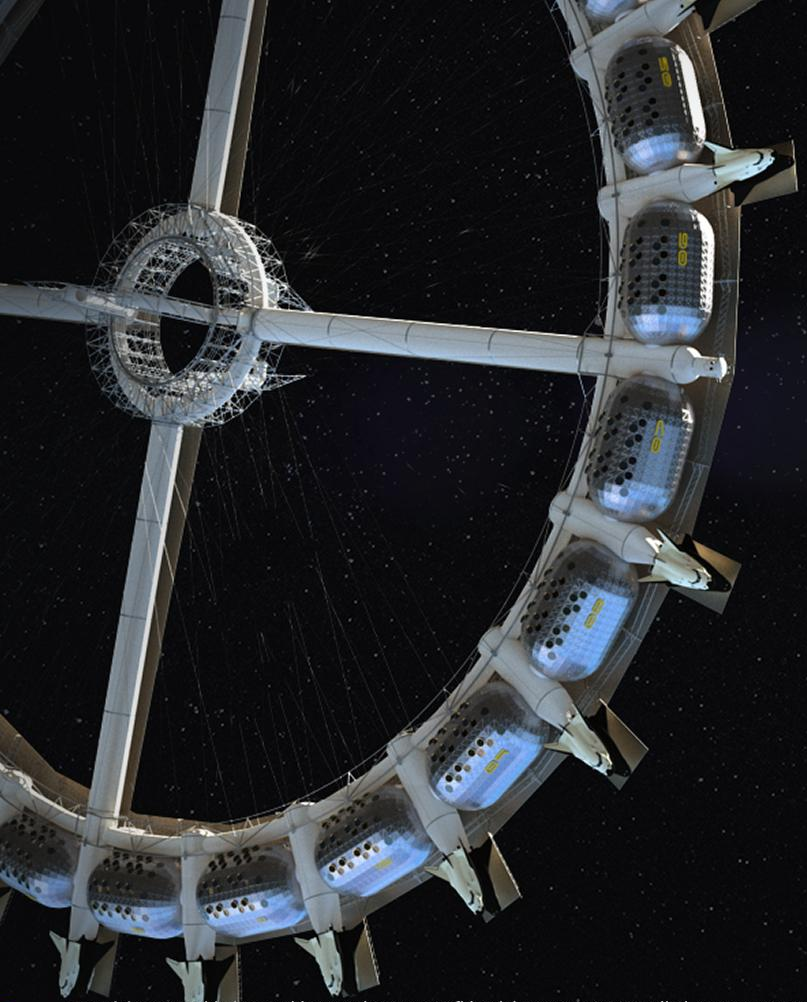
ORBITAL ASSEMBLY

THE WORLD'S FIRST LARGE-SCALE SPACE CONSTRUCTION COMPANY



The Earth is the cradle of humanity, but mankind cannot stay in the cradle forever.

— Konstantin Tsiolkovsky

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The future of humanity is in space

Our Vision

A future where humanity lives both on- and off-world, and is equipped with all it needs to flourish throughout the solar system.

Our Mission

To build large structures in space quickly, affordably, and using proven technology adapted in new ways to enable the sustainable use of space.

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We are living in a time of Great Expansion

$2.7 trillion space industry

Bank of America Merrill Lynch sees the space industry growing to $2.7 trillion in 30 years: “We are entering an exciting era in space where we expect more advances in the next few decades than throughout human history.”

New massive industries are emerging

To build large structures in space fast, affordably, and using proven technology adapted in new ways to enable the sustainable use of space.

Less dependent on Earth

The space industry will become less dependent on Earth supplies, as more resources are extracted from extraterrestrial sources: energy, propellant, and construction materials.

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The next space race: new rules, more players, further ambitions

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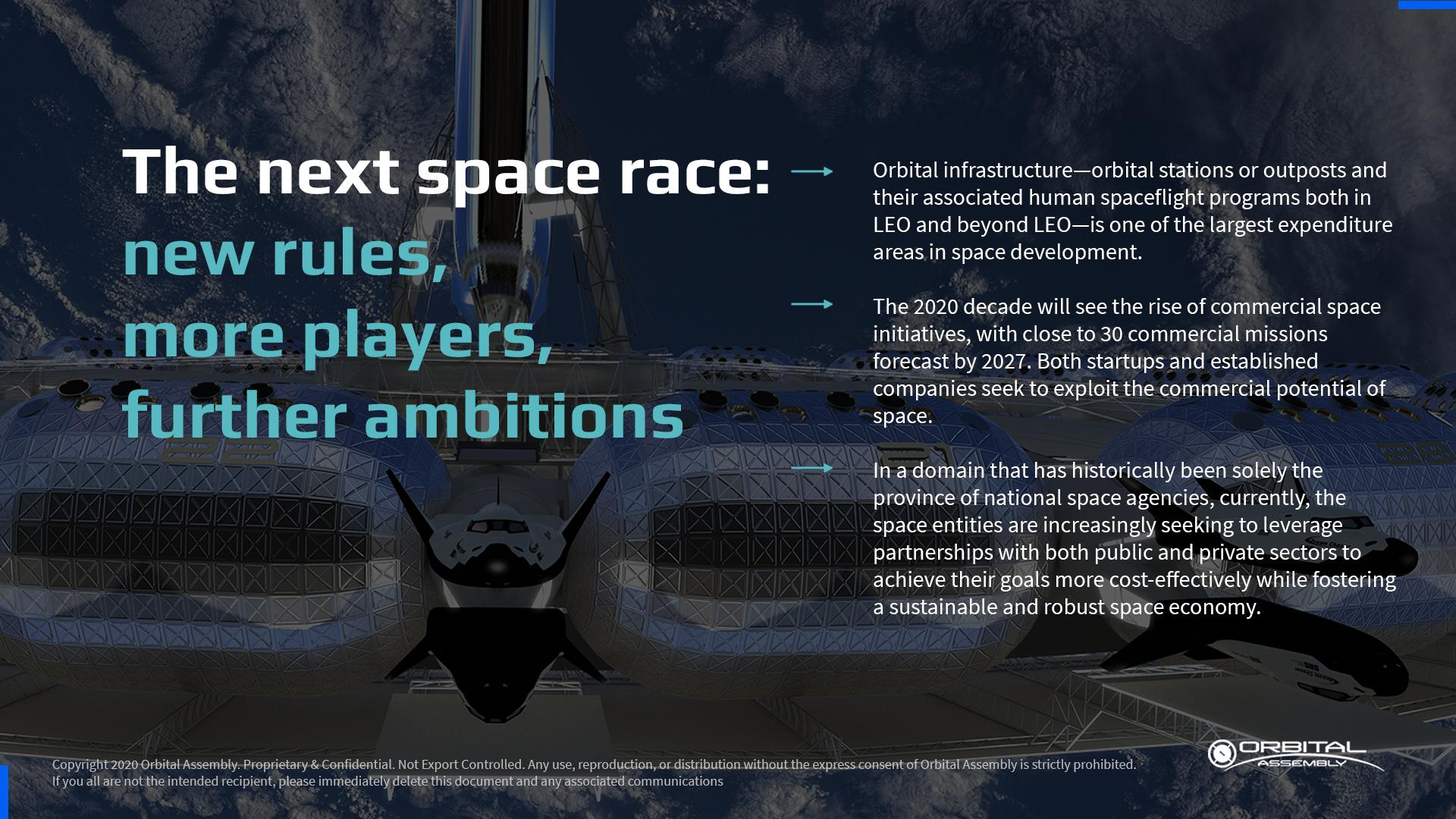

