Space Travel Industry Report

TO THE MOON AND BEYOND

The commercial space travel industry is in its infancy with several successful launch tests having being conducted in the last two years. Despite the industry's fresh beginnings, the space travel market has already experienced several ups and downs. Recently, many industry participants achieved major milestones which have made investors optimistic about the sector. The market hopes that upcoming launch tests continue to succeed, and that soon these companies can begin launching customers into space.

The space travel industry is a unique market which merely contains a handful of participants: all of whom have significant funding and the ability to foster rapid technological innovation through their research and development efforts.

The next decade is the period to watch for the commercial space travel industry. Through disruptive innovation and leading technological enhancements, the commercial space travel industry will experience rapid growth through major key drivers as well as smaller developing companies.

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Table of Contents

Introduction to the Industry

Industry Description..... 3
Market Concentration..... 3
M&A & Capital Markets Activity..... 4
Q1 2021 Industry..... 4
Types of Space Travel 5
Major Players..... 6

Development And Trends

Innovative Technology..... 7
Revenue Forecast..... 7
Space Hotels..... 8
Speculation..... 8
Decline In Costs..... 9

Industry Drivers

Growing Competition..... 10
Competition In Sub Orbital Market..... 10
Competition In Orbital Market..... 10
Competition in Cross-Planet & Beyond Earth Market..... 10
Regulations..... 11
Research Initiatives..... 11
Passenger Safety..... 12

Industry Outlook

Short-Term Outlook..... 13
Long-Term Outlook..... 13
Valuation & Financial Performance..... 14

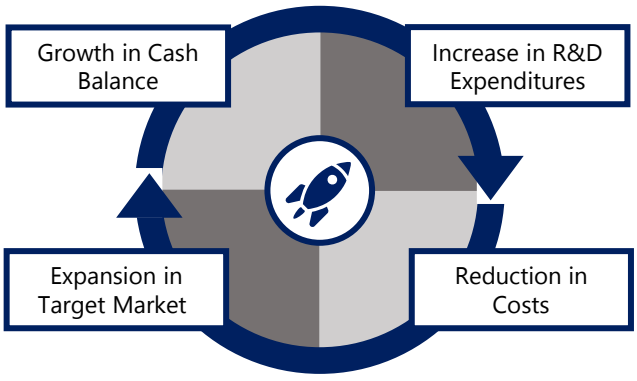
Introduction to the Industry

Industry Description

Space travel is a commercial service provided by government-funded or private entities to customers allowing them to journey into space for a variety of purposes, including leisure, business, and research. Flights can be sub-orbital, orbital, and even beyond-Earth. The current approach to space travel and the development of vehicles to access space are primarily focused on extensions of existing rocket launch vehicles and planes. The plan is to launch a rocket into space and then reuse it, thereby recycling the rocket and allowing for significantly reduced costs, which can be attributed to the lack of a need to produce a new rocket each time. Based on recent analysis, the industry is expected to grow by $5.16 billion during the forecasted 2021-2025 period at a CAGR of nearly 14%.

In its current form, commercial space travel is largely considered a luxury, as the average consumer has a yearly income in excess of $1 million. However, through an industry focus on reducing costs by expanding research and development efforts, expenses for operators and subsequently fees for customers are expected to be reduced to more affordable, mass-market levels. Overall, the industry has optimistic prospects, and investors are hoping that players can achieve major leaps in the near-term.

Industry Model

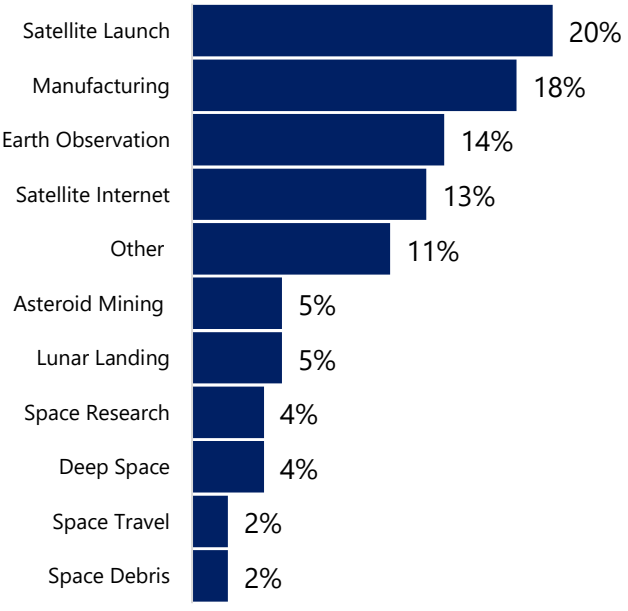


Market Concentration

Being relatively novel, the commercial space travel industry is categorized as having a low to moderate share concentration; however, as the industry rapidly grows, the market is estimated to increase its fragmentation through an inflow of companies entering the space.

Presently, there are three main competitors operating in this industry: Virgin Galactic, led by Richard Branson; SpaceX, led by Elon Musk; and Blue Origin, led by Jeff Bezos — all behemoth corporations headed by multi-billionaires who can afford to finance current costs. Therefore, a large part of the expected fragmentation is dependent on decreasing the cost of rockets, which is a major factor towards lowering barriers to entry. In fact, many forecasts are dependant on the market being fragmented in the future as new entrants receive more funding and cost barriers are overcome. However, the current players may begin to acquire their competition and further expand their expansive market share, thereby maintaining concentration.

