

QUARTERLY REVIEW OF GLOBAL PRIVATE INVESTMENT

# GENERATION SPACE INDEX

Q2 2024



GENERATION  
SPACE

# EXECUTIVE SUMMARY

The space sector continues to demonstrate robust growth and resilience, evidenced by four consecutive quarters of investment recovery. This quarter saw \$2.41bn invested, the slightest increase from the previous quarter's \$2.39bn, bringing the total investment over the past twelve months to \$8.5bn. The growth in investment this quarter was primarily driven by a large volume of deals across Series A to Series C. This is in stark contrast to the period from 2019 to 2021, where investment was largely driven by Series D+ rounds. Q2 2024 culminated in a record number of deals, 174 in the quarter, and 528 over the trailing twelve months (TTM).

The two largest rounds of the quarter were both done by Chinese companies. Space Pioneer, a launch business, and MinoSpace, a satellite manufacturer. Including last quarter's \$1bn investment into Shanghai Spacecom Satellite Technology, China is now leading global space investments for the period YTD 2024. This is likely driven by a strong desire to match or exceed the capabilities of Western counterparts like SpaceX. China has demonstrated a strong commitment to advancing its commercial space infrastructure and is moving fast to close the capability gap with major spacefaring nations.

Direct-to-cell technology continues to make remarkable strides. Starlink had deployed about 100 direct-to-cell satellites as of the end of Q2 2024, with hundreds more to launch and initial service to commence in the US before

the end of 2024. AST SpaceMobile's \$100m deal with Verizon likely drove a significant 440% increase in the company's stock price over the quarter. Lastly, Apple's announced that iOS 18 will expand satellite messaging capabilities. Unlike traditional cellular networks constrained by terrestrial reach, direct-to-cell satellite technology enables users to access mobile phone connectivity anywhere on Earth.

SpaceX continues to drive the industry forward with Starship; their 150 tonne to orbit next generation rocket that will drastically reduce the cost of access to space. The business achieved a significant milestone with its fourth test flight, successfully performing simulated soft landings of both the booster and upper stage. Starship promises to revolutionize the economics and mass availability for launching into space, which would unlock significant value for companies and start-ups in the ecosystem and beyond.

Q2 2024 also saw a SpaceTech IPO, with Astroscale's listing on the Tokyo Stock Exchange. Meanwhile, public new space businesses including Planet, a leader in optical satellite imagery, have announced their plans to drive towards profitability in the foreseeable future.

We look forward to seeing how these key trends shape investor decision-making in the year ahead.

## KEY HIGHLIGHTS FROM THE QUARTER

**\$8.5BN**

invested in the **Trailing Twelve Months (TTM) to Q2 24**  
(\$5.1bn in TTM to Q2 23)

**\$2.4BN**

invested in **Q2 24** (\$2.4bn in Q1 24)

**330**

on **Seraphim Investment Index Q2 24** (281 in Q1 24)

**385**

on **Seraphim Number of Deals Index in Q2 24** (320 in Q1 24)

**\$18M**

average deal size in **Q2 24** (\$22.6m in Q1 24)

**\$5M**

median deal size in **Q2 24** (\$4.4m Q1 24)

**\$208M**

biggest deal closed in **Q2 24** (Space Pioneer)

**China's Accelerating Pace:** Q2 2024 showcased significant space activity from China, highlighted by the launch and successful return of the Chang'e-6 space probe. This lunar sample return mission brought back the world's first samples from the far side of the moon, demonstrating China's advanced space capabilities. The country's commercial space sector continues to rapidly develop. YTD 2024, Chinese companies have secured the three largest SpaceTech investments, underscoring China's ambition to develop a space industrial base and capabilities comparable to those of SpaceX and the United States more broadly. However, this is not without setbacks, as evidenced by the dramatic static fire test of Space Pioneer's Tianlong-3 rocket. The test saw an anchoring mechanism failure, resulting in an unplanned launch and explosion.