The next space race: new rules, more players, further ambitions

- Orbital infrastructure—orbital stations or outposts and their associated human spaceflight programs both in LEO and beyond LEO—is one of the largest expenditure areas in space development.
- The 2020 decade will see the rise of commercial space initiatives, with close to 30 commercial missions forecast by 2027. Both startups and established companies seek to exploit the commercial potential of space.
- In a domain that has historically been solely the province of national space agencies, currently, the space entities are increasingly seeking to leverage partnerships with both public and private sectors to achieve their goals more cost-effectively while fostering a sustainable and robust space economy.

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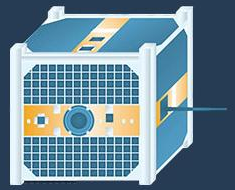
Ten years of space commercialization, reusable rockets, and cubesats

- The last decade has seen an explosion of innovation in the private space sector, arguably led by **SpaceX**. In 2015, the company landed the first stage of its Falcon 9 rocket after takeoff in a huge milestone for the development of reusable rockets. Reusable rockets have been considered by organizations like NASA since the 1960s, but **SpaceX were the ones to finally make them happen**. - Digital trends, 2020

- The next decade will see the assembly of many large structures in orbit with the formation of a space construction industry. Orbital Assembly will lead the way with many advanced space construction tools and machines.



> 1200 CubeSats launched as of January 2020

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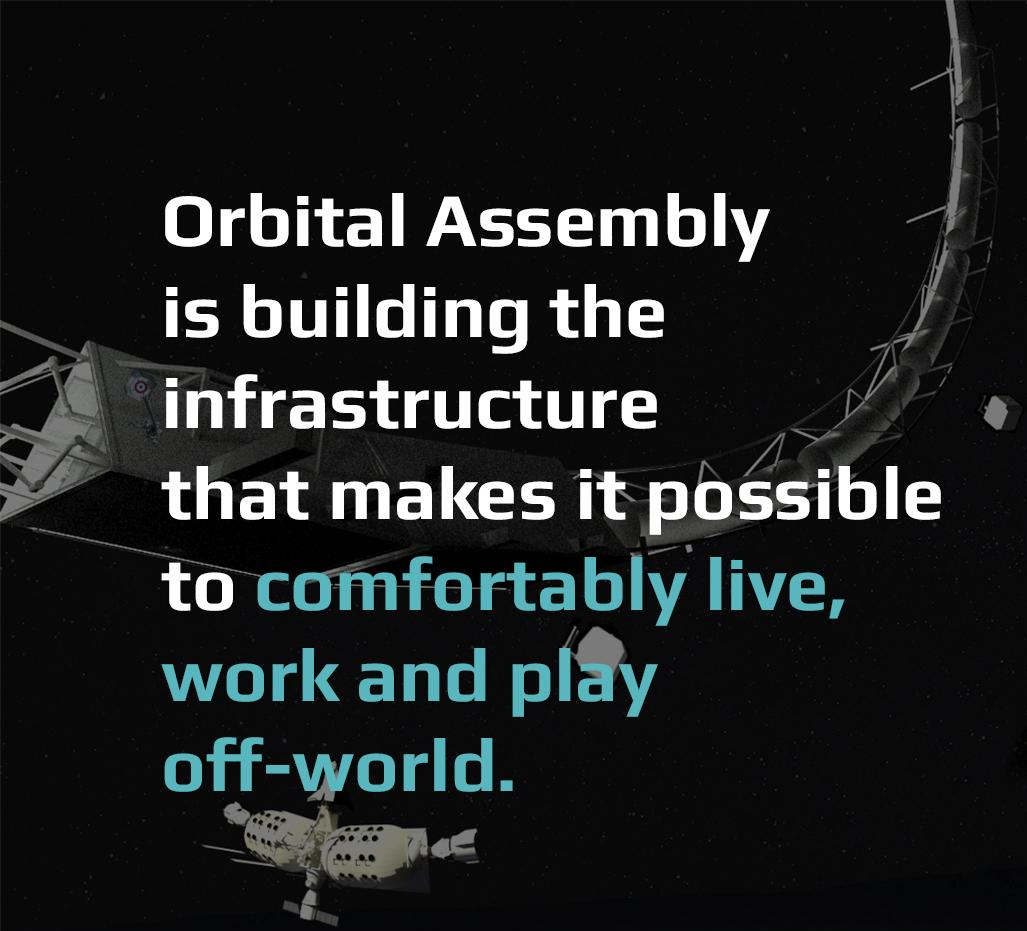
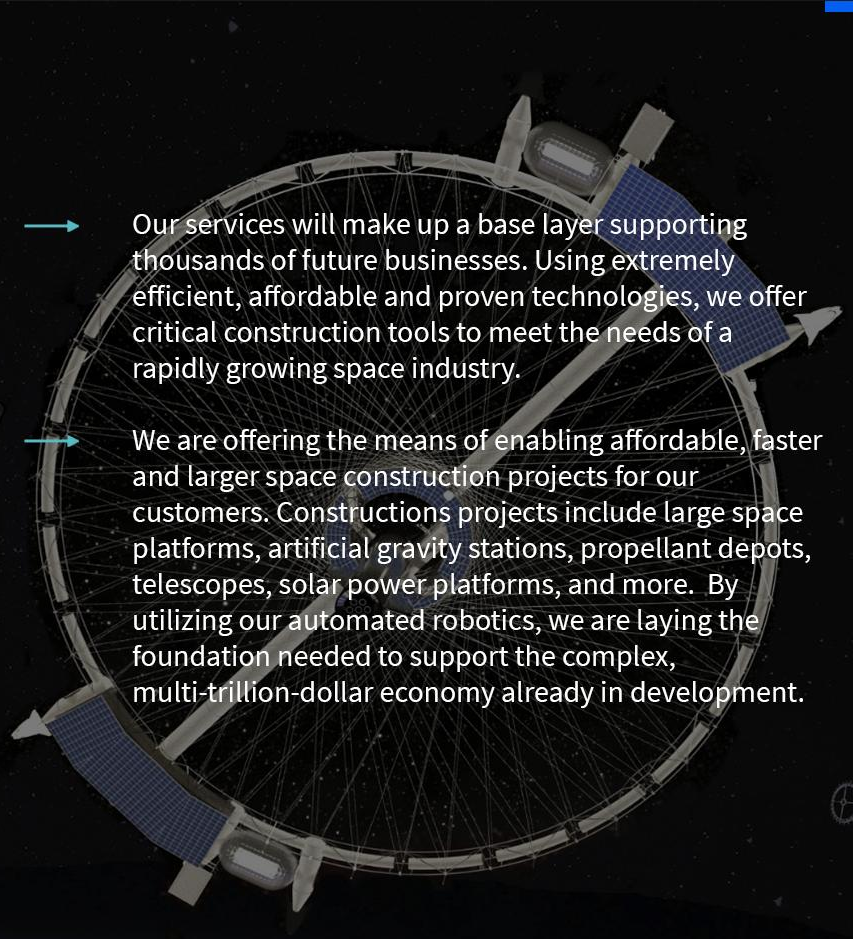
Orbital Assembly is building the infrastructure that makes it possible to comfortably live, work and play off-world.





