BARON INSIGHTS

Mission to Mars: Investing in SpaceX



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Key Takeaways

In 2024, SpaceX continued its rapid pace of innovation, achieving numerous milestones in its quest to revolutionize space technology with the ultimate goal of enabling humans to become a multi-planetary species.

- 2024 represented yet another record-breaking year for SpaceX's Falcon 9 launch activity, highlighted by 134 launches, a 40% year-over-year increase, and the 24th flight of a first stage booster.
- Starship, SpaceX's revolutionary new launch vehicle, achieved significant milestones. Most notably, the first mid-air catch of the Super Heavy first stage booster. The rocket is poised to significantly expand SpaceX's growth opportunities and strengthen its competitive position.
- Starlink, SpaceX's satellite broadband network, reported a 100% year-over-year increase in active subscribers. Starlink's satellite constellation now represents over 60% of all active satellites in orbit and is serving areas where over a third of the world's population resides.

Space Exploration Technologies Corp., or SpaceX, was founded by Elon Musk in 2002 with a vision to decrease the costs of access to space, paving the way to enabling humans to become a multi-planetary species.

Since that time, SpaceX has achieved unparalleled strength in the orbital launch market. The Falcon 9, SpaceX's "workhorse" rocket, has redefined the space launch market by offering more reliable and more available access to space at a fraction of the cost.

In this piece we focus on several key milestones achieved over the past year as SpaceX continues to innovate and iterate, building on its long list of awe-inspiring firsts in the years preceding.

With its dominant market position, SpaceX's ambitions are propelling continued innovation that is limited only by the rules of physics. SpaceX's newest rocket, Starship, promises to revolutionize space access even more through reducing costs by orders of magnitude over time. The pursuit of lower costs to orbit opens a world of possibilities for space-driven operations for both governments and commercial enterprises.

SpaceX has played a pivotal role in increasing space-related demand. It supplemented a primarily government-driven space launch market with robust commercial-driven demand. The company's innovations have paved the way for groundbreaking commercial space missions, including the first private and commercial human spaceflight missions, the first commercial spacewalk (Polaris Dawn), and several government and private astronaut missions to the International Space Station (ISS).

SpaceX's unique position is now materializing across the large broadband market under the company's Starlink operation serving millions of users across all seven continents and oceans.

Falcon 9 launch and reusability

The dominance of SpaceX's launch segment is undeniable, demonstrated by a record 134 Falcon rocket launches in 2024, or two and a half orbital missions a week on average. Over half of all global orbital launches in 2024 used the Falcon rocket, far ahead of its second-place rival, the Chinese Long March 2 rocket which supported only ~12% of launches.[1] The 2024 launch figure marks remarkable growth from 96 launches in 2023, a close to 40% increase. The 134 Falcon missions in a single year is merely one flight shy of the 135 Space Shuttle missions flown by NASA over a 30-year period. This increased launch cadence presents SpaceX with multiple advantages,

[1] https://space.skyrocket.de/doc_chr/lau2024.htm



SpaceX Falcon 9 rocket (Photo: iStock)

including greater revenue potential, improved Starlink deployment efficiency, reduced launch costs, and increased rocket reliability.

> *"2024 represented yet another record-breaking year for SpaceX's Falcon 9 launch activity, highlighted by 134 rocket launches and the 24th flight of a single first stage booster."*

While this level of growth is astonishing, CEO Elon Musk and his team project an additional 35% growth in Falcon launch volume in 2025,[2] supplemented by a meaningful increase in the launch frequency of Starship's program.

The essential pillar of Falcon's success and competitive edge is SpaceX's mastery of rocket reusability. Since its inception, SpaceX has launched nearly 450 times, of which around 380 missions have leveraged a flight-proven (reused) booster. In 2024, the company launched a flight-proven booster for its 24th flight, up from 19 flights in 2023. SpaceX's goal is to certify each Falcon 9 booster for up to 40 flights. This continued growth in booster reusability provides a substantial advantage. Already today, SpaceX needs to produce less than 5% of the boosters required by traditional competitors to complete the same number of orbital missions. This level of efficiency and cost-saving advantage is rare in any industry.

As of late 2024, SpaceX had already launched a fleet of 7 boosters, each flying 20 times or more. The record-holding booster, serial number 1067, performed its inaugural flight in 2021. With 24 missions as of year end 2024, this booster has launched 8 astronauts, nearly 6 tons of supply to the ISS, several hundred Starlink satellites, and multiple third-party commercial satellites to orbit.

Starship's development program

SpaceX is a proven disruptor and its own fiercest competitor. Despite being the clear leader in launch, SpaceX's mission and innovation culture continue to drive the technology forward.

Starship has performed several successful flight tests, including inspiring mid-flight catches of the Super Heavy booster. When fully operational, Starship promises unparalleled reduction in launch costs, enhanced availability, and expanded volumetric and gravitational capabilities for payloads destined for low-Earth orbit, the Moon, and eventually Mars.

> *"Starship, SpaceX's revolutionary new launch vehicle, is poised to significantly expand SpaceX's growth opportunities and strengthen its competitive position."*

At a towering 408 feet and an unprecedented thrust of over 16 million pounds, Starship has earned its title as the largest and most powerful rocket ever flown. This behemoth is expected to enhance SpaceX's reusability-driven efficiencies by becoming the world's first fully and rapidly reusable rocket while pushing the boundaries of orbital vehicle performance. With an anticipated payload capacity of up to 200 tons, in-orbit refueling capabilities, and a reliable and rapidly reusable architecture, Starship will allow the transport of larger payloads deeper into space than ever before.

