

Successful models taking newspace forward amid record investment activity

The newspace market continues to germinate opportunities amid the introduction of new companies, the spinoff of new markets and vigour in investment activity.

The bustle is palpable as new players adopt already successful models for their ventures amid the unearthing of new markets. And fresh data indicates that newspace investment in 2019 was the most ever.

Amid the hype, however, are worries, including a crowded newspace marketplace with only so many funds to feed hungry, striving players. And opinions have long been voiced about whether a newspace bubble could form and burst amid serious political rows, geopolitical tensions and macroeconomic pressures.

Soaring newspace

The newspace market is soaring amid investment and company introductions, including UK-based space science company **Blue Skies Space**. University College London scientists founded the company to address the difficulty of researchers who want access to space observation data. Their first satellite is Twinkle.

“We are capitalising on the newspace approach to space business, thanks to the pioneering work by businesses from other space domains over the past decades,” Blue Skies Space CEO Marcell Tessenyi told Connectivity Business.

There is a “huge unfulfilled” demand for deep space observation data, with a “number” of customers having already made payments to Twinkle to secure access as soon as the first satellite has been launched. Management has estimated the annual market size to be £5.4bn (US\$7.1bn) based on the budgets available from space agencies, universities and institutions for space observation data.

No space science satellites have ever been launched and operated commercially. Twinkle’s innovation is the application of existing commercial space models – especially those to serve the telecommunications and Earth observation markets – to a new market.

Satellites for space science are exclusively delivered by major space agencies, which the public sector finances with long lead times. Also, Twinkle’s service is “competitive”

with the costs of using ground telescopes, though satellites have the advantage of no interference from Earth’s atmosphere.

“Once we have proven this model with Twinkle, we expect competition to emerge, which is part of the reason for us to scale up the delivery of satellites in a short time-frame,” he added.

Other satellite operators might emerge as rivals once the company has proven the model with its first satellite in planning. **Airbus** (EPA:AIR) and the Canadian branch of Switzerland-based technology conglomerate **ABB** (NYSE:ABB) are building the first bird. India’s SSLV rocket is expected to launch it in late 2023 with a rideshare as a backup solution via either PSLV or **Arianespace’s** Vega rocket.

Twinkle expects to generate revenues of £14m (US\$18.4m) in the first year with a “rather modest” operating cost basis, Tessenyi said. The company has raised US\$1m, part of which has come from ESA. It is seeking funding from a combination of private and public investment.

Twinkle is projecting it will generate a profit. It does not anticipate needing to raise equity after the first satellite is launched.

The company is expecting to launch its two second-generation satellites around 2026. Following the launch of these birds, the company anticipates revenues of £68m (US\$89.3m) a year as it takes advantage of the economies of scale and while keeping its operating cost base.

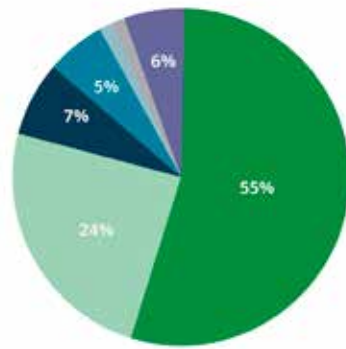
Science is slowly emerging as a key application for newspace, though it is a small one. IoT environmental projects to monitor greenhouse and aerosol gases and pursue other projects have recently materialised as a key application for commercial satellites. Agricultural connectivity has a science component in part because of population projections. It is expected to have grown from 7.35 billion people in 2015 to 9.70 billion strong in 2050, translating into a 70% required growth in food supply over current levels.

Often companies that seek commercial viability in



Source: Twinkle Space

Cumulative space investment by location since 2009



United States United Kingdom France China Singapore Japan Other

Source: Space Angels

some of these segments combine them with applications in larger markets, such as government, military or something else, to try to ensure profitability.

Other recent startups include German launch company **Isar Aerospace**, which closed a US\$17m series A round in December, US-based smallsat launcher **Loft Orbital** and others. Loft Orbital closed a US\$13m series A the same month.