- Our services will make up a base layer supporting thousands of future businesses. Using extremely efficient, affordable and proven technologies, we offer critical construction tools to meet the needs of a rapidly growing space industry.
- We are offering the means of enabling affordable, faster and larger space construction projects for our customers. Constructions projects include large space platforms, artificial gravity stations, propellant depots, telescopes, solar power platforms, and more. By utilizing our automated robotics, we are laying the foundation needed to support the complex, multi-trillion-dollar economy already in development.

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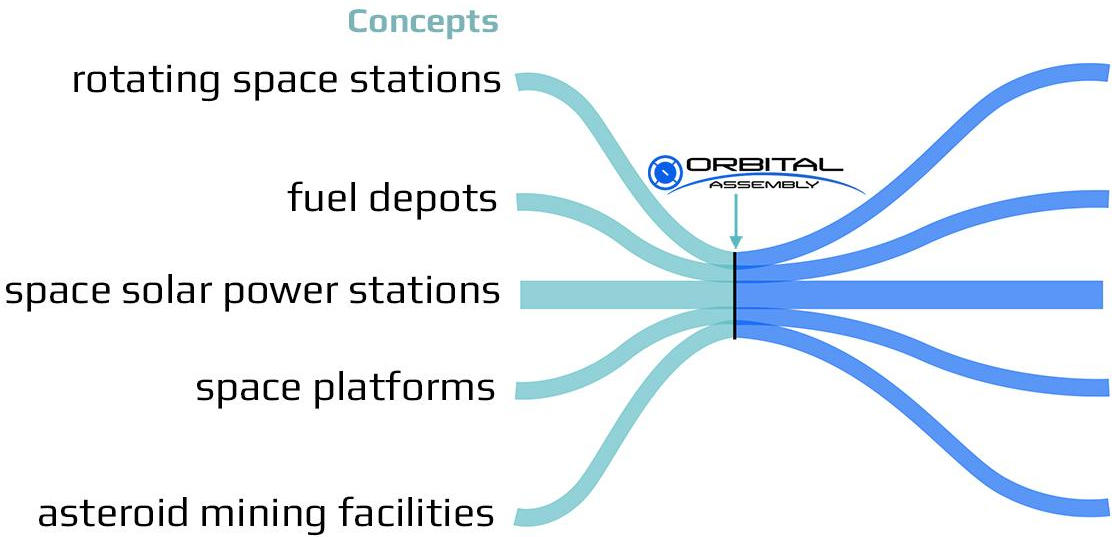
Orbital Assembly is a focal point of all of the upcoming in-orbit facilities

Every construction project in space represents another prospective client. Our robotic capabilities will enable us to assemble large facilities and infrastructure in orbit.



Next Decade Reality

Thousands of people living and working in space

Inexpensive refueling to access any point in the Solar System

Unlimited renewable energy on Earth

Enabling a robust space-based economy

Increasing resource independence from Earth

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Disruptive innovation in space construction

In less than a decade we will go from fewer than 9 people currently in space to several hundred people comfortably living, working, playing, and pushing the boundaries of what's possible.

- We will use our construction capabilities to build large, rotating space stations creating artificial gravity that will counteract space sickness and increase human comfort, duration and access. This will enable more humans to live, work and play in space. The Future is in Rotation™!
- We will also build other structures of unlimited size, allowing exploration, research, industry and commerce to flourish beyond what the ISS and current fairing-constrained launch capabilities can offer.
- Our Voyager Space Station is designed to offer experiences no human being has experienced before. Exclusive restaurants facing the Earth from space, zero-g concerts, spacewalks in different gravity zones — sci-fi fantasy becomes a reality!
- With more machines, infrastructure, and people in space, we will achieve tremendous gains in capability and efficiency, resulting in an acceleration of economic growth.

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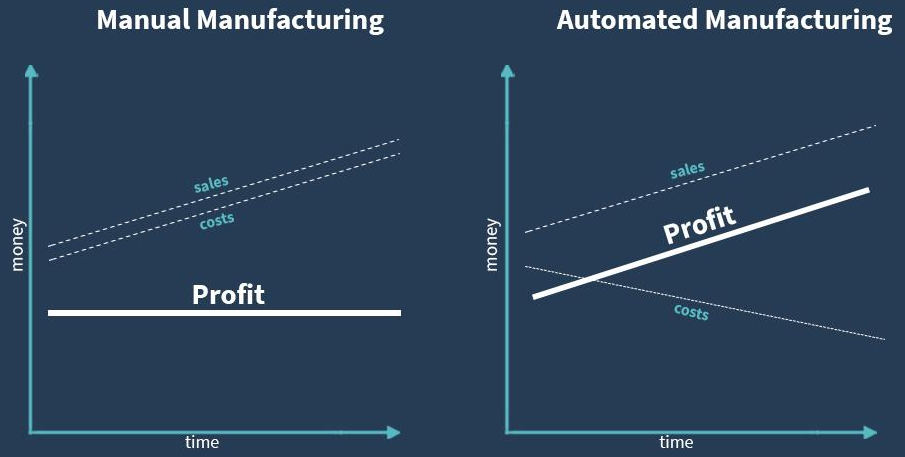
The main obstacle to prosperity in the space industry

The main challenge for space development is the fact that rocket payloads are limited to fairing size.

