

QUARTERLY REVIEW OF GLOBAL PRIVATE INVESTMENT

# GENERATION SPACE INDEX

Q1 2023



GENERATION  
SPACE

As we present the first SpaceTech Index of 2023, it's intriguing to see what the new year brings following a tumultuous and challenging 2022. For the first time ever, private investment in SpaceTech in Europe surpassed that in the US, reflecting dramatic decreases in US investments and increased European investments. European governments and the EU have put an enormous focus on space sovereignty in launch, constellations, and communications in 2023, and it appears that private investors are catching up. Could 2023 be Europe's year?

In Q1, private investment in SpaceTech significantly rebounded, with total investment reaching \$1.4bn, up 75% from \$801m in Q4 2022. This marks the highest number of deals in a single quarter, with 128 deals closed in Q1 and a total of 402 deals on a TTM (Trailing Twelve Months) basis. While early-stage deals remain dominant, Q1 saw a 120% increase in growth deals compared to the previous quarter, as many growth-stage companies returned to raise financing after delaying throughout 2022. European growth-stage companies thrived, securing five out of the top ten international round sizes. Europe played a key role in driving Q1's rebound, emphasising the region's growing prominence in the SpaceTech sector. All subsectors experienced a decrease in investments, except for Product, which saw significant investments in climate-focused products leveraging space data. The US remained the go-to place for large Series A investments.

Despite the economic pullback in 2022, Q1's rebound in investment, led by Europe, and record-breaking number of deals signal a strong interest in SpaceTech from both private and public market investors. With the highest number of growth deals ever in a single quarter and some recovery in growth stage round sizes, the industry looks poised for continued growth as the economic uncertainty clears.

**Important Note:** we have previously tracked drone and UAV companies in the index. However, given the growing number of pure-play SpaceTech companies, we have decided that the inclusion of drones is no longer appropriate. As such, we've updated our historical data to remove drone companies throughout the database, resulting in variations from previous reports in certain historical figures for investment and number of deals.

#### Restated historical investment:

2017	<b>2.0bn</b>
2018	<b>2.9bn</b>
2019	<b>4.0bn</b>
2020	<b>6.3bn</b>
2021	<b>9.9bn</b>
2022	<b>6.9bn</b>

## Highlights

# \$5.9BN

invested in last 12 months (\$6.9bn in Q4 22)

# \$1.4BN

invested in Q1 (\$801m in Q4 22)

# 233

on Seraphim Investment Index (272 in Q4 22)

# 281

on Seraphim #Deals Index (257 in Q4 22)

# \$165M

biggest deal closed in Q1 (Isar Aerospace)

# \$14.3M

average deal size in Q1 (vs. \$9.7m Q4 22)

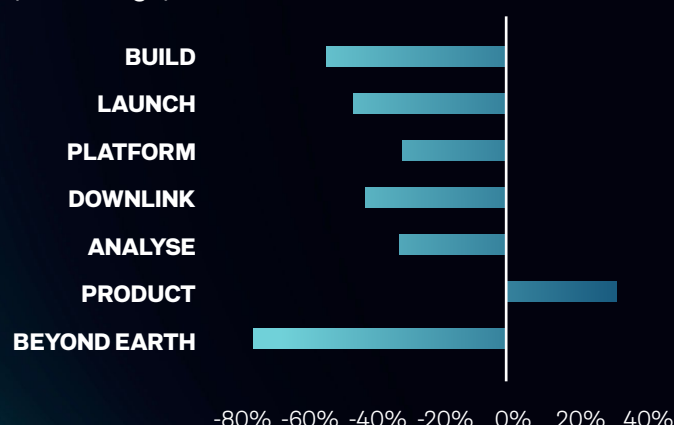
# \$4.5M

median deal size in Q1 (vs. \$3.5m Q4 22)

# 1

space-related SPAC announced (vs 0 in Q4)

## Investment (\$), TTM to Q1 22 vs. Q1 23 (% Change)



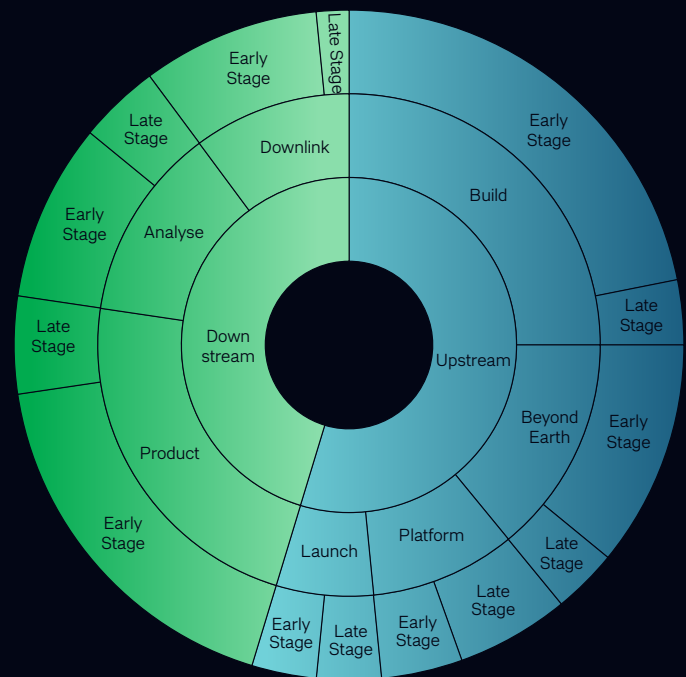
In the latest TTM period, investment declined across nearly all space industry subsectors, except for product. The most capital-intensive subsectors, Build, Launch, Downlink, and Beyond Earth, have experienced the largest drops. This aligns with expectations, as these subsectors had witnessed exceptionally large megarounds between Q2 '21 and Q1 '22. Standing out from the crowd, product investment increased 32% compared to the previous TTM period. This growth can be attributed to several major funding rounds for climate-focused platforms (BeZero Carbon \$50m Series B and Pachama \$55m Series B, and location services provider Swift Navigation \$100m Series D).