**Direct-to-cell:** Starlink had launched over 100 direct-to-cell satellites as of the close of Q2 2024, with hundreds more planned for the remainder of the year. At this pace, the business is poised to start servicing customers in the US by the end of this year, marking a strong step toward providing ubiquitous, high-quality connectivity to users globally. In parallel, AST continued to expand its partnerships, securing a \$100m deal with Verizon. This follows a similar deal already in place with AT&T. Shareholders have welcomed this news as evidenced by the company's share price almost tripling during the quarter. Additionally, Apple announced expanded satellite messaging capabilities for iOS 18, moving beyond just emergency messaging, to now include sending and receiving SMS and iMessages.

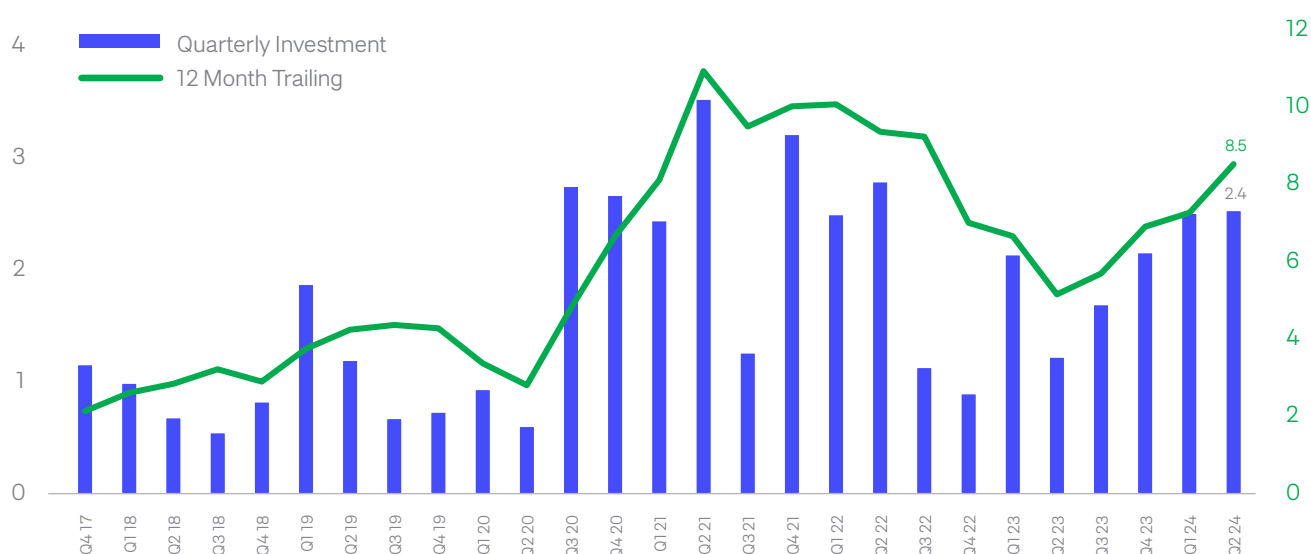
**SpaceX's Starship Re-Entry Success:** SpaceX achieved another milestone with its fourth Starship test flight, demonstrating soft landings of both the booster and Starship over water. With this Starship edges closes to becoming operational, which promises to yet again revolutionize the economics of space launch. There are many startups today that plan to leverage these new economics, and more abundant mass to orbit, to enable larger and more advanced capabilities in space. Examples include K2 Space and Exlabs, who are aiming to deploy larger and more capable satellites, and others aiming to bring cargo to the lunar surface such as Astrolab and Ethos Space.

**Public Space Companies:** Seraphim portfolio company Astroscale, a Japanese on-orbit servicing company, successfully completed its IPO on the Tokyo Stock Exchange. Astroscale joins the ranks of other public Japanese space companies including ispace and IQPS, both of which went public in 2023. Meanwhile, established space companies like Planet, who listed in 2021, are actively driving towards profitability. In an effort to reduce costs and improve margins, Planet announced a second round of headcount reductions, following a 10% cut in August 2023, and an additional 17% cut this quarter.

**Boeing Starliner:** Boeing's Starliner launched to the ISS in June, but not without experiencing multiple challenges along the way. The first two launch attempts were called off just ahead of liftoff, but Starliner ultimately reached the ISS on the third launch attempt. In space, the capsule continued to experience technical difficulties, with thrusters shutting down unexpectedly and helium leaks being found in five different parts of the spacecraft, delaying the crew's return to Earth.