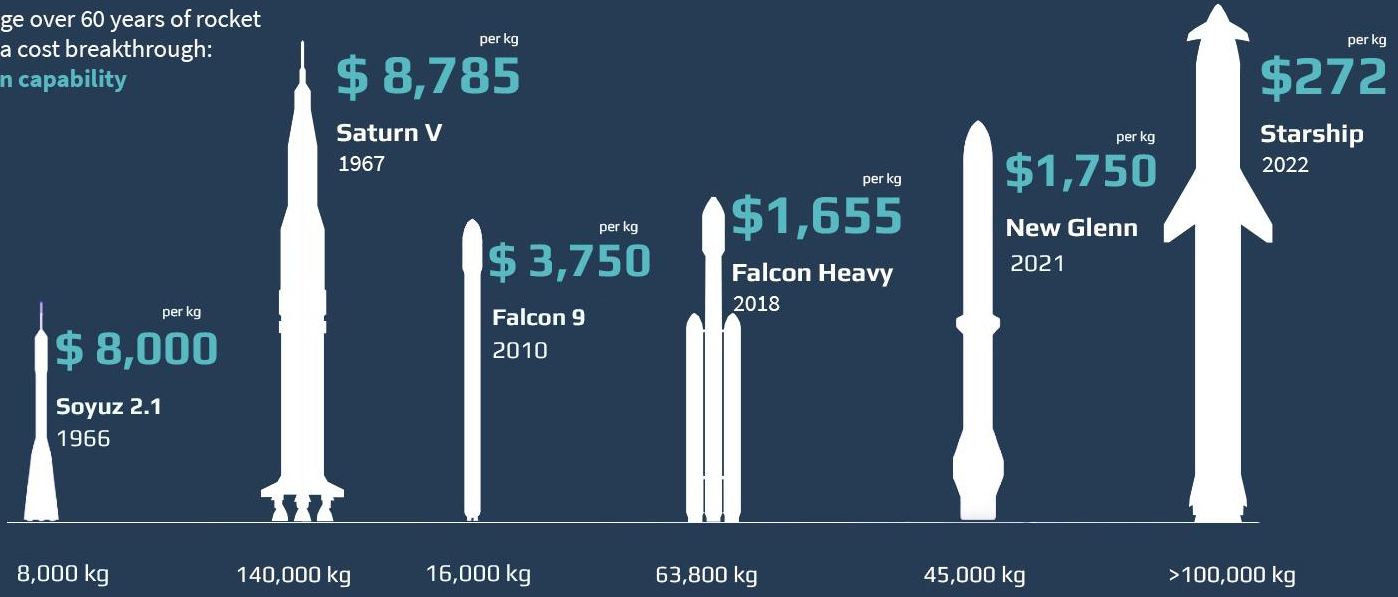
Any space construction is typically delivered prefabricated from Earth and then attached to another structure in space. Without developed tools for assembly, it is not possible to construct something larger than than current ISS modules.

→ To make space more affordable and to accelerate commercialization of space, Orbital Assembly is automating the process of large-scale space construction. Instead of assembling custom structures by hand, humans will primarily supervise large, purpose-built construction robots assembling mass-produced parts, freeing up time for tasks only humans can do (like troubleshooting).



WHY THE DISRUPTION IS HAPPENING

There has been very little change over 60 years of rocket production. Now we're having a cost breakthrough: Reusable rockets are growing **in capability and shrinking in cost.**



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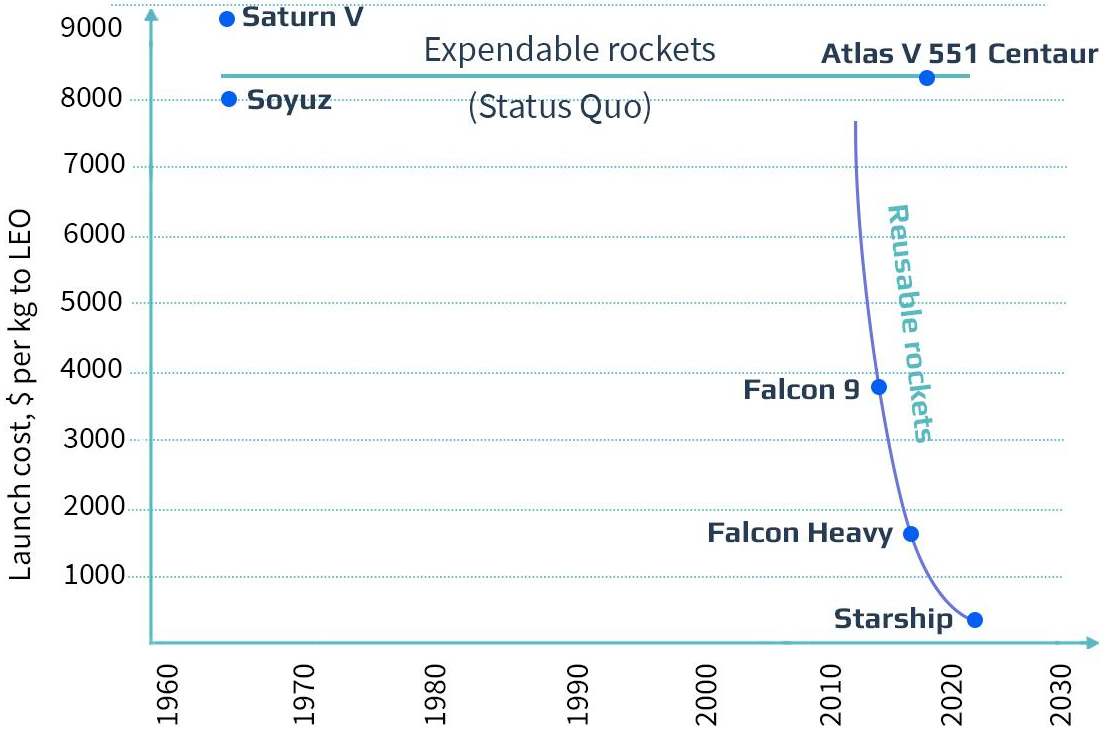
Launch grows cheaper

The Falcon 9 costs $50 million to launch (15,600kg). The retired Space Shuttle cost us $1.5 billion per launch (27,500kg). That makes the Falcon 9 **over one hundred and fifty times more affordable to deliver payloads to LEO!**



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Major enabler of the space economy is on-orbit construction automation

Entering the Golden Age of Space Travel development means a total shift on how things are done in space.

- **Beyond size limitations.** Larger and more precise than a human can build.
- **Scalable.** Humans can supervise many at once, only intervening where needed. Robots can also learn to perform more like humans over time (AI).
- **Robots** are faster and can work around the clock.
- **People need many more resources** whereas robots only need (solar) power and occasional maintenance.
- **Safety**. Much lower risk to human life.
- **Unburdens people** from performing repetitive, monotonous and dangerous tasks in orbit.

