

August 28, 2023

## COMPANY INFO

Company Name	Axiom Space
Sector	SpaceTech
Segment(s)	Upstream
Ownership	Private
Funds Raised	\$550 Mn
Co-Founder	Kam Ghaffarian
CEO, Co-Founder	Michael Suffredini
Website	<a href="https://www.axiomspace.com/">https://www.axiomspace.com/</a>
Employees	750
Founded	2016
Est. Revenue (2023)	\$400 Mn

## Funding Summary

1 Jan '16	Seed (\$3 million)
15 Aug '18	Series A1
1 Dec '19	Series A2 (\$7 million)
1 July '20	Angel
16 Feb '21	Series B (\$130 million)
1 July '21	Angel
22 Dec '22	Convert (\$172 million)
July '23	Series C (\$235 million)

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## Axiom Space (Private)

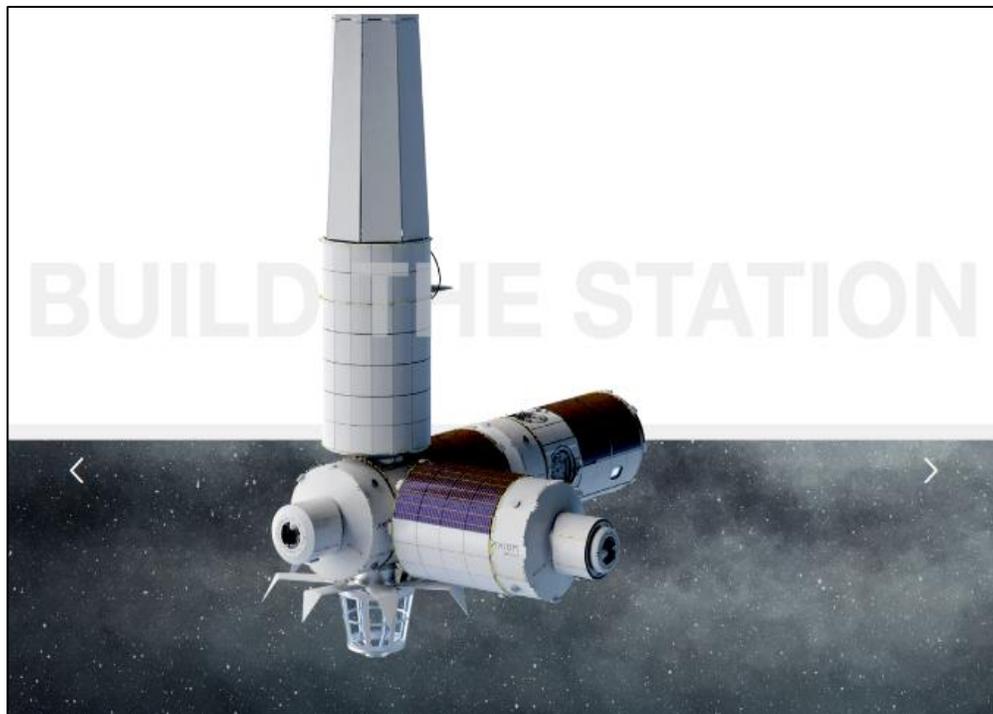
## Pushing the Boundaries of Innovation

- **Axiom Space is the future builder and operator of the first privately owned space station to replace the ISS and plans to launch the first section by 2026.** Compared to its competitors, Axiom has planned an early launch of its space station, which, if it becomes successful and fully functional, will attract higher numbers of users and greater confidence. Axiom Station is the only station that was awarded the exclusive rights to attach to the ISS and build off it. The existing user base will physically transfer to Axiom Station when Axiom attaches its module to the ISS. This is a significant advantage because Axiom will inherit \$2 billion in annual revenue from the ISS customer base, primarily toward the end of the life of the ISS. At the time of retirement of the ISS in 2028-2030, Axiom's assembled station will separate from the ISS and continue to expand both commercial and NASA tenant operations.
- **Axiom is also the only private company authorized and capable of sending crew to the ISS** as precursor missions to its own Station. In 2022, Axiom successfully completed the first private mission to the ISS. This research-focused precursor mission was named Axiom Mission 1 (Ax-1). The Ax-1 astronauts were the first to lay the groundwork for Axiom Station and the full realization of LEO possibilities. In May 2023, the company launched Axiom Mission 2 (Ax-2), the second all-private astronaut mission to the ISS, marking another pivotal step toward building the Axiom Station. The company has sold out its third mission, Ax-3, and plans to launch it in late 2023/early 2024. These missions create revenue and profits that help fund the building of the space station.
- **The Space Report Q2 2023 by the Space Foundation says that the global space economy grew 8% to \$546 billion in 2022 and is projected to climb another 41% over the next five years.** The space economy is seeing a constant revenue growth from commercial space assets as well as governments. Axiom's technological focus in late 2023/early 2024 for innovation and solutions includes leveraging the promising microgravity environment. Microgravity is a crucial environment in space exploration and the development of technologies required for long-duration missions. A key differentiator is that Axiom is targeting a total addressable market where countries with governments having budget of billions of dollars as well as a fraction of it will be able to participate equally.
- Axiom serves several Low Earth Orbit needs: human spaceflight for both professional and private astronauts, on-orbit research, on-orbit manufacturing, in-orbit data centers, and space exploration support. **Axiom primarily generates revenue from strong and emerging sources like provision of end-to-end mission services, building of the next generation of spacesuits under the ambit of agreements with NASA, and launching of the Space Access Program.** The company's efforts toward developing a business model similar to now-successful startups like Facebook, Apple, Amazon, Microsoft, and Google, raises hopes regarding fulfillment of Axiom's fundraising plan and goal of creating maximum shareholder value. **Axiom Space has raised \$500 million to date, with the latest growth funding in July 2023.**

### Company Overview

- **Axiom Space is a private space infrastructure developer, owner, and operator.** It aims to make the possibilities of Low Earth Orbit (LEO) accessible to visionary governments, researchers, scientific institutions, manufacturers, and individuals. The company's LEO platform access and decades of human spaceflight management experience support the research and testing of exploration-enabling technologies and in-space manufacturing. This creates new opportunities for advanced industries, governments, and educators and enables future human space exploration. The company believes that microgravity is the most promising environment for innovation and problem-solving since the Internet.
- **Axiom Space was founded in 2016 by Dr. Kam Ghaffarian, who founded Stinger Ghaffarian Technologies, Inc., which became NASA's second-largest engineering services contractor and the entity that trained NASA astronauts and operated the ISS, and Michael Suffredini, who oversaw the International Space Station's transition from assembly to operation and commercial utilization.** The rest of its leadership team includes world-class, specialized experts in commercial utilization of microgravity, on-orbit operations, astronaut training, space medicine, space system design, engineering, marketing, and law.
- **Today, Axiom is sending human spaceflights to the ISS as precursor missions to its own Station.** In 2022, Axiom Space successfully completed its first private mission to the International Space Station. Axiom Mission 1 (Ax-1) was research-focused, and the Ax-1 astronauts laid the groundwork for the full realization of LEO possibilities. The astronauts conducted extensive research and STEM outreach. In May of 2023, the company launched Axiom Mission 2 (Ax-2), the second precursor astronaut mission to the ISS, another key step toward building of Axiom Station.
- **Axiom is currently building the first section of the station, Hab One, scheduled to go to space in early 2026.** Axiom plans to complete the Station by 2028.

