Somerset House, New Wing, Strand,
London WC2R 1LA, United Kingdom
info@londoneconomics.co.uk
londoneconomics.co.uk
@LondonEconomics
+44 (0)20 3701 7700

SPAC(e) In Focus - Finance at the Final Frontier

The rise of a new financial mechanism has been central to the arrival of many new space ventures on public markets. But as the fervour for SPACs, or special purpose acquisition companies, wanes among investors, what will be the consequence for the space industry? In the latest edition of Space in Focus, Pat Mathewson offers a primer on SPACs and reflects on their potential to distort business strategies and ultimately fuel consolidation across the industry.

The SPAC frenzy of 2021 concluded with the arrival of Virgin Orbit, a commercial launch provider focused on small satellites (NASDAQ: VORB), arriving on the stock exchange on December 30th. It was the tenth space company to go public via a special purpose acquisition vehicle, or 'SPAC' deal, in the preceding twelve months. Investors' tepid reaction to VORB's listing forced its parent company Virgin Group to inject up to $100m for the SPAC deal to proceed.[1] The contrast between this listing and its sister company, Virgin Galactic, in 2019 is emblematic of declining interest in SPACs as a financial mechanism[2], and may suggest that SPAC fever has broken for the space industry.

While significant column inches have been devoted to assessing the merits of individual SPAC deals, less attention has been paid to the impact of SPAC fever across the industry. As the pace and fervour of this trend slows, what will be its legacy? Clear-eyed observers will find capital in excess of strategy, where the funds raised by firms exceed that for which they have articulated a purpose within their present business plan. The easy capital supplied by market speculation will distort business concepts, increase direct competition between firms, and set the stage for eventual consolidation. Similar to the failure of large LEO concepts in the 1990s[3], such failures have the potential to dent investor confidence in the space industry, resulting in long-term damage by depriving future viable concepts of capital.

This article will provide an introduction to SPACs, including a summary of the supply and demand-side drivers behind the proliferation of the financial mechanism. Furthermore, it will offer an overview of what may be waning investor interest, and the risks posed by moral hazard and asymmetric information. Finally, the analysis will conclude with a reflection on the longer-term consequences of SPACs on the space industry.

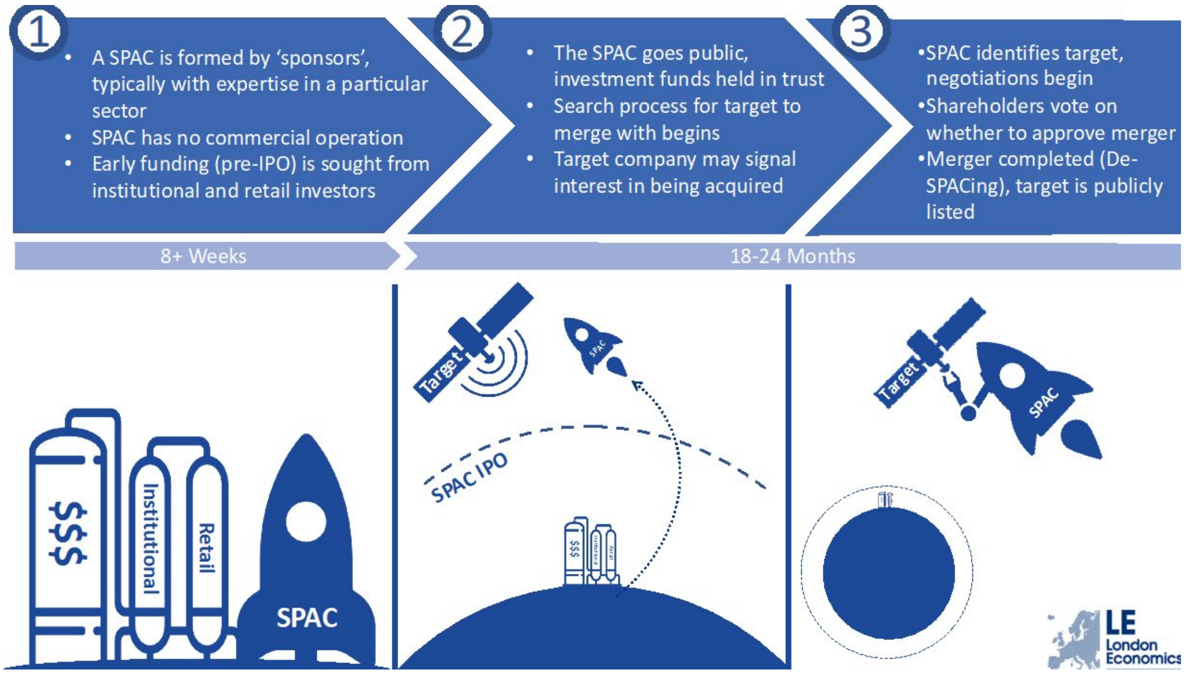
Primer: What is a SPAC?