In 2018, there were 80 new space companies started up worldwide, a decline from the roughly 95 startups in 2017 but higher than some 77 in 2016, NSR found. A decade prior, less than 20 companies began in most years.

Record new space investment

Newspace enjoyed a record year in investment, according to newly updated data from Space Angels. With US\$767m invested in Q4 2019, the total investment for the year reached US\$5.8bn, making 2019 the largest year on record for space investment.

Cumulatively, investors have put US\$25.7bn in 535 unique space companies since 2009, it added.

“This past decade, the entrepreneurial space ecosystem has proven itself to be financially robust, increasingly global and thematically diverse,” the group said.

Though funding for the year was primarily concentrated in large, late-stage deals, early-stage companies like Twinkle still

dominate financing. In 2019 seed financing accounted for 51% of investment, and series A financing made up 22%.

These included a US\$80m series A funding round in Japan-based **Synspective**, which venture firm Space aSTART 1 led, and a US\$14.1m series A round in UK-based satellite terminal startup **Isotropic Systems**, which **Boeing’s** (NYSE:BA) HorizonX venture arm ran.

At the same time, seed and series A financing declined slightly for the year, while series C, late stage and other financing

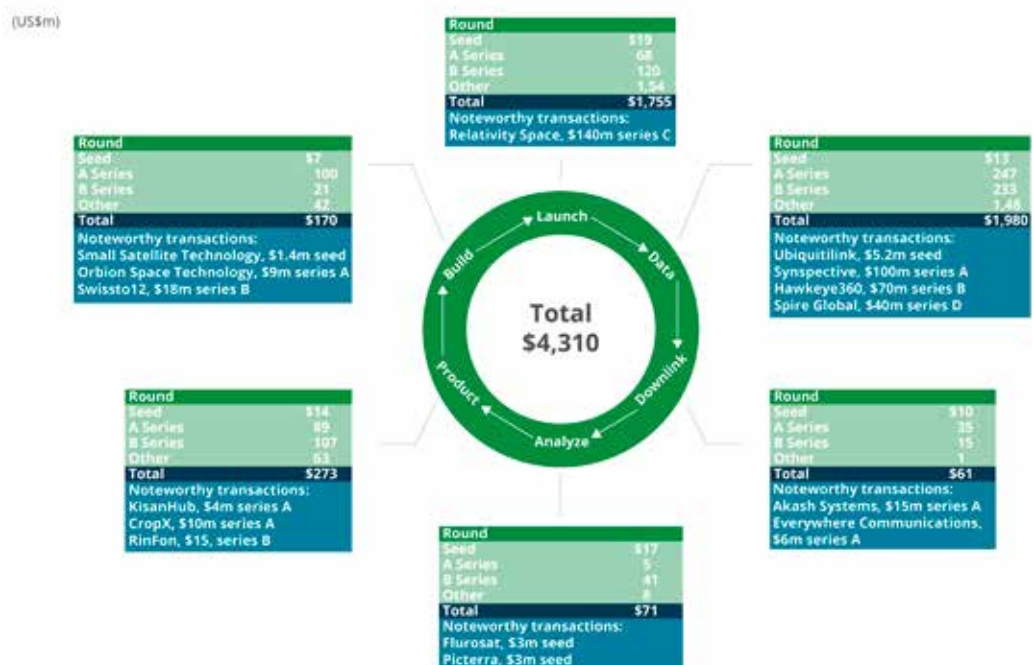
went up. In addition to US\$1bn-plus investment Blue Origin, OneWeb and SpaceX there were a record number of C+ raises from companies such as China’s **LandSpace** (US\$70m), US-based Orbital Insight (US\$50m), US-based **Relativity Space** (US\$140m), Argentina’s **Satellogic** (US\$50m) and the US’ **Spire** (US\$40m).

“We believe this reflects a healthy maturation of the entrepreneurial space ecosystem as early-stage companies graduate from concept to growth,” it said.