#### Chart 1: Construction of the World's First Commercial Space Station is Underway



Source: Intro-act, Axiom Space

## Services Offered

- Axiom is an end-to-end space mission provider centered around its Axiom Station.
- Axiom is the first and only private company allowed to use the ISS during its precursor missions, enabling broad access to the space station by carrying out missions for crews of national and private astronauts, as well as clients in the research and industrial sectors. This has allowed space travelers to participate in a variety of space programs and promote new opportunities. Axiom’s team combines NASA experience with lower cost and flexible solutions. The company has worked closely with space agencies around the world for over two decades, manages a significantly large astronaut training program, and is fortunate to have been involved in every ISS mission since the program’s inception.

Chart 2: Services Offered by Axiom Space



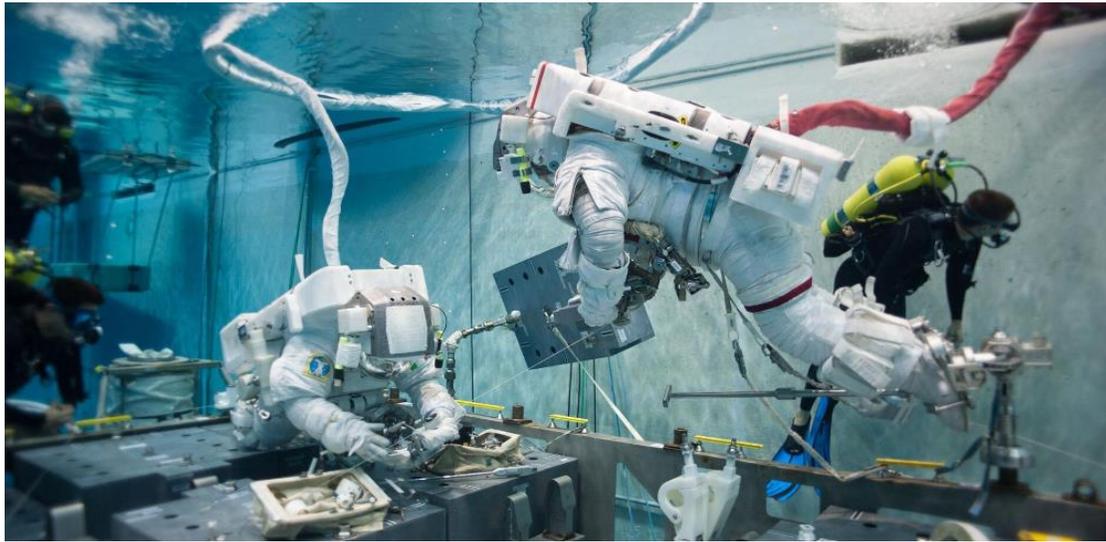
Source: Intro-act, Axiom Space

**Axiom Space offers services to national astronauts relating to human spaceflight.** Axiom Space works to expand the community of spacefaring nations and globalize the benefits of access to the space environment. The company uses its human spaceflight engineering, training, operations, and program management expertise to help governments build human spaceflight programs and send their astronauts on their own space missions. These programs promote the growth of high-tech industries, stimulate the economy, inspire youth to pursue STEM education, and are a source of national pride and international respect.

The company’s go-to-market strategy is via its Access Program, which is a tier-based subscription program enabling access to Axiom Station, including data sharing, research, and manufacturing payloads, astronauts’ time on the station, and up to full module ownership. The program enables countries to realize long-term economic and scientific value in microgravity, without the need to build or expand their own infrastructure, such as on-orbit facilities, launch vehicles, medical or training programs, and support capabilities.

To-date, Axiom has had more than nine countries signing up to the Access Program’s different tiers, with many nations in negotiations. In August 2023, ESA (European Space Agency) has become Axiom’s first repeat customer after signing a spaceflight agreement for a Swedish astronaut on Ax-3 and a Polish astronaut on Ax-4. The Ax-3 mission will be the first all-European astronaut mission, representing Sweden, Italy, and Turkey.

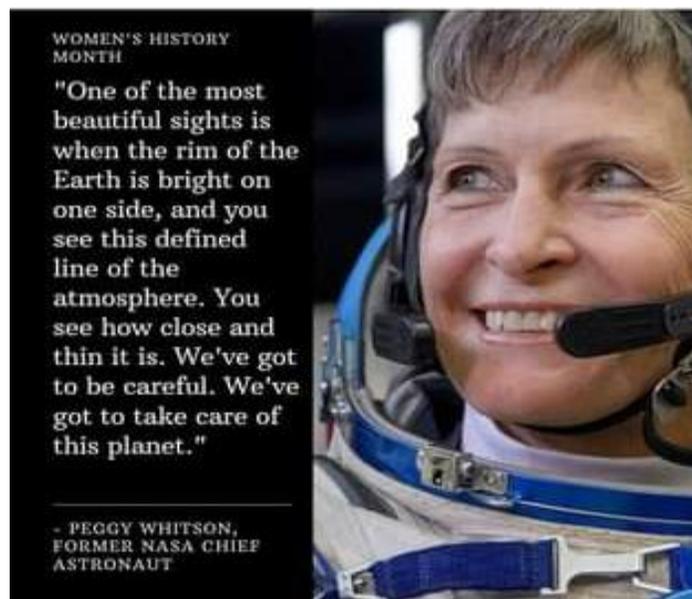
Chart 3: Charting Humanity's Future



Source: Intro-act, Axiom Space

To the private astronauts, Axiom offers “mission to ISS” services today and to Axiom Station in a few years. Axiom Space specializes in astronaut candidate selection, training, and certification. Its expert mission planning includes training, transportation, provisions, microgravity experiment design, and management of time in orbit. It also offers a turnkey solution to getting national astronauts into space. Beyond the mission, Axiom can assist in organizing in-country training infrastructure, strategic engagement with industry, and relations with other government agencies—the fundamentals of a fruitful, national human spaceflight program. Missions with Axiom include 17 weeks of training at space agency facilities. Axiom works with its private astronauts to design an optimal itinerary. Examples include STEM education outreach, research, filmmaking and photography, and support for philanthropic causes.

Chart 4: Encouraging Feedback is Fueling Axiom's Confidence

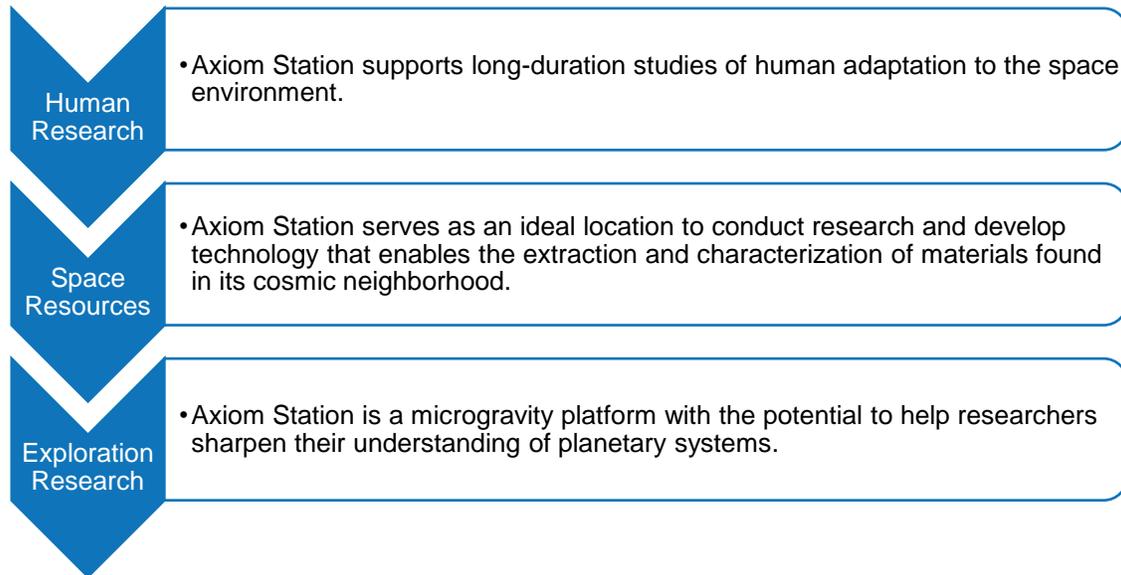


Source: Intro-act, Walnut Avenue Family & Women's Center, Facebook

Axiom provides a platform for testing next-generation designs of exploration systems and establishing the reliability of legacy systems for future spacecraft so that humans can safely traverse the solar system and gain new heights. It is important to prove that exploration technology works in the space environment before it's sent off into the expanse.