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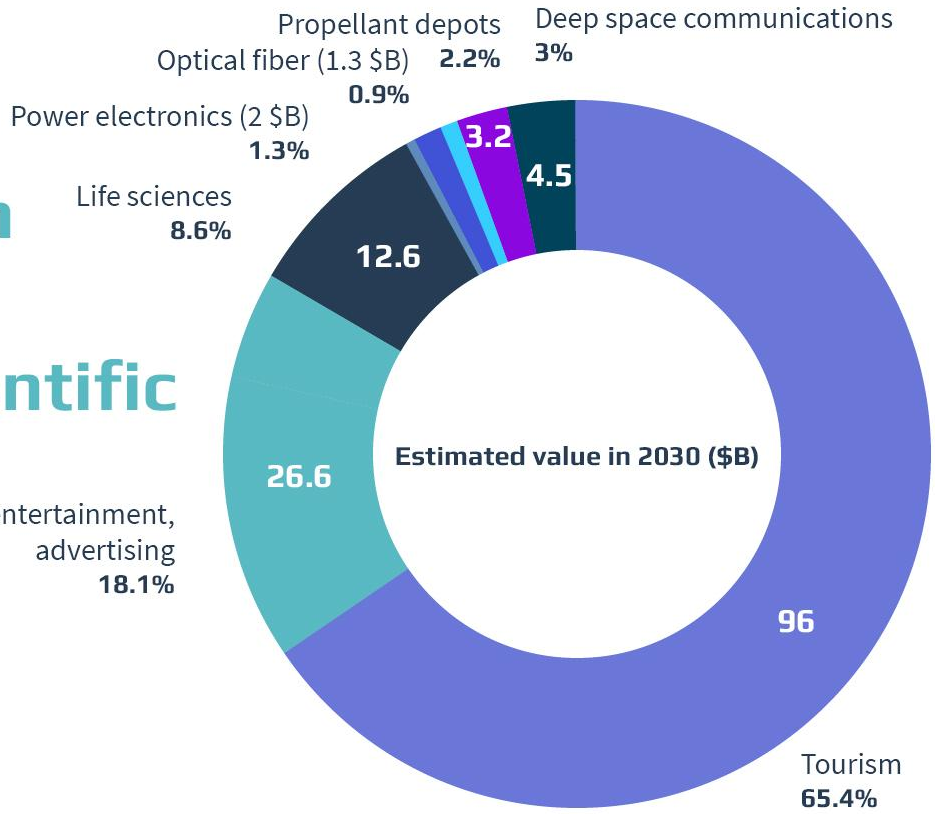
On-orbit construction enables important technologies for scientific exploration



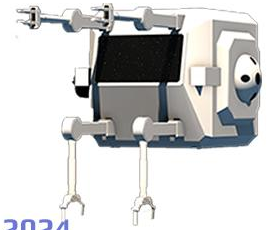
Development of orbital construction tools

2021

Observer Drone

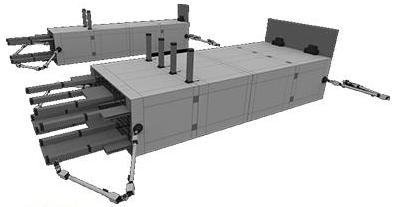
2023

Errant Object Retrieval drones



2024

Construction pod



2024

Structural Truss Assembly Robot

Type of construction	All major and minor projects	Major construction projects	Major construction projects	Major construction projects
Capabilities	Construction, maintenance and operations oversight, exploration	Construction, maintenance and active operations oversight, mining	Construction, maintenance, mining	Major construction of trusses, and structural segments
Launch weight	Varies, 2-10 kg	Varies with application; 2-1,000+ kg	1,000 kg or more	Approx 25,000 kg

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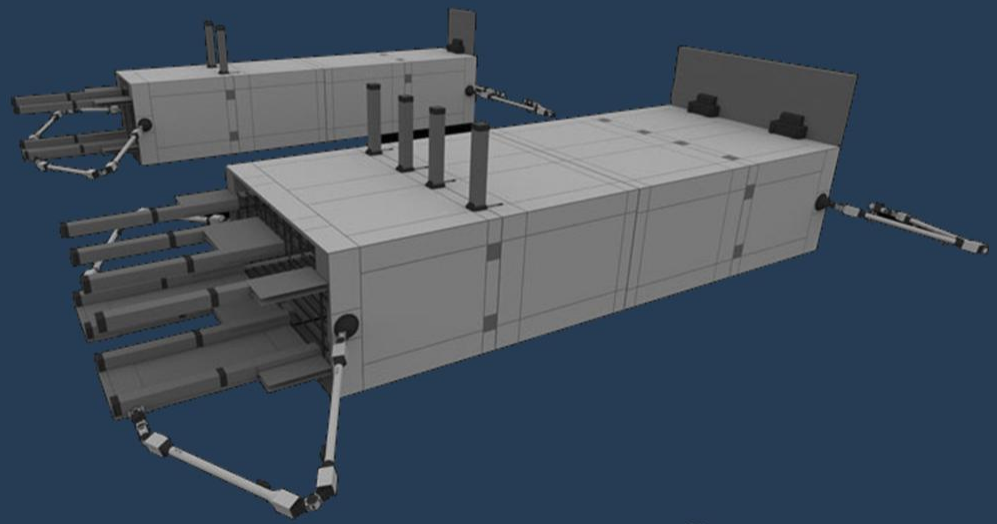
Structural Truss Assembly Robot (STAR)

- Orbital Assembly - Structural Truss Assembly Robot, The **STAR** is a specialized, automated assembly system designed to create segments of the outer ring truss for Voyager Station. The truss will be assembled from prefabricated metal segments that will be welded in orbit. A ground demonstration producing 100m of truss in less than an hour will be accomplished in November of 2020!

- The STAR will be 5.5m x 5.5m x 12m long:
  - Will build and assemble 100m of truss in a couple days instead of years like the ISS assembly.
  - Can build multiple truss profiles: triangular trusses, box trusses, circular trusses.

- Similar to the STAR, the **GSAL** is an automated assembly system designed to create segments of a structure. The segments are then welded together to form the whole structure. This method of construction is called permanent modular construction. The GSAL will consist of a number of workstations, each with a different assignment. Each will assemble semi-complete segments much like aircraft manufacturers and shipyards do.