In 2024, SpaceX conducted 4 Starship flight tests that demonstrated substantial progress. These flights achieved orbital speed for the first time, nearly flawless Raptor engine performance, successful hot-staging separations between the Super Heavy booster and Ship, multiple soft landings in the ocean, and two remarkable


Starship Test Flight Mission (Photo: SpaceX)

[2] https://x.com/elonmusk/status/1868890203123073078

mid-air catches of the Super Heavy booster by SpaceX's Mechazilla mechanical system on the launch and catch tower.

Starship will launch 100 to 200 tons of payload to orbit in a reusable configuration and up to 400 tons as an expendable vehicle, significantly more than Falcon 9's capacity of 17 to 23 tons. The company's goal is to reduce Starship's launch costs to $2 to $3 million per flight, which could lower the cost of launching a kilogram to low-Earth orbit to just tens of dollars.[3] This would represent an almost 99% reduction from the Space Shuttle's $50,000 per kilogram[4] price tag and a significant decrease from Falcon 9's current cost, illustrating the transformative potential of Starship.

In the coming years, SpaceX expects to meaningfully accelerate its launch rate, aiming to launch the rocket as many as 400 times over the next four years.[5]

The company has already been awarded contracts leveraging Starship's unique capabilities, including multi-billion dollar awards for the Human Landing System as part of NASA's Artemis Program aimed to return U.S. astronauts to the Moon.

During our 2024 Annual Baron Investment Conference, SpaceX President and Chief Operating Officer Gwynne Shotwell noted that, "ultimately, I think Starship will be the thing that takes us over the top as one of the most valuable companies. We can't even envision what Starship is going to do to humanity and human … lives, and I think that will be the most valuable part of SpaceX."[6]

Starlink – broadband and cellular connectivity from space

We view SpaceX's satellite broadband segment, Starlink, as a key economic driver for the company.

Over the past four years, the company has launched over 7,000 satellites for its Starlink operations. This represents an unprecedented launch cadence and has positioned the company as the largest satellite constellation operator by more than a factor of 10. In fact, as of late 2024, SpaceX was operating roughly two-thirds of all active satellites.[7]

During 2024, the company launched close to 2,000 new satellites. All Starlink satellites launched in 2024 year were second-generation satellites, offering four times higher throughput than the original satellites. The combination of more satellites and higher throughput allows the network to be more robust and offers better coverage around the world.



Starlink Mission (Photo: SpaceX)

> *"Starlink, SpaceX's satellite broadband network and a key economic driver for the company, is growing rapidly."*

The introduction of the Starlink Mini kit in 2024 provides a smaller, more portable, and more affordable solution catering to customers with higher mobility needs. This, coupled with a significant expansion in production capacity for customer kits at the company's Bastrop facility, should enable even faster growth for Starlink.[8]

Starlink also achieved robust growth among users, reaching over 4.6 million active subscribers in late 2024 – double the 2.3 million subscribers at the close of 2023. Starlink is now available in 118 countries and territories, covering an area with a total population of over 2.8 billion people.

Starlink achieved notable growth in both the maritime and aviation sectors, highlighted by a milestone contract with United Airlines and Air France to equip their entire fleets, thousands of planes, with Starlink starting in 2025. Starlink has already been installed on more than 500 planes and has commitments to install on an additional 2,000,[9,10] signaling a rapid expansion of its footprint in the sector. In maritime, Starlink serves approximately 75,000 vessels that consume 50 petabytes of data each month. With over 300 cruise ships subscribed to the network, Starlink is used by 10 million passengers annually, or close to 30% of global cruise ship passengers.

[3] https://x.com/SpaceX/status/1776669097490776563
[4] https://ntrs.nasa.gov/api/citations/20200001093/downloads/20200001093.pdf
[5] https://www.youtube.com/watch?v=UvrqWP4YsIk
[6] https://www.youtube.com/watch?v=UvrqWP4YsIk
[7] https://x.com/elonmusk/status/1831829780150534355
[8] https://x.com/elonmusk/status/1867654712369230039?s=43&t=osw0T9XrChCX4WMlLZi5YA
[9] https://www.cnbc.com/2024/09/17/spacexs-starlink-has-2500-aircraft-under-contract.html
[10] 2024 Starlink Progress Report

As part of 2024's Starlink buildup phase, the company also launched more than 350 satellites with direct-to-cell capabilities, with a goal to double that number by mid-2025. This new functionality allows the company to offer connectivity to billions of potential cellular and other internet-connected devices across the world. The company announced a list of partners and launched the service in late 2024 in New Zealand in partnership with One New Zealand and in early 2025 in the U.S. in partnership with T-Mobile.[11]

Conclusion

SpaceX's incredible accomplishments have transformed the space industry in ways that other companies and governments had not considered feasible. This has created significant value for stakeholders including employees, shareholders, consumers, and governments. Its promise to make life multiplanetary has the potential to change the course of humanity.

SpaceX is an ideal example of a "Baron style investment." First, SpaceX benefits from attractive markets supported by long-term secular trends. The space launch and space applications markets, such as broadband from space, are large and rapidly growing, driven by declining orbital launch costs, technology innovation, and an evolving regulatory environment. Second, SpaceX has built layers of competitive differentiation by leveraging its strong first mover benefit, unique technology architecture, talent, culture, and significant scale. Third, management has proved, over many years and occasions, their ability to deliver high-quality results well beyond elevated expectations which are often considered impossible by competitors and industry "experts."

We have been studying SpaceX for close to a decade. Our confidence in the opportunity has increased dramatically over the years, and we remain extremely excited regarding SpaceX's long-term prospects.

[11] https://www.starlink.com/business/direct-to-cell

Risks: All investments are subject to risk and may lose value.

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*% of Long Positions.

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