Chart 5: Exploration System Platforms Offered by Axiom Space

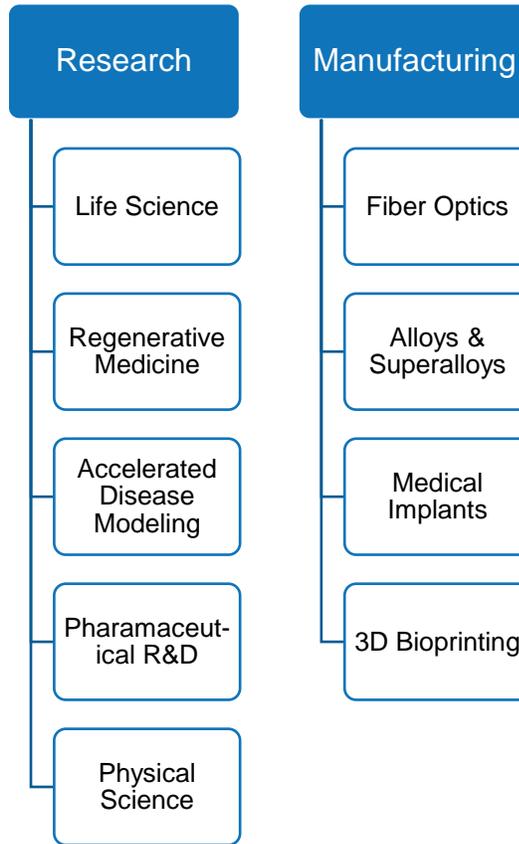
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Source: *Intro-act, Axiom Space*

- **Axiom’s research and manufacturing services highlight the benefits of microgravity, extreme environments, and an orbital lab.** It uses microgravity-as-a-platform to simplify access to space. Axiom believes that the elements of the space environment—ionizing radiation, extreme temperatures, near-vacuum, and atomic oxygen—can be harnessed and leveraged for new product development and enhanced innovations. Axiom Station will be the first space station with a commercial business model that enables customers to generate economic returns and profit streams in LEO

Chart 6: General Applications of Innovation Platforms offered by Axiom Space



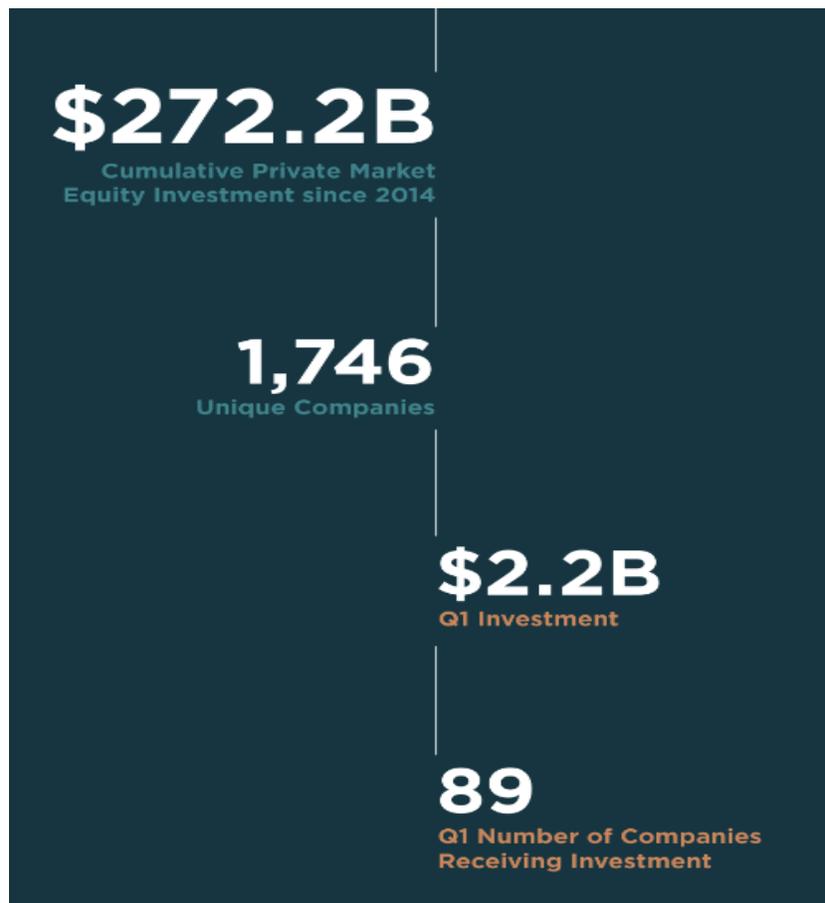
Source: Intro-act, Axiom Space

- **Axiom Space’s missions provide a platform for brands to take action on causes like environmental consciousness, emerging commercial business, humanitarian work, science and education causes, or ocean preservation.** Axiom Space works on providing unique infrastructure through Axiom Station and the Axiom Extravehicular Mobility Unit (AxEMU) spacesuit. It serves as a major provider in the quickly growing space economy. It will help transform the \$30 trillion manufacturing and pharma sectors using techniques available only in microgravity and provide additional in-space solutions and infrastructure. UBS, Morgan Stanley, Bank of America, and Goldman Sachs estimate that the sector will be valued at \$1 trillion to \$3.5 trillion within 10-20 years, and Axiom Space sees exciting opportunities ahead as it is providing early access to this industry for commercial and private partners.

## Industry Overview and Opportunities

- **The space ecosystem delivers value to crucial industry sectors through space-enabled capabilities and business models.** The SpaceTech market has been experiencing significant growth in recent years due to several factors, such as growing demand for satellite-based communication services and a surge in the deployment of Earth observation satellites, which provide valuable data for applications such as weather forecasting, climate monitoring, agriculture, urban planning, and disaster management. This data is used by governments, research institutions, and businesses to make informed decisions and develop innovative solutions. Additionally, the emergence of new players in the space industry, including private space companies like SpaceX, Blue Origin, and Virgin Galactic, has brought renewed interest and investment in SpaceTech. These companies are working on ambitious projects, such as reusable rocket systems, satellite constellations for global Internet coverage, and plans for space tourism.