Special purpose acquisition companies, or SPACs, offer an alternative route to public listing from a traditional IPO. They enable a prospective company to be acquired by another, which is already listed, though that listed company may have no significant operation in its own right. (For an overview of the process behind a SPAC merger, see Figure 1 and Box 1.) The popularity of SPACs

[1] Waters, R. (2021). "Virgin Orbit's Nasdaq listing falls short of fundraising target." *Financial Times*, December 29th, 2021. Available at: Virgin Orbit's Nasdaq listing falls short of fundraising target
[2] Foust, J. (2021). "Interest in SPAC Mergers Declining." *Space News*, November 18th, 2021. Available at: Interest in SPAC mergers declining
[3] This history is detailed in a previous edition of *Space In Focus* by Farooq Sabri, available at : LEO satcoms in the NewSpace era: key to the mass market or empty promise?

amongst space industry players was ignited in 2019 following the listing of Virgin Galactic. Twelve such deals have been announced since then, seeking to raise $5.1bn of funding, and yielding an estimated aggregate market value of $27.1bn.[4]

Figure 1 SPAC Merger Overview



Source: Author's Construction

Box 1 How a SPAC merger works[5,6,7,8,9,10,11]

- A Special Purpose Acquisition Company, or 'SPAC', is a shell company formed to raise capital through an IPO in order to acquire an existing operating company, which is referred to as a 'target'. This enables the target company to forgo the IPO process itself, and the associated regulatory and reporting requirements.
- SPACs are generally formed by investors, known as 'sponsors', with expertise in a specific industry. The IPO will typically have an associated investment thesis focused on a particular sector or geography, in-line with a sponsor's experience.
- At the time of their IPOs, SPACs have no existing commercial operations or stated targets for acquisition. Sponsors may have a target in mind, but they will refrain from identifying it to avoid onerous disclosure requirements during the IPO process.

[4] BryceTech (2021). *Start-Up Space Report*. September 1, 2021. Available at: Start Up Space Report
[5] Investopedia (2021). "Special Purpose Acquisition Company (SPAC)." October 16th, 2021. Available at: Investopedia SPAC
[6] PWC (2021). " How special purpose acquisition companies (SPACs) work." Available at: How special purpose acquisition companies (SPACs) work
[7] FINRA (2021). "Investing in a SPAC". March 29, 2021. Available at: Investing in a SPAC
[8] SEC (2021). "What You Need to Know About SPACs – Updated Investor Bulletin." May 25th, 2021. Availabe at: What You Need to Know About SPACs
[9] Dear Retail (2021). "How regular retain investors can cash out on red hot spacs." Available at: How regular retain investors can cash out on red hot spacs
[10] Allen & Overy (2020). "The Journey to De-SPACing and Beyond." Available at: The Journey to De-SPACing and Beyond
[11] Barton, Roger (2022). "High redemption rates see SPACs relying on alternative financing." January 14th, 2022. Available at: High redemption rates see SPACs relying on alternative financing.