Another key trend is that, while investment is primarily concentrated in the US, the entrepreneurial spirit has gone global with the amount of financing outside the North American nation doubling year-over-year. China is particularly active, as the nation coughed up 34% of funding in Q4 2019.

Cumulatively, the top three sources for financing comprise US (55%), the UK (24%) and France (7%).

LTM global space investment through Q3 2019



Source: Seraphim Capital

M&A gathering speed amid enlarged newspace investments and interest

Commercial satellite M&A activity in 2020 is primed to crescendo as executives search for opportunities amid increasing newspace investments and growing interest in the sector.

Long-term portfolio planning in the industry – and the impact of trends including reduced satellite capacity pricing, increased competition and among some players higher debt loads in increasingly crowded fields – are likely to spur executives to look at inorganic growth.

Notable entities have recently invested in, acquired or sold satellite businesses. Last year ended on a bang as **Maxar Technologies** (NYSE:MAXR) in late December announced the C\$1bn (US\$769m) sale of its Canada-based satellite technology unit **MDA** to a consortium of private equity firms led by **Northern Private Capital**, subject to regulatory approvals; Maxar Technologies and **Northern Private Capital** were unable to comment before this report was published. Other major players that include **Goldman Sachs** (NYSE:GS), **Morgan Stanley** (NYSE:MS), **Raytheon** (NYSE:RTN) and **Rolls Royce** (LSE:RR) have put their skin in the game recently.

Holding its second annual space summit in mid-December 2019, Morgan Stanley hosted three times as many investors as it did in the prior year, according to media reports. Indeed, the financial services giant ran out of room for attendees in 2019.

Investor interest is increasing as a major deal winds down: the US\$3.4bn sale of UK-based MSS satellite operator **Inmarsat** (LON:ISAT) to the **Triton Bidco** private equity consortium.

Satellite M&A, however, is deployed only sporadically, even as indicators point to the likelihood of an upward trend. And other types of inorganic activity such as public offerings and private equity investment remain limited compared with more established sectors in the wider business world.

M&A and profitability

M&A is in the offing for the next few years in part so that investors can leverage profitability, space industry consultant Shigeki Kuzuoka told Connectivity Business.

A key reason is that investments in newspace have recently gone up, yet few investors have generated profits. “I believe there are not so much – or no – startups who [have gained] profits,” he added. They are likely to change their portfolio management strategies towards a longer-range vision.

Some 10 venture firms have made at least seven investments in newspace companies, according to Pitchbook, with the **Space Angels** (22), **Hemisphere Ventures** (17) and **Data Collective** and **Founders Fund** (nine each) the busiest. Of these Hemisphere was the most active in 2019, comprising infusions in imaging company **Planet**, climate sensing specialist **PlanetIQ** and satellite launch provider **SpaceX**.

All indices measuring commercial space investment point skyward, including Bryce Space and Technology. It found total investment in the 2013-18 period quintupled, to US\$13.14bn, compared with the 2007-12 period (US\$2.61bn). And acquisitions grew markedly, US\$3.1bn and US\$584m, respectively.

More than 220 angel- and venture-backed space companies have been founded and funded since 2000. Some 24 of these companies have been acquired, at a total value of about US\$3.7bn.

Pent-up demand over the post-recession period might account for part that surge, but investor confidence in space is ardent. As part of its data gathering function, Space Angels found though Q3 2019 that US\$5bn was invested that year, putting 2019 on track to be the largest on record for space investment.

Eyes are on at least two businesses as potential targets, US- and Europe-based smallsat startup **LeoSat** and Canada-based Earth observation company **Urthecast** (TSX:UR).

In late November, LeoSat founder Cliff Anders told Connectivity Business that the company has received inbound interest, including from technology giant **Amazon** (NASDAQ:AMZN), as other plans are evaluated for its LEO broadband constellation amid a halt in funding. He was unable to provide an update for this report.