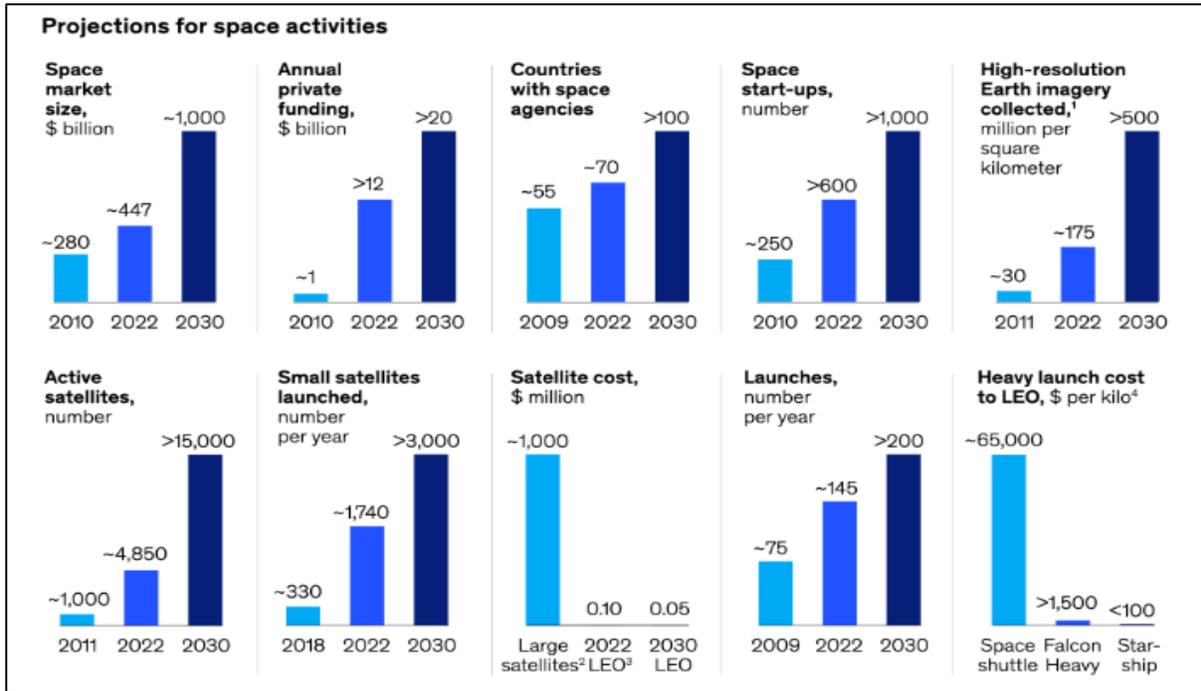
Chart 7: Rise of Space Startups



Source: Intro-act, Space Capital

- **A McKinsey report elaborates that the space market has grown to approximately \$447 billion in 2022, up from \$280 billion in 2010 and potentially reaching \$1 trillion by 2030.** A crucial factor bolstering the space industry as well as its infrastructure development is the reduction in launch costs seen in the past decade. The private sector has been successful in developing reusable rockets, which have enabled significant cost reduction. Going forward, the launch costs are expected to fall further with the higher use of reusable rocket stages, a drop in material costs, and economies of scale, leading to declining operating costs. Lower launch costs are also contributing to the small satellite revolution, accelerating research and innovation by making satellite launches more accessible for a larger cross-section of stakeholders—corporations, start-ups, universities, and nonprofits.

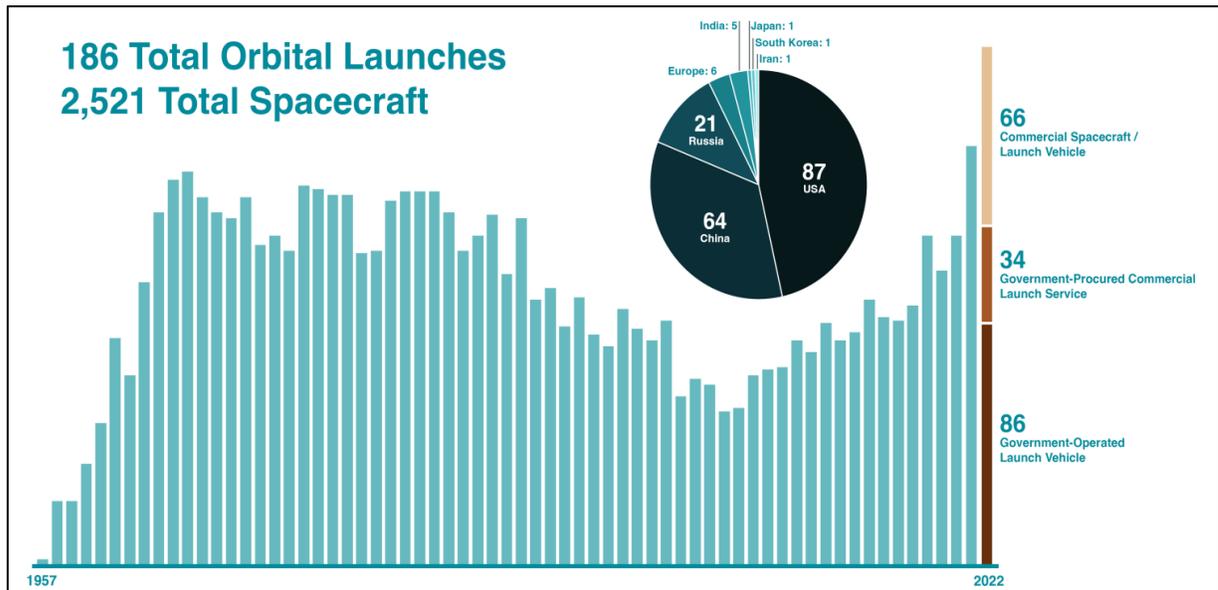
Chart 8: The Space Sector Has Come a Long Way and Looks Poised for Growth



Source: Intro-act, [McKinsey & Company](#)

- In 2022, the orbital launches activity set a new record.** Following the optimism infused by SpaceX, the space launch companies piled up a record 186 flights in 2022, all but six of which reached orbit. From 45 orbital launches recorded in 2021, the launches from the U.S. jumped to 78 for the year 2022, driven by SpaceX, which successfully flew its Falcon rocket fleet 61 times, according to a compendium of launch activity compiled by Jonathan McDowell, a Harvard University astrophysicist. China recorded 64 missions by a mix of government and commercial providers, a 15% increase over the 56 launches conducted in 2021, McDowell’s report showed. Russia also stepped up its launch rate in 2022 to 21 launches, five more than the 16 orbital flights attempted in 2021. The worldwide orbital launch rate in 2022 topped the previous record, set in 2021, of 146 flights, 10 of which were unsuccessful.

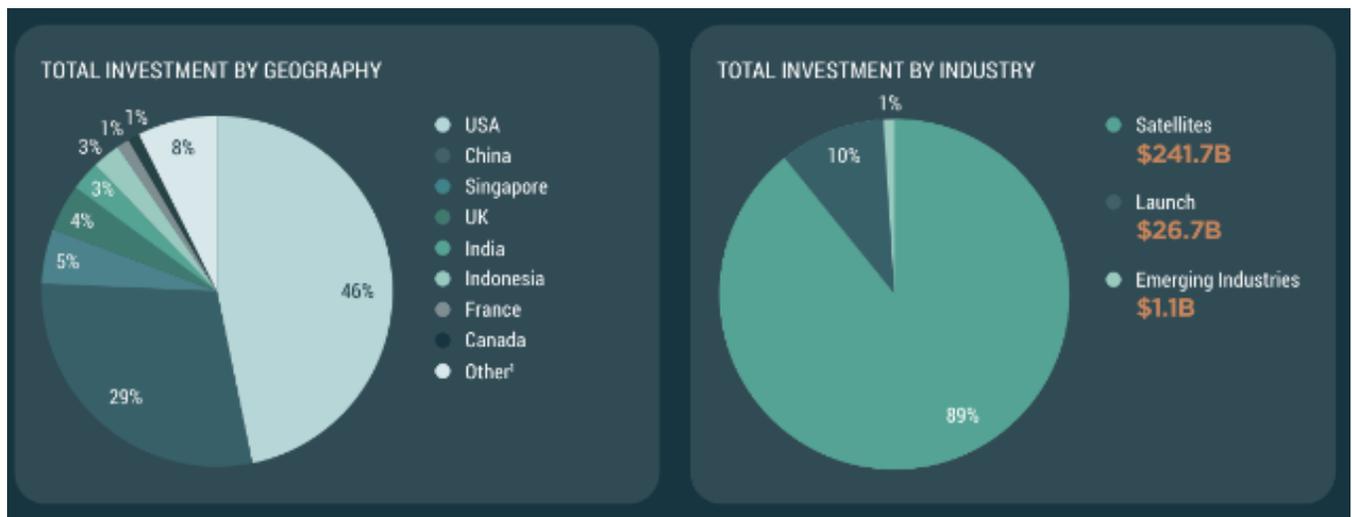
Chart 9: 2022 Launch Year in a Review



Source: Intro-act, BryceTech

- According to Space Capital, the total Q1FY23 investment in the space economy amounted to \$2.2 billion, distributed across 89 companies. Growth-stage companies received \$1.2 billion, accounting for 55% in total. Series C round attracted the highest quarterly inflows since the middle of 2021. Growth-stage accounted for 26 rounds, bagging a substantial increase from the prior three quarters.