- A SPAC will engage underwriters and institutional investors before offering shares to the public. Retail investors may invest in a SPAC by electing to participate in the IPO, or by purchasing its securities on the open market following an IPO.
- The funds raised by a SPAC's IPO are held in an interest-bearing trust account, and the SPAC typically has 18-24 months to identify and complete a merger with a target company.
- If the merger is successful, the target and its operation effectively 'takes over' the public company status of the SPAC and continues its life as a public company. This is referred to as 'de-SPACing'.
- If a SPAC does not complete a merger in that timeframe, it is liquidated, and the funds held in the trust are returned to shareholders.
- Once a SPAC has identified a target, its management negotiates with the operating company, and proposes an acquisition to SPAC shareholders.
- Shareholders of the SPAC vote on whether to accept the proposed acquisition, in light of its financing conditions and purchase agreement.
- Individual investors have the right to reject the proposal and redeem their shares prior to the merger for a pro-rata share of the funds in the trust, usually the original IPO price of $10 per share. The proportion of investors that opt to exercise this right is known as the 'redemption rate.'
- Once shareholders approve the SPAC merger and all regulatory matters have been cleared, the merger will close and the target company becomes a publicly listed company.
- The SPAC merger may be accompanied by a Private Investment in Public Equity, or PIPE. The PIPE is an additional funding round that raises further capital from institutional investors following the identification of a target.

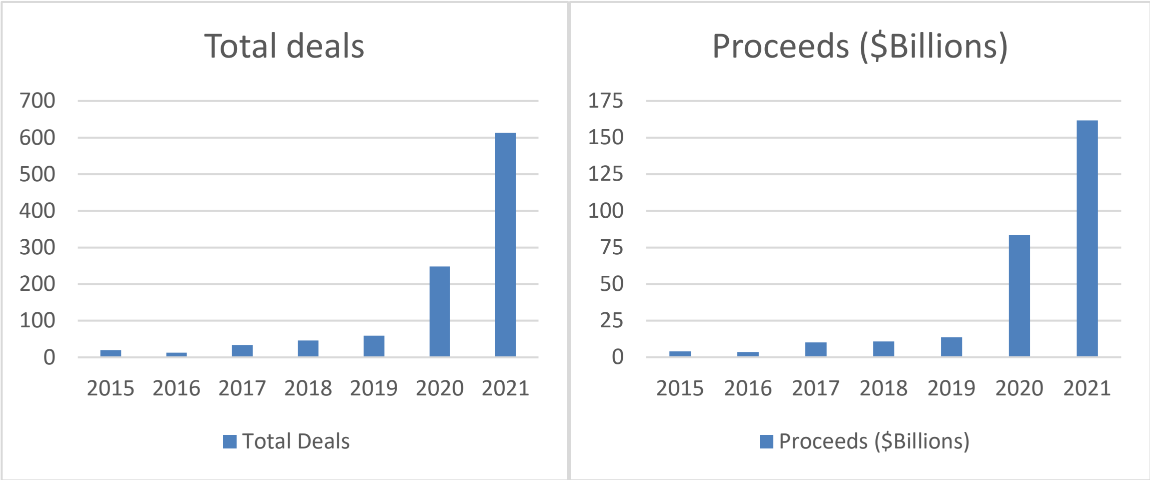
Recent SPACs in the space industry

The rise in space industry specific SPACs parallels a broader proliferation of the financial mechanism across all sectors. US-listed SPACs have increased in both total number and the size of individual deals over the last several years. Across all industries, 2021 yielded 613 deals totalling $161.8bn in proceeds.[12] Figure 3 details twelve deals within the space industry, beginning with Virgin Galactic with launched the trend though its deal with Social Capital Hedosophia.[13]

[12] Statista (2022). Available at: Number of special purpose acquisition company (SPAC) IPOs in the United States and Proceeds of special purpose acquisition company (SPAC) IPOs in the United States

[13] Nasdaq (2019). "The Space SPAC: Everything You Need to Know about Virgin Galactic." October 28th, 2019. Available at: The Space SPAC: Everything You Need to Know about Virgin Galactic

Figure 2 Total US SPAC deals and proceeds, annually



Source: LE Graphic based on Statista data[14]

Figure 3 Timeline of recent space industry SPAC announcements

Source: BryceTech[15]

The economic drivers of SPACs

The demand for SPACs in capital markets occurs against the backdrop of a "reach for yield", and a global savings glut most recently exacerbated by the CoVID-19 pandemic.[16,17] Furthermore, the trend is a function of pent-up demand from investors, particularly retail investors, seeking exposure to frontier industries such as electric vehicles or space technology and who have traditionally been excluded from the IPO process.[18,19] When a SPAC merges with a start-up, such investors can engage earlier in the lifecycle of these firms, an opportunity typically reserved for venture capitalists.[20] Demand is also driven by additional incentives, such as a structure which provides a theoretical floor to any downside risk from their investment, and warrants to buy shares in the future at a specified