Service Breakdown (%)



Sources: Morgan Stanley, Revfine, UBS

Introduction to the Industry

M&A & Capital Markets Activity

Over the last 10 years, there has been a cumulative total of $186.78 billion in equity investment across 1,480 unique companies in the space economy. This investment was led by the United States and China, which collectively accounted for 75% of the global total.

The space industry announced that 11 space-related companies are coming to market via deals with 'blank check' vehicles. In total, the first quarter of 2021 has seen $7.2 billion of intended funding for the space sector, compared to $7.7 billion for the whole of last year, according to research by Seraphim Capital.

With both private and public market investors seemingly now educated on the trillion-dollar potential of the space investment market, the pathway for accessing the capital required to deliver on the out-of-this-world ambitions of various space companies has never been clearer.

Q1 2021 Industry

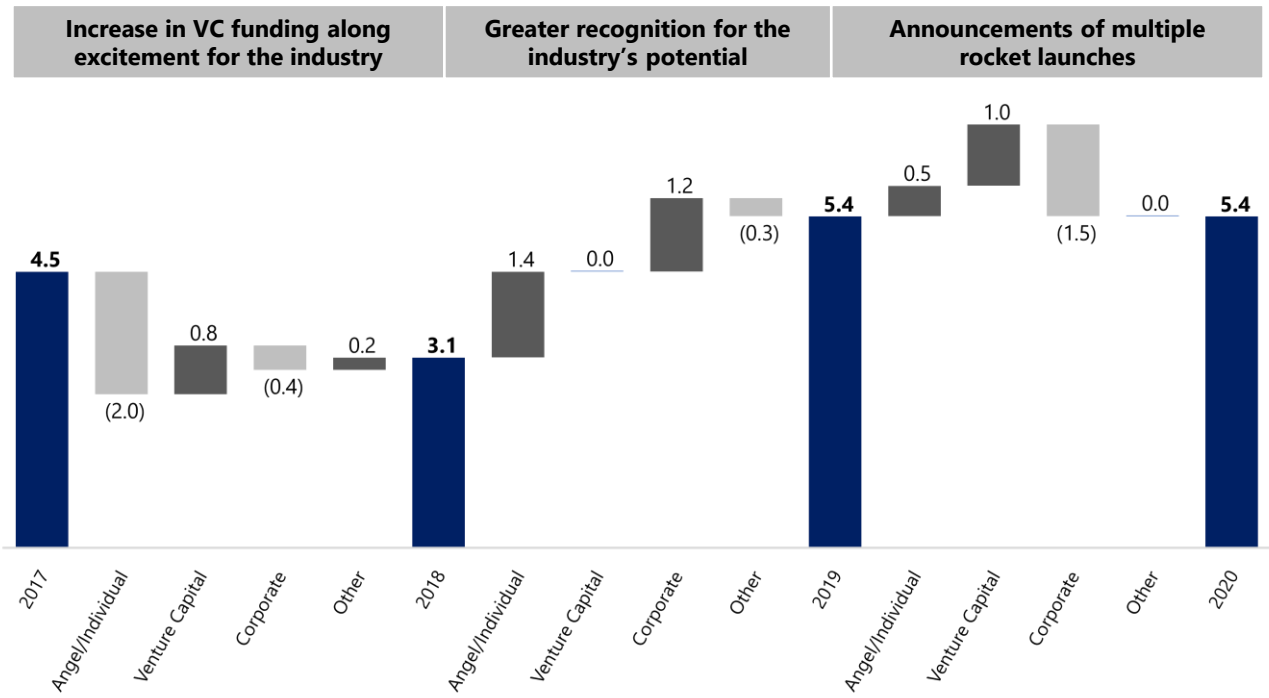
Rocket Lab announced on March 1 that it has agreed to merge with Vector acquisition in a deal valuing the space startup at $4.1 billion. Rocket Lab makes a small reusable rocket called Electron that can carry up to 300 kg of payloads to low Earth orbit.

Satellite maker, Spire Global, announced on March 1 that it is going public this summer through a merger with Navsight. Spire Global specializes in making small satellites used for forecasting weather.

Seattle-based satellite imagery company, Blacksky Technology Inc, announced a merger with Osprey Technology, which is valued at $1.5 billion.

Astra, a company manufacturing small satellite-delivering launch vehicles, announced that it is merging with Holigity to go public in a deal valuing the company at $2.1 billion.

Annual Investment Source ($B)



Sources: Seraphim Capital

TO THE MOON AND BEYOND

Types of Space Travel

Sub-Orbital Space Travel

A sub-orbital spaceflight takes place when a spacecraft reaches outer space, but its trajectory intersects the atmosphere or surface of the gravitating body from which it was launched, so that it will not complete one orbital revolution or reach escape velocity. This type of travel activity will be commercially rolled out by Virgin Galactic in the coming years. These flights are anticipated to reach heights above the Karman line, which attempts to define the boundaries between Earth's atmosphere and space. Sub-orbital space travel will be dedicated to providing tourists with a feeling of weightlessness, a highspeed experience, and a view of Earth's curvature. All these above features define sub-orbital space travel and differentiate themselves from orbital space travel.