## INVESTMENT OVERVIEW

### Seraphim Quarterly Investment Tracker (\$bn Invested)



Quarterly investment in Q2 2024 saw the slightest increase vs. the previous quarter, coming in at \$2.41bn (\$2.39bn in Q1 2024). While we have not returned to the heights of 2021, this quarter shows continued positive momentum, as

the 4th quarter of continued recovery in investment, both on a quarterly and TTM basis.



# OVERALL INVESTMENT ACTIVITY

## Seraphim Trailing 12 Months (TTM) Investment Activity Index (Q1 2018 = 100)



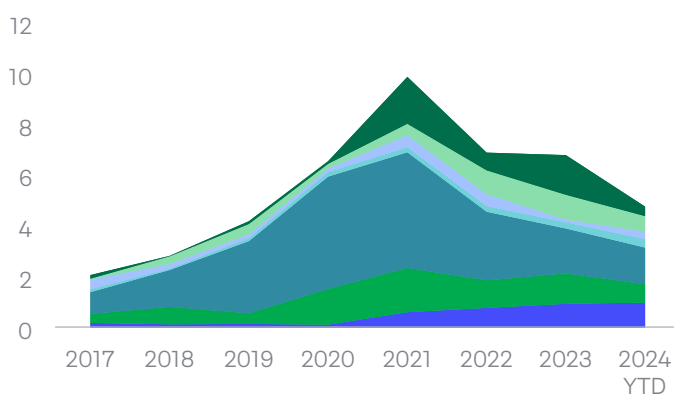
Investment in SpaceTech has continued to significantly outperform general venture capital. General VC experienced a mild uptick in the most recent quarter following a prolonged decline since 2022. Meanwhile, SpaceTech has demonstrated a much more pronounced recovery and sustained growth, particularly in the number of deals completed.

Indeed, Q2 2024 set a record for SpaceTech deals closed in the quarter (174), contributing to a total of 528 deals over the trailing twelve-month period. This growth has been primarily driven by a substantial increase in Seed and Series A investments, possibly indicating stronger investor confidence in early-stage SpaceTech ventures.

## DATA LIFECYLE

■ Beyond Earth ■ Product ■ Analyse ■ Downlink ■ Platform ■ Launch ■ Build

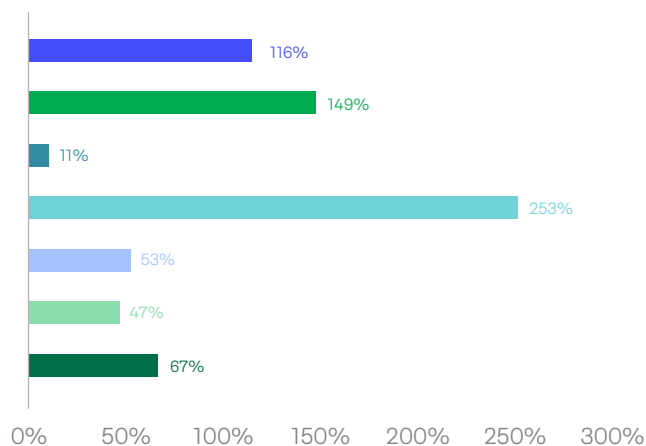
### Annual Investment (\$bn)



Downlink has historically been one of the smaller segments for investment. However, the TTM period has seen multiple significant deals within the segment such as Armada, Second Front, Skyloom and Skylo. This quarter, downlink continued its strong trajectory, with a round making it into the top 10 deals. Emposat, a Chinese business that raised \$71m, focuses on satellite communications products.