Investment in start-up space

(US\$m)

Investment Type	2000-2006	2007-2012	2013-2018	Total 2000-2018
Seed/Prize/Grant	5742	5202	52,170	53,114
Venture Capital	328	520	7,544	8,391
Private Equity	234	1,301	301	1,836
Acquisition	-	584	3,098	3,682
Public Offering	-	-	23	23
Total Investment	1,304	2,606	13,136	17,047
Debt Financing	710	3,388	638	4,736
Total with Debt	2,014	5,995	13,774	21,783

Source: Bryce Space and Technology

Global satellite operators that want to diversify their operations would make the best fit with LeoSat, Kuzuoka said. It is focused on a business-to-business connectivity model – banking, data centres, oil & gas, maritime and telecoms providers – instead of business-to-consumer model, such as OneWeb.

Yet others contend that LeoSat’s configuration is fundamentally different than consumer-oriented providers, making a deal for it from these types of companies remote.

As for Urthecast, it said in mid-November as part of its Q3 2019 earnings release that the company has received non-binding bids to acquire all or substantially all of its **Deimos Imaging** business and continues to negotiate with these parties and complete due diligence activities as it seeks to complete a sale. Urthecast acquired Spain-based Deimos Imaging, including the Deimos-1 and -2 remote sensing satellites, for €74.2m (US\$82.7m) in June 2015. Urthecast was unable to respond before this report was published.

Satellite capacity pricing drops

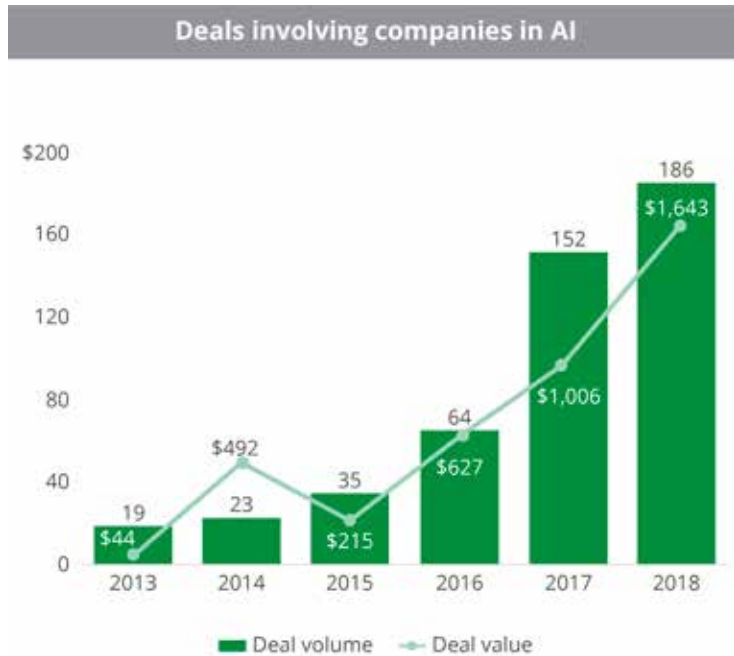
Other factors are likely to accelerate M&A in space, including debt calculations and the ongoing effect of satellite capacity pricing drops. These falloffs have moderated recently, as Euroconsult principal Emeline Bardoux told Connectivity Business in December that declines are averaging in the low to high single digits. In recent years, they have fallen around 18%, with some contending these drops are key to unlocking new markets.

An HTS supply-demand gap, a key price pressure point for both FSS and HTS capacity, is expected to peak around 2021-22 time-frame, indicating certain bottom pricing levels for GEO payloads, Northern Sky Research said in an analysis.

With an average FSS break-even price – lowest price for capacity without a loss – of a satellite dropping from US\$1,500/MHz/month to US\$600/MHz/month between 2017-21, and with HTS break-even prices dipping from US\$28-60/Mbps/month in 2017 for large consumer broadband payloads to US\$12/Mbps/month by 2021, this time-frame might prove to be a litmus test for multiple operators.

The key question is how a satellite operator reduces the impact of pricing and how it future-proofs growth, and whether M&A is the right strategy.