[14] Statista (2021). Available at: Number of special purpose acquisition company (SPAC) IPOs in the United States and Proceeds of special purpose acquisition company (SPAC) IPOs in the United States
[15] BryceTech (2021). *Start-Up Space Report*. September 1, 2021. Available at: Start-Up Space Report
[16] Campbell, J. and Sigalov, R. (2020). "Portfolio Choice with Sustainable Spending: A Model of Reaching For Yield." *NBER Working Paper Series*, April 2020. Available At: Portfolio Choice with Sustainable Spending: A Model of Reaching For Yield.
[17] Irwin, N. (2021). "This is a Terrible Time for Savers." *The New York Times*, August 9th, 2021. Available At: This is a Terrible Time for Savers
[18] Randewich, N. (2021) "Analysis: SPAC returns trail S&P 500 as retail investors temper interest." *Reuters,* May 4th, 2021. Available At: Analysis: SPAC returns trail S&P 500 as retail investors temper interest
[19] Wharton (2021). "Why SPACs are booming", May 4th, 2021. Available at: Why SPACs are booming
[20] The Economist (2021). "What is a SPAC." *The Economist*, April 13th, 2021. Available At: What is a SPAC

price.[21,22] The frenzied growth of SPACs has led some analysts to conclude that their popularity is yet another case of irrational exuberance leading to a bubble.[23]

On the supply side, the key drivers behind SPACs lay in its contrast with a traditional IPO. These perceived advantages from the perspective of target companies include "higher valuations, less dilution, greater speed to capital, more certainty and transparency, lower fees, and fewer regulatory demands."[24] For example, a SPAC merger can be completed in 3-5 months compared to 9-12 months for a traditional IPO, with its valuation established in the first month rather than at the end of the process.[25] For space firms looking to go public, such speed may be viewed as critical as they seek a first-mover advantage to establish themselves in a 'frontier industry' such as space. Additionally, SPACs have yielded higher valuations than traditional IPOs. This may be due at least in part to a conflict of interest on behalf of underwriters, who have been accused of targeting an artificially low IPO price in order to give a "pop" to close contacts in public markets.[26] Likewise, a 92% increase in the average value of companies that went public via IPOs may seem like a success, but this represents money left on the table that could have been used by companies for productive ends.[27] Raising "too little capital at too low a price" is a particularly egregious sin in a cap-ex intensive industry such as space, where your strategic objective might include obtaining first-mover advantage and being the first to build an EO or satcom constellation with global coverage.[28]

Finally, an essential supply side driver, at least in the context of space start-ups, may be the reduced regulatory and disclosure requirements of SPACs. Critically, IPOs are not legally allowed to make projections or forward-looking statements on their performance. This restriction to reporting solely historical financial performance stands in contrast to SPACs which are granted "safe harbour" or protection from legal liability from forward looking statements.[29] Valuations for recent space industry SPACs have been grounded in projections of significant year-over-year revenue growth. For example, four Earth Observation companies who have gone public via SPAC – Planet, BlackSky, Spire, and Satellogic – offered 2021-2024 revenue growth projection CAGRs (compound annual growth rates) of 37%, 103%, 106% and 274% respectively.[30] With even established financial institutions such as Morgan Stanley forecasting a global space industry in excess of $1tn by 2040, space start-ups are capitalising on a narrative that they stand on the verge of a frontier industry.[31]