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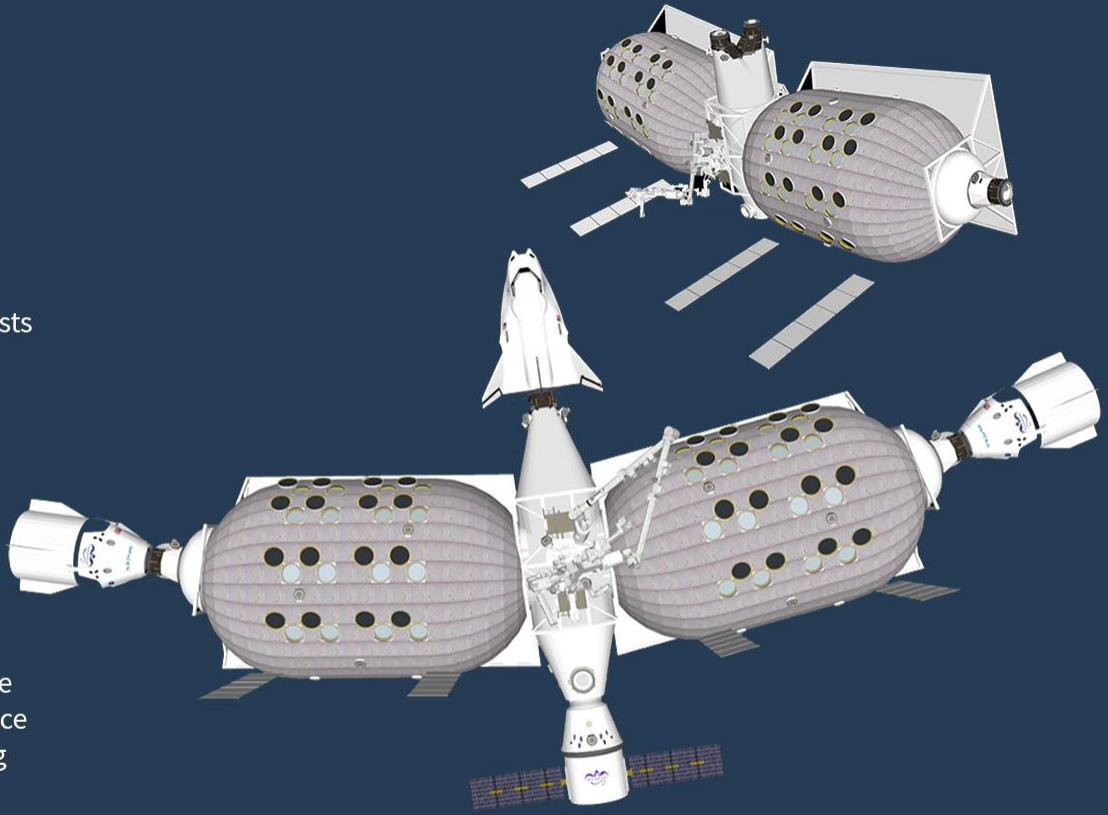
NASA's Free Flyer Solicitation

- We are proposing to the NASA solicitation that requests proposals from the United States (U.S.) commercial entities to enter into a public-private partnership to develop and demonstrate commercial destination technologies and markets in LEO.

This **free flyer** will be a zero-gravity station utilizing many Voyager Station design elements such as large pressurized habitats, access tubes, and maintain a sun-synchronous (near-polar) orbit providing nearly continuous power and spectacular views of the entire Earth. With NASA funding for Free Flyer, we can finance critical initial design stages, lowering risk for building Voyager Station.



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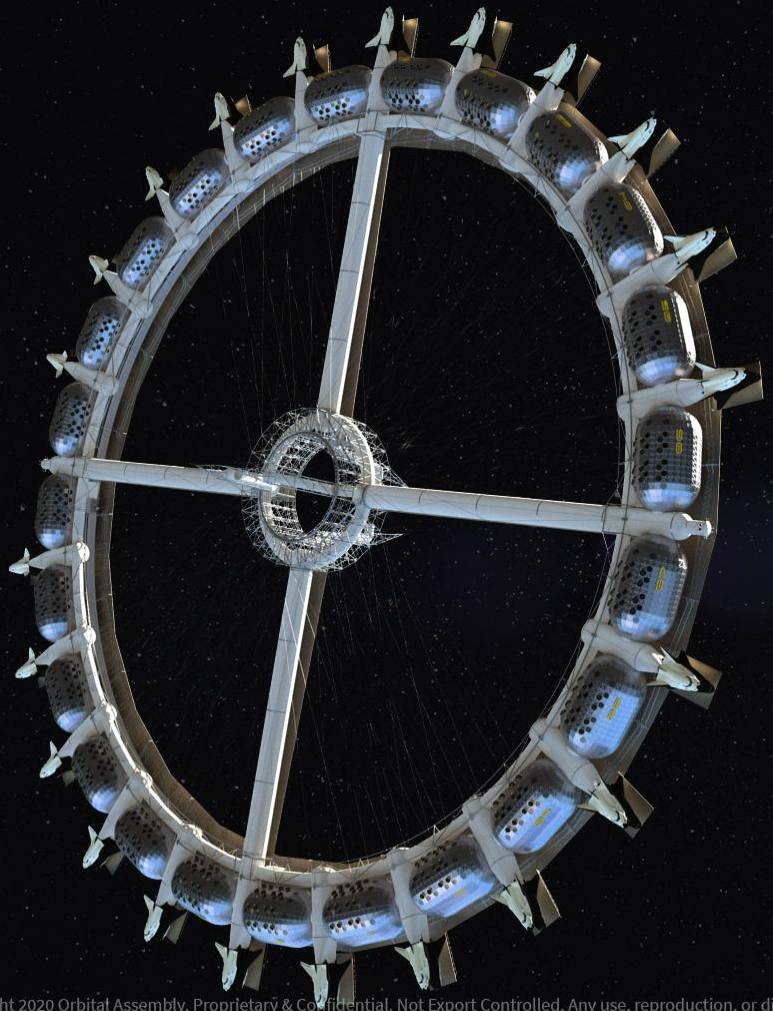

Voyager Station:
The first rotating space station

- 194 m in diameter (to the nose tips of the Dream Chasers, the diameter of Voyager Station is 211.6 m)
- 54,000 m3 total pressurized volume
- capacity for up to 400 people
- cost per visit: as low as $2M/person
- estimated revenues when fully operational: $28B/yr.