Launch experienced substantial growth over the previous TTM period. This resulted from multiple \$100m+ rounds across North America, Europe, and Asia. Space Pioneer, a Chinese launcher, was responsible for the largest deal this quarter. In addition to this, Firefly's \$312m round in Q4 2023 significantly

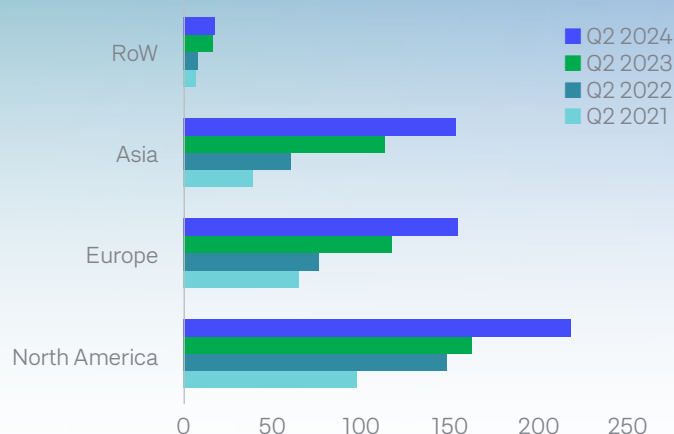
### Investment, TTM to Q2 24 vs to Q2 23 (% Change)



contributed to the investment in this period. D-Orbits \$110m round in Q1 2024 was the largest European round in the category.

While growth in Launch was punctuated by a smaller number of large rounds, growth in the Build segment was the result of significant growth in the number of rounds. The largest round in Build was Mino Space with \$138m.

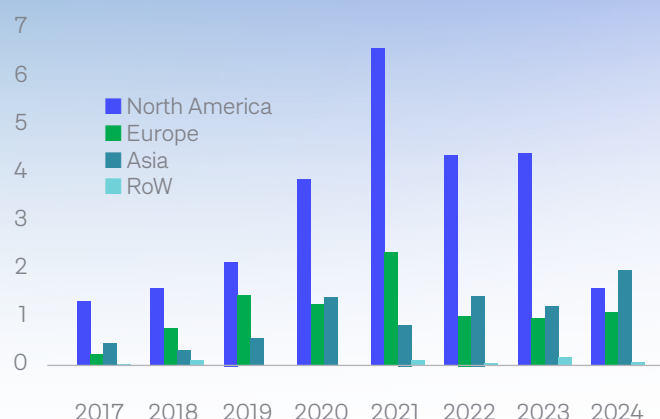
## Number of Deals (TTM)



In the TTM to Q2 2024, North America continues to lead with the greatest number of deals. Asia has been rapidly catching up with Europe over the last 4 years and are effectively on par today (149 in Asia and 150 in Europe).

Deal volume in Asia is primarily being driven by China, who holds the highest proportion in the geography at 75 deals or 50% of total volume.

## Investment By Region (\$bn)

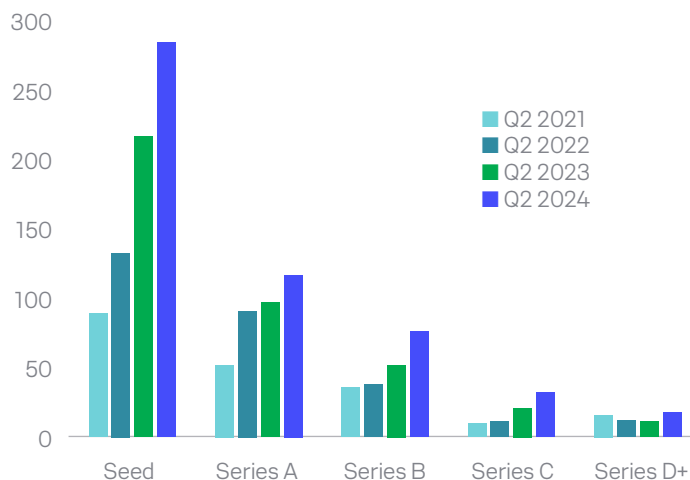


China leads 2024 in terms of space investment, following the near \$1bn round into Shanghai Spacecom Satellite Technology in Q1 2024 and the two largest deals of Q2 2024 with Space Pioneer and MinoSpace raising \$208m and \$138m, respectively.

Notably, YTD 2024 has seen a reversal of roles, with North America no longer leading the world by a significant margin in terms of investment.