Chart 10: Cumulative Private Market Equity Investment in Space from 2014 to Present



Source: Intro-act, Space Capital

## Microgravity: A Promising Environment

- **The unique weightlessness of objects in space shows a number of physical phenomena that are not observed naturally on Earth, offering attractive opportunities for scientists, innovators, and entrepreneurs to execute revolutionary breakthroughs.** By removing or minimizing the effects of gravity, researchers can study the behavior of various physical, chemical, and biological systems in unique ways, leading to new insights and advancements in multiple fields. Notably, although the cost to get to space is continuously reducing, on a relative basis, it is still expensive. These higher costs will be offset by high-value products manufactured in microgravity with a substantial volume, which will lead to a minimal cost per unit for each journey.

NASA explains that decades of microgravity research has encouraged U.S. industry to depict the unique market value of in-space manufacturing, technology advancement, and drug development with the help of NASA's investment in dedicated transportation and research time for ISS National Laboratory investigations.

Chart 11: Microgravity Research Advantages

Advantages of Microgravity	Combining of multiple and challenging substances in the absence of sedimentation
	Avoidance of convection currents due to buoyant forces in an orbiting spacecraft
	Containerless processing provides an ultrapure, contaminant-free environment for manufacturing or study of materials in their molten state.
	Hydrostatic pressure is nearly eliminated, which allows secondary forces like diffusion and surface tension to dominate, boosting research in a weightless environment.
	In microgravity, shear stresses are significantly reduced due to reduced potential for surface contact with the fluid container.
	Protein crystals produced in a microgravity environment grow larger with fewer defects, yielding higher-quality crystals for diffraction than their Earthbound counterparts.

Source: Intro-act, Axiom Space

- **According to a 2022 McKinsey report, “Many companies believe that the environment of space could help them discover new products, enhance their current offerings, or decrease development timelines. The number of patents with ‘microgravity’ in the title or abstract soared from 21 in 2000 to 155 in 2020.”** The report has identified four industries that could potentially capture billions of dollars in value after collaborating with space companies and utilize the microgravity research approach.

**Boost in Drug Development:** Researchers in the pharmaceutical industry are leveraging microgravity to boost drug development. There is an elevated need for biologic medicines, including enzymes, nucleic acids, and antibodies in the drug industry. These medicines have complex structures and include processing steps. The pre-clinical testing of these complex molecules can be carried out with the utmost comfort in a low-gravity environment. Despite the scheduled retirement of the ISS in less than a decade, the private space providers are striving to mark a new era for science in space, which can pave the way for drug manufacturing to be scalable and cost-effective.

**Opportunities in Skin Care Development:** Primarily in the beauty and personal care industry, skin care can be seen as a potential candidate to benefit the most from investing in this new environment. R&D based on space will help to develop or manufacture active ingredients in skin care products. This is because, as discussed earlier, microgravity has a minimal sedimentation rate and buoyancy, making it easier to combine different substances.

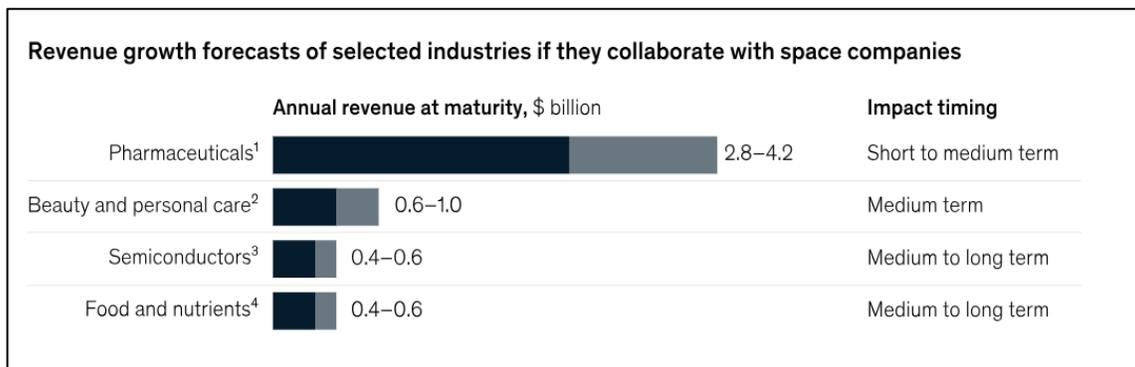
Scientific studies have also shown that yeast grown in microgravity has a higher growth rate and metabolic production, making products more effective.

**Benefits to the Semiconductor Industry:** Microgravity research has the potential to offer significant benefits to the semiconductor industry, including:

- ✓ Manufacturing of large, high-quality crystals, improving their efficiency, and making them ideal for advanced electronic devices.
- ✓ Growing uniform and defect-free thin films of semiconductor materials used in optoelectronic devices. This improved material quality can result in enhanced light-emitting efficiency and detection sensitivity, leading to more efficient and reliable optoelectronic devices.
- ✓ Influencing the behavior of fluids and gases, enabling more precise control over various manufacturing processes used in semiconductor fabrication.
- ✓ Allowing the study of radiation effects on semiconductors without the complicating influence of gravity.
- ✓ Providing a unique environment to study fundamental physical and chemical processes that affect semiconductor materials and devices.

**Benefits to the Food and Beverage Industry:** Microgravity research can have significant implications for the food and beverage industry. While microgravity research in this sector is still an emerging field, ongoing studies and future experiments hold great potential for improving food quality, extending shelf life, enhancing nutritional value, and advancing food production methods. These advancements can benefit space exploration and contribute to innovations in food and beverage industries on Earth.

**Chart 12: Potential Business Collaborations with Space Companies to Benefit from Microgravity**



Source: Intro-act, McKinsey

- **Axiom Space believes that microgravity is an attractive and emerging environment that will lead to greater innovation and solutions.** Axiom’s AX-2 mission collected data that will help in understanding human physiology on Earth and on-orbit, and present the utility of novel technologies to be used in future human spaceflight pursuits. In November 2022, Virgin Galactic Holdings, Inc., an aerospace and space travel company, announced an agreement with Axiom Space for human-tended microgravity research. The Virgin Galactic spaceflight, tentatively scheduled for next year, will prepare an Axiom Space astronaut for an upcoming trip to orbit, while conducting microgravity research to supplement the work that the astronaut will conduct on the International Space Station. Axiom Space Chief Astronaut Michael López-Alegría [added](#), “Our shared vision with Virgin Galactic to further enable human space exploration, increase scientific discovery, and expand the international space explorer footprint makes this a great partnership. Virgin Galactic’s platform offers an incredible resource for future Axiom astronauts as they prepare for longer duration missions.”