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Potential partner technologies

SPACEX
Launch capabilities

SIERRA NEVADA CORPORATION
Emergency Return Vehicles (ERV)

MDA
A MAXAR COMPANY
Robotic arms

Honeywell
ECLSS, Common Berthing Mechanism (CBM)

Virgin GALACTIC
Tourist transportation

Hilton
HOTELS & RESORTS
Operations & marketing services

PARAGON
SPACE DEVELOPMENT CORPORATION
ECLSS

Raytheon Technologies
Avionics

MOTOROLA
Communications

ILC DOVER
Space suits

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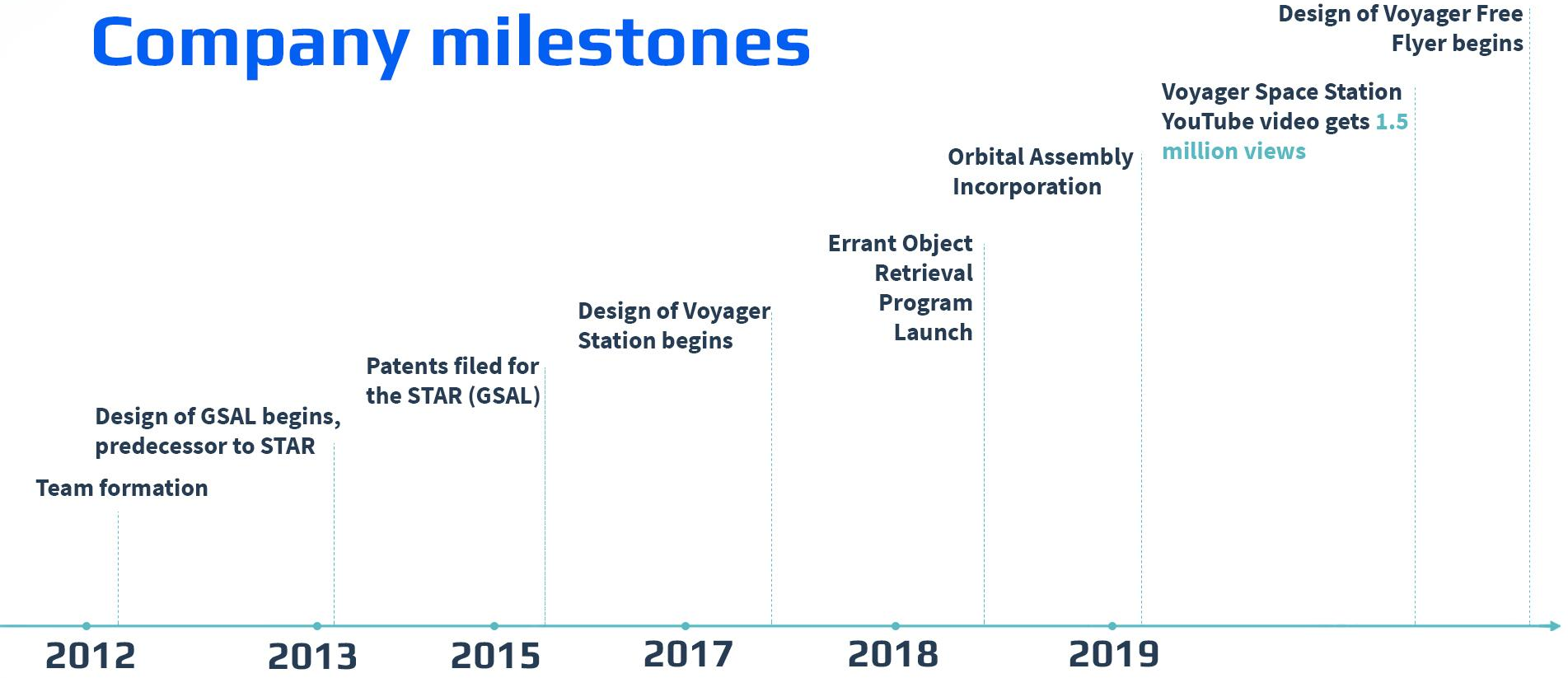
Company milestones



Company milestones

Bold team of world-class experts

John Blincow CEO

John has worked as a pilot for 24 years, flying all over the world in the Boeing 757, DC-10, and Boeing 747-400. John's experience as a pilot instructor includes United Airlines, Boeing Flight Safety, and as a security instructor for the Transportation Safety Administration (TSA). John graduated with a B.A. from Cal State San Bernardino in 1996.

Thomas Spilker, Ph.D. CTO & VP of Engineering and Space Systems Architecture Design

Tom earned his Ph.D. from Stanford University and then worked for more than 20 years as both a scientist and engineer at the Jet Propulsion Laboratory. Tom worked on NASA's Voyager, Cassini, and Genesis missions, and is a Co-Investigator for the MIRO instrument on ESA's Rosetta mission.

Tim Alatorre COO, interim CFO, VP of Business Administration, Habitation Architectural Design

Tim has over 20 years experience in habitat design, graphics, web design, programming, and engineering. He is a Licensed Architect in California (C-32555) and several other states. Tim is currently CEO of Domum, a leading architecture firm, and serves as a Planning Commissioner and member of a municipal Architectural Review Committee in Northern California.

Jeffery Greenblatt Ph.D. **Chief Visionary Officer**

Jeff has a Ph.D in chemistry from the University of California, Berkeley, and is a well-known expert in the fields of energy analysis, climate policy and sustainable transportation, with almost 20 years' experience. He began expanding his focus to emerging space technologies in 2014, founding Emerging Futures, LLC, an environmental and space consultancy, in 2016. Jeff served as a Staff Scientist at Lawrence Berkeley National Laboratory for over 8 years, and has worked in research and leadership capacities at Google, Environmental Defense Fund, Princeton University and NASA Ames Research Center.

Robert Miyake **Thermal Systems Engineering, Drone Technologist**

Robert worked at the Jet Propulsion Laboratory for more than 30 years retiring in 2011, as a Lead Thermal System and Systems Engineer in design, test, and flight operations. Robert also was the thermal systems lead for advanced technology development and future missions. He worked on NASA's missions; SeaSat, TOPEX, MGS, IAE, and, WF/PC and other flight instruments.

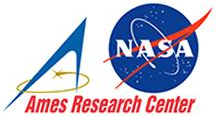
James Wolff, Esq. **Chief Business Officer**

James received his undergraduate degree from Johns Hopkins University and his Juris Doctorate from New York Law School. His corporate portfolio includes co-founding Deep Space Industries, an asteroid mining and space utility company based at NASA Ames Space Center, co-founding Space Initiatives, a Femto-sat transponder company funded by the Air Force, Chief Financial Officer of Immortal Data Inc., an aerospace black-box sub-components company (former X-Cor), and more. He is an Executive board member-at-large for the United Nations Association, serving on the Southern District Division of New York committee.

Team: Professional Experience

Companies

Government



Universities


Non-profits

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Advisors

Shawna Pandya, MD Medical Advisor

Dr. Shawna Pandya is a scientist-astronaut candidate with Project PoSSUM, physician, aquanaut, pilot-in-training, VP Immersive Medicine with Luxsonic Technologies and Fellow of the Explorers' Club. She is also Director of the International Institute of Astronautical Science (IIAS)/PoSSUM Space Medicine Group, Chief Instructor of the (IIAS) PoSSUM Operational Space Medicine course, Chair of Strategic Directives for the PoSSUM13, clinical lecturer at the University of Alberta, a newly appointed Primary Investigator (PI) for the Shad Canada-Blue Origin student microgravity competition. Dr. Pandya holds degrees in neuroscience, space, entrepreneurship and medicine, and is currently completing a fellowship in Wilderness Medicine.