Most operators are adopting service business lines in broadband, maritime, video or data. Expectation of 25-30% managed services revenue by 2021 is likely, acting as a shield to accelerating price declines. And preserving contract value via increased bandwidth consumption, with price reductions, became a norm in 2018-19, showing partial elasticity in data, backhaul and maritime



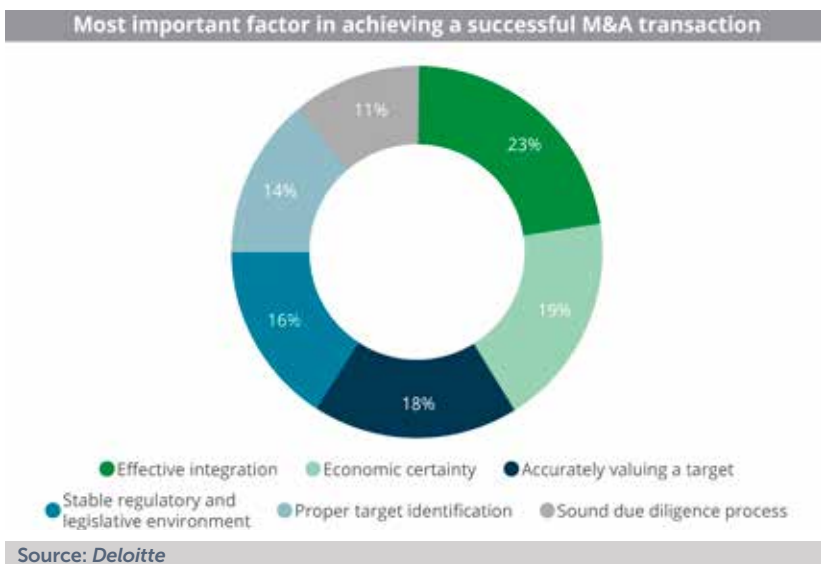
Source: PwC

passenger segments.

“Operators are looking to create captive growth markets, undercutting competitors, and with interim capex cycles ending, many operators are also creating favourable net debt/EBITDA positions to acquire other companies,” it said. “Growth through complementary mergers becomes straightforward.”

Other factors are at play in M&A calculations, such as high debt. Maxar’s divestiture of MDA – when combined with the recently completed sale of real estate in California – reduces the company’s debt by more than US\$1bn and significantly lowers Maxar’s leverage ratio, it said in the announcement. It had total liabilities of US\$4.34bn in its most recent filing.

For the MDA deal, *BMO Capital* is advising Northern Private Capital, a BMO source told Connectivity Business. *PJT Partners*, *RBC Capital Markets* and *Bank of America Merrill Lynch* are serving as financial advisers to Maxar. *Wachtell, Lipton, Rosen & Katz* and *Stikeman Elliott* are serving as its legal advisors.



Source: Deloitte

Smattering of players dominate commercial satellite financing success

Financing success is concentrating among certain players and sectors of satellite, as only a handful of companies dominate investment amid increasing alliances involving some of these ventures.

The industry is hot, as investment through Q3 2019 reached US\$5bn, putting the year on track to be the largest for space investment ever, according to investor and analytics provider Space Angels. Space unicorns are emerging. And non-US investors are increasingly making waves.

On a more pessimistic note, some well-known trends and developments are providing balance, including the impact of the FCC's recent decision to pursue a public auction on 280MHz of C-band on FSS satellite operators and the wider sector in general. Others include the influence of the LEO satellite revolution on the widening satellite capacity supply-and-demand gap and the effect of increasing GEO satellite capacity on pricing, though some caution that lower pricing could be key to unlocking new markets and more contracts.

Only 11 companies account for about three-quarters of all space investment, according to a Bryce Space and Technology analysis. What it shows is that investors are interested in satellite communications, launch and data analytics. Bryce Space and Technology was unable to comment before this report was published.

One of them is **Spaceflight Industries**-owned imagery company **BlackSky**, which announced in mid-November that it had obtained a US\$50m senior secured loan from FSS operator **Intelsat** (NYSE:I). As part of the announcement, BlackSky said that over time the company

could incorporate access to Intelsat's global communications infrastructure.

