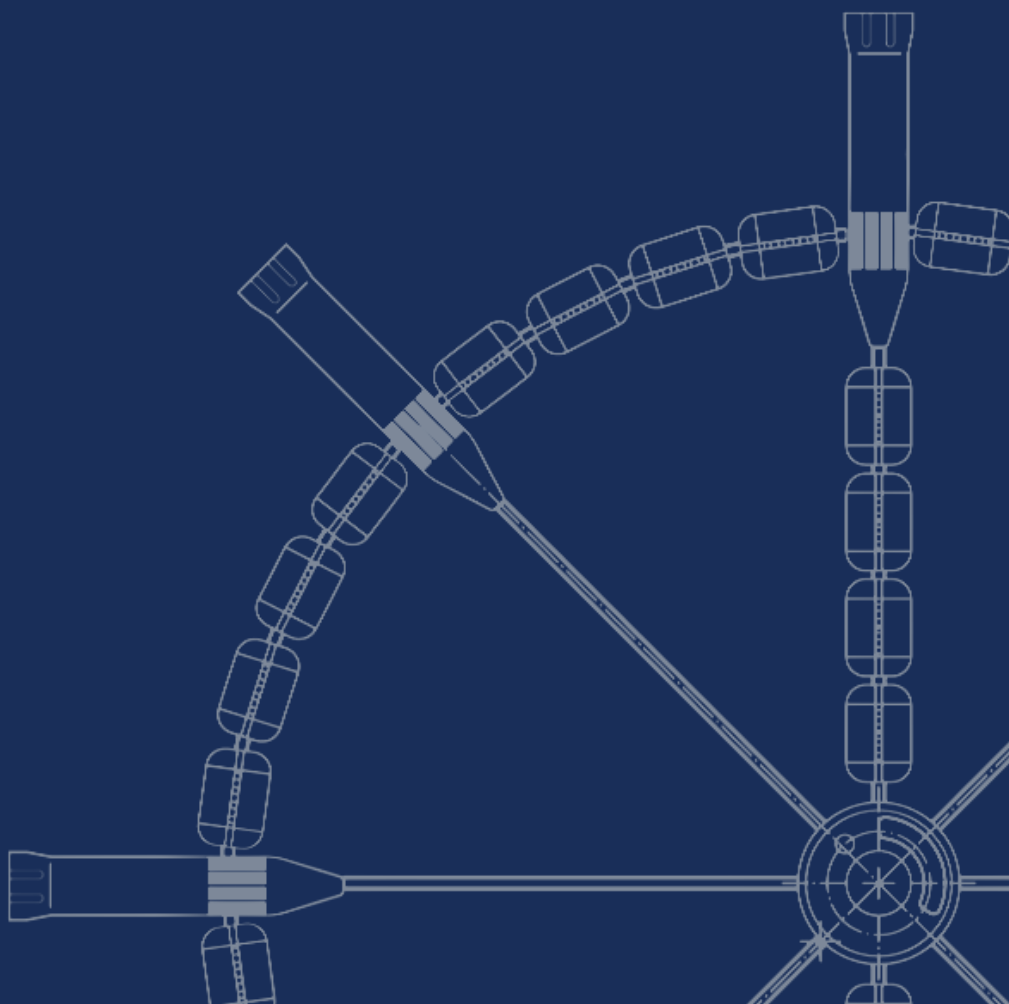
Making Orbit Livable

Whitepaper | Atlantis | July 2025



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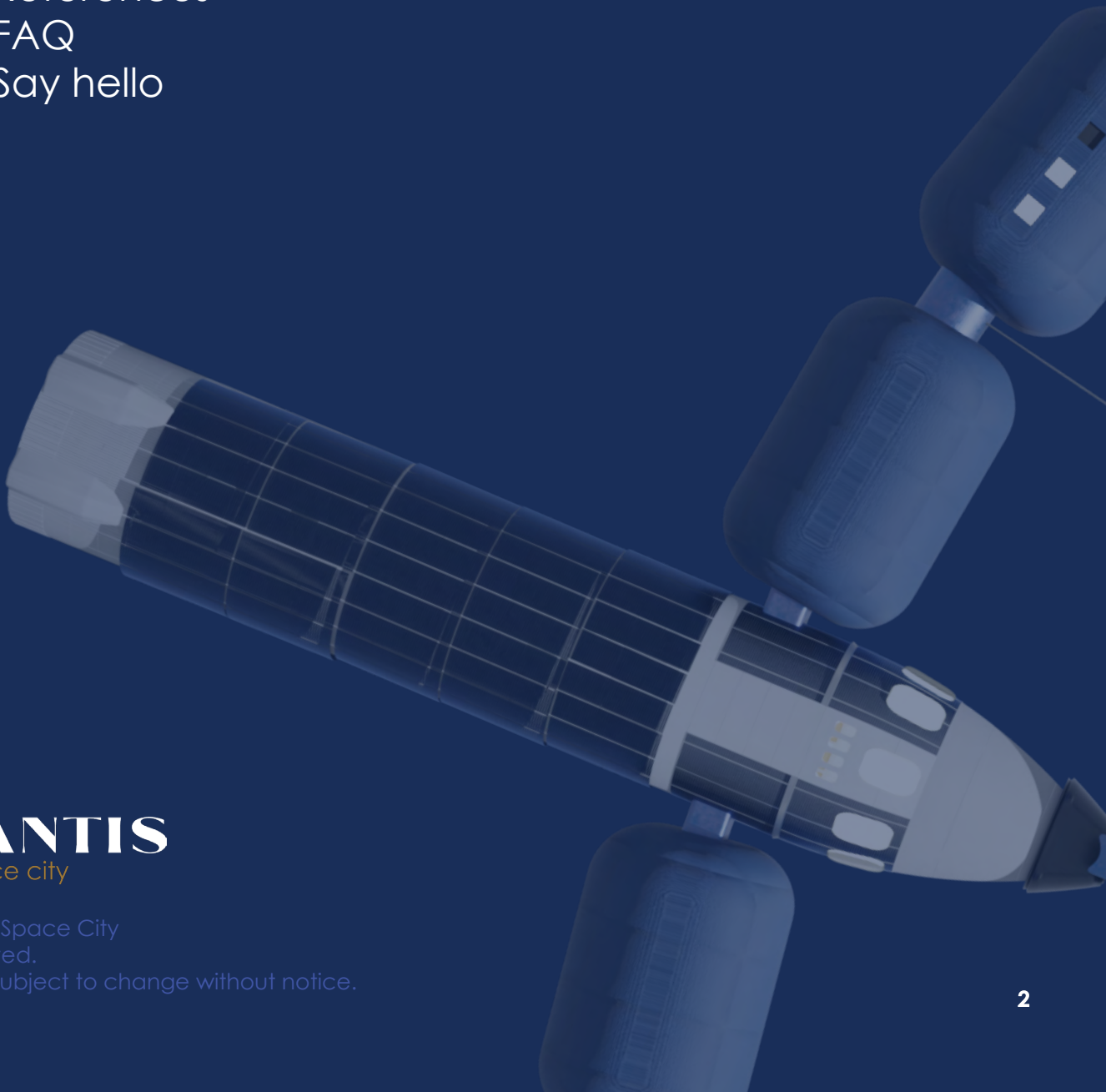


ATLANTIS
space city

Executive Summary

LUXE and PRIME: Pioneering Human Presence in Orbit
Atlantis proposes converting mass-manufactured SpaceX Starships into orbital hotels, research platforms, and long-term infrastructure for Low Earth Orbit (LEO). By leveraging NewSpace advancements—especially reusability, vertical integration, and large-payload vehicles—we aim to make living and working in space economically viable, physically safer, and experientially transformative.

NASA has already selected SpaceX to propose concepts for converting Starships into orbital habitats. Atlantis builds directly on that foundation

Why Now
Space infrastructure has stagnated. Government-led programs are slow and expensive, while commercial orbital platforms remain speculative. However, a convergence of key breakthroughs—such as SpaceX's reusable Starship, low-cost avionics, and mass-manufactured space habitats—has created a narrow yet historic window for a new class of orbital assets. We believe now is the time to act.

Our Approach
We introduce a two-phase project:

- **LUXE** A single retrofitted Starship acting as a luxury microgravity hotel for ultra-high-net-worth individuals. Four en-suite rooms. Amenities include micro-G recreation, spa pod, vertical farming, and an optional EVA experience. Designed to be revenue-positive within two years.
- **PRIME** A rotating ring of eight Starships delivering artificial gravity and a 112-guest capacity. Offers Earth-like comfort in orbit with full amenities, crew quarters, and continuous resupply. Break-even within 5–6 years; lifetime value in the tens of billions of dollars.

Core Advantages

1. Reusability & Cost Reduction: We exploit Starship's reusability and pre-integrated systems (maneuvering, oxygen, thermal, structure) to bypass years of station design.
