



2021

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# Space Investment Quarterly

Q4 2021



# \$252.9B

Cumulative Equity Investment

# 1,694

Unique Companies

# \$14.7B

Q4 Investment

# 134

Q4 Number of Companies Receiving Investment

Front cover image courtesy of [Planet Labs](#).

Space Capital portfolio company Planet Labs goes public via SPAC and lists on NYSE on December 8, 2021.

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Q4 2021

## Welcome to the Q4 2021 Edition of the Space Investment Quarterly.

Last year, the space economy benefited from a significant increase in global venture funding. VCs invested \$17.1B into 328 space companies in 2021, setting a new record, and accounting for 3% of total global venture capital flows. This was driven in part by near-zero interest rates in the U.S., which prompted investors to allocate more to the asset class in pursuit of greater returns. However, it appears that a new era of monetary policy is coming, with the Fed poised to raise rates faster and more significantly than expected, which could slow the pace and scale of capital deployment. Indeed, the public markets have started the year with a selloff and, if it continues, venture firms may not find it as easy to raise record-setting funds as they did last year.

2021 was a big year for SPACs and two of our portfolio companies went public this way: Rocket Lab (\$RKL) and Planet Labs (\$PL). Planet was one of our firm's first investments back in early 2015, when the space economy was just getting going, so it was particularly meaningful for us to see them achieve this milestone. But not all SPACs are created equal and, unfortunately, much of the momentum we saw in 2021 came at the cost of deep diligence, which increases the risk for investors. Additionally, the capital markets have been awash in money for the entire pandemic and it has resulted in some frothy valuations for public stocks and growth rounds in high-performing privately held companies. It's important for investors to realize that investment in the space economy requires specialist expertise. We believe that this will become more apparent in 2022 as some of these overvalued companies come back down to Earth and the quality companies rise above.

Within private markets, another \$14.7B was invested into 134 space companies in Q4, resulting in a quarter trillion dollars (\$252.9B) of equity investment into 1,694 unique companies in the space economy over the past 10 years. This was a record year for investment in the category, with \$46.3B invested across all space technology stacks. It was a particularly massive year for investment in space

Infrastructure with \$14.5B invested (more than 50% greater than the prior record set in 2020). While venture momentum set all-time records for space investments in 2021, much of this capital was chasing solutions based on a 10-year-old launch paradigm. As we look ahead, we see tremendous opportunities to scale mass adoption of the existing infrastructure as we look for radically new approaches to build and operate space-based assets.

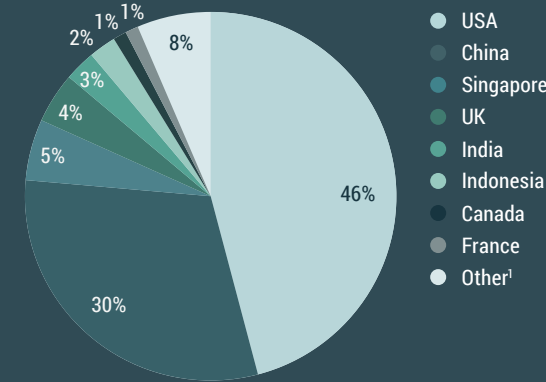
Launch and Satellite industries have claimed the lion's share (95%) of investment in space Infrastructure to-date, but this was also a record year for investment in other industries within the layer. With \$0.9B invested during the year, investment in Emerging Industries was 2.8x higher than the previous record set in 2020. The biggest beneficiary was Biospheres (i.e. space stations – [industry definitions here](#)), claiming \$0.3B of the total. Geographically, there are new countries leading investment in these emerging categories: while the U.S. continues to lead with 62% of total investment over the last 10 years, Japan takes the #2 spot with 30%, followed by Italy with 2%. However, much of this investment in Infrastructure is based on the current Falcon 9 paradigm.

Now, with Starship expected to come online in 2022, we are entering into a new phase of Infrastructure development. Elon Musk [has said](#) that "full and rapid reusability is the holy grail of orbital rocketry". Starship is poised to be that grail; there has never been anything like it. With the ability to launch 1,100 cubic meters and 100 tons to orbit for just the cost of fuel, Starship will completely change how we operate in space. SpaceX already fundamentally changed the economics of space 10 years ago with the Falcon 9 and Starship will have a similar impact, further reducing the cost to orbit, enabling Emerging Industries, and making existing infrastructure obsolete. As investors in this category, we're looking for founders who see what's coming and are building for this new reality. 

# Rise of the Space Startups

## CUMULATIVE EQUITY INVESTMENT FROM 2012 TO PRESENT

### TOTAL INVESTMENT BY GEOGRAPHY



**1,694**

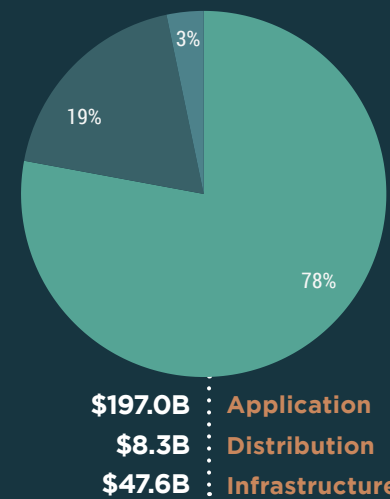
Number of Companies Receiving Investment