Tim Clements Fabrication Manager

Tim is a performance-driven senior management professional with over 20 years of extensive knowledge and experience in marine warships & transport vessels, mining infrastructure, civil infrastructure and the on and offshore Oil & Gas construction industry.

Skilled in planning manufacturing and engineering operations while developing business objectives and ensuring their practical implementation. Well-developed organizational, analytical and intellectual skills capable of building a team to solve complex engineering problems and challenges.

Eric Ward Systems Engineer

Eric Ward is an experienced Systems Engineer who sees growing the private space industry as the next step to progressing humanity's future and venturing beyond the planet. He has a Master's degree in Systems Design and Management from MIT, has published multiple technical documents on system architecture and the Space Industry, has been featured in Fast Company, and has co-founded multiple space startups as well as the MIT New Space Age Conference. He also holds a Bachelor's Degree in Mechanical Engineering.

Advisors

Jill Buchanan Creative Experience Director

A masterful creative force and experiential design and marketing lead, Jill Buchanan uncovers exquisite solutions and understands the significant nuances within relationships between customers, clients, and managing teams in order to produce once-in-a-lifetime experiences. Always a pioneer, her passion for the arts, culture, science and technology is readily apparent in her work. Jill's creativity has been contracted by the likes of GIANNI VERSACE, GUCCI, SAKS FIFTH AVE, AVE, HARPER'S BAZAAR and MERCEDES BENZ. She is the visionary behind the first ever 360 dome nightclub/ entertainment experience, she launched another remarkable 360 experience at NY Fashion Week, and she was the pioneer in designing and producing the first fully-immersive art dome for CARTIER with David Lynch that debuted at Art Basel Miami.

James Phalen Financial Advisor

James has successfully harnessed and applied his prior military and professional experience to meaningfully advise startup and growth organizations. He enjoys rolling up his sleeves while addressing a variety of commercialization opportunities and solving important problems. His methods and contributions improve organizational productivity and bottom-line financials by providing intelligently designed processes and actionable solutions - driving value for investors and every level of team, client and vendor. His most recent advice has assisted technology and operational teams in the areas of B2B SaaS, CPG, emerging agriculture, space, real estate, future-of-work, energy, global trade, finance, entertainment, and transportation - Innovation is opportunity and knows no bounds or industry limitations.

John C. Mankins Space Power Advisor

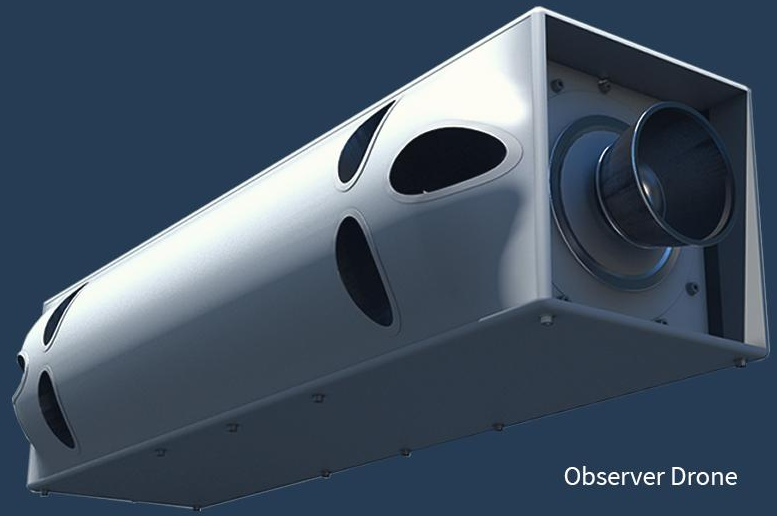
John C. Mankins is President of Artemis Innovation Management Solutions LLC and of Mankins Space Technology, Inc. and a Director of Solar Space Technologies. He is also Vice President of the Moon Village Association, and serves on the Boards of both the National Space Society and of SPACE Canada, and is a Dean and Professor on the faculty of the on-line Kepler Space Institute.

Mankins is well-known as an expert in human and robotic exploration and development; he best known for writing in the early 1990s the first detailed definitions of the “TRLs” – Technology Readiness Levels – and as the world’s leading expert in the field of “Space Solar Power”.

Objectives of First Round Funding

Preliminary funding has been achieved; current needs are to expand our capabilities. We are seeking to secure between $6 and $10 million in seed round funding to do the following:

- Build and test the Observer Drone.
- Develop the P-STAR from a ground-based prototype to a 40% orbital construction machine.
- Submit patents for over 20 more space construction machines, tools and structural design elements.
- Formalize working relationships with contractors and subcontractors for space construction components and control software development.
- Establish industry norms and common communication protocols for control and operation of space construction assets.



Observer Drone

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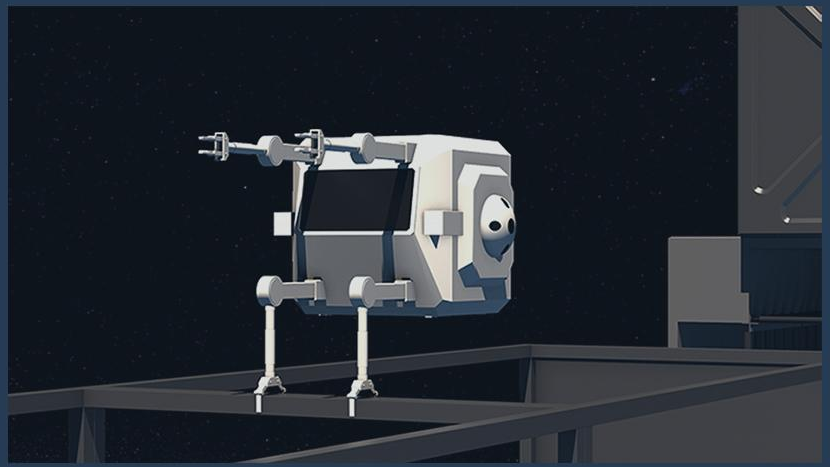
Financials

Initial funding will allow Orbital Assembly to establish the first company dedicated to space construction with the following important steps:

- Leverage OAC's existing patents:
  - Structural Truss Assembly Robot (STAR) Method Patent.
  - Structural Truss Assembly Robot Apparatus Utility Patent.
  - Structural Truss Assembly Robot Design Patent.
- Key engineering hires.
- Set up a production & testing facility.
- Build a ground-based Demonstrator of the STAR (DSTAR) with automated robotic operation.
- Design, build and launch demonstrator Observer Drone:
  - Contract and offer Observer Drone services to commercial customers.
  - Combine P-Star prototype design with partner companies ambitions.



P-STAR in space

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Let’s work together to initiate the start of the Golden Age of space travel!

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