## Construction of World's First Commercial Space Station

- **For decades, the International Space Station has been the destination for any research work and international projects in LEO. Since 2000, ISS has been continuously occupied by a human crew.** According to a *Space News* article, the ISS budget is \$3.8 billion, of which 82% (\$3.1 billion) is NASA's contribution, with more than \$1.3 billion going to operations, maintenance, and research performed there, and nearly \$1.8 billion on crew and cargo transportation. NASA's actual ISS costs in 2020 were also around \$3.1 billion, with roughly \$1.2 billion spent on operations and maintenance, \$400 million on research, and \$1.5 billion on transportation. Taking note of this high maintenance aspect, NASA decided to adopt a new commercial business model that includes space facilities that are built by private companies at lower costs, without compromising safety and quality. The ISS is set to be decommissioned by 2030. With that deadline in mind, NASA is exploring private players' capabilities in building a commercial space station. As part of NASA's Next Space Technologies for Exploration Partnerships initiative, NASA awarded Axiom a \$140 million contract in 2020 to provide at least one habitable spacecraft to attach to the ISS.
- **Public-to-private shift.** The movement to private space stations will save NASA a lot of money for other activities. It is similar to what happened with the Space Shuttle and SpaceX, a public-to-private transition that has paid off very well for both public and private sectors.

Chart 13: Axiom Space Station Infographic



Source: Intro-act, Axiom Space

- **Commercial space stations create new opportunities for manufacturing, working, and traveling beyond Earth.** They become hubs for space tourism, operations, research, and manufacturing. The next generation of space stations could offer rentable spaces, advanced robotics, and a host of R&D and manufacturing resources. The environmental conditions of LEO could allow companies to experiment and manufacture in different and unique ways. Properties found only in microgravity could enable greater precision in R&D and manufacturing, from semiconductors and fiber optic cables to pharmaceuticals, human organs, and stem cells. Several nations are already building their own space stations. While the U.S. government and its partners are stretching the ISS life until

## Axiom Space

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2030, countries like China, Russia, and, more recently, India, have announced plans to have their own sovereign space stations in the coming years. Commercial space stations have business models that accommodate commercial for-profit recurring activities in LEO.

- **Axiom Space is working on the world's next breakthrough innovation platform.** Axiom Space differentiates itself from its competitors as the only company having the advantage of connecting its modules to the International Space Station. Through this strategic partnership, Axiom Space will smoothly continue its research and manufacturing activities through the effective adoption of the hefty multinational user base of the ISS National Laboratory. Leveraging techniques available only in microgravity, Axiom Station will introduce people, research, and manufacturing, thus proliferating the growth of key industries. In order to provide a high-quality accessible platform to private companies and governments, Axiom is making efforts to ensure that the space station rapidly expands the infrastructure and solutions operating in LEO, which will contribute to research and development. Post- completion of preliminary and critical design reviews in collaboration with NASA, Axiom's partners at Thales Alenia Space have commenced welding and machining activities for the primary structures of Axiom Station's first module. The initially assembled module will take its first step in Houston for completion of its final assembly and integration. Axiom Space is preparing for a 2026 launch of the first section of the station.

### Chart 14: Axiom Station Exteriors

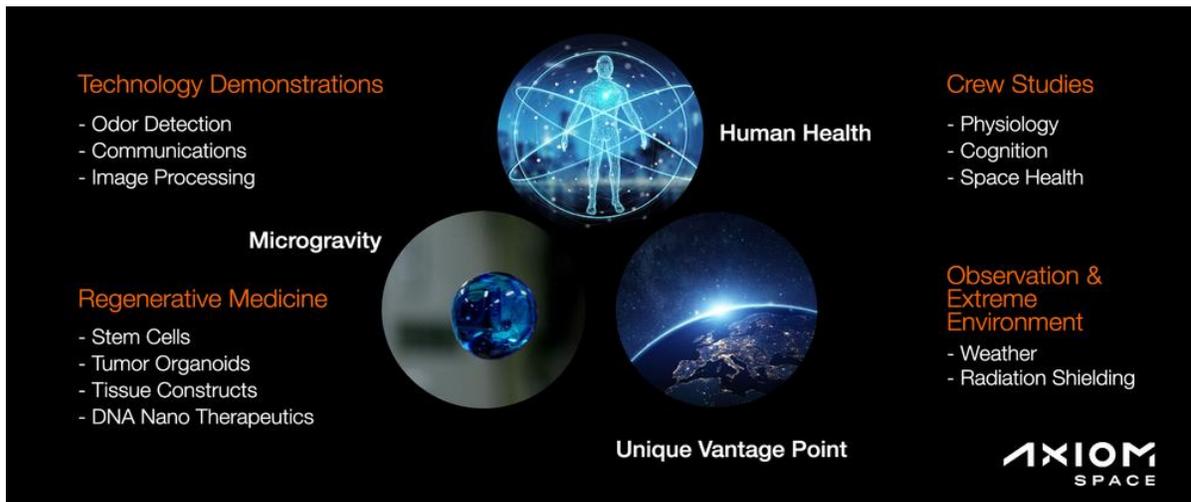
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Source: Intro-act, Axiom Space

- **Background:** In May 2021, NASA and Axiom Space signed an order for the first private astronaut mission (Axiom Mission 1) to the International Space Station. On April 8, 2022, a SpaceX Falcon 9 rocket carrying the company's Crew Dragon spacecraft was launched from Kennedy Space Center in Florida with Commander Michael López-Alegría and Pilot Larry Connor of the U.S., and Mission Specialists Eytan Stibbe of Israel, and Mark Pathy of Canada aboard. The rocket safely returned on April 25, 2022. The mission included crew members conducting scientific research, outreach, and commercial activities. Ax-1 Mission Specialist Mark Pathy successfully conducted the first-ever two-way holoportation session from the International Space Station, connecting with Canadian astronauts Dr. David Williams and Joshua Kutryk on the ground from NASA's Mission Control.

Chart 15: Research and In-Space Manufacturing in Low Earth Orbit



Source: Intro-act, Axiom Space

- Background:** In December 2021, NASA selected Axiom Space for the second private astronaut mission to the ISS. The Axiom Mission 2 (Ax-2) launched on May 21, 2023, and landed on May 30, 2023. Axiom Space’s Director of Human Spaceflight Peggy Whitson, a former NASA astronaut and ISS commander, led the mission. Aviator John Shoffner of Knoxville, Tennessee, served as pilot and the two mission specialists were Ali Alqarni and Rayyanah Barnawi from the Kingdom of Saudi Arabia (KSA). According to Axiom, Ax-2 focused on performing proof-of-concept studies and cutting-edge advancements in microgravity. In September 2022, NASA announced that it is seeking proposals for two new private astronaut missions to the ISS with targeted flight opportunities between late 2023 and 2024. In March 2023, NASA and Axiom signed a mission order for the third private astronaut mission to the ISS, targeted to launch no earlier than November 2023 from the agency’s Kennedy Space Center in Florida.

Chart 16: Ax-2 Mission Highlights



Source: Intro-act, Axiom Space

## The Next-Generation Space Suit

- **The Extravehicular Mobility Unit (EMU) is the spacesuit currently worn by astronauts during extravehicular activities (EVAs), commonly known as spacewalks, outside a spacecraft or space station.** The EMU protects astronauts from the harsh conditions of space, including extreme temperatures, micrometeoroids, and the vacuum. The EMU is a highly advanced spacesuit that has been used by NASA astronauts during Space Shuttle missions and continues to be used on the ISS. It undergoes regular maintenance and upgrades to improve its functionality and ensure astronaut safety during EVAs.