**\$252.9B**

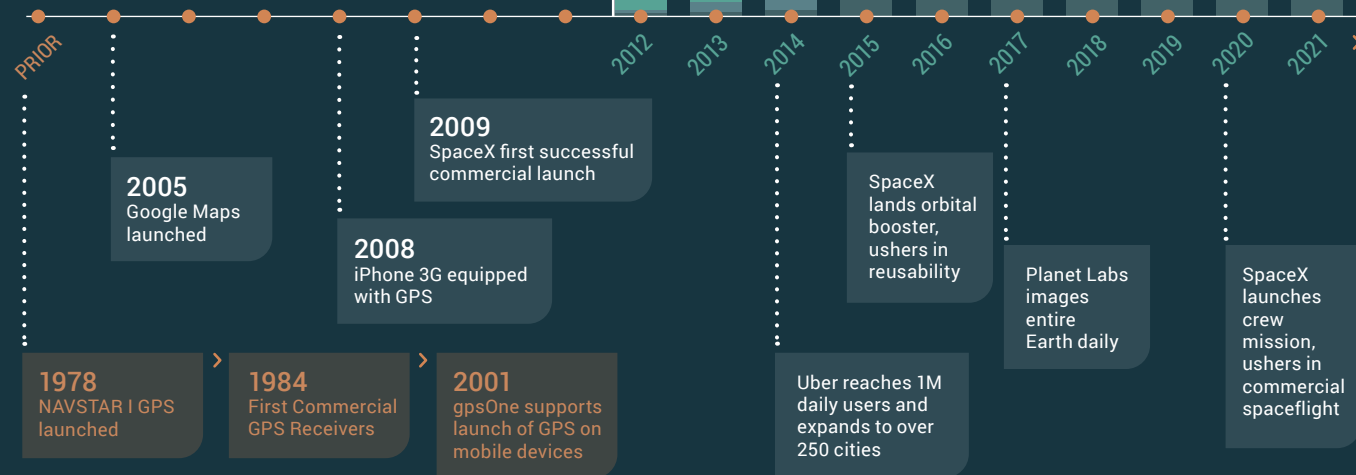
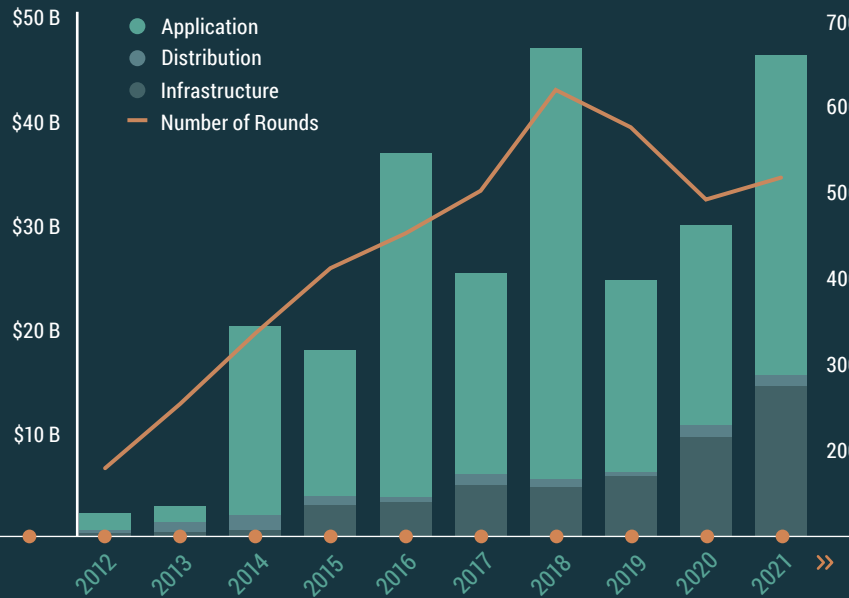
Equity Investment in Space Companies

Over the last 10 years, there has been \$252.9B of equity investment across 1,694 unique companies in the broader space economy, led by investment in the U.S. and China, which collectively account for 76% of the global total. Investors deployed another \$14.7B in Q4 with Infrastructure investments focused on Manufacturing and Components (\$1.9B) and Application investments focused on Location-based Services, with emphasis on Delivery. Five SPACs closed in Q4, opening up new growth curves through technical advancements or acquisition and providing exits to early investors. With \$4.3B invested in Infrastructure companies during the quarter, the year end total reached \$14.5B. This figure surpassed the previous annual record year of \$9.8B by nearly 50%, set just last year.

### TOTAL INVESTMENT BY STACK



### ANNUAL INVESTMENT BY STACK



1. "Other" consists of countries each representing less than 1% of funding.



# Year to Date Equity Investments

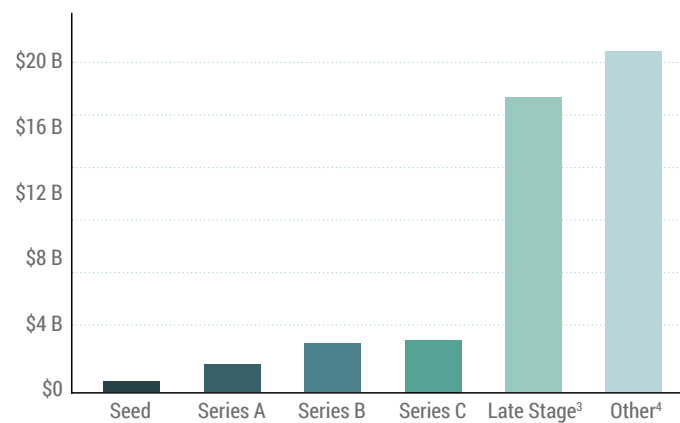
## EQUITY INVESTMENTS

**\$46.3B** NUMBER OF ROUNDS **512**

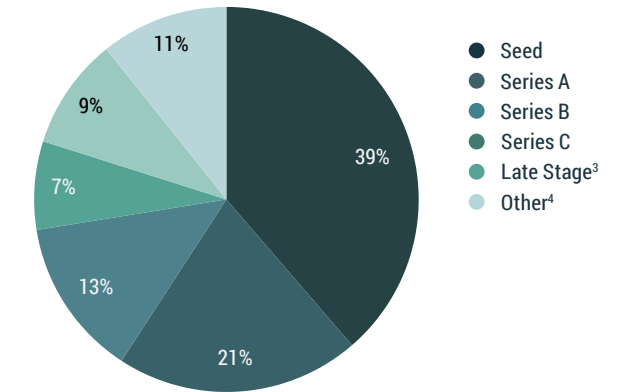
EARLY-STAGE INVESTMENT<sup>2</sup> **\$2.2B**