BlackSky is also linked to joint-venture company **LeoStella**, which satellite builder **Thales Alenia Space** and Spaceflight Industries announced at Satellite 2018. LeoStella is to construct 20 small satellites for BlackSky, which has a goal of a 60-satellite constellation.

More broadly, the investment acumen Spaceflight Industries is starting to show, as one of its other companies, rideshare specialist **Spaceflight**, is also in the group of 11. Thales Alenia Space acquired a minority stake in Spaceflight Industries via a US\$150m funding round in early 2018. Spaceflight has completed five missions in 2019, with another five planned this year, including the recent announcement of a 14-spacecraft mission aboard India's Polar Satellite Launch Vehicle later in November and December.

Rideshare is a growing market, as **SpaceX** announced plans in August to transport 200kg satellites to LEO for US\$1m through its Smallsat Rideshare Program. It will handle payloads aboard a Falcon 9 vehicle, translating into a US\$5k price-per-kg for smallsats for the maximum mass allowed.

SpaceX is in elite company as it is only one of three players – with fellow launcher **Blue Origin** and LEO broadband startup **OneWeb** – over the last five years to have received nearly half (US\$5.9bn) of all start-up-only space investment, according to Bryce Space and Technology. All three are backed by celebrity entrepreneurs, Jeff Bezos, Elon Musk and Sir Richard Branson, respectively.

Indeed, the surge in recent investment recently is largely attributable to Bezos' estimated US\$1.4bn self-capitalisation of Blue Origin, following the sale of US\$2.8bn of his **Amazon** (NASDAQ:AMZN) stock. Year-to-date, that investment is the largest in the industry this year, according to Space Angels.

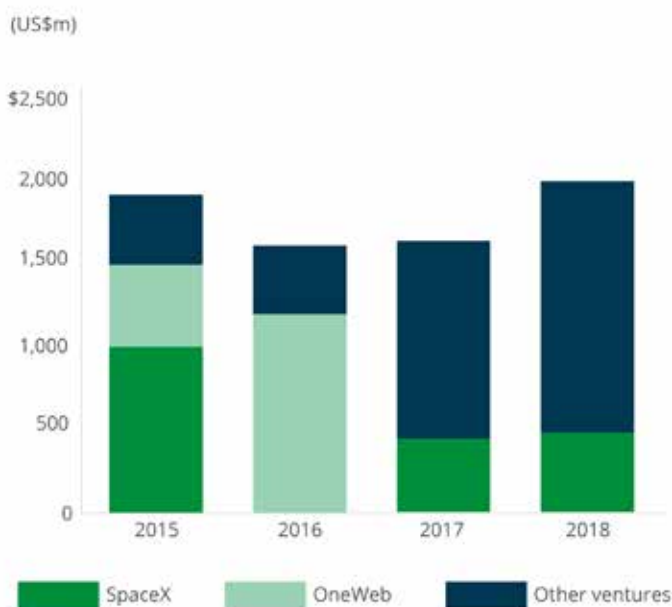
Plethora of partnerships

Increasing collaborations among top recipients of investments are aimed at enhancing value, including at OneWeb.

It generated attention in mid-September, when the company announced it would work with MSS operator **Iridium Communications** (NASDAQ:IRDM) as part of a combined service offering. It is designed to make it easier for the companies' clients to offer bundling and co-marketing opportunities for Iridium's Certus L-band services and OneWeb's Ku-band service.

With US\$3.4bn in funding in the bank, OneWeb launched the first six satellites for

OneWeb and SpaceX funding achievement



Source: Bryce Space and Technology

its announced 650-strong initial constellation aboard an **Arianespace** Soyuz rocket in February.

Another collaboration involving top investment recipient **Rocket Lab** was announced in late October. The smallsat launcher said that Sweden-based **Kongsberg Satellite Services** will be the sole provider of ground station services for the Electron launch vehicle and Photon satellite bus customers.