2. Modular Scalability: LUXE revenue and infrastructure serve as the seed for PRIME. Later versions could support R&D, manufacturing, defense, or even planetary staging.
3. New Guest Paradigm: By partnering with luxury brands and minimizing astronaut-level training, we reframe space travel as an exclusive but attainable luxury and research experience.

Market Potential

- 28,000 individuals globally hold $100M+ in assets; 16 million hold $10M+ (Henley & Partners, 2023)
- LUXE breaks even with just 96 guests over a two-year period.
- PRIME requires ~0.004% of the $10M+ asset class to reach viability.
- Long-term business models include space-based manufacturing, orbital R&D hubs, data center operation, astronaut staging, in-orbit maintenance and defense.

Next Steps

- Validate core technical assumptions (Starship cost, conversion feasibility, artificial gravity).
- Secure partnerships (SpaceX, space hab manufacturers, luxury hospitality).
- Begin pre-sales once launch readiness is within 12–24 months.

Our goal is not to replicate the ISS—it is to commercialize orbit. LUXE and PRIME are not just destinations; they are the beginning of a large-scale human foothold in space.

Why Now: A New Chapter for Humanity in Orbit

For the first time in history, building large-scale, habitable infrastructure in space is within reach. Not as a decades-long government program, but as a fast-moving, commercially viable venture. This is made possible by the convergence of three forces: low-cost avionics, ultra-heavy and reusable launch vehicles like SpaceX's Starship, and large-scale, mass-manufactured space hardware from NewSpace companies such as VAST and Sierra Space.

This paper outlines how we can harness those forces to create the next chapter of human presence in Low Earth Orbit. Not just satellites and science labs, but permanent, habitable, revenue-generating destinations. The goal is to transform orbit from a