EARLY-STAGE ROUNDS **303**

### BY STAGE • INVESTMENT AMOUNT



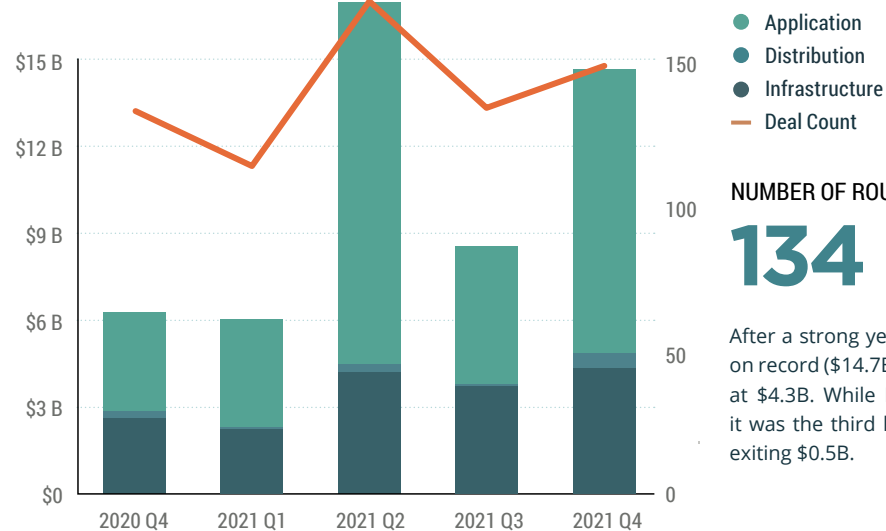
### BY STAGE • ROUND SHARE



Large, late-stage deals continued to drive flows with \$38.1B invested in Late Stage/Other rounds in 2021. Overall, investment in the top 10 rounds accounted for \$25.5B, or 56% of total space investment YTD.

303 early stage rounds accounted for 59% of all rounds closed YTD, representing \$2.2B of investment and creating a strong pipeline for future growth investments. Deal activity in Seed and Series A was likely bolstered by "the great resignation" and multiple successful late stage companies spinning out new founders.

### BY TECH STACK • INVESTMENT AMOUNT AND DEALS BY QUARTER



### NUMBER OF ROUNDS IN Q4

**134**

After a strong year, Q4 closed out 2021 with the second largest quarter on record (\$14.7B). Infrastructure investments set a new quarterly record at \$4.3B. While Distribution continued to be relatively small at \$0.6B, it was the third largest quarter at this layer of the stack with investors exiting \$0.5B.

2. Early-stage consists of Pre-Seed, Seed, and Series A rounds.

3. Late-stage consists of Series D+ and Liquidity Rounds.

4. "Other" includes PIPE transactions as well as non-traditional investments and self-capitalization from Jeff Bezos, Elon Musk, Richard Branson, and Robert Bigelow who are classified as Individual investors providing large investments (hundreds of millions) in their own companies through unclassified rounds.



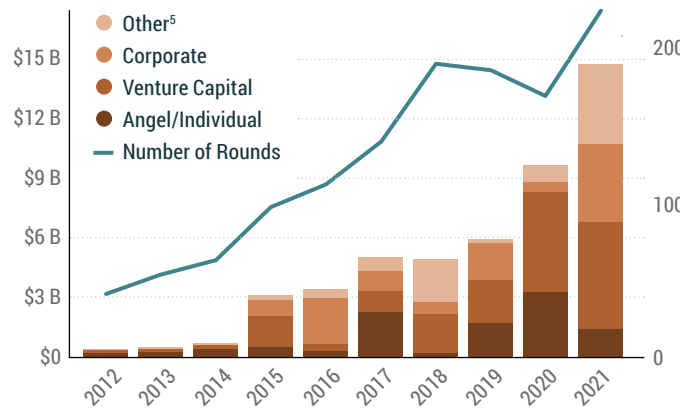
# Infrastructure

Hardware and software to build, launch, and operate space-based assets

TOTAL EQUITY INVESTMENT SINCE 2012

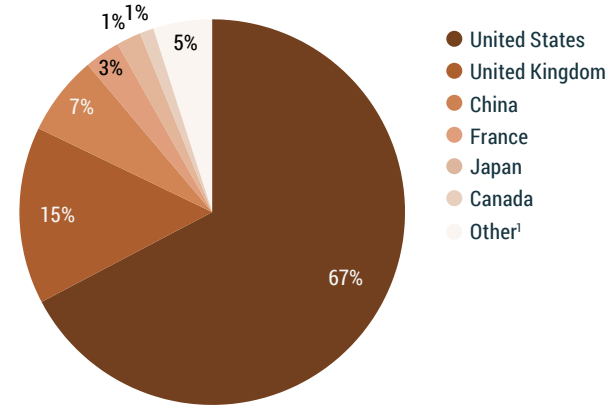
# \$47.6B

## ANNUAL INVESTMENT SOURCE



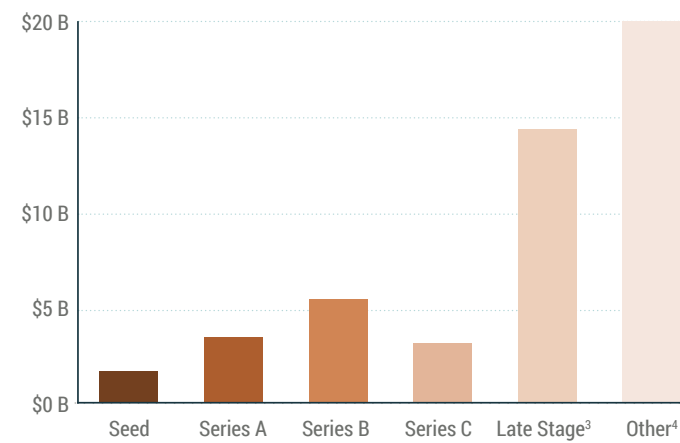
A record breaking \$4.3B was invested in Infrastructure during Q4 driven by mega-rounds in Sierra Space (\$1.4B Late stage), SpaceX (\$337M Series P) and Planet Labs (\$250M PIPE). Annual Infrastructure investments also set a new record at \$14.5B, having surpassed the previous high of \$9.8B set in 2020. Venture investors deployed \$5.4B, breaking the previous high of \$5.0B set last year. Corporate investors deployed \$3.9B, dwarfing the previous record of \$2.3B set in 2016.