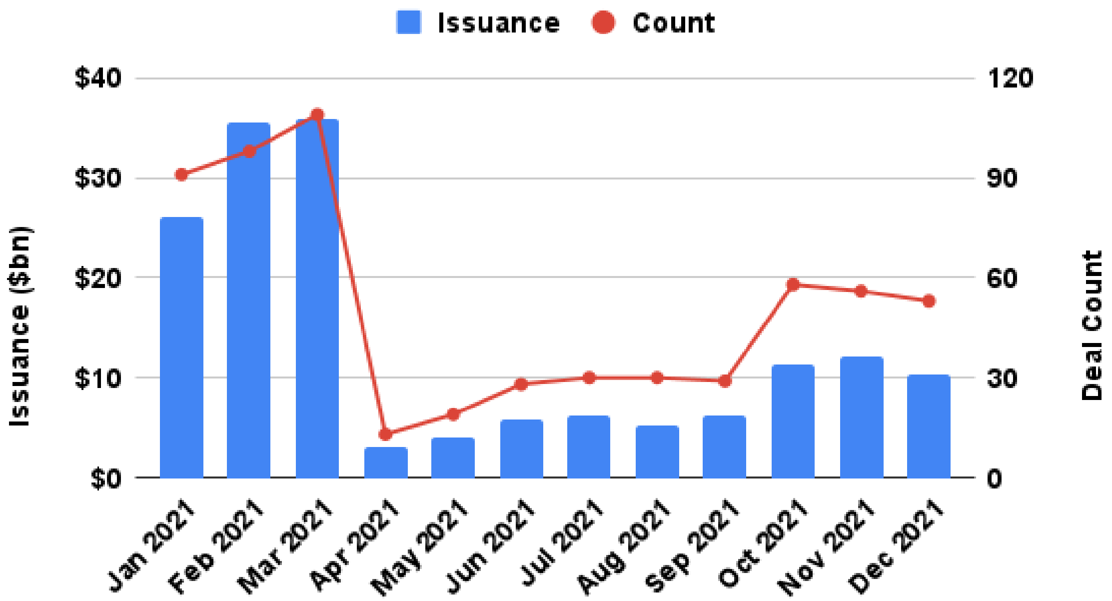
The breaking of SPAC fever

As we enter 2022, it appears the SPAC trend has slowed. The perceived advantages, driving increases in supply and demand as outlined above, have turned out to be more tenuous than expected at the

[21] Bazerman, M. and Patel, P. (2021) "SPACs: What You Need to Know" *Harvard Business Review,* July- August 2021. Available at: SPACs: What You Need to Know
[22] McVie, C. (2021) "Is the SPAC Party Over?" August, 8th, 2021. Available at: Is the SPAC Party Over
[23] Naumovska, I. (2021). "The SPAC Bubble is About to Burst". *Harvard Buiness Review* Available at: The SPAC Bubble is About to Burst
[24] Bazerman, M. and Patel, P. (2021) "SPACs: What You Need to Know" *Harvard Business Review,* July- August 2021. Available at: SPACs: What You Need to Know
[25] Bazerman, M. and Patel, P. (2021) "SPACs: What You Need to Know" *Harvard Business Review,* July- August 2021. Available at: SPACs: What You Need to Know
[26] The Economist (2021). "The Spactacular Boom on Wall Street." *The Economist,* Feb 20th, 2021. Available at: The Spactacular Boom on Wall Street
[27] Bazerman, M. and Patel, P. (2021) "SPACs: What You Need to Know" *Harvard Business Review,* July- August 2021. SPACs: What You Need to Know
[28] Bazerman, M. and Patel, P. (2021) "SPACs: What You Need to Know" *Harvard Business Review,* July- August 2021. SPACs: What You Need to Know
[29] Wharton (2021). "Why SPACs are booming", May 4th, 2021. Available at: Why SPACs are booming
[30] Avascent (2021). "Space SPACs- Valuation in Zero-G." *Avascent.* Available at: Space SPACs Valuation in Zero-G
[31] Morgan Stanley (2020). "Space: Investing in the Final Frontier" Available at: Space: Investing in the Final Frontier

height of the boom. Investors have taken notice, as evidenced by weak market performance, increasing redemption rates, and waning enthusiasm for associated PIPE deals.

Figure 4 US SPAC issuance by month



Source: SPAC Research[32]

The precipitous drop is SPAC deals in April of 2021 came in response to a looming regulatory crackdown (Figure 4). The Securities and Exchange Commission (SEC) issued new guidance advising companies that they should treat stock warrants as liabilities and not equity. Furthermore, the SEC advised companies may have to restate financials, impacting several quarters or years of previous reports.[33] These measures would serve to slow the SPAC process.