Orbital Space Travel

Orbital spaceflight is another type of space activity in which a shuttle must achieve orbital velocity allowing it to remain in the Earth's orbit. For example, trips to the International Space Station (ISS) are orbital spaceflights. This type of activity is targeted towards tourist seeking to experience a loop around earth's orbit. To date, Space Adventures Ltd has been the only company to send tourists to the ISS for recreational purposes — at a cost of $20 million.

Beyond Earth Space Travel

Although very unexplored, beyond Earth space travel is highly desired. Any commercial activity that seeks to provide tourists an experience beyond the Earth's orbit, lies in this category. This type of activity first gained prominence when the Space Adventures Ltd. proposed its plan for providing customers with a visiting flight around the lunar orbit at a cost of $100 million in 2007. Recently in 2017, SpaceX has also announced its plan to carry its tourists around the lunar orbit using its Starship concept at a cost of $70 million.

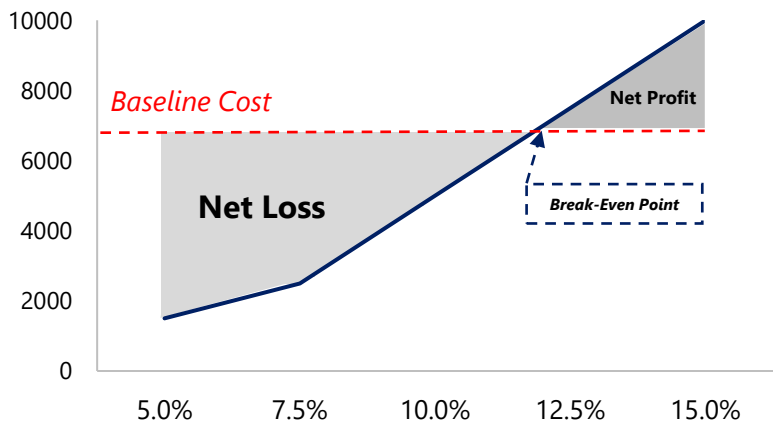
Cross-Planet Space Travel

SpaceX wants to fly people from any two points around the world in less than half an hour. The company is currently developing the Starship, which can be used as a vehicle for point-to-point Earth-bound trips. The sheer power of the rocket is enough to enable a trip from New York to Paris, which takes around 7 hours 20 minutes by plane, to merely last 30 minutes. Each of these vehicles can transport 853 passengers, and it is estimated that 1 trip would cost the company $1 million, working out to $1200 per person. According to UBS, if the cross-planet flight market is even to grab 5% of the total flights currently flown and charge $1500 a ticket, that could help generate an approximate $12 billion of revenue annually.

Revenue Drivers

- Industry Awareness
- End-User Safety
- Economies of Scale
- Public Funding

Share of Flights Compared to Ticket Prices



Sources: NASA, UBS

Major Players

Virgin Galactic

Virgin Galactic Holdings, Inc., an integrated aerospace company, develops human spaceflight for private individuals and researchers in the United States. It also manufactures air and space vehicles. The company's spaceship operations include commercial human spaceflight, flying commercial research, and space development payloads. Virgin Galactic has separated itself from the competition because of its FAA licenses. Only it, along with two other companies, have taken advantage of new regulations and filed for and received the required permits to provide sub-orbital space travel. Further, Virgin Galactic's primary advantage over these two competitors is its plan to offer more than just the spaceflight. It plans on providing a full first-class vacation, along with the training and medical testing needed for the flight at a total cost of $200,000. Currently the company is worth $8.5 billion.

Space Exploration Technologies (SpaceX)

SpaceX — Space Exploration Technologies Corporation, in full — is an American aerospace company founded in 2002 that helped usher in the era of commercial spaceflight. The company entered the arena with the Falcon 1 rocket, a two-stage liquid-fueled craft designed to send small satellites into orbit. The Falcon 1 was vastly cheaper to build and operate compared to its competitors: a field largely populated by spacecraft built by government-owned or funded organizations, ventures, and companies such as Lockheed Martin and Boeing. It is the only private company capable of returning a spacecraft from low-Earth orbit, and in 2012, their Dragon spacecraft became the first commercial spacecraft to deliver cargo to and from the ISS. Additionally in 2020, SpaceX became the first private company to take humans there as well. They believe a fully and rapidly reusable rocket is the pivotal breakthrough needed to substantially reduce the cost of space access. Currently, the company is valued at $74 billion.

Blue Origin

Blue Origin was founded by Jeff Bezos with the vision of enabling a future where millions of people are living and working in space to benefit Earth. Blue Origin's efforts include flying astronauts to space on its rockets, producing reusable liquid engines, creating a highly-renewable orbital launch vehicle, and returning Americans to the surface of the Moon. Both its New Shepard and New Glenn rockets have been designed with reusability in mind from the beginning. Their vertical take-off and vertical landing architecture enables them to reuse the first stage of their launch vehicles with minimal refurbishment. Blue Origin's engines are designed, developed, and manufactured in the United States. They provide great control with a precisely timed start, high-power thrust for launch, deep throttling for landing, and stop and restart capabilities. Since their first, simple, single-propellant engine — the BE-1 — they have built and tested multiple generations for sub-orbital and orbital spaceflight.

Boeing

The Boeing Company emerged as a major player in the space tourism industry when it signed an agreement in 2014 with NASA as part of its Commercial Crew Development program. This program was designed to increase the involvement of companies in the private sector within the production of crew vehicles to be launched into orbit. As part of the agreement, Boeing was contracted $4.2 billion to begin work on the development of a reusable crew capsule known as the Boeing CST-100 Starliner. Crucially, the company's contract with NASA provides Boeing with the opportunity to sell seats to space tourists. The idea of this being that at least one space tourist would participate in each future space mission. Through this, Boeing is enabling critical research on the ISS that benefits the future space economy, deep-space exploration, and life on Earth.