## CUMULATIVE INVESTMENT GEOGRAPHY



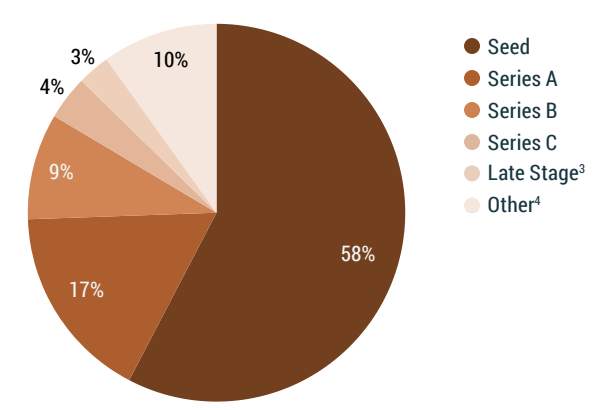
The United States continues to lead global investment in Infrastructure at 67% of the total since 2012. The U.K. has risen to second with 15% of the total, driven almost entirely by investments in OneWeb. This aligns with the U.K.'s National Space Strategy identifying space as a driver of growth for the nation going forward. China has grown to 7% of the total with capital primarily flowing to small launch and manufacturing/component companies.

## BY STAGE • CUMULATIVE INVESTMENT AMOUNT



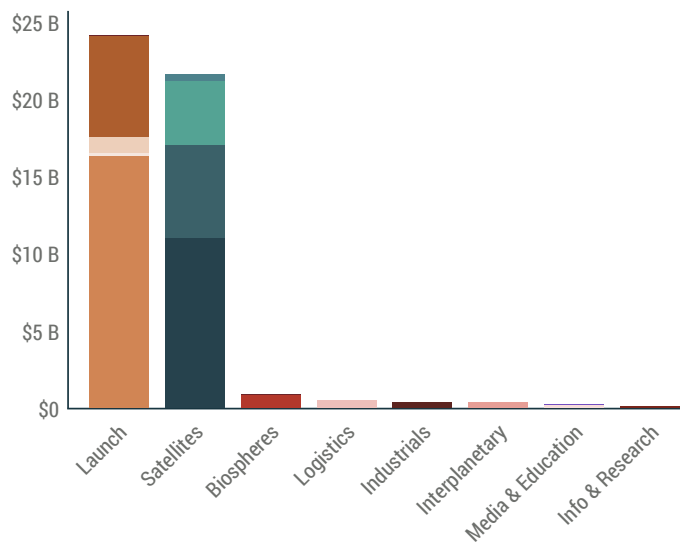
In Q4, investments in Launch and Satellites continued to be concentrated in Late Stage rounds, reflecting the capital intensity of those industries. Since 2012, 71% of this investment has gone to Late Stage and Other rounds. Early stage companies over that same period received 11% of capital.

## BY STAGE • CUMULATIVE ROUND SHARE



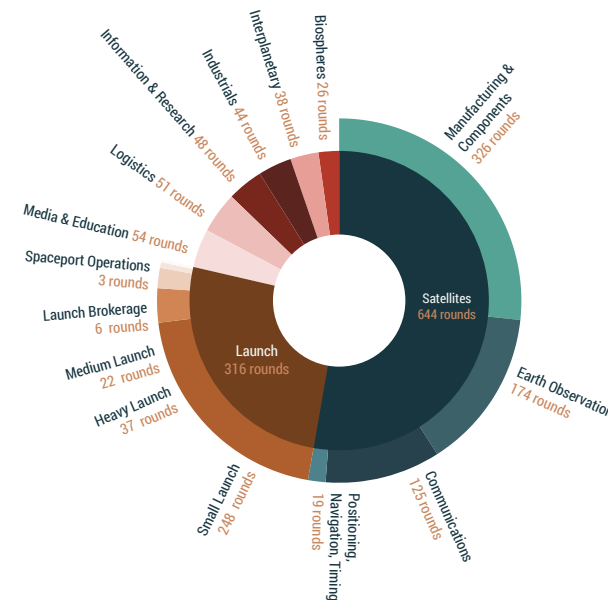
Early-stage rounds have accounted for 75% of total equity rounds over the past decade. This pipeline has begun to shift away from Small Launch and towards Earth Observation and Communication Satellites, particularly focused on SAR, RF, hyperspectral, and IoT capabilities.

## BY SECTOR<sup>6</sup> • CUMULATIVE INVESTMENT AMOUNT



An additional \$1.3B was invested in Launch during Q4, bringing the cumulative investment in the industry over the past decade to \$23.8B. Small Launch saw strong flows for three consecutive quarters, reaching \$2.7B invested in 2021. This annual figure represents 42% of the cumulative investment over the past decade. Another \$1.9B was invested in Satellites in Q4, bringing the ten year total to \$21.4B with 51% invested in the Communications sector.

## BY SECTOR • CUMULATIVE ROUND SHARE



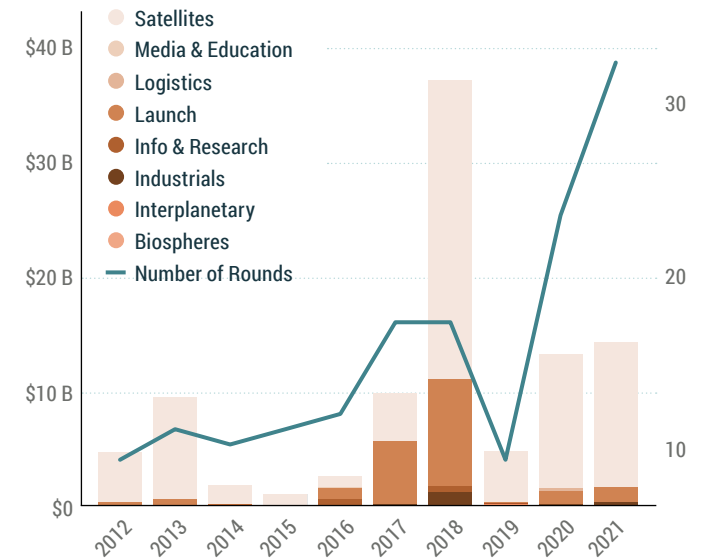
Satellites have accounted for the most deal activity, accounting for 52% of total round share since 2012. Within Satellites, Manufacturing & Components and Earth Observation sectors account for a combined 77% of total round activity. Emerging industries including in-space Industrials, Logistics, Biospheres, and Interplanetary operations represent a combined 13% of rounds and 4% of investment dollars since 2012. Super heavy launch may unlock a cost effective on-orbit economy and fuels new investment.