Regulatory pressures also impacted the space industry specifically. Momentus and its SPAC, Stable Road, attracted the ire of regulators for reportedly misleading investors regarding a successful test of a propulsion system, resulting in a $8m dollar settlement prior to listing.[34] Their actions garnered special mention from the SEC as a prime example of the asymmetric information and moral hazard dangers posed by SPACs. Regulators said the case: “illustrates risks inherent to SPAC transactions, as those who stand to earn significant profits from a SPAC merger may conduct inadequate due diligence and mislead investors.”

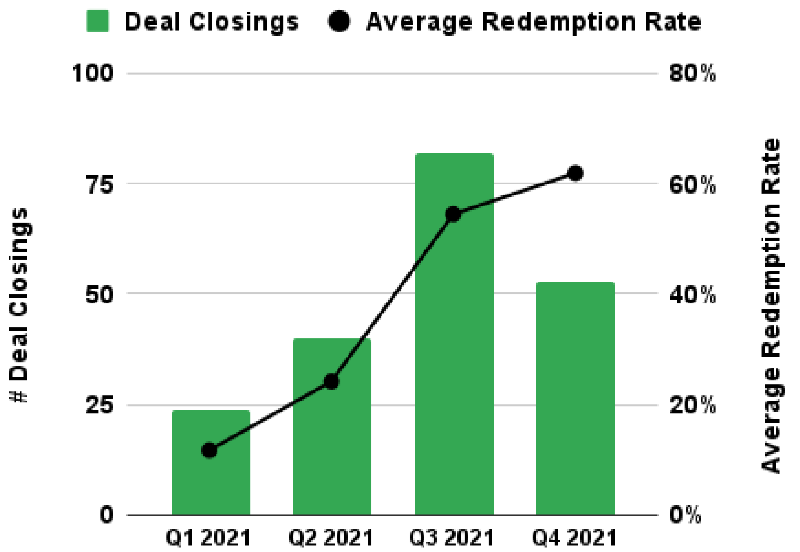
Evidence also suggests SPACs are not the cost-saving vehicle proponents suggest. A study by the European Corporate Governance Institute suggests SPACs consumed one-third of the cash they raised, or 50 per cent of the money they eventually delivered to the companies they brought public.[35] Researches noted, “These costs are much higher than those for IPOs, even accounting for

[32] SPAC Research (2022). “2021 Year In Review.” January 10th, 2022. Available at: 2021 Year In Review
[33] Beltran, L. (2021). “Coinbase and 45 Other Companies Debuted in April, but SPAC IPOs Fell to a Trickle.” *Barrron’s,* May 5th, 2021. Available at: Coinbase and 45 Other Companies Debuted in April, but SPAC IPOs Fell to a Trickle
[34] Sheetz, M. (2021). “Space company Momentus, after settling SEC charges, gets SPAC approved and will go public.” *CNBC*, August 11th, 2021. Available At: Space company Momentus, after settling SEC charges, gets SPAC approved and will go public
[35] Foroohar, R. (2021). “Spacs are falling short of their promises.” *Financial Times*, July 11th, 2021. Available at: Spacs are falling short of their promises

underpricing, and are roughly twice as high as even SPAC sceptics have previously estimated."[36] Furthermore, the study found that SPAC share prices typically fall by one-third within a year following their listing, and since 2010, there has never been a year in which SPAC mergers outperformed the Russell 2000 small cap index. As of January 21st, 2022 at the time of writing, all but one of 11 completed space industry SPAC deals is currently trading below its initial listing price of $10.

Signs of investor fatigue are also evident in rising redemption rates (Figure 7), that is SPAC shareholders who withdraw their funds when a target in announced, and falling proceeds from PIPE deals (Figure 8). The average redemption rate rose from approximate 10% in Q1 of 2021 to over 60% in Q4. [37] Arqit, a quantum encryption company, is a space industry player who experienced the hard edge of this trend first hand. Nearly 94% percent of shareholders in the SPAC Centricus Acquisitions chose to redeem their shares when Arqit was announced as the target company. Arqit had expected to receive $400m in cash from the transaction, but had to settle for approximately one quarter of that sum.[38] Capital raised though PIPE deals has also fallen sharply. "SPAC deals across the market in February 2021 included $15bn of PIPEs. By October, PIPE deals had fallen to $800m and, through the first half of November, only $200m of PIPEs had been announced.[39]" Collectively, these signs indicate an environment that is much less accommodating to new SPACs than it was a year ago.