Sources: Blue Origin, Boeing, SpaceX, Virgin Galactic

Development and Trends

Innovative Technology

Since the advent of space travel in the latter half of the last century, 550 people have been to space — 35 of whom took the trip in the last three and a half years. The cost of accessing space for individuals has fallen from 20 million, paid by Dennis Tito in 2001 to fly to the ISS, to $250,000, which is now the prepaid cost of a ticket to sub-orbital space with Virgin Galactic.

As mentioned, the key to successful space travel will be rocket reusability. Both Virgin Galactic and Blue Origin are pursuing this route through their respective SpaceShipTwo and New Shepard rocket models. Since it will be a while before these companies can achieve payback on their initial investments, ticket costs for sub-orbital space travel will remain high. After a number of setbacks in recent years, Virgin Galactic expects to launch its maiden commercial passenger service to sub-orbital space in early 2022. Blue Origin plans the first crewed launch into space of its New Shepard Rocket this year on July 22. If the launches by both companies prove to be successful, they will act as catalysts for space economy investment.

SpaceX has already scheduled two tourist launches. The first is set for September 2021. Axiom Space, a company constructing habitable attachments to the ISS, is organizing the other trip, which is scheduled for 2022. These trips will be costly for wannabe space travellers, with a current price tag of $55 million for the flight and eight-night reservation on the ISS.

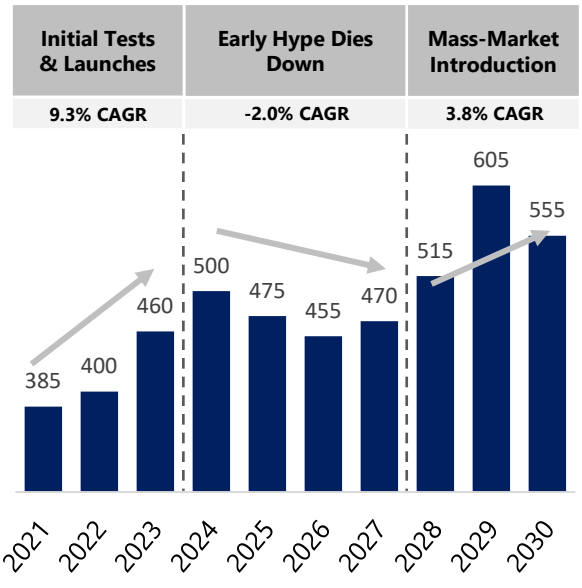
Blue Origin recently held an auction for a seat on its first sub-orbital flight accompanied by Jeff Bezos, which sold for a whopping $28 million. It is worth considering that the cost of this ticket could soon potentially pay for 100 flights on Blue Origin. Further, the experience of being the first few to view the Earth from space may justify elevated prices in the near-term.

Revenue Forecast

Commercial sub-orbital spaceflight services are estimated to account for the majority of the total revenue share during the forecasted period, 2021-2025. This is primarily due to the lower prices associated with sub-orbital space travel when compared to orbital space travel, which is expected to have limited demand as a result of lack of affordability.

Companies such as Virgin Galactic and Blue Origin are currently testing sub-orbital flights that can carry space tourists and reach altitudes between 50 and 68 miles. Sub-orbital travel is expected to begin sooner and grow at a stronger rate, owing to greater frequency and lower ticket prices. Whereas orbital travel is set to expand the commercial space ecosystem in a significant way alongside government programs. The years 2021 and 2022 are likely to encompass several significant milestones for the industry. These major milestones are set to pave the path for commercial space flights, laying the foundation for further significant developments in the earliest part of the next decade.

Forecasted Orbital Space Travel Revenue ($M)



Sources: ICMBD Journal, PwC, Statista, UBS

Development and Trends

Space Hotels

With the rapid development of space travel, several companies are seeking ways to provide living accommodations for prospective travellers in space. These hotels aim to provide comfort, Earth-like gravity, and the luxuries of Earth-bound hotels, along with recreational activities which are exclusive to space.

Axiom Space, a private company that has several agreements with NASA and SpaceX, will provide training to private astronauts and plans to send the first fully private human spaceflight mission to the ISS. A crew scheduled to launch in 2021 aims to perform research in support of developing modules for a new, privately funded space station. Axiom plans to construct and deploy a commercial space station to replace the ISS after its expected retirement in 2024. The new station is intended to be open to visitors from space agencies and the general public. Under an agreement with NASA, the company intends to build the craft in stages as a modular attachment to the ISS that will be released as a free-floating station in orbit once complete.

This exclusive partnership with NASA gives Axiom a short-term strategic advantage over its competitors. Combined with increased funding from NASA, Axiom is likely to see major improvements in its performance and financial results. In the long run, this agreement is another step towards a more commercial and privatized space industry.

Another organization, Gateway Foundation, based in California, announced design plans last year for a space hotel that could accommodate hundreds of passengers. Dubbed the Von Braun Rotating Space Station, this spaceport will orbit Earth all the while accommodating not only scientific research, but also visiting tourists. Design plans depict a giant wheel rotating in space that could provide Earth-like gravity to passengers on board.