## TOP DEALS IN THE QUARTER

COMPANY	ROUND	AMOUNT
Sierra Space	Series E	\$1,412 M
SpaceX	Series P	\$337 M
Planet Labs	PIPE	\$250 M
ABL Space Systems	Series B	\$200 M
OneWeb	Corporate	\$164 M
Virgin Orbit	PIPE	\$160 M
Hawkeye 360	Series D	\$150 M
Loft Orbital Solutions	Series B	\$140 M
Astroscale	Series F	\$109 M
Ursa Major Technologies	Series C	\$85 M

The top 10 deals represent \$3.3B, or 76%, of total Infrastructure investment for the quarter with \$2.9B invested in eight U.S. companies. The remaining two rounds are attributed to Japan-based company Astroscale's \$109.0M Series F, and \$165.0M invested in UK-based OneWeb.

## EXITS BY SECTOR



Investors realized \$8.4B through 9 Infrastructure exits in Q4. The majority of Infrastructure exits over the past decade have come from acquisitions (59%).

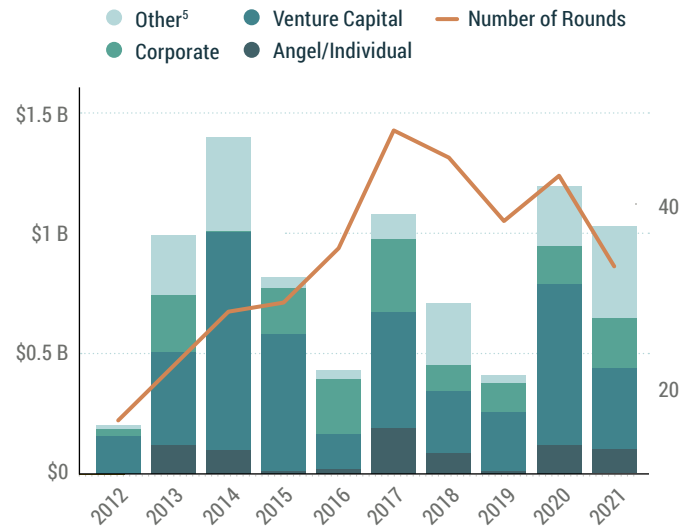
# Distribution

Hardware and software to connect, process, and manage data from space-based assets

TOTAL EQUITY INVESTMENT SINCE 2012

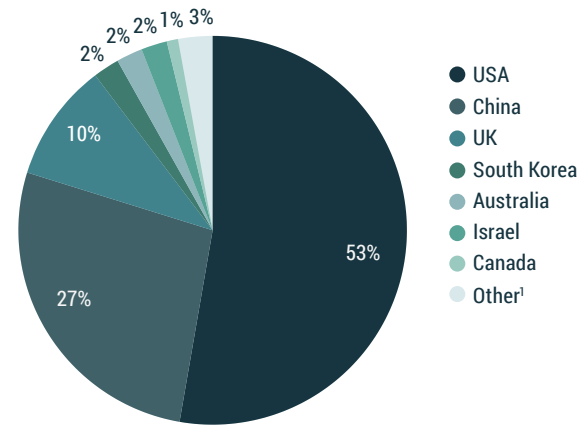
**\$8.3B**

## ANNUAL INVESTMENT SOURCE



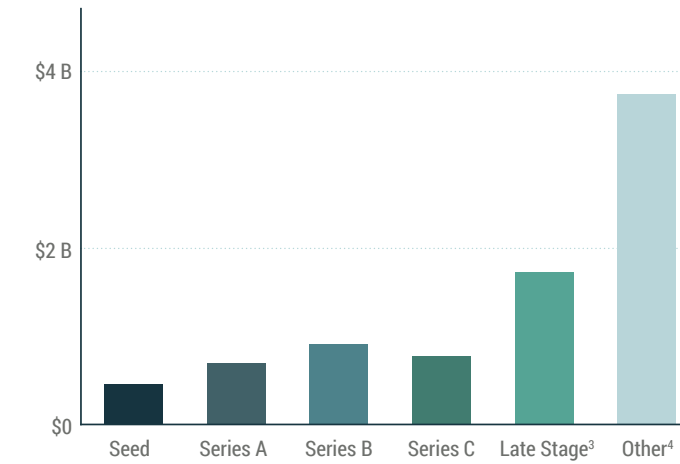
A total of \$0.6B was deployed across twelve rounds in Q4. There has now been \$8.3B invested in Distribution companies across 337 rounds over the last 10 years. Investment at this layer of the stack includes hardware and software to connect satellites and process data for terrestrial customers.

## CUMULATIVE INVESTMENT GEOGRAPHY



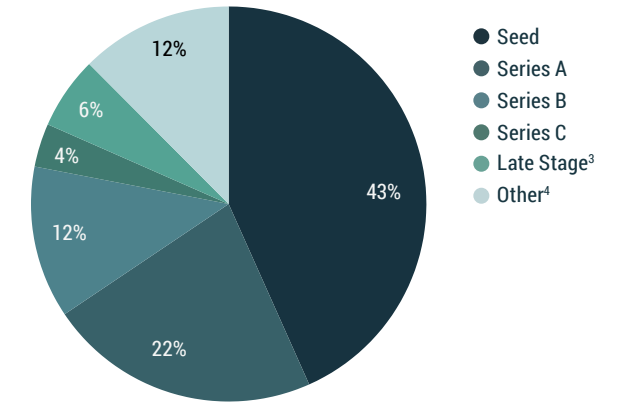
U.S. companies have attracted the majority of capital within Distribution since 2012, accounting for 53% of the total investment. Chinese companies previously accounted for 70% and it has now fallen to 27% due to a reclassification of China's largest online and on-demand delivery platform, Meituan (\$15.8B funding raised), from Distribution to Applications.

## BY STAGE • CUMULATIVE INVESTMENT AMOUNT



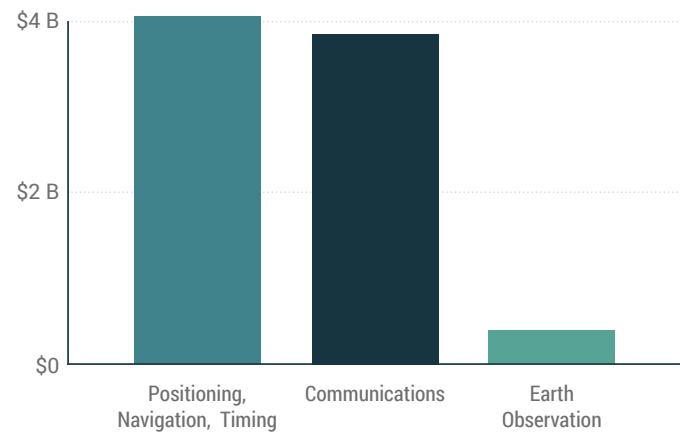
Since 2012, 65% of capital in Distribution has been invested in Late Stage and Other rounds. Early stage companies over that same period received just 13% of capital. Investments at this layer of the stack are becoming more software and big data oriented.