The partnership provides Photon customers downlink and uplink capabilities in the UHF, S, X and Ka bands across a global ground station network of more than 200 antennas that support 50,000 contacts per month, according to the announcement.

Having raised nearly US\$290m in venture capital, Rocket Lab is a potential contender for a public offering, Connectivity Business reported in late October.

Finally, top investment recipient **Planet** in mid-October announced Planet Orbit, a partnership programme. It will enable partners to gain access to geospatial data not otherwise available in the commercial market and build market competencies.

In February, Planet closed a US\$168m series D funding round, bringing its total equity capital raised to US\$384m. It is also seen as a candidate for a public offering.

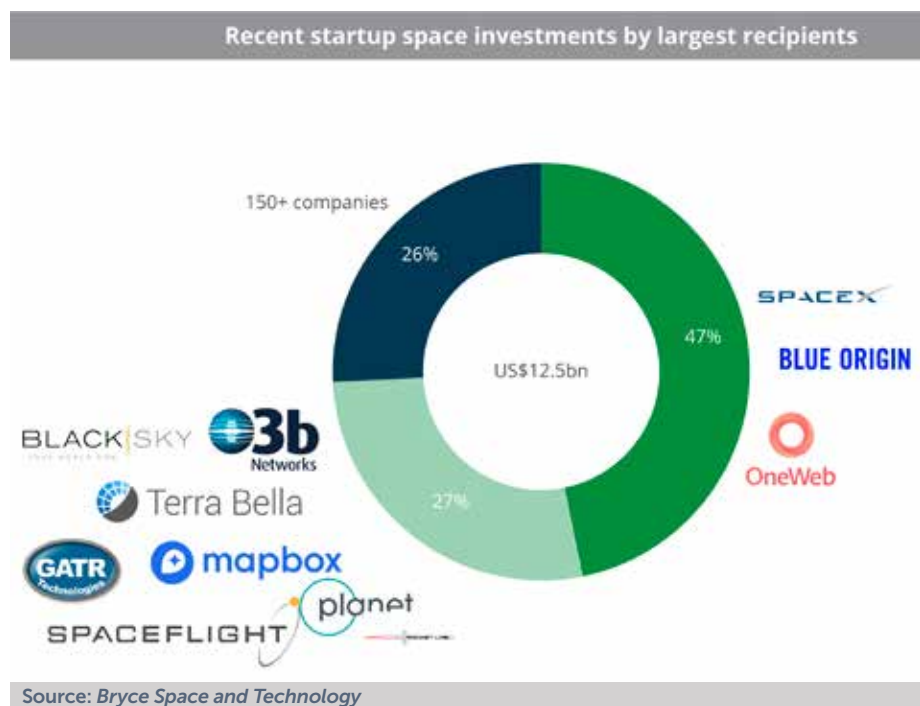
Other companies that are top generators of investment comprise satcoms provider **GATR Technologies**, SES (EPA:SESG)-owned MEO network operator **O3b Networks**, online maps provider **Mapbox** and Planet-owned imagery provider **Terra Bella**.

Two of these companies have a relatively low profile, **Cubic Corporation** (NYSE:CUB)-owned **GATR Technologies** and **Mapbox**. Providing inflatable antennas mostly for use by the military and in disaster zones, GATR Technologies in October announced a US\$325m contract with the US Marine for its next-generation Troposcatter antenna, a four-metre system that weighs around 620 pounds.

Recent noteworthy investments included those of 3D-printed rocket builder **Relatively Space** (US\$140m) of the US, Japan-based synthetic aperture radar startup **Synspective** (US\$100m) and US-based smallsat operators **Hawkeye 360** (US\$70m) and **Spire** (US\$40m), according to Space Angels.

Satellite unicorns?