Currently, this station can accommodate up to 450 people. The ultimate goal is to have it house amenities ranging from restaurants and bars, to sports facilities. All amenities are to be designed with the consideration of allowing passengers to take full advantage of the weightlessness experience while on board the station. It is estimated that a three-night stay will cost around $5 million. Construction is set to begin in 2025, and the company says it anticipates completion of the orbiting hotel some time around 2027. Gateway Foundation aims to achieve this through the support of the world's first large scale space construction company, Orbital Assembly Corporation.

Speculation

Ideas such as space hotels requires people to be imaginative, and at times cause them to lose their sense of reality. These projects will cost billions of dollars, and even then, its not guaranteed that they will be a success. In Axiom's recent round of funding, the company met its goals of raising $1 million. However, this company only has $497 in assets, and this is the exact company that plans to build a 200-meter space hotel. The speculation behind these flamboyant ideas is justified.

In the past, many companies have pitched the idea of a space hotel, and have committed to their deadlines, although not one company ever came close to achieving their goal. However, in this scenario, a crucial part of the equation is almost solved and that is institutional interest for the space industry. Well-known companies and personalities are investing billions of dollars in space start-ups. Moreover, there are established companies that are very close to building commercial vehicles that will take passengers to space. There is quite a lot of excitement built up for ideas like space hotels, but realistically these developments all depend on the success of space transportation companies.

Sources: Bloomberg, Financial Times, S&P Capital IQ

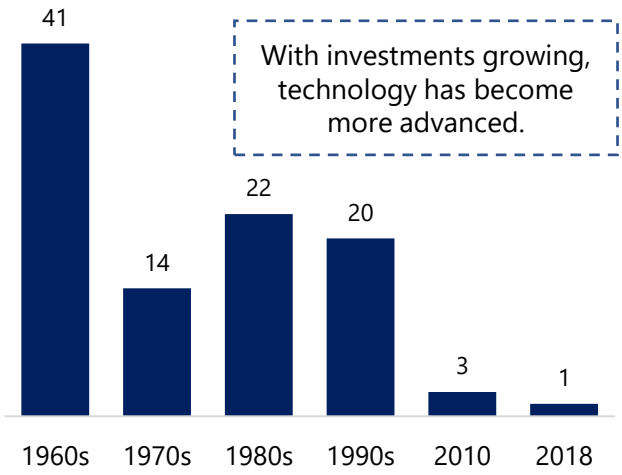
Development and Trends

Decline in Costs

Launch costs have been seen as one of the major barriers to entry for new space companies. In recent years, innovations in rocket design and manufacturing have lowered per-launch costs. Decreased expenses and a more diverse array of launch options have made it easier for new companies to enter the market.

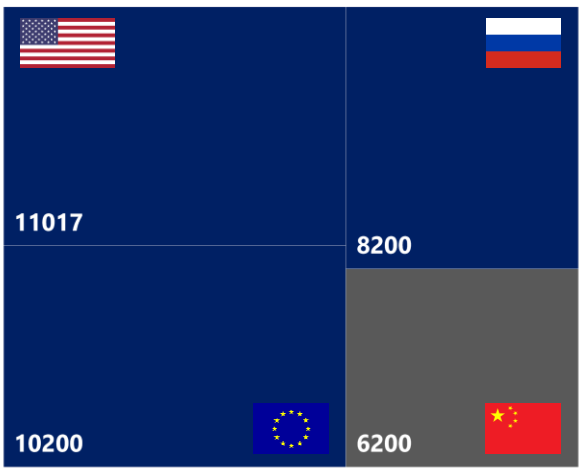
Furthermore, over the next decade, launch costs are predicted to decline 10-fold. Part of this decline will be driven by the mainstream adoption of reusable rocket technology. Since the early days of the space shuttle, reusable rocket technology has been seen as a key solution to achieving economic and sustainable access to low orbit space travel. While fuel accounts for a large portion of the weight of a rocket, most of the cost is attributed to its hardware; hence, savings in this area translate to great overall expense reduction. Both SpaceX and Blue Origin are betting on reusable rocket technology for sending medium-to-heavy loads to geostationary orbit with their Falcon 9 and New Shepard rocket models, respectively. SpaceX achieved a breakthrough in December 2017 when it reused a Falcon 9 rocket for the first-time in a NASA resupply mission.

Falling Launch Costs ($/Kg)



Another factor of the rapidly decreasing launch costs over the past decade largely stems from the decision of SpaceX to develop a vertically integrated vehicle production line that is more reliable, adaptable, and efficient. Between 1970 and 2000, the cost to launch a kilogram to space remained steady, with an average of $18,500/kg. SpaceX initially decreased this cost through its Falcon 9 rocket to $2,720/kg, and then further reduced it in 2018 through its SpaceX Falcon Heavy rocket to a mere $1,400/kg. Further, SpaceX is currently working on developing its fully re-usable Starship rocket system, which boasts an impressive anticipated launch cost to Low Earth Orbit (LEO) of $10/kg. Starship is currently in the prototype and testing phase, with the first orbital test flight planned for some time in the second half of 2021.

Launch Cost to LEO by Region ($/kg)



In addition, decreases in costs and technological improvements in areas such as processing power, data storage, camera technology, solar array efficiency, and micro-propulsion have been adapted into a variety of space-related areas, including within telecommunications, Earth observations, and most importantly, space exploration mission launches.