## BY STAGE • CUMULATIVE ROUND SHARE



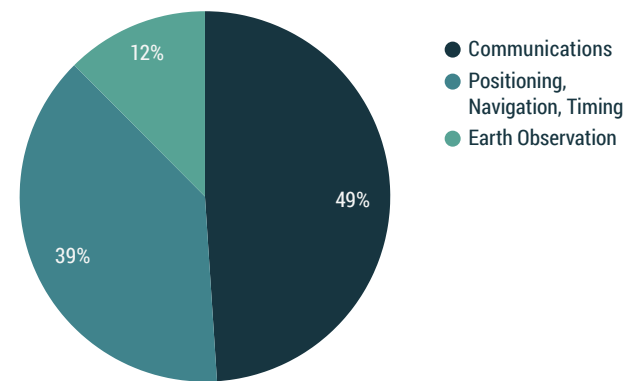
Early-stage rounds account for 65% of the total rounds in Distribution since 2012. This may suggest a more nascent ecosystem and higher experimentation as Communications and Earth Observation slowly develop, similar to PNT.

## BY SECTOR • CUMULATIVE INVESTMENT AMOUNT



Since 2012, 49% of investment in Distribution has gone to companies that specialize in PNT, followed by Communications with 45%. As Starlink prepares to launch commercial services providing both the satellite hardware and terminals, competitors including OneWeb and SES have formed partnerships with terminal companies Intellian, Kymeta, and Isotropic Systems to unlock broad connectivity, multi-orbit communications, and drive down terminal costs.

## BY SECTOR • CUMULATIVE ROUND SHARE



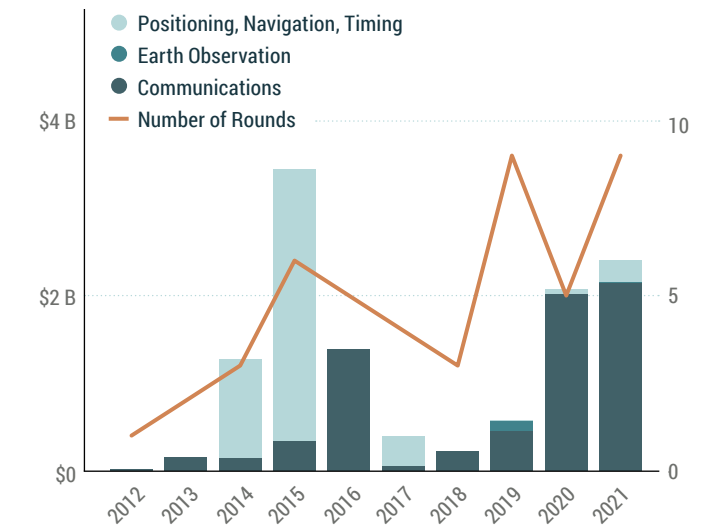
Comms and PNT account for 88% of all investment rounds in Distribution over the past decade. Earth Observation represents a larger percentage of rounds vs capital (12% vs. 4%), indicating a nascent sector with more early-stage activity. This activity includes SkyWatch, a company that provides a digital infrastructure for the distribution of Earth Observation data and Rendered.ai, a company that provides data engineering tools for proveable AI. Both are Space Capital portfolio companies.

## TOP DEALS IN THE QUARTER

COMPANY	ROUND	AMOUNT
KORE Wireless	PIPE	\$225 M
NextNav	PIPE	\$205 M
Anuvu	Corporate	\$50 M
Xenesis	Series A	\$20 M
Hedron	Series A	\$18 M
Navenio	Series A	\$13 M
Point One Navigation	Series A	\$10 M
Fixposition	Series A	\$10 M
Infostellar	Series B	\$6 M
Warpspace	Series A	\$4 M

The top three deals in Q4 accounted for 80% of the total investment in the quarter. KORE Wireless, an IoT services company, raised a \$225.0M PIPE as a part of its SPAC deal, while NextNav, provider of 3D geolocation services, raised a \$205.0M PIPE.

## EXITS BY SECTOR



Investors realized \$0.5B through three Distribution transactions during Q4 including NextNav and Kore Wireless Group's SPACs, and Premise's acquisition of Native. Since 2012, 78% of Distribution exits have come in the form of leveraged buyouts with nearly all exits (99%) occurring in the Comms and PNT sectors. PNT was particularly attractive to acquirers in 2014 and 2015 for its exposure to Location Based Services. Over the past couple of years, Comms acquisitions have become more common as investors seek exposure to IoT.