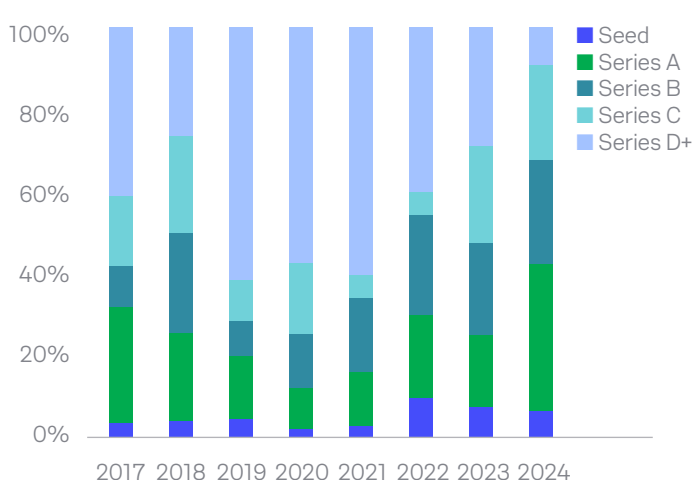
# STAGE OF INVESTMENT ANALYSIS

## Number of Deals (TTM)



One of the trends we identified last quarter was the difficulty of graduation to Series A. In the most recent quarter this has appeared to ease, with 46 Series A deals completed, vs 27 during Q1.

## Investment Concentration (\$bn)



Through 2019 to 2021, investment in space was heavily concentrated in the first generation of mature Series D+ businesses including SpaceX and OneWeb (accounting for >50% of investment in these years).

There has been a gradual reversal of this trend as we move towards 2024, with Series D+ rounds now accounting for less than 10% of investment.

Most of the investment YTD 2024 has been concentrated in the next generation of SpaceTech companies, which are currently in their early growth rounds.

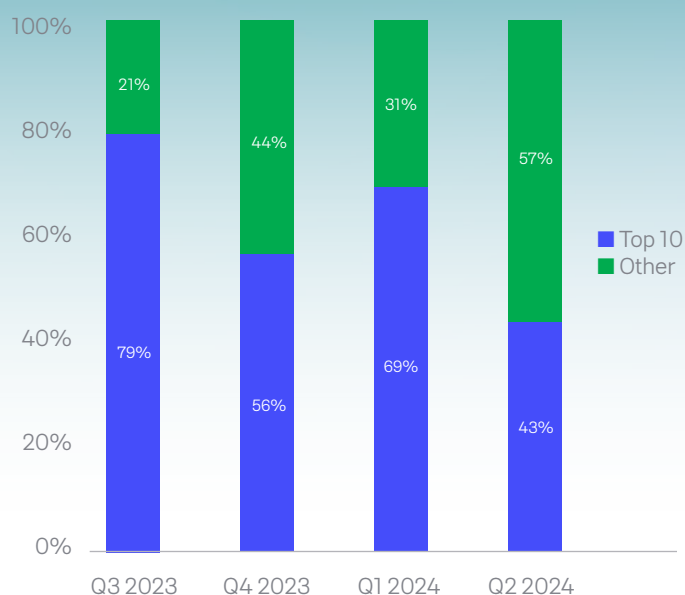
# TOP 10 DEALS OF THE QUARTER

## Q2 2024 Top Deals

This quarter, the two largest deals were both Chinese businesses. Space Pioneer and MinoSpace led the investment charts. Emposat, another Chinese company specializing in communications products, also featured on the list. The high concentration of Chinese companies in the top deals has propelled China to the top geography for investment year-to-date.

European businesses also had a strong showing this quarter. Iceye raised a significant growth round to continue expanding its constellation, and PLD secured funding to advance its launcher technology. Aalto HAPS, an Airbus spin-off from the Zephyr program, raised funds as well, classified as D+ due to the mature stage of its technology following significant internal development at Airbus. Isar Aerospace raised a \$70m Series C extension during the quarter.

The US saw noteworthy activity with Apex, which focuses on building lower-cost standardized satellites, and Varda, which focuses on life science in space, both announced large rounds.