# Q1 2023 DEALS ACTIVITY (# DEALS)

From Q3 to Q4 2022, the number of Space Tech deals plateaued at approximately 106 deals per quarter, marking a decline compared to the first half of the year. During this time, growth stage deals decreased, while early-stage deals increased as investors diversified their portfolios with smaller investments in more companies.

In Q1 2023, early-stage deals saw a modest 4% growth, while late-stage deals rebounded with vigour. The quarter witnessed 32 growth stage deals, setting a record for the highest number of deals in a single quarter. It is believed that many Series B+ startups, adequately funded through 2021, refrained from raising capital during the uncertain economy of 2022 to avoid lower valuations. However, as the economic outlook remains unclear and runways shorten, many companies have resumed fundraising, often accepting flat or reduced valuations. Throughout 2022, companies focused on improving financial health to align with investors' growing preference for high-quality growth firms with clear paths to cashflow breakeven and minimal future financing needs. Consequently, growth deals tend to be smaller, and valuations generally remain flat.

Q1 2023 has seen a significant increase in Beyond Earth companies being formed and funded, making it the second-largest upstream subsector in terms of deal volume. This trend suggests either a growing investor appetite



for higher-risk subsectors or a perception that this subsector now carries less risk. The product category continues to be the largest downstream sector.

## Q1 2023 Top Deals

In Q1, the top 10 SpaceTech deals made up 51% of the total sector investment, showing a lower capital concentration than in previous quarters when companies like SpaceX and OneWeb led with mega-rounds. Most of the top 10 deals were in capital-intensive subsectors, such as Launch, Beyond Earth, and Collect.

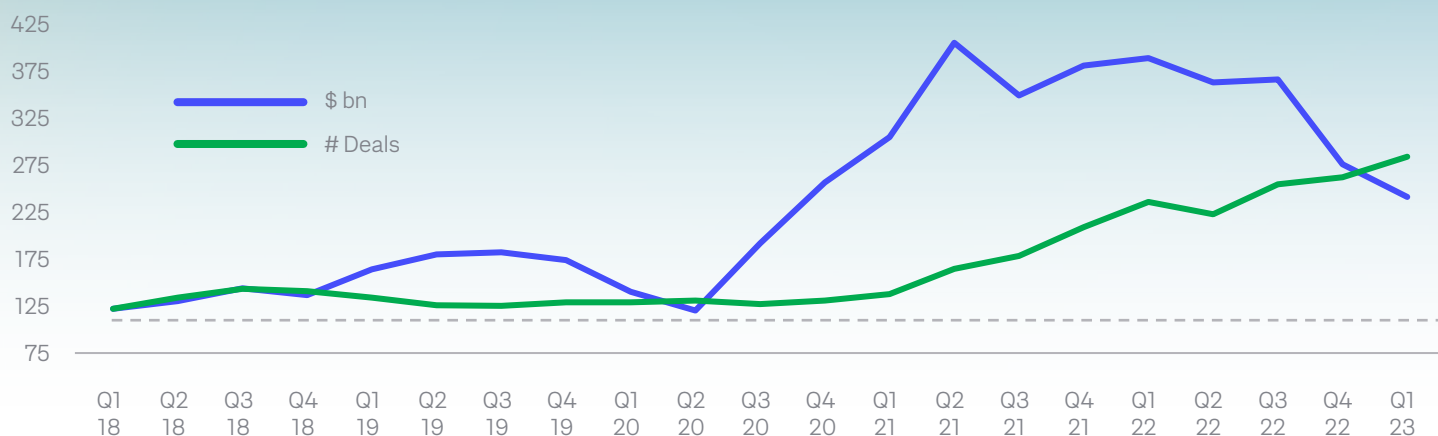
Isar Aerospace topped the Q1 investment list, marking the first European company to do so since OneWeb in Q3 2021. Despite recent challenges in accessing growth capital, especially in Europe, Isar's accomplishment demonstrates that high-quality European growth stage SpaceTech

businesses can still secure funding. European companies secured 5 of the top 10 investments this quarter, possibly boosted by the increasing emphasis in Europe on sovereign space capabilities. The US remains the go-to location for sizable Series A rounds, as evidenced by Freeform's \$45m round this quarter and Slingshot's \$41m round in the previous quarter. However, only three US companies raised large funding rounds in Q1, reflecting a real drop off in growth funding in the US this quarter. Four of the quarter's biggest deals involved companies servicing the in-space economy, highlighting the development of a substantial market for businesses operating in space. For an in-depth look at this emerging segment, refer to the Seraphim In-Space Economy Ecosystem Map.