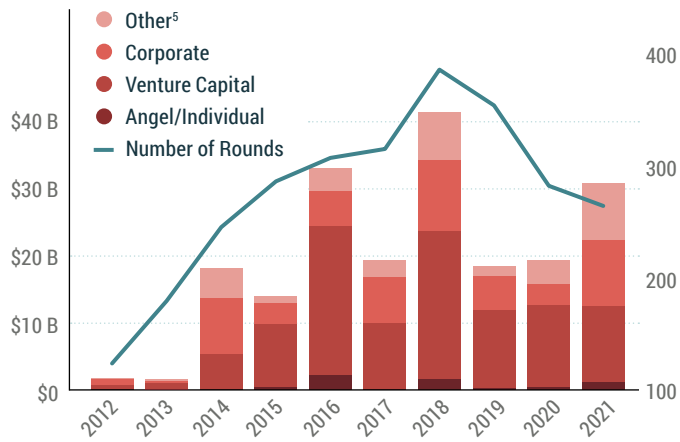
# Applications

Specialized software that utilizes data from space-based assets

TOTAL EQUITY INVESTMENT SINCE 2012

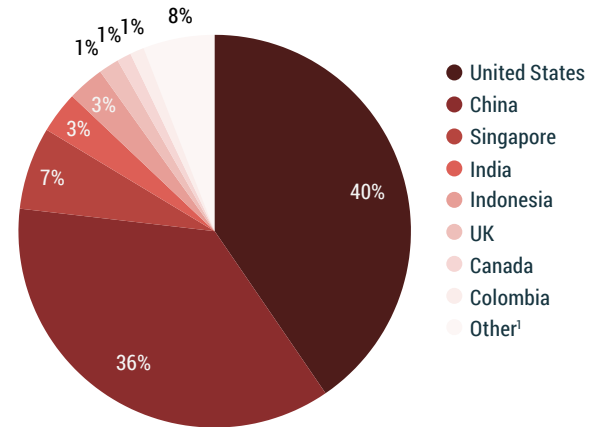
# \$197.0B

## ANNUAL INVESTMENT SOURCE



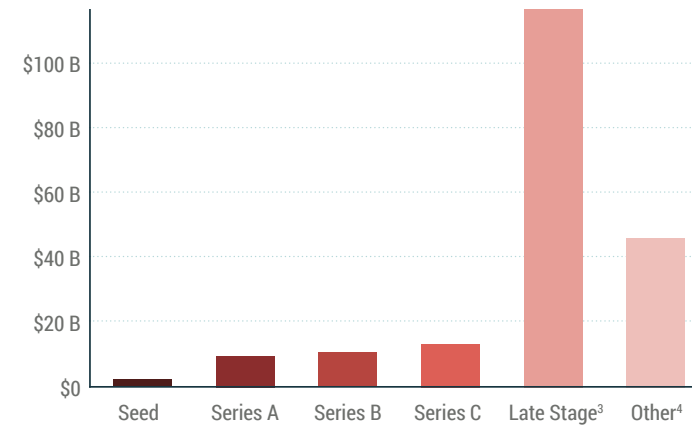
Another \$9.8B was invested into Applications across 59 rounds in Q4. There has now been \$197.0B invested into 1,041 Application companies over the past 10 years. This investment has brought Location-Based Services to the masses through ride-hailing, on-demand delivery, and micro-mobility. The majority of investment in the quarter (52%) came from "Other" investment sources that are largely composed of private equity, and investment banks, followed by venture capitalists (31%).

## CUMULATIVE INVESTMENT GEOGRAPHY



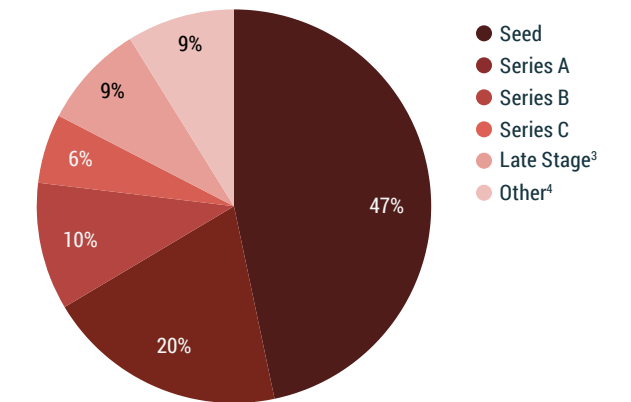
U.S. companies continue to attract the largest share of Applications investments, accounting for 40% of the total since 2012. China follows the U.S. with 36% of total, helping drive the country's e-commerce and location-based services boom.

## BY STAGE • CUMULATIVE INVESTMENT AMOUNT



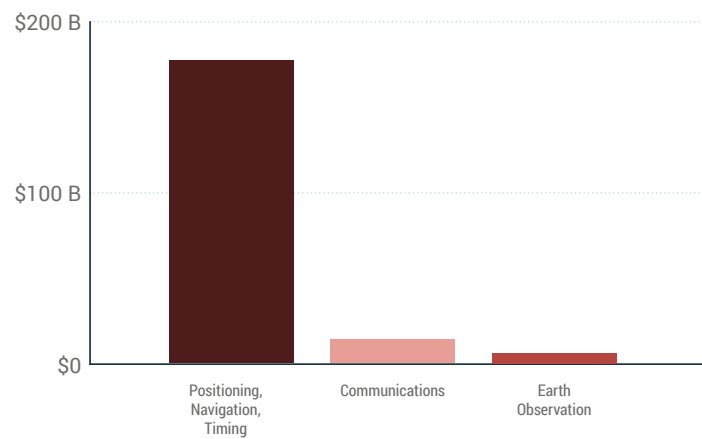
Investment in Applications continues to be concentrated in Late Stage and Other rounds (82%), as companies stay private longer and require larger amounts to reach global market share.

## BY STAGE • CUMULATIVE ROUND SHARE



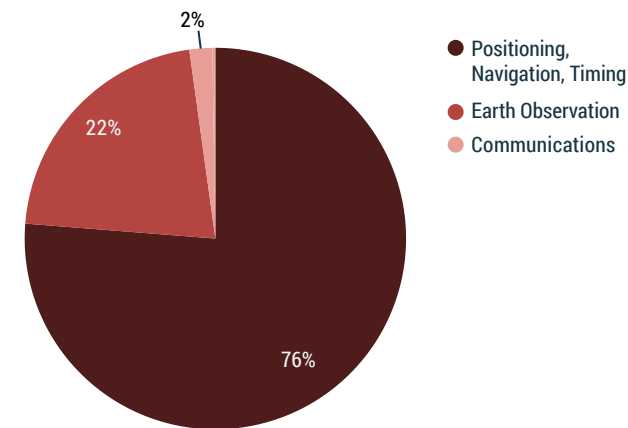
Early-stage rounds in Applications have represented 67% of the total since 2012, suggesting relatively greater success attracting follow-on funding than Infrastructure and Distribution. While PNT Applications dominate capital flows, Earth Observation Applications annual investments doubled in 2021, reaching \$560.0M.

## BY SECTOR • CUMULATIVE INVESTMENT AMOUNT



Applications investments continue to be heavily concentrated in the PNT sector, accounting for 97% of Q4 investment. Companies at this layer of the stack have attracted significant investment globally in response to COVID-19, particularly in the on-demand delivery and ride-hailing segments, a trend that continued in Q4 as consumers demand faster deliveries and more precise location updates.