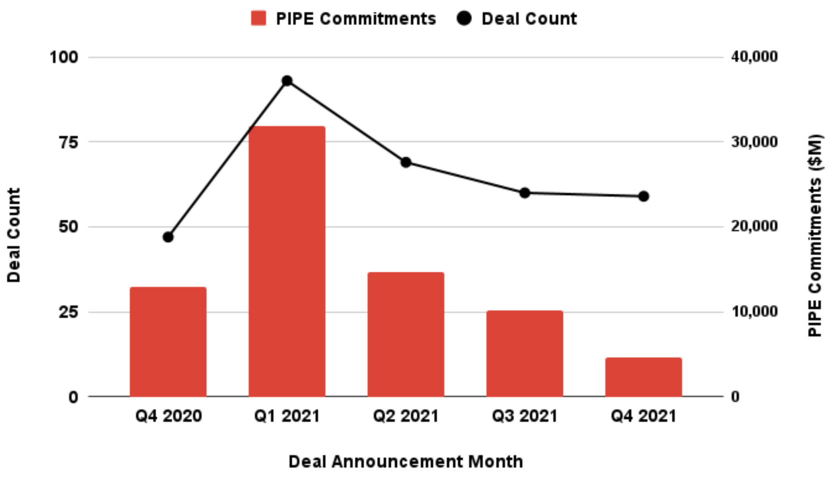
Figure 5 Increasing SPAC redemption rates



Source: SPAC Research[40]

[36] Foroohar, R. (2021). "Spacs are falling short of their promises." *Financial Times*, July 11th, 2021. Available at: [Spacs are falling short of their promises]
[37] SPAC Research (2022). "2021 Year In Review." January 10th, 2022. Available at: [2021 Year In Review]
[38] Aliaj, O. et al. (2021). "Soaring Spac redemptions signal their fall from favour." *Financial Times*, September 27th, 2021. Available at: [Soaring Spac redemptions signal their fall from favour]
[39] Foust, J. (2021). "Interest in SPAC Mergers Declining." *Space News*, November 18th, 2021. Available at: [Interest in SPAC mergers declining]
[40] SPAC Research (2022). "2021 Year In Review." January 10th, 2022. Available at: [2021 Year In Review]

Figure 6 Declining PIPE Capital Raises



Source: SPAC Research[41]

From speculation to consolidation

But what will be the legacy of the large influx of capital from space industry SPACs over the last year? What consequences will this period have for these companies and their sky-high valuations?

Success via SPAC is not without precedent, Iridium, a global satcom company, went public via a SPAC in 2008, and today is valued at nearly $6bn market cap with $594m in annual revenue.[42,43] However, what is new is that SPACs are being pursued by space companies with zero, or effectively zero, revenues and typically at very early stages in their product development and commercialisation timeframes. The year before Iridium went public, it earned $260m in revenue.[44] Contrast that with Astra, a launch start-up which went public via SPAC in July 2021, which as of Q2 2021 has zero revenue, while anticipating $4m of revenue by the end of the year, and over $1.1bn by 2025.[45,46] Similarly, Momentus Space, while expecting zero revenue in 2021, forecasts nearly $2.2bn of revenue by 2027.[47]

The merits of each individual company's revenue projections aside, more attention should be paid to the effect of SPAC fever in aggregate across the industry. Analysts have highlighted that to date, "the current SPACs are not only pursuing different business models, many are targeting different markets entirely."[48] However, investors should be mindful of how soaring valuations may drive a

[41] SPAC Research (2022). "2021 Year In Review." January 10th, 2022. Available at: 2021 Year In Review
[42] Yahoo Finance (2021). "Iridium Communications Inc." Available at: Iridium Communications Inc
[43] The history of this transaction is detailed in a previous edition of *Space In Focus* by Farooq Sabri, available at : LEO satcoms in the NewSpace era: key to the mass market or empty promise?
[44] Iridium (2008). "Iridium® Satellite Announces Q4 and Fiscal Year 2007 Results." Available at: Iridium Satellite Announces Q4 and Fiscal Year 2007 Results
[45] NASDAQ (2021). "ASTR Financials". ASTR Financials
[46] Sheetz, M. (2021). "Here's what investors should know about rocket builder Astra as it prepares to go public." *CNBC*, Feb 25th, 2021. Available At: Here's what investors should know about rocket builder Astra as it prepares to go public
[47] Momentus (2021) "Investor Deck." Available at: Momentus Investor Deck
[48] Avascent (2021). "Space SPACs- Valuation in Zero-G." *Avascent.* Available at: Space SPACs- Valuation in Zero-G