There are a couple other trends among successful companies, including the emergence of space unicorns, private companies with a valuation in excess of US\$1bn, such as

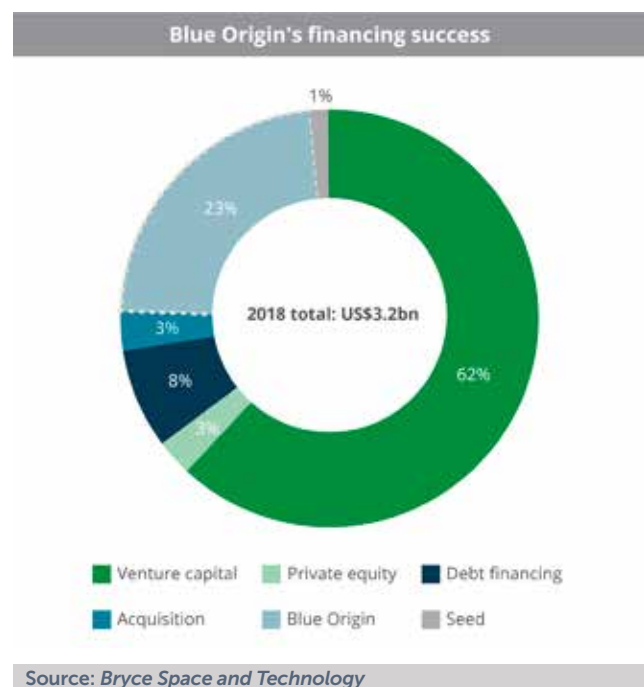


SpaceX.

Several other startup space companies, including OneWeb, Planet and Rocket Lab, are seen as potential unicorns. Two others, Mapbox and meta-materials specialist **Kymeta**, are likely on the path.

Though US startups continue to dominate space, with about 80% of all investment in 2018, close to half of investors and companies reporting investment in the last three years are based outside the North American nation. Some 94 investors in 2018 were based outside the US. From 2017 to 2018 the number of non-US investors rose from 47% to 49% of all investors, with most of the upstarts in China and the UK.

The largest investment in a non-US space startup was a US\$90.6m series A in i-Space, a China-based launch startup, in late 2018.



The annual Connectivity Business Investment Conference will explore the critical strategic and financial issues impacting private or public equity and debt capital investments across the rapidly evolving global terrestrial and orbital connectivity infrastructure and services industry.

Agenda

The focus of private capital investment: terrestrial connectivity

The session will explore the current appetite for private capital investment and portfolio monetisation through the lens of terrestrial connectivity. Investment and valuation trends in fibre networks, macro cell towers, small cell networks, hyperscale and colocation data centres, and other innovative terrestrial connectivity infrastructure will be discussed.

Investor Keynote / Interview

The focus of private capital investment: orbital connectivity

The session will explore the current appetite for private capital investment and portfolio monetisation through the lens of orbital connectivity. Investment and valuation trends in mature GEO / MEO satellite bandwidth, evolving LEO constellations, smallsat and launch innovation, teleports and distributed data centre integration, Earth observation, and other innovative orbital connectivity infrastructure will be discussed.

Strategy Keynote / Interview

Understanding positive and negative sentiment in the equity and debt capital markets

The session will consider diverging strategies for investment or capital preservation, discuss the outlook for a potential contraction in global equity and debt capital markets, and explore the prevailing views of industry analysts, advisors, and investors across the various subsectors of communications.

CFO Keynote / Interview

The outlook for connectivity investments in mobility market verticals

The session will focus on the future of fleet connectivity growth for both terrestrial and satellite players by addressing specific demand drivers and costs associated with mobility market verticals, including aviation, maritime, ground transportation, energy, agriculture, and mining.

The outlook for wireless broadband services and 5G connectivity

The session will consider investment theses for 5G terrestrial and orbital broadband connectivity related IoT applications as well as adjacent opportunities in content distribution and edge computing.

CEO Keynote / Interview

The outlook for shifting M&A dynamics

The session will debate how M&A may advance opportunities for inorganic value creation in the global digital infrastructure and related connectivity markets. The theme of connectivity infrastructure convergence will be addressed along with valuation trends (trading & acquisition multiples, cost of capital, synergies & take-over premiums), prevailing lessons from recent deals, and the driving characteristics that may shape future deal activity.



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