently provide the funding necessary to bring space-based programs to initial operating capability, as well as to sustain ongoing programs; they can also fund ventures, typically via straight equity,



but also debt, and in the latter case with the option to convert to equity; and they also sometimes act via a corporate venture fund. Lastly, corporations may likewise acquire firms, including start-up space ventures, of which there have been several examples in recent years.

- **Accelerators & Incubators:** Although they are ultimately distinct types of actors, accelerators and incubators are similar in several core ways. Both aim to support start-ups, offer mentoring in developing their business, and both offer means to attract investment. Broadly concerning their differences, “accelerators ‘accelerate’ growth of an existing company, while incubators ‘incubate’ disruptive ideas with the hope of building out a business model and company”.

Investment categories

- **Seed/Prize/Grant:** Funding received by a start-up typically at an early stage of development. This category includes a variety of funding instruments that are usually obtained as the result of a selection process (application, competition) and involve limited obligations from the company.
- **Acquisition:** A situation whereby one company purchases most or all of another company's shares in order to take control. An acquisition occurs when a buying company obtains more than 50% ownership in a target company.
- **Debt Financing:** Process of raising money by selling debt instruments to individuals and/or institutional investors (e.g. banks). In return for lending the money, the individuals or institutions become creditors and receive a promise that the principal and interest on the debt will be repaid.
- **Private Equity:** Investment consisting of capital that is not listed on a public exchange. Private equity is composed of funds and investors that directly invest in private companies.
- **Public Offering:** Process of offering shares in a private corporation to the public. The first time, the operation is called an Initial Public Offering (IPO).
- **Venture Capital:** Funds invested by VC firms, usually with medium-term stakes, for high-profit, high-risk activities.

Space value chain segmentation

The space value chain can be divided into segments. ESPI selected the Seraphim SpaceTech Ecosystem Market Map (available at: <https://seraphimcapital.co.uk/insight/news-insights/introducing-seraphim-spacetechn-market-map>) to organize start-ups business along the value chain.

The upstream part of the space value chain includes all business activities related to the development, production, deployment and operation of space systems. This includes:

- **Build:** development and manufacturing of space systems (incl. sub-systems, equipment, components and materials) and/or provision of related software and engineering services;
- **Launch:** development and manufacturing of launch systems and/or provision of launch services;
- **Data:** operation of space systems to lease or sell satellite capacity data.

The downstream part of the space value chain includes all business activities related to the exploitation of space systems' capabilities or data to provide space-enabled products and services to end users:

- **Downlink:** development and manufacturing of the ground support infrastructure and services required to exploit a space system (e.g. relay systems, communications, ground terminals, cryptography);

- **Store:** provision of solutions for satellite data storage and processing;
- **Analyse:** provision of value-adding solutions for satellite capabilities and data exploitation (e.g. big data analytics, machine learning and artificial intelligence, algorithms);
- **Product:** provision of space-enabled products to end-users (e.g. mapping & 3D, data platforms, location and tracking, insight and monitoring).

Seraphim also include, in a separate segment, companies whose business involve activities beyond Earth orbit including services and products for space exploration, space resources, space logistics or space research.

Annex B – About New Space

The global landscape of space activities is currently undergoing profound changes. Whereas the vast majority of space activities are still led by governments, with private industries acting as suppliers for public programmes and relying massively on public funding, a disruptive and commercially driven ecosystem has emerged over the last decade marked by ambitious private endeavours featuring innovative schemes and business models. In this new ecosystem, public actors are eager to explore new ways to conduct space programmes and to foster the development of the commercial space sector. In turn, private actors also seek to play a more prominent role, leveraging public funding and private investment to develop new business models and address new markets.

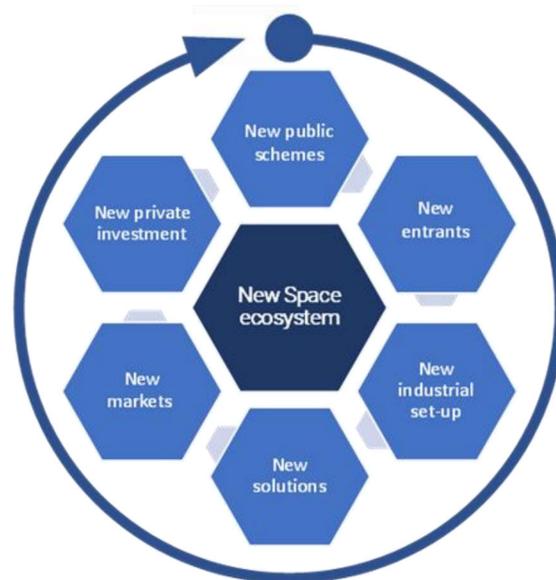


Figure 24: The New Space ecosystem

The underlying dynamics of this new ecosystem, usually referred to as New Space, feature a wide range of interrelated trends:

-New public schemes for space programmes, procurement and support to innovation involving new arrangements with the private sector and the development of new public instruments.

-New entrants including emerging spacefaring nations and new business ventures from space companies and start-ups as well as from non-space companies seeking to enter the space sector.



-New solutions including new products and services but also disruptive value propositions such as integrated solutions, lower prices, reduced lead times, lower complexity, and better flexibility.

-New markets under exploration or development in both the upstream and downstream segments of the space value chain.

-New industrial set-ups and implementation of new industrial methods and processes for the development and production of space systems as part of innovative business models.

-New private investment from various sources and involving multiple financial instruments (e.g., venture capital, private equity, loans, prizes, crowdfunding...).



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