real change in business strategy, bringing companies into direct competition with one another. The twin combination of vast amounts of capital and pressures to meet sky-high expectations from investors may lead SPACs to deviate from their original concepts – e.g. by entering new business areas and moving up the supply-chain to capture more value.

Take for example Earth Observation, which has seen a burst of recent SPACs both completed and announced in BlackSky, Planet, Satellogic, and Spire, all of whom will devote their raised capital to the construction and improvement of their own constellations. (Not to mention the presence of incumbents, Maxar and Airbus, launching new EO constellations in the coming year.[49,50]) BlackSky for example, has traditionally positioned itself as an analytics company, but its activities and capital spend reveal a company pursuing a strategy of vertical integration.[51] Likewise, while Planet presents itself firstly as an imagery provider, as an operator of the largest EO constellation, it holds the key ingredient necessary to training an advanced machine learning or AI analytics product.[52]

With space start-ups achieving sky-high valuations against the backdrop of zero revenue (Astra went public via SPAC at a valuation of $1.2bn, and Momentus Space at $557m[53,54]), what will be the impact of this seemingly easy (albeit diminished) course to capital? As Joe Morrison of Umbra argues, this success will encourage other companies, who may also have zero revenue, to see themselves as viable for public listing.[55] What happens to the strategic landscape as new entrants, flush with capital from huge valuations, join an increasingly crowded market? It seems inevitable that this vast capital will be deployed towards competing concepts. This competition will in turn deprive some ventures of the large revenue base necessary to justify this cap-ex and ultimately lead to commercial failure and consolidation.[56]

The legacy of SPAC fever will remain undecided until the point at which the sky-high revenue targets of space industry SPACs are missed. As with the failure of the large LEO concepts in the 1990s, this modern failure could dent investor confidence in the space industry and hurt the industry in the long-term by starving viable concepts of capital.

[49] Maxar (2021). “Worldview Legion.” Available at: Worldview Legion

[50]Airbus (2021). “Pléiades Neo Trusted Intelligence” Available at: Pléiades Neo Trusted Intelligence

[51] BlackSky (2020). “BlackSky: A data-analytics platform that just happens to own a satellite manufacturer.” September 14th, 2020. Available at: BlackSky: A data-analytics platform that just happens to own a satellite manufacturer

[52] Planet (2021). “Investor Presentation.” July 20201. Available at: Planet Investor Presentation

[53] Sheetz, M (2021). “Space company Momentus, after settling SEC charges, gets SPAC approved and will go public.” *CNBC*, August 11th, 2021. Available at: Space company Momentus, after settling SEC charges, gets SPAC approved and will go public

[54] Sheetz, M. (2021) “Rocket builder Astra to go public via SPAC at $2.1 bn valuation after reaching space last month.” *CNBC,* February 2nd, 2021. Available at: Rocket builder Astra to go public via SPAC at $2.1 bn valuation after reaching space last month

[55] Ravichandran, A. (2021) “[Bonus] An Unedited Discussion on SPACs in Earth Observation with Joe Morrison” *Terrawatch Space,* July 8th, 2021. Available at: An Unedited Discussion on SPACs in Earth Observation with Joe Morrison

[56] A parallel example in the market for satcoms is detailed in a previous edition of *Space In Focus* by Farooq Sabri, available at : LEO satcoms in the NewSpace era: key to the mass market or empty promise?

Other Sources

Rainbow, J. (2021). “Satellite veterans warn of space SPAC downside. *Space News*. March 19th, 2021. Available at: Satellite veterans warn of space SPAC downside

Luinaud, M. and Ricard, W. (2021). “The Promises and Pitfalls of SPACs for the Space Economy.” Satellite Today. June 2021. Available at: The Promises and Pitfalls of SPACs for the Space Economy