Sources: Deloitte, NASA, Statista, UBS

Industry Drivers

Growing Competition

The commercial space travel industry was founded in the U.S., and it is home to the majority of industry leaders. Well established innovation infrastructures, easy access to financing, and an abundance of high-net-worth individuals to entice as potential clients, are some of the key factors that are boosting the space travel market's growth in the region. Major industry players residing in the United States include Virgin Galactic, SpaceX, and Blue Origin, among others. This environment effectively stands to promote a new "space race", but in the commercial sector. Several wealthy entrepreneurs from external industries such as tech recognize the potential of the commercial space travel sector and have therefore gone head-to-head by committing billions of dollars into the development of all the varying vehicle, flight, and attraction types. The race to reap the benefits of being first to market in each area is a significant industry driver, and the stakes are only climbing for the ever-growing number of participants.

Competition in Sub-Orbital Market

Owing to the expected significant demand for this form of travel as a result of its low cost to both companies and passengers, competition in this market is substantial. The two major sub-orbital competitors are Virgin Galactic and Blue Origin. Both companies' systems are rocket-powered and capable of carrying up to six passengers on a flight, but that is where the similarities end. Virgin Galactic's spacecraft, SpaceShipTwo, is docked underneath a jet-powered carrier aircraft. The company reuses the spacecraft, replacing the hybrid rocket engine and reconnecting it to the carrier aircraft. Blue Origin's more traditional rocket, New Shepard, launches with a domed capsule on top of the booster. But unlike conventional rockets, New Shepard's booster also comes back to land separately — with the company reusing the boosters for future launches.

Competition in Orbital Market

This market is dominated by two companies: SpaceX and Boeing. During summer 2020, in a historic mission, SpaceX launched and returned its Crew Dragon craft to and from the ISS carrying two NASA astronauts. The flight made SpaceX the first private company to send people to orbit — a feat only previously achieved by government superpowers. However, Crew Dragon likely won't be the only option for passengers to get to the ISS in the coming years.

While testing delays have caused the spacecraft to remain in development, Boeing's Starliner capsule is designed to carry as many as seven passengers. And, under Boeing's contract with NASA to fly four astronauts at a time, the company is allowed to sell a fifth seat to prospective space tourists, although it may opt instead to reserve this space for additional cargo in the near-term. Finally, while Crew Dragon and Starliner are likely to remain the two best options for orbital tourists in the near term, SpaceX is also working on its next-generation Starship rocket. It's the company's top priority, as Musk wants to build a fully reusable rocket system that can launch cargo or as many as 100 people at a time.

Competition In Cross-Planet & Beyond Earth Market

There is only one company working on the beyond Earth and cross-planet product: SpaceX. The reason non-governmental competition in the beyond Earth market is non-existent can be attributed to its significant associated costs; hence, SpaceX is currently the only private company with both the aspirations and needed capital to work towards this. SpaceX has planned missions for planet Mars for the year 2026, and if this mission is successful, there can be a whole new market that SpaceX can benefit from. Although, demonstrated success in this area is sure to attract many competitors down the line once SpaceX has overcome major cost hurdles.

Sources: Bloomberg, Blue Origin, Boeing, CNBC, NASA, SpaceX, Virgin Galactic

Industry Drivers

Regulations

Since the U.S. is the hub of the space travel industry, it is the only country that has worked to somewhat implement a regulatory framework surrounding the topic. The Commercial Space Launch Amendments Act of 2004 designates the Federal Aviation Administration (FAA) — the current regulator of the commercial airline industry — as the regulator of commercial space travel. This potentially signals that the government is looking to regulate space travel companies in a similar fashion to airlines. Though, it is worth mentioning that the FAA is barred from imposing any spaceflight participant safety rules until 2023 to provide the industry with a regulation-free "learning period". Current rules require launch vehicle operators to explain certain safety information, including informing passengers of general space travel risks.

Please note that owing to the novelty of the space travel industry and lack of a developed regulatory framework, current regulations seek to absolve operators of liabilities by putting the responsibility and contemplation of risks on the passenger. This is unlike other, more regulated travel industries such as airlines, in which governments heavily scrutinize operators. To eventually achieve mass-market, however, the space travel industry needs to adopt stricter regulations that address safety and mitigate passenger concerns by putting them first while holding operators liable for negligence. This is a crucial step, especially after considering that current players are incentivized to be the first to market and may therefore cut corners and act outside of the interests of passenger safety.

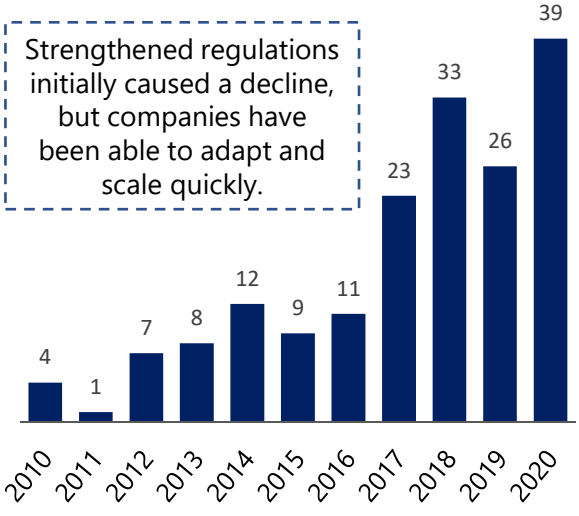
Future regulation development past 2023, once FAA restrictions are removed, along with cooperation from major governments across the world are likely to drive commercial space travel growth as addressing passenger safety is critical to gaining customer confidence and therefore allowing the industry to take off at a large scale.