The Astronaut Space Suits Market is projected to register a CAGR of more than 50% in the coming years. The COVID-19 pandemic had a minimal impact on the space industry. The progress in space exploration activities halted for a brief period in 2020, but most of the activities resumed by the end of the year. The increasing investments in deep space human exploration programs by countries like the United States, China, India, and Russia, will fuel the demand for spacesuits during the forecast period. Also, the development of new spacesuits with advanced materials for low weight and enhanced mobility is expected to accelerate the growth of the market in the future.

Chart 17: Two Suited Crew Members Working on the Lunar Surface



Source: Intro-act, NASA

- For more than 50 years, no humans have set foot on the Moon. The Apollo 17 mission in 1972 was the last crewed journey to the Moon. NASA's Artemis Program is the first step in the next era of human exploration. Partnering with commercial and international partners, NASA will establish a sustainable presence on the Moon to prepare for missions to Mars. **In June 2022, NASA announced its intention to partner with industry players for new spacewalking and moonwalking services and selected Axiom Space and Collins Aerospace to provide astronauts with next-generation spacesuit and spacewalk systems as well as advanced spacewalking capabilities in Low Earth Orbit and on the Moon.**

According to NASA's official website, the companies were chosen from the Exploration Extravehicular Activity Services (xEVAS) contract solicitation. The contract gives selected vendors the opportunity to compete for missions that will provide a full suite of capabilities for NASA's spacewalking needs during the period of performance through 2034. The indefinite-delivery and indefinite quantity milestone-based xEVAS contract has a combined maximum potential value of \$3.5 billion for all task order awards. In September 2022, Axiom Space was awarded a \$228 million task order under the \$1.26 billion NASA Spacesuit contract. On March 15, 2023, Axiom's Extravehicular Mobility Unit (AxEMU) spacesuit was revealed by the company at Space Center Houston's Moon 2 Mars Festival, while the

full fleet of training spacesuits were to be delivered to NASA by late summer. In July 2023, Axiom won an additional task order for \$147M over four years for LEO suits.

Chart 18: Characteristics of AxEMU



**SAFETY**- Leveraging lessons learned from legacy spacesuits, the AxEMU incorporates new technology that delivers enhanced safety and reliability.

**BETTER MOBILITY** – Ensuring maximum comfort, Axiom uses soft and hard joints for an increased range of motion to enable astronauts to perform more precise geological and scientific tasks, and translate on space stations easier.

**LONG LIFE** – AxEMU'S architecture meets the needs of individual, commercial, and government customers with requirements, resources, and mission objectives.

**MULTIPLE USERS**- The AxEMU spacesuit is a revolutionary development in design, offering benefits to multiple users like astronauts, space agencies, and commercial space companies.

**DYNAMIC** - The AxEMU utilizes features to withstand the dusty environment of the lunar surface and maintain critical interfaces that enable safe and effective extravehicular activities in microgravity.

**BUILT TOGETHER** – The AxEMU leverages on the expertise of experience and knowledge of diverse individuals from multiple industries, working together to build history.

Source: Intro-act, Axiom Space

- **The Axiom Extravehicular Mobility Unit spacesuit will provide astronauts advanced capabilities for space exploration, while providing NASA with commercially developed human systems needed to access, live, and work on and around the Moon.** The advanced spacesuits make sure that astronauts exhibit high performance and possess robust equipment; the spacesuits are also able to accommodate a wide range of crew members. As per Axiom's website, these spacesuits provide better flexibility, insulation from harsh environments, and specialized tools for exploration needs and capturing of scientific opportunities. Axiom says that using innovative technologies and a flexible design, these spacesuits will enable more exploration of the lunar surface than ever before. The development of these next-generation spacesuits by Axiom Space will be a crucial milestone in the company's growth as it enhances American leadership in space exploration, as well as an understanding of the Moon, the solar system, and beyond.
- **Spacesuits will be used for EVA on Axiom Station.** The spacesuits can be used for experiments outside of Axiom Station.
- **The market for next-generation spacesuits is very large.** They are going to be used for Artemis, and astronauts will need them when they travel on rovers. Gateway, a small space station in lunar orbit, will be part of the market as well.

## Leadership Team

Axiom Space's leadership team includes world-class, specialized experts in commercial utilization of microgravity, on-orbit operations, astronaut training, space medicine, space system architecture/design/development, engineering, marketing, and law.



**Kam Ghaffarian, Executive Chairman.** Kam Ghaffarian is the visionary space and energy entrepreneur behind several companies dedicated to furthering human civilization, including Axiom Space. Having co-founded Axiom in 2016 to unlock space's potential for innovation through commercialization, he serves as Executive Chairman of the Board and a key strategic advisor on the development of the space economy.



**Michael Suffredini, President & CEO.** A key leader in the success of humanity's first permanent foray off of the Earth—the International Space Station—Michael Suffredini is one of the world's foremost authorities on the development and operation of space stations. He assembled and heads a world-class team of experts at Axiom. He finished a decorated 30-year career at NASA by serving as its International Space Station Program Manager from 2005 to 2015.



**Matt Ondler, Chief Technology Officer.** Leads the engineering organization at Axiom Space. He is directing the company's development of the world's first commercial destination in space that will provide a next-generation microgravity platform and a seamless transition from the International Space Station. Matt spent two-and-a-half-decades in various leadership roles at NASA, culminating as NASA JSC's Assistant Director of Engineering.



**Dr. Mary Lynne Dittmar, Chief Government & External Relations Officer.** A national influence in space policy and programs for more than two decades, she leads the development and execution of public policy, corporate advocacy, and external relations for Axiom Space. In this role, she is responsible for conveying Axiom's vision, goals, and progress to key stakeholders, policy makers, and the public, directing strategy and implementation of corporate strategic communications efforts and government activities.



**Tejpal Bhatia, Chief Revenue Officer.** Has 25 years of startup and strategic leadership experience at some of the world's largest companies and three investor-backed, high-growth startups. He leads revenue generation and future monetization strategy for the commercial development of space as Chief Revenue Officer at Axiom Space. Prior to joining Axiom, he led External Strategic Narrative for the Office of the CIO at Google.



**Rex Walheim, Chief Safety Officer.** Is a veteran of three spaceflights as well as the United States Air Force. As a NASA astronaut, he logged more than 36 hours on five spacewalks and more than 36 days in space. Following his flying days and prior to his retirement from NASA in 2020, he served sequentially as: Chief of the Exploration branch of the Astronaut Office; Assistant Director for Operations for the Flight Operations Directorate; and Deputy Director of Safety & Mission Assurance at the Johnson Space Center.



**Michael López-Alegría, Chief Astronaut.** Michael is a decorated astronaut who returned to Low Earth Orbit for the fifth time in 2022 as Commander of Axiom Mission 1, history's first all-private crew to the International Space Station. He is involved in both operational and business development efforts within Axiom Space. He has more than 40 years of aviation and space experience with the U.S. Navy and NASA.



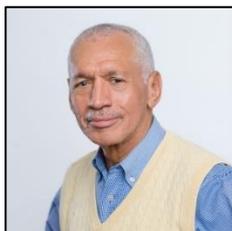
**Derek Hassmann, Chief of Mission Integration & Operations.** A core component of Axiom's unrivaled expertise in human spaceflight training and operations, Derek Hassmann oversees those functions at Axiom as it leads the realization of private orbital spaceflight and prepares for the launch and integration of its privately developed modules to ISS. Derek served as a NASA Flight Director for more than a decade and was responsible for leading flight control teams in the Mission Control Center during ISS operations including 16 spacewalks and five Shuttle missions.