## BY SECTOR • CUMULATIVE ROUND SHARE



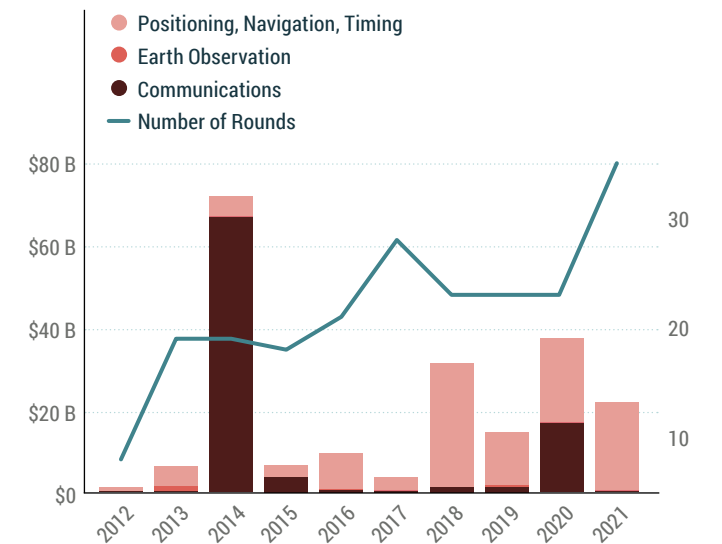
PNT also accounts for the vast majority (76%) of all Applications rounds since 2012. Earth Observation (EO) represents a much larger percentage of rounds vs capital (22% vs. 3%), indicating early-stage activity and the potential for significant innovation. Several examples include Regrow, a Space Capital portfolio company building the analytics engine for the agriculture value chain, and Pachama, a company providing remote verification and monitoring for carbon credits.

## TOP DEALS IN THE QUARTER

COMPANY	ROUND	AMOUNT
Grab	PIPE	\$4,040 M
GoPuff	Series I	\$1,500 M
Ola	Series J	\$639 M
Nuro	Series D	\$600 M
Lime	Series F	\$523 M
Niantic	Series D	\$300 M
Hellobike	Series I	\$280 M
Instacart	Series J	\$232 M
Bird Global	PIPE	\$160 M
Via	Series G	\$130 M

The top 10 Application deals in Q4 accounted for \$8.5B (86%) of investment for the quarter with the largest round, a \$4.0B PIPE into Grab, a company based out of Singapore offering a suite of services from delivery to mobility, and the second largest round going to GoPuff, a delivery service company that raised a \$1.5B Series I. Tomorrow.io is the only pending Applications SPAC, and its closing is expected to add an additional \$0.4B to the company's balance sheet by mid 2022, including \$75.0M of equity investment through a PIPE.

## EXITS BY SECTOR



Investors realized \$2.2B through eleven Applications transactions in Q4. The three largest exits consisted of an IPO and two SPAC, including Samsara, a company that develops cloud operations tools for IoT data, Grab, a company offering delivery, mobility, and financial services, and Bird Global, a micro-mobility company. There are multiple late-stage Applications companies that have raised mega-rounds recently and we anticipate large exits in the near future.



With another \$14.7B invested into 134 space companies in Q4, there has now been over a quarter trillion dollars (\$252.9B) of equity investment into 1,694 unique companies in the space economy over the past 10 years. This was a record year for investment in the category, with \$46.3B invested across all space technology stacks and a particularly massive year for investment in space Infrastructure, with \$14.5B invested (more than 50% greater than the prior record set in 2020). Investors realized \$38.5B of value through 74 space company exits in 2021, driven primarily by acquisitions, SPACs, and IPOs in the Infrastructure and Applications stack. VCs invested \$17.1B into 328 space companies in 2021, setting a new record, and accounting for 3% of total global venture capital flows. With Starship expected to come online in 2022, we are entering into a new phase of Infrastructure development and as investors in this category, we're looking for founders who are building for this new reality.

## Select Portfolio Milestones

[Planet Labs goes public via SPAC under the ticker \\$PL \(Planet Labs\)](#)

[SpaceX acs 100th rocket landing after Dragon cargo ship launch to space station \(Space.com\)](#)

[Arbol launches Arbol Underwriters, entering the Reinsurance Market with Bermuda MGU \(Arbol\)](#)

[Isotropic Systems completes first-ever successful simultaneous connection of multiple satellites across separate orbits \(Isotropic Systems\)](#)

[GHGSat accomplishes a world first: Methane Emissions from Opencast Coal Mines Measured from Space \(GHGSat\)](#)

[Quantum Xchange Collaborates with Thales to Enable Quantum-Safe Key Delivery Across Any Distance, Over Any Network Media \(Quantum Xchange\)](#)

[SkyWatch Launches TerraStream Certified Solutions Provider Program for Satellite Operators \(SkyWatch\)](#)

## Additional Resources

The framework for this report is based on [The GPS Playbook](#), a report co-authored by Space Capital and Silicon Valley Bank, which looks at how a space-based technology has generated trillions of dollars in economic value and some of the largest venture outcomes in history. Using GPS as an analogy, we believe that Space-based Communications and Geospatial Intelligence sectors have the potential to generate over \$1 trillion in equity value over the next decade.



## Our Methodology

Space Capital began publishing the *Space Investment Quarterly* in 2017 with the aim of uncovering insights about investing in the space economy. The data shown in this report is gathered from a number of sources across many categories, and no single piece of data can be added to our databases until confirmed by multiple sources. Our reported data is subject to change over time as previously undisclosed deals are added to our database. Below is a select list of our data sources:

### Investment Databases

- Pitchbook
- Crunchbase
- Mattermark
- CB Insights

### Crowd Platforms

- AngelList
- SeedInvest

### Confidential Sources

- Diligence Process
- Company Management
- Co-Investors
- Commercial Partners
- Government Partners

### Public Announcements

- Press Releases
- SEC Filings
- Events

### News

- Bloomberg
- CNBC
- Fortune
- SpaceNews
- TechCrunch

**6,234**  
Rounds Catalogued

**573**  
Exits Catalogued

**+ \$7B**  
Added to Prior Periods

## About

Space Capital is a seed-stage venture capital firm investing in the Space economy, specifically focused on unlocking the value in Space technology stacks such as GPS, Geospatial Intelligence, and Communications. We are actively investing out of our third fund with \$100 million under management. Our space economy focus enables us to be a true partner to our portfolio companies and unlock significant value far in excess of our investment capital.

## Assets

All charts and tables from this report are available for [download](#). This work is licensed under the Creative Commons Attribution-NoDerivatives 4.0 International License, which means content cannot be altered from its original form and must include Space Capital attribution. [Click here](#) to view a copy of this license.

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