COMPANY	COUNTRY	DATA LIFECYCLE	SUB CATEGORY	STAGE	AMOUNT (\$m)
Space Pioneer	China	Launch	Rockets	Series C	\$208m
Mino Space	China	Build	Space Hardware	Series C	\$138m
Aalto HAPS	UK	Platforms	Drones & UAV	Series D+*	\$100m
World View	US	Beyond Earth	Space Tourism	Series D+	\$95.7m
Apex	US	Build	Space Hardware	Series B	\$95m
ICEYE	Finland	Platforms	Satellites - Earth Observation	Series E	\$93m
Varda	US	Beyond Earth	In-Space Manufacturing	Series B	\$90m
PLD Space	Spain	Launch	Rockets	Series C	\$83.8m
Emposat	China	Downlink	Communications	Series C	\$70.7m
Isar Aerospace	Germany	Launch	Rockets	Series C (Extension)	\$70m

## CONCLUSION AND OUTLOOK

Q2 2024 marks four consecutive quarters of investment growth and a record number of deals, underpinning recovery in the sector. The momentum is largely driven by substantial early-stage Seed and Series A deals, indicating a robust and healthy pipeline of new opportunities emerging in the space industry.

Investment YTD 2024 has predominantly been focused on businesses in their early growth stages. This is a noteworthy shift from the predominant focus on late-stage businesses in the past and signals growing investor confidence in a new generation of space companies that will ultimately drive good outcomes for investors.

During the period China has led global SpaceTech investment as they aim to match or exceed the space capabilities of the US. Growing geopolitical tensions between both countries have and are influencing this trend as both countries vie for strategic dominance in space.

Further developments in direct-to-cell technology are exciting and show the potential to massively expand the already large Satcoms market by putting connectivity directly into the hands of people.

Overall, the investment landscape for space technology looks promising and we are optimistic for the rest of 2024.

## VC FUNDS + RESEARCH + ACCELERATOR

### Our Model: Inception to exit support powered by smart capital

Seraphim is the world's leading specialist investor in SpaceTech.

Powered by smart capital from leading Space companies and government agencies, we have a unique model combining investment funds, accelerators, and an angel investor platform.

We use our panoptic view of the SpaceTech ecosystem to provide inception to exit support to the sector's most ambitious and fearless entrepreneurs as they aspire to harness the infinite potential of Space to help push the boundaries of what is currently possible by turning science fiction into science fact.

Seraphim Space Investment Trust Plc is listed on the London Stock Exchange (Ticker: SSIT)

### Our Focus: Businesses collecting & communicating data from above

We are focused exclusively on the multi \$trillion SpaceTech investment market.

We believe SpaceTech is at the nexus of mega-trends that will define societal change over forthcoming decades and has a unique role to play in addressing the world's most pressing problems.

Radical advances in the Space sector mean a data and connectivity tsunami is about to transform the world as we know it, driving the next major paradigm shift in the global economy.

We invest in companies that are enabling, generating and exploiting data being collected and communicated from above.



**Mark Boggett**  
CEO



**James Bruegger**  
CIO



**Rob Desborough**  
Accelerator &  
Early Stage

## Methodology & Taxonomy

We use a wide range of different data sources to compile our investment tracker. This includes proprietary, off-market information from our deal flow and network, deal databases such as Crunchbase, industry news sources such as SpaceNews and TechCrunch, and public announcements from companies themselves. We only include third party capital invested on an arm's length basis and therefore do not include personal investment that the likes of Jeff Bezos may make in their own space initiatives.



### BUILD

- Building & selling satellites, autonomous systems
- Components, sub-systems, complete systems
- Hardware (sensors), software (i.e. control system), hybrid (i.e. machine vision)



### LAUNCH

- Building & launching rockets
- Launch-related services



### PLATFORM

- Any data collection / space platform (i.e. smallsat, HAPs)
- Multi-modal: look, listen, communicate



### DOWNLINK

- Facilitate transmission of data from space / aerial platform back down to earth
- Satcoms & terrestrial comms networks
- Data storage, processing, security



### ANALYZE

- Analysis of data from space / aerial platforms
- A.I / machine learning enabled analytics



### PRODUCT

- Packaging of different data streams (space & non space)
- Tailored to specific use cases in specific verticals
- Location, monitoring, insight, mapping



### BEYOND EARTH

- In-Space infrastructure (i.e. Space stations)
- In-Space services (i.e. Satellite refuelling, servicing and repair)
- Utilising the microgravity environment for R&D and manufacturing

## Current Portfolio

We are the most prolific investor in SpaceTech globally. Across our different activities, we currently have a portfolio of more than 100 of the world's leading SpaceTech start-ups.