COMPANY	COUNTRY	DATA LIFECYCLE	SUB CATEGORY	STAGE	AMOUNT (\$m)
Isar Aerospace	Germany	Launch	Rockets	Series C	165
Voyager Space	US	Beyond Earth	Space Infrastructure	Series B	80
Astroscale	Japan	Beyond Earth	Space Logistics	Series F	76
Capella Space	US	Platform	Satellites - Earth Observation	Series C	60
Mino Space	China	Build	Space Hardware	Series B	59
Exotrail	France	Launch	Space Tugs	Series B	58
EOS-X Spaceship Company	Spain	Beyond Earth	Space Exploration	Series C	54
Agreena	Denmark	Product	Data Platform	Series B	49
Reaction Engines	UK	Launch	Rockets	Series D	48
Freeform	US	Build	Space Hardware	Series A	45



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

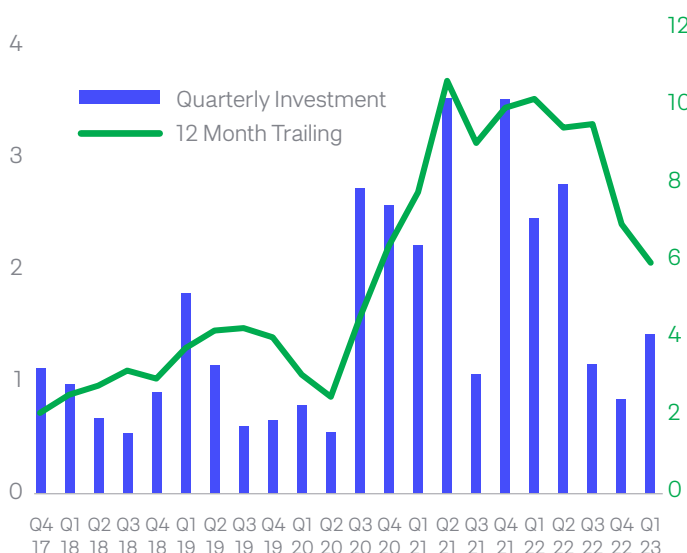


The Space Index indicates that TTM investment in SpaceTech has been subdued over the past two quarters, with growth investors shifting towards earlier stage deals to avoid high burn rates and capital requirements. Many growth stage startups have also delayed fundraising, opting for alternative financing sources and extending runways until economic conditions improve.

Investment and deal numbers remain well above historical norms prior to Q4 2020. Although investment has decreased since the record highs of 2021 and 2022, those peaks were largely driven by mega-rounds from companies like SpaceX, OneWeb, Sierra Space, and Virgin Galactic. Adjusting for these outliers, Q1 2023 still ranks as the fifth highest funding quarter to date, suggesting sustained activity in the space economy.

Despite these challenges, there are reasons to be optimistic about the future of SpaceTech investment:

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



Late-stage companies successfully raised growth rounds en masse in Q1 2023. With space investment rebounding substantially from the previous quarter, both investors and startups are regaining confidence in the sector and seeking high-quality deals.

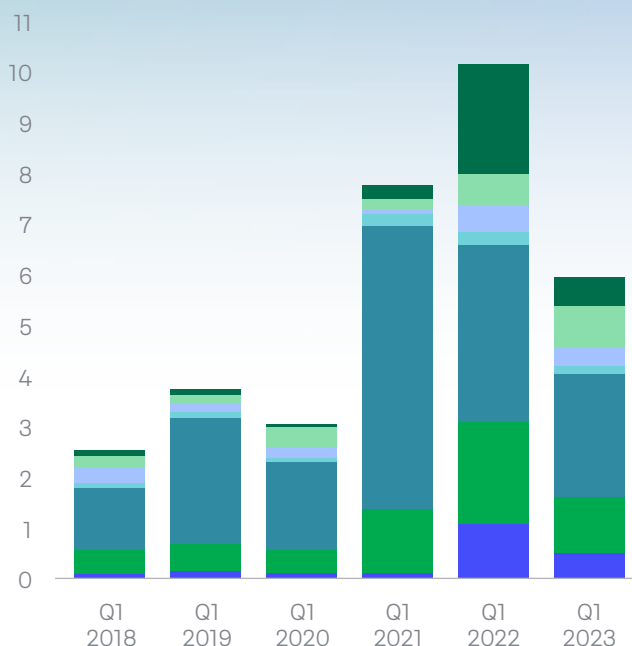
## Seraphim Deal Tracker (#Deals)



Deal numbers have reached all-time highs, both in terms of TTM (403) and last quarter (129). While early-stage deals continue to grow moderately and account for most transactions, there has been a remarkable resurgence in growth stage deals. Overall, the SpaceTech startup landscape remains healthy and active across all stages, signaling a promising outlook for the sector.

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

## TTM Investment (\$bn)



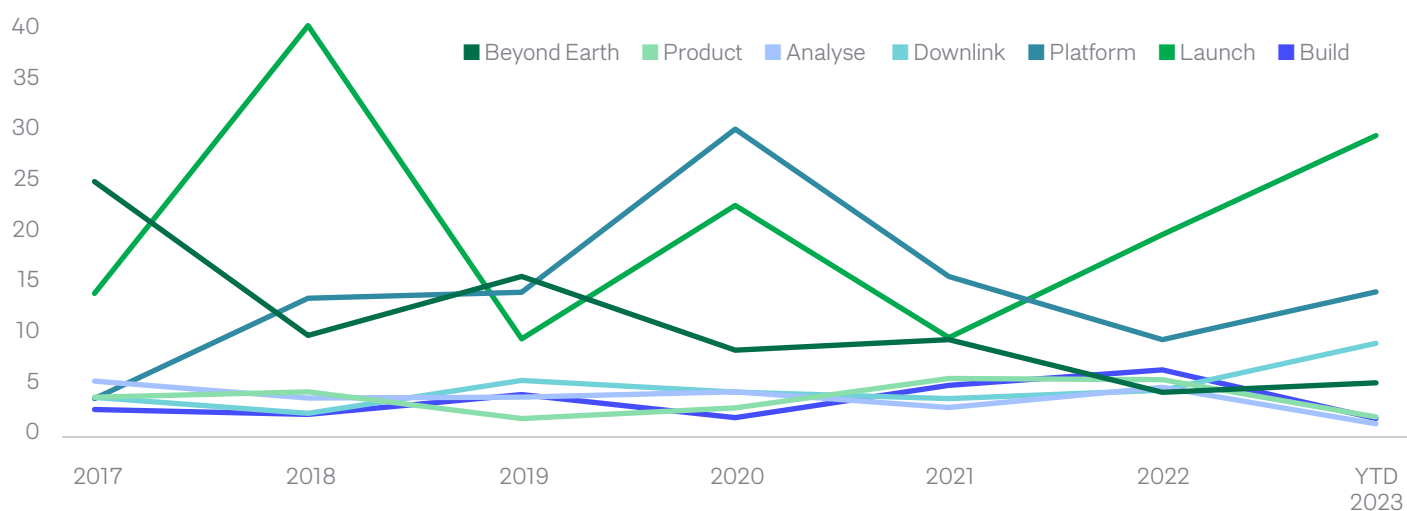
In the trailing twelve months to Q1'23, funding reduced to levels last seen before 2021. This is largely due to a quieter funding environment in 2022 as most companies paused fundraising while most investors decided to wait

out the economic downturn. However, it's notable that Launch maintained an approximately equal, and significant, proportion of funding compared to the previous 12 month period (19% versus 20%). This was largely driven by six Launch companies raising over \$30m each at Series B+ in Q1'23, a stark contrast to the relative scarcity of growth deals in 2022. A recent narrative emerging is the need for a strong European launch company to compete against US-based rivals. German company Isar Aerospace raised the largest Launch round of \$165m, signalling a return of investor confidence in larger upstream space rounds, especially since cooler valuations make these deals more affordable.

On the other hand, funding for Platform companies is down to 41% versus 72% in TTM Q1'21 (although roughly on par with the Q1'22 value of 34%). Historically, mega constellations like SpaceX's Starlink have attracted significant funding rounds but these constellations are now maturing, reducing the need for additional capital.

The only other category experiencing growth in proportion of funding received was Product, up to 14% versus 9% previously. Product companies utilize space data to provide services to a wide range of verticals from insurance to climate; this allows such companies to access funding from a wider range of investors.

## Median Deal Size (\$m)

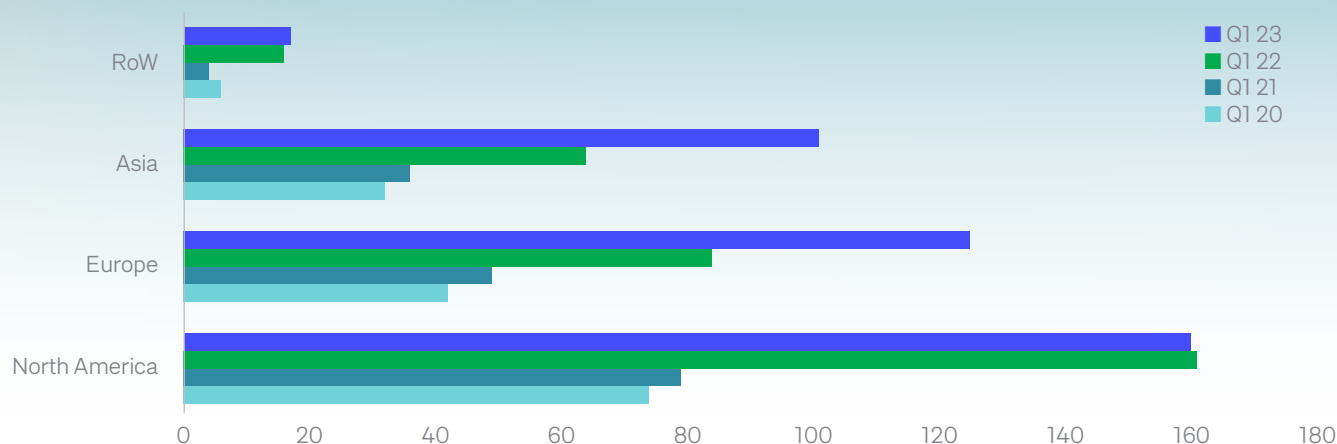


Q1 2023 saw a slight resurgence in median deal sizes compared to 2022's lower or flat figures. This increase likely results from cautiously optimistic investors deploying accumulated dry powder and startups, who had delayed fundraising, returning to the market. However, Analyse, Product, and Build sectors actually had smaller round sizes than last quarter. Analyse and Product sectors were resilient in 2022, potentially reducing their immediate need for fresh capital. Furthermore, these categories have more earlier stage companies, reducing median round size. In

contrast, capital-intensive sectors like Beyond Earth, Launch, and Collect experienced larger funding rounds. Launch and Collect also tend to have more growth stage companies, increasing their median round size.

Downlink's median deal size increase was driven by three larger rounds out of five in the quarter, which included SpiderOak, Transcelestial, and QuadSat.

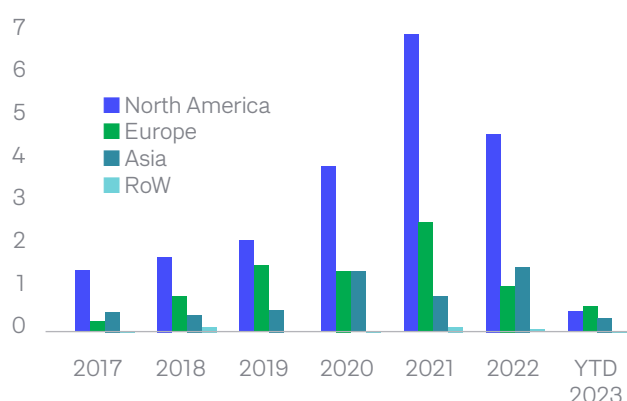
## No. Deals Last 12 Months Investment



In the trailing twelve months to Q1 2023, deal numbers in Asia and Europe continued their rapid growth, a trend first observed last year. Asia and Europe are experiencing a surge in space startups, with Europe steadily catching up to North America. Several factors contribute to this growth, such as increased investor appetite, more frequent launches, and the rise of product-based startups that don't require launching into space. Furthermore, sovereign support for startups in emerging geographies can reduce the perceived risk associated with investing in

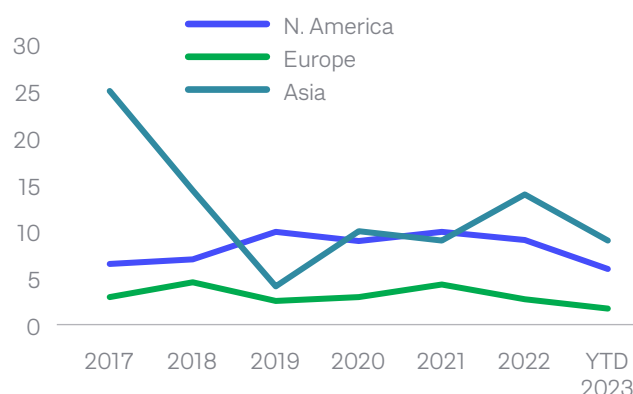
these geographies, making their startups more attractive. In Europe, the increased focus on climate, ESG, and regulation related to monitoring and climate resiliency is driving a wave of climate-related product companies leveraging space data. In contrast, the number of US deals plateaued in the last year, reaching a 2022 high of approximately 160 TTM deals. There's no evidence to suggest this stagnation will continue, as a similar stagnation trend was seen in 2020 before the explosion of space investing in 2021.

## Investment By Region (\$bn)



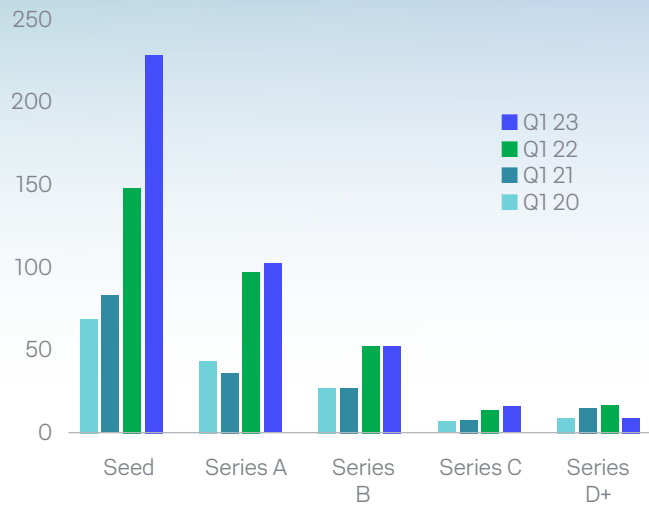
For the first time, European startups have received more funding than their US counterparts. Received more funding than their US counterparts, or indeed any other geography. Large upstream funding rounds in Europe, particularly for rocket launch and in-space servicing companies, indicate greater support for European efforts in these markets. European investment in 2023 seems poised to match or even exceed 2022 levels given that Q1 is almost 50% of the previous year already. In contrast, US investment has fallen further compared to last year. Asia, the only region that experienced growth last year, has not maintained this trend in the current quarter, dropping to third place.

## Median Deal Size By Region (\$m)



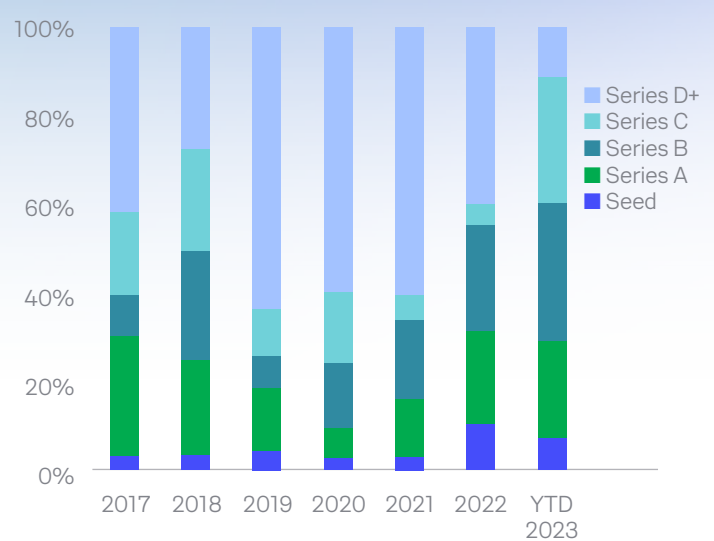
Median deal size is down across the board. This may be driven by companies preferring to raise small extension rounds rather than full funding rounds, in order to extend runway until such a time that valuations are more favourable. Also, there was a total absence of megarounds and only one round greater than \$100m – which was much more common in 2021 when markets were much more optimistic and willing to support startups raising these large rounds.

## No. Deals TTM (Q1 2023)



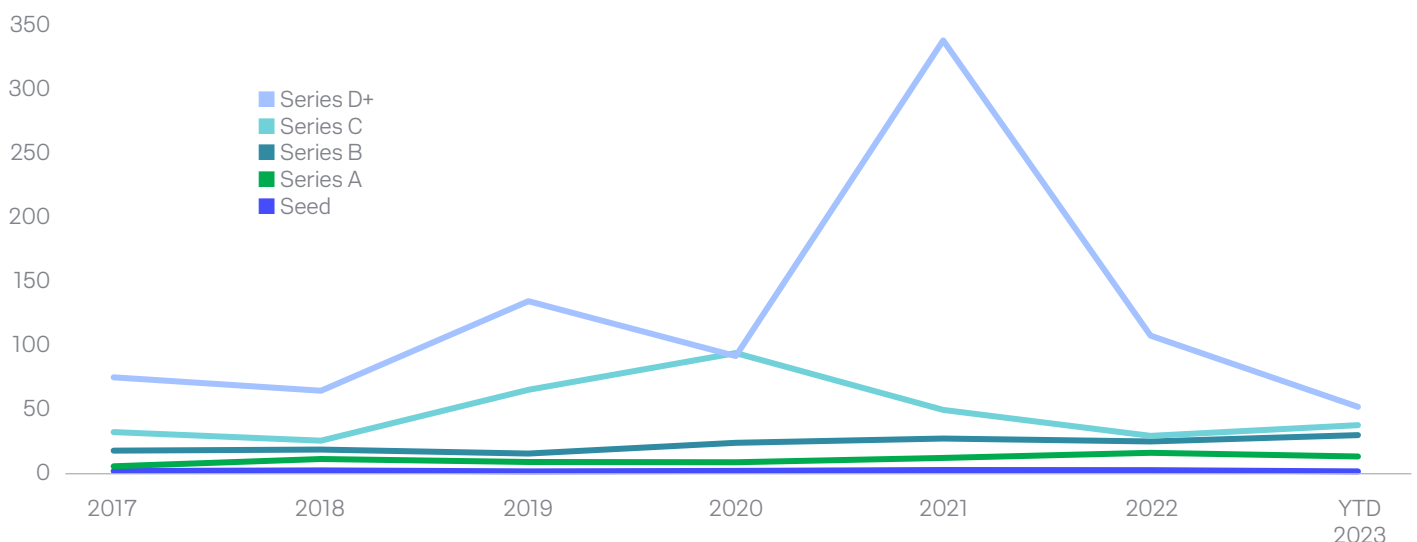
The number of early stage deals continues to grow in the last twelve month period, especially at seed which has seen an almost 55% increase year on year. Meanwhile, deals at growth stages have largely fallen or plateaued. Clearly, founders of new companies have not been discouraged by recent economic dynamics and are continuing to found new space startups.

## \$ Invested By Stage (%)



The proportion of investment in late D+ stage deals has contracted quite rapidly over the past 2 years as the funding environment for such large, late stage deals had mostly dissipated. Investors are preferring to fund earlier stage deals, with an increasing proportion going to Series B companies where startups typically experience their first genuine revenues and can thus point to more validated growth plans.

## Median Deal Size (\$m)



While median deal size fell from 2021 to 2022, there was a slight resurgence in Q1 2023 at early growth stages. At Series B and C, companies have typically validated their technology and are seeing early recurring revenues from customers. Given broader macroeconomic trends, investors have experienced a flight to quality and return to basics – strong revenues, cash flows, and future profitability outlook. These

characteristics are more typical at early growth stage once a company has overcome initial derisking and challenges.



## Announced & Completed Space SPAC Deals

SPAC valuations remain suppressed, trading significantly below their listing prices. We have seen that a lot of space SPACs have been struggling as the public markets become more conservative and risk-averse. Some of the companies that went public via SPAC have remained resilient, with AST, Blacksky and Rocket Lab share prices up from the end of the previous quarter. However, other companies like Satixfy and Virgin orbit saw significant decreases in share price throughout Q1.

Virgin Orbit announced in March that it was ceasing all operations and furloughed almost all of its staff as it sought new funding sources to keep the company afloat. The company has since filed for Chapter 11 bankruptcy.

World View, a stratospheric balloon tourism company, announced plans to go public via SPAC by Q2 2023, however there is sure to be much scrutiny around this transaction given the recent performance of space SPACs.

ANNOUNCED	COMPLETION	COMPANY	REGION	SPAC SPONSOR/ EXCHANGE	DATA LIFECYCLE / SUB CATEGORY	AMOUNT	PRO FORMA EV	MARKET CAP CAP 31/03/23
Oct - 20	Aug - 21	<b>Momentus</b>	US	\$SRAC / Nasdaq	Launch / Space Tugs	\$247m	\$567m	\$55.0m
Dec - 20	Mar - 21	<b>AST&amp;Science</b>	US	\$NPA / Nasdaq	Platform / Satcoms	\$462m	\$1400m	\$1016.1m
Feb - 21	Jul - 21	<b>Astra</b>	US	\$HOL / Nasdaq	Launch / Rockets	\$500m	\$2100m	\$113.7m
Feb - 21	Aug - 21	<b>Spire</b>	US	\$NSH / NYSE	Platform / Earth Observation	\$265m	\$1600m	\$104.2m
Mar - 21	Sep - 21	<b>BlackSky</b>	US	\$SFTW / NYSE	Platform / Earth Observation	\$283m	\$1100m	\$208.1m
Mar - 21	Aug - 21	<b>Rocket Lab</b>	US	\$VACQ / Nasdaq	Launch / Rockets	\$777m	\$4800m	\$1929.7m
Mar - 21	Sep - 21	<b>Redwire</b>	US	\$GNPK / NYSE	Beyond Earth / Space Infrastructure	\$170m	\$620m	\$194.8m
May - 21	Sep - 21	<b>ArQit</b>	UK	\$CENH / Nasdaq	Platform / Satcoms	\$115m	\$1100m	\$187.6m
Jul - 21	Dec - 21	<b>Planet</b>	US	\$DMYQ / NYSE	Platform / Earth Observation	\$590m	\$2400m	\$1069.4m
Jul - 21	Jan - 22	<b>Satelogic</b>	S. America	\$CFV / Nasdaq	Platform / Earth Observation	\$262m	\$780m	\$188.7m
Aug - 21	Dec - 21	<b>Virgin Orbit</b>	UK	\$NGCA.O / Nasdaq	Launch / Rockets	\$228m	\$3200m	\$67.4m
Oct - 21	Mar - 22	<b>Terran Orbital</b>	US	\$TWNT / NYSE	Build / Satellite Manufacturers	\$255m	\$1600m	\$265.5m
Dec - 21	Cancelled	<b>Tomorrow.io</b>	US	\$PTOC / Nasdaq	Product / Data Platforms	\$420m	\$1200m	N/A
Jan - 22	Cancelled	<b>D-Orbit</b>	Europe	\$BREZ / Nasdaq	Launch / Space Tugs	\$185m	\$1300m	N/A
Mar - 22	Oct - 22	<b>SatixFy</b>	Europe	\$EDNC / Nasdaq	Build / Space Hardware	\$229m	\$365m	\$54.5m
Sep - 22	Feb - 23	<b>Intuitive Machines</b>	US	\$IPAXU / Nasdaq	Beyond Earth / Space Exploration	\$81m	\$566m	\$148.4m
Jan - 23	Q2 23	<b>World View</b>	US	\$LHC / Nasdaq	Beyond Earth / Space Exploration	\$121m	\$350m	N/A



## ANGEL PLATFORM + ACCELERATOR + VC FUNDS + RESEARCH

**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.



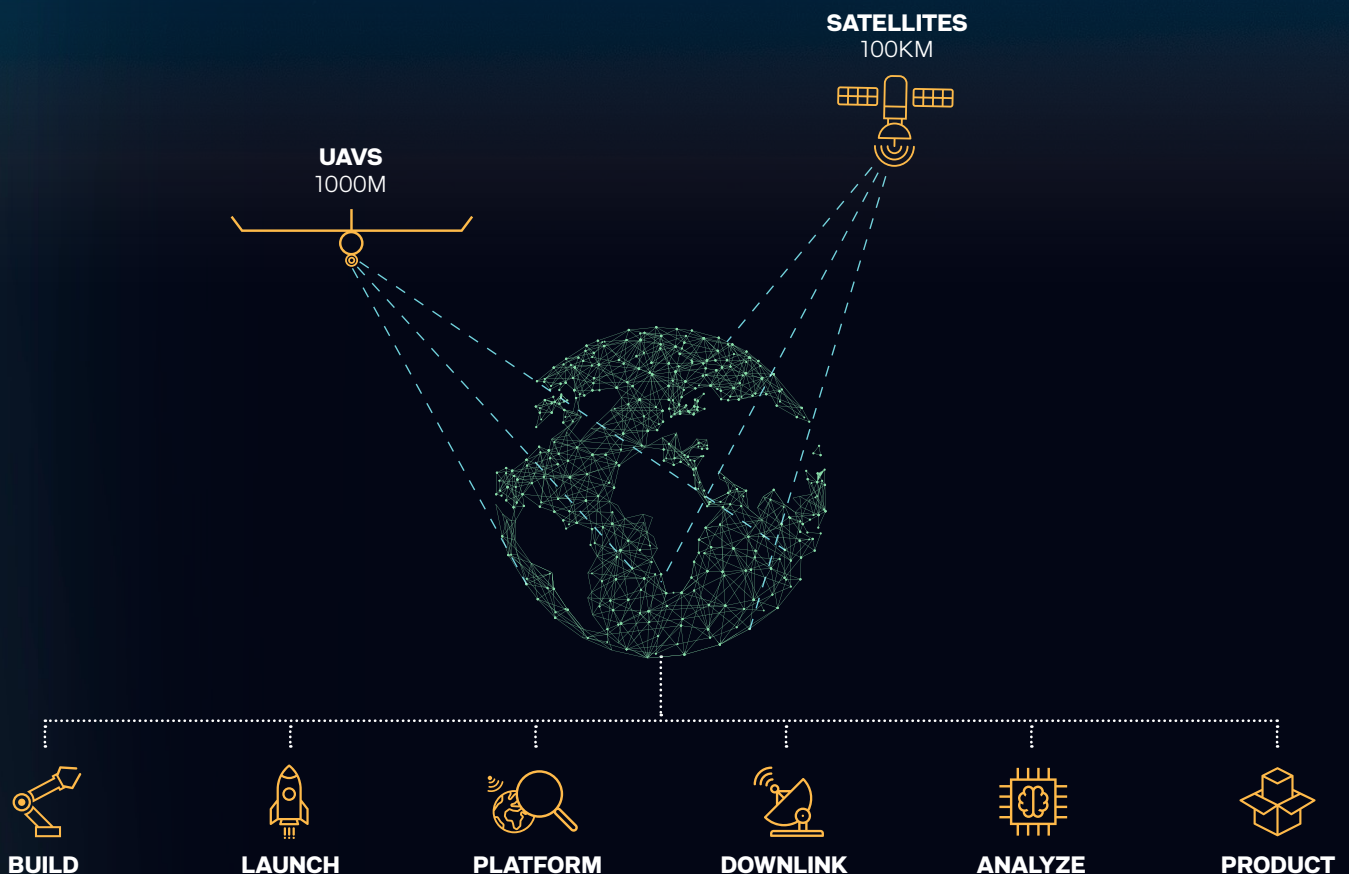
**Mark Boggett**  
CEO



**James Bruegger**  
CIO



**Rob Desborough**  
Accelerator &  
Early Stage



## Current Portfolio

We are the most prolific investor in SpaceTech globally. Across our different activities, we currently have a portfolio of more than 70 of the world's leading SpaceTech start-ups.

### Fund



### Accelerator



## 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.

## 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.



### 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



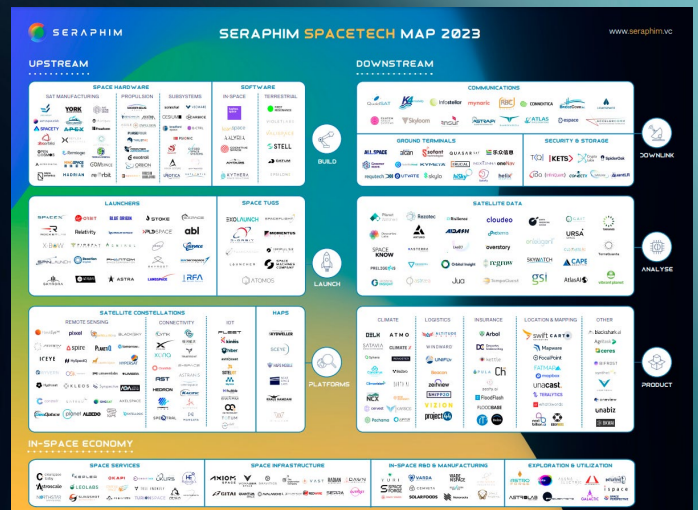
### ANALYZE

- 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

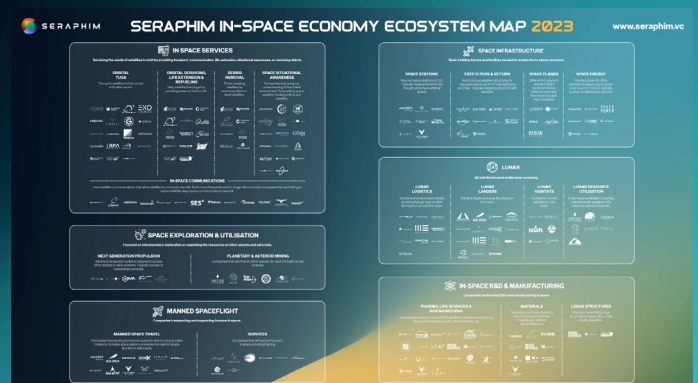


## IN-SPACE ECONOMY ECOSYSTEM MAP

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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