Research Initiatives

Research initiatives are primarily geared towards lowering costs, which will ultimately help decrease the fees for end-users. Innovations such as the development of reusable rockets by SpaceX and the use of 3D printing technology in the manufacturing of parts have served to reduce the overall cost of commercial flight provision.

Additionally, several associations and partnerships between various industry players, governmental agencies, and educational institutions serve to further research efforts. For example, the Commercial Spaceflight Federation established the Sub-orbital Applications Research Group with the mission of promoting the development of commercial human spaceflight, pursuing higher levels of safety, and sharing best practices and expertise throughout the industry. Therefore, companies taking part in the association are encouraged to collaborate and learn from each other, all the while involving outside third parties such as scientists and students in the conversation. These types of initiatives are likely to have a significant positive impact on innovation in, and the development of awareness about, the global space travel industry.

FAA-Licensed Commercial Launches



Sources: FAA, NASA

Passenger Safety

Risk Factors

Different companies are developing varying systems for take-off and landing. The main problem is the high-speed that a spacecraft needs to achieve, requiring large quantities of high quality (but also dangerous) fuel. The forces acting on the spacecraft during take-off are also significantly higher than in civil aircraft, which makes the entire process even more complicated and hazardous for passengers.

Further, in space, there are constant levels of intense radiation emitted by solar plasma eruptions, solar wind, and cosmic radiation. The Earth's magnetic field protects the planet from such radiation; however, this protection does not exist in space. For passengers undertaking shorter suborbital flights, radiation will not have a significant effect. For longer orbital flights, radiation can pose a problem. Astronauts staying in low-Earth orbit (from 200 to 2000 km) receive the same amount of radiation in one week as a person on Earth receives in one year.

Such factors greatly affect a flight into orbit and thus increase the likelihood of accidents. Commercial space companies aim for safety standards that over time will become similar to those currently applicable in aviation. Therefore, numerous prototype spacecraft are on a quest to minimize risk during take-off, flight, and landing.

Preparation

Tourists flying into space would be required to carry out certain physical and mental preparation, as all astronauts, scientists and researchers do. For longer flights, passengers must also acquire some technological skills and be able to react in case of complications, danger or accidents. Such training programs would comprise a two-day basic program, a two-day follow-up program with in-depth preparation and an additional day for participants learn about the various experiments, space garments, and life support systems, etc. The program includes classroom studies, exercises, and simulations, including a centrifuge-based simulation of acceleration during take-off.

In contrast to suborbital flights, trips to other orbits require strenuous, months-long preparation. These flights place significant stress on both one's physical body and mental health Therefore, this necessitates prospective passengers to undergo intensive physical training, among other regimens, to acquire tolerance to stress. These programs must be adapted to age, gender, cultural environment, and general fitness levels. Several weeks before a flight, space tourists would be subjected to daily active physical preparations, with the aim of improving the passenger's overall conditioning, physical fitness, and cardiovascular function.

Key Causes of Concern

- Required Speeds
- Radiation
- Training Process

Confidence Rate

Currently, only 33% of the target audience feels confident in taking the risk of leaving the Earth on a space travel flight. Due to the perception of going into space, the industry will need to determine ways to provide a feeling of security for its customers.

Sources: Academica Turistica Journal, Financial Times, Statista, Wall Street Journal

Industry Outlook

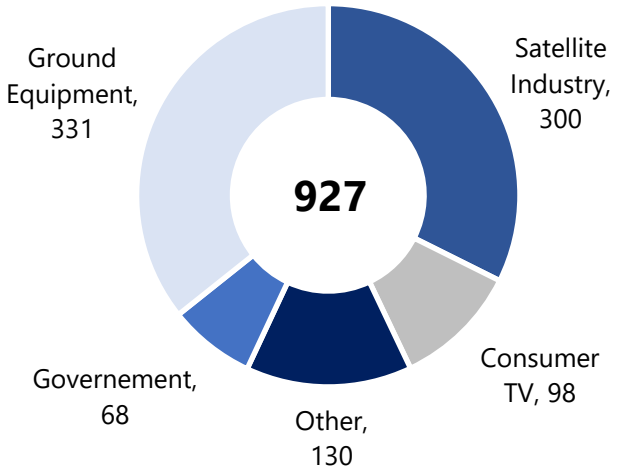
Short-Term Outlook

In the next two years, we will likely witness the first commercial space travel flights to low orbit space by Virgin Galactic and Blue Origin. Upon successful completion, these launches will likely act as catalysts that spark substantial consumer and investor interest in the industry.

In the short-term, the most significant opportunities will come from the sub-orbital space travel market. Initiatives by large public and private firms suggest that this is an area where we will see significant development, potentially enhancing U.S. leadership and addressing opportunities and vulnerabilities in many industries such as aviation and hospitality.

Currently, the new space and services technology launches continue to be in the prototype phase and will require additional funds and development before providing broader commercial services and economic returns. Existing commercial space service providers will likely continue to evaluate their business models and technology to prepare for shifts in the market, but are not expected to make significant changes beyond research and development until new products and services are proven.