### Fund



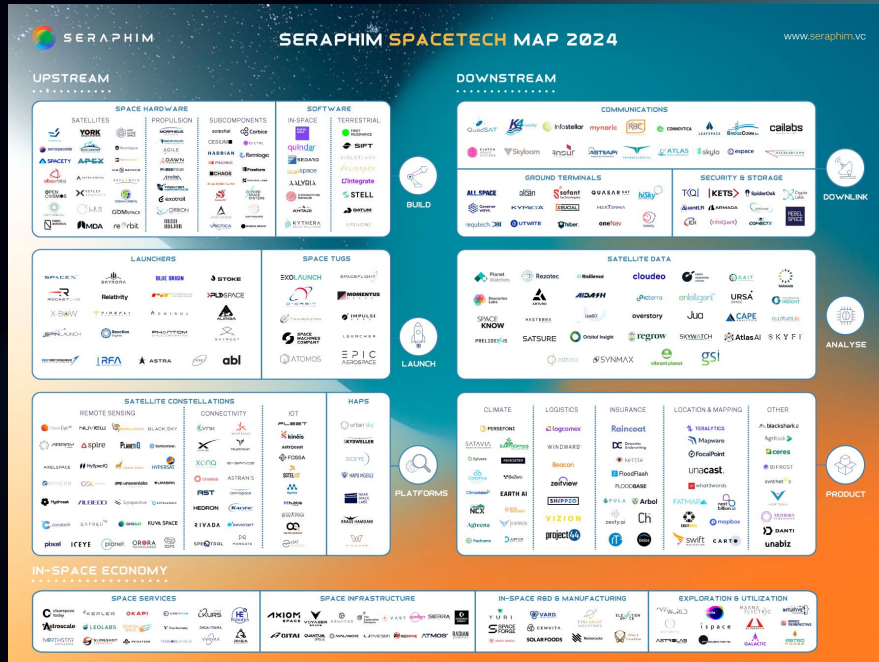
### Accelerator





# FURTHER RESEARCH

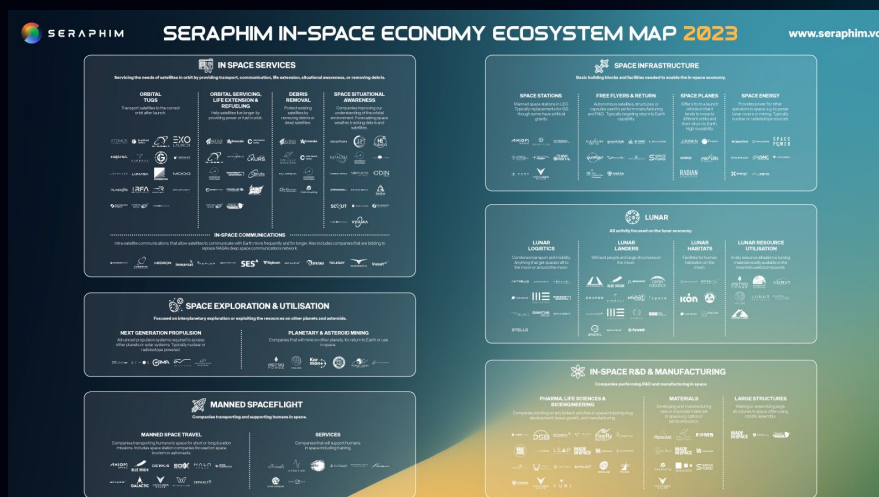
We routinely publish our own research and insights on our website with a view to helping other investors share our excitement for the multi-decade transformational potential of Spacetech. Key periodic research we publish includes our widely recognised SpaceTech Ecosystem and Smallsat Constellation market maps.



## SERAPHIM SPACETECH ECOSYSTEM MAP 2024

Global VC backed emerging leaders per category.

↓  
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## IN-SPACE ECONOMY MAP

Global VC backed companies providing services in space.

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