**Christian Maender - Executive Vice President, In-Space Solutions.** A key architect of the planning, design, technical integration, and execution of microgravity research and technology demonstrations on the International Space Station, he brings his unique expertise to Axiom's leadership in offering microgravity as a next-generation platform for innovation and discovery. He directs Axiom's conversations with in-space manufacturing and research customers.



**Peggy A. Whitson, Ph.D., Astronaut, Director of Human Space Flight.** With more than 35 years of experience in space and science, Peggy is an Axiom astronaut slated as the backup commander of Ax-1 and the commander of Ax-2—the first-ever private missions to the International Space Station. Previously, Peggy flew on three long-duration missions to the ISS (Expeditions 5, 16, 50/51/52) and spent more cumulative time in space than any US astronaut or any woman in the world (665 days).



**Charlie Bolden, Business Development Consultant.** Bolden is a retired Marine Corps general who served as NASA Administrator from 2009 to 2017 after flying on four Space Shuttle missions during a 14-year astronaut career. Today, he is another key touchpoint on Axiom's long list of elite space expertise, working with the space infrastructure developer and orbital human spaceflight services leader in a consulting role.

## Financial Overview

- **Axiom’s 2023 estimated revenue is around \$400 million.** In the near term, until Axiom Station is operational, Axiom will earn its revenue primarily by being an end-to-end mission provider of short-duration missions to the ISS. It also sells research missions for experiments to be conducted in the ISS microgravity lab. Partnering with NASA for the provision of next-generation spacesuits and spacewalk systems will be a significant contributor to Axiom’s revenue. Its revenue is divided into three segments i.e., Human Spaceflight Services, Space-infrastructure-as-a-Service (SaaS), and Spacesuits. Axiom Space’s “Access Program” is the company’s go-to-market plan, offering a tier-based subscription model to its Station.

Axiom’s Chief Revenue Officer, Tejpaul Bhatia, in a discussion with *TechCrunch*, highlighted that “Fundraising is very important and we’re following the model of the five most valuable companies in the world—Facebook, Apple, Amazon, Microsoft, and Google—which operated at a loss when they first started out. We are trying to create as much shareholder value as possible and taking capital to build essential infrastructure and innovate at speed while staying focused on safety.” Axiom Space has raised a total of \$500 million up to July 2023.

Chart 19: Funding History of Axiom Space

Date	Event	Amount (\$ Million)
July 2023	Series C	235
22 Dec '22	Convert	172
01 Jul '21	Angel	-
16 Feb '21	Series B	130
01 Jul '20	Angel	-
01 Dec '19	Series A2	7
15 Aug '18	Series A1	-
01 Jan '16	Seed	3

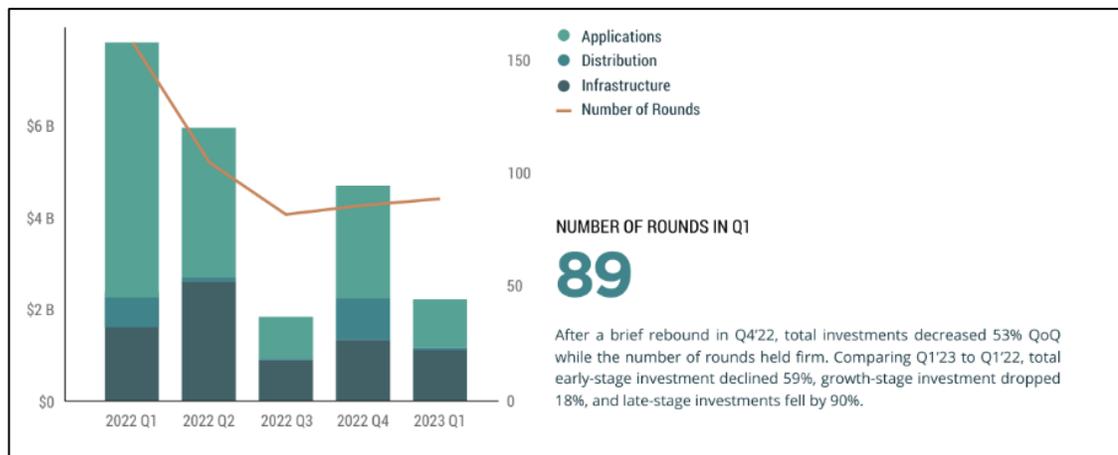
Source: *Intro-act, FactSet*

- **In the same discussion, Tejpaul Bhatia was optimistic about the launch of Axiom’s first habitat on the ISS. He asserted that the extra crew quarters and lab facilities will enable Axiom to offer more missions since it will no longer be subject to ISS capacity constraints.** Bhatia expects 2024 to be a key inflection point for revenue growth. Talking about revenue sources, he said, “Once Axiom Station comes on, we will have a hybrid model where companies, institutions, and governments can custom-build, buy, or lease physical and digital space.”
- For its total addressable market, Axiom taps countries that have budgets for space programs but haven’t yet been able to afford one. Axiom aims to provide solutions to countries with budgets of billions of dollars as well as a fraction of it and meet their needs. Bhatia is hoping that NASA, ESA, JAXA, the Canadian Space Agency, and Roscosmos will move their \$2 billion annual revenue spend to Axiom Station, as the successor to ISS.

## Risks

- In Q12023, the venture market experienced a challenging market and rate environment. Across tech, venture funding to startups slipped by more than 50% YoY to \$76 billion globally and \$37 billion in the U.S., dropping to the lowest in 13 quarters. The space economy was bound to have a dent in it, due to the decreased investments, given that VCs constitute the primary source of capital for space companies, with \$1.3 billion invested across 68 rounds in Q1, accounting for 60% of total investment and 76% of total rounds. Space investment faced the lowest quarter since 2015, with a total of just \$2.2 billion invested in Q1, a 53% decrease from the prior quarter.

Chart 20: Investment Amount by Deals and Quarter



Source: Intro-act, Space Capital

According to a study by [Seraphim](#), a popular SpaceTech VC firm, in 2023, Europe overtook the U.S. in private SpaceTech investment. It found that the European sector attracted \$565 million in Q12023. The quarterly investment in Europe hit almost 50% of the entire previous year. In contrast, U.S. investment has fallen farther compared to 2022. Asia experienced growth last year, but lagged Europe in the first quarter of 2023. This implies that SpaceTech investments in the U.S. may possibly have a shaky path ahead, which can indirectly affect some of the emerging SpaceTech players like Axiom Space.

- Axiom has made plans to launch its commercial space station by 2026. A [NASA OIG](#) report highlights that research needed for long-duration missions to the Moon and Mars will not be complete by 2030. Under the agency's current plans, both health risk mitigation and technology demonstrations cannot be guaranteed to be complete by 2030—the expected retirement date of the ISS.

Also, according to a *Space News* article, panel discussions at the Beyond Earth Symposium, held in Washington, D.C, revealed that representatives of private space companies have expressed a need for clarity from the Federal Government regarding which agency will provide oversight of their future space stations. This may affect their operations in terms of smooth execution. Eventually, solutions are expected to be sought for this relatively new private space industry, which is in a trial-and-error mode.

- Even as Axiom is marching toward the development of the first commercial space station, it is not alone in the process. Its competitors include Blue Origin, Voyager Space, and Northrop Grumman Systems Corporation. Blue Origin is targeting the launch of its commercial space station (Orbital Reef) in 2027 whereas Voyager Space is planning to launch its station, Starlab, by 2028. Northrop Grumman Station has mapped its stage 1 launch in late 2028, and stage 2 launch in 2030. Other competitors include Above: Space and VAST. Axiom needs to constantly keep innovation at the highest possible pace, in order to stay ahead and lead the tough competition. However, none of the competitors can connect to the ISS like Axiom Station; they will have to be built as free-flying structures.

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