Global Space Economy Value by 2040 ($B)



Long-Term Outlook

In the long-term, the space industry will impact several industries such as IT, hardware, and telecom sectors. Morgan Stanley estimates that the global space industry could generate revenue in excess of $1 trillion in 2040, up from the current $350 billion figure.

UBS forecasts similar results for the space industry, with it being valued up to $926 billion by 2040, an almost three-fold rise from the current value. This translates to a compound annual growth rate (CAGR) of 4.6%. Assessing the future value of the space economy is fraught with forecast risk, evident in the wide dispersion of third-party estimates. Current forecasts for the value of the space economy in 2040–2045 range from $600 billion to over $2 trillion. Launch execution risks are considerable as multi-year delays are not uncommon. The theses behind these forecasts are contingent upon both reusable rockets being commercially operational in the next couple of years, and satellite broadband being a success.

Increased Investments

The number of investments in space from 2004 have increased vastly at a CAGR of 17% up to 93 investments in 2020. This high growth rate was possible because of the participation of 16 of the world's richest individuals. The space industry is still in its early stages, and UBS foresees rising private investment as costs and entry barriers decline and new public listings of private space ventures increase. This is because many new private ventures are likely to become profitable in the coming years and may therefore pursue a public listing. UBS expects to see a rise in internet providers and communication companies investing in space given the large growth of this market. They also foresee an ample spectrum of companies across new sectors that will benefit from space in the coming years: some by raising existing investments, and others by investing for the first time.

Sources: Morgan Stanley, UBS

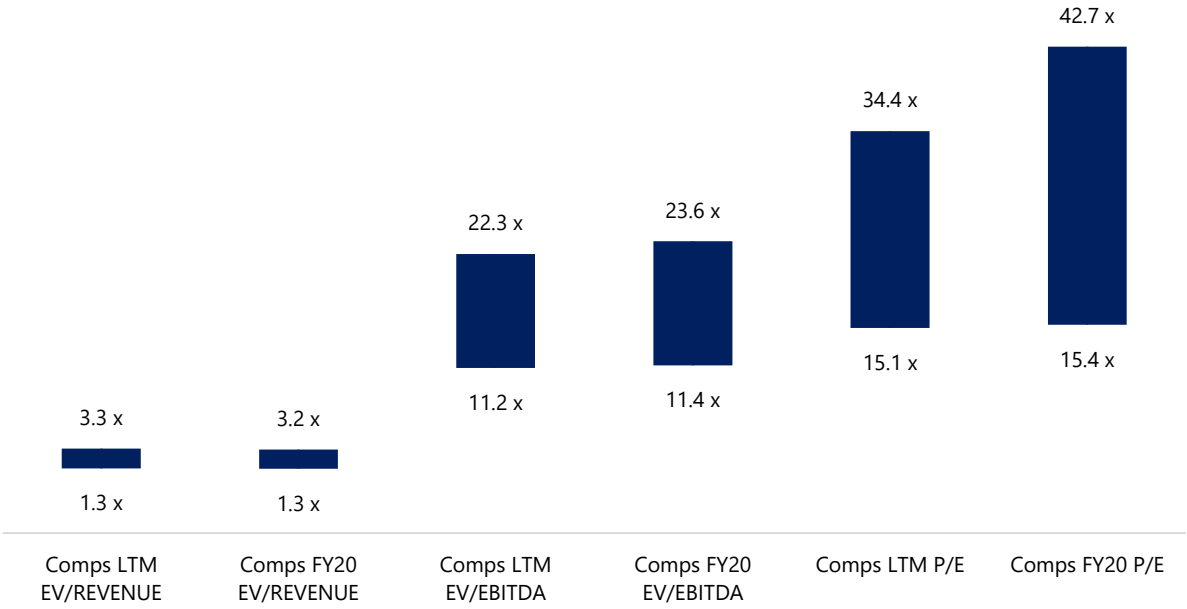
Conclusion

Financial Performance & Valuation

Due to the nature of the industry, there are limited public companies to fully understand the levels industry players are trading at. For this reason, we have limited the scope of the analysis to space-related (primarily defence and satellite) companies. Currently, businesses in the space travel industry are being valued based on their funding rounds, with SpaceX being the largest ($74B valuation). Despite the market being fragmented, many small-cap companies have gone public via a SPAC in order to try to compete with the major players.

As mentioned in the report, the cost intensity of the industry has caused many companies to struggle. Currently, the EBITDA margin is on average 14%, with 0% EBITDA growth over the past year. As a result of the pandemic, many projects have been on hold, subsequently negatively impacting their revenue growth. Despite this, as the industry grows, alongside enhanced technology and greater confidence in rockets, companies will have more understandable and comparable multiples.

Comparable Companies – Multiples Analysis



Conclusion

Although still in its infancy, the space travel industry has continued to rocket its way up the economy. A surge in both public and private investments, cutting edge tech advancements fuelled by the industry's fierce competition, and a shifting regulatory environment provide clear tailwinds for both the short and long-term. Through substantial technological achievements, major players continue to highlight the significant far reaching impacts of space travel with its multi-industrial benefits. While consumers are still wary of the safety of the rockets, as the industry continues to successfully complete all of its required tests, public opinion will likely change. All in all, space travel is forecasted to skyrocket as exemplified by the very first commercial space flights taking off this year. The industry will change the future of humanity and may even save it. Get ready for take-off as we watch commercial space travel boom in the near-term.

Sources: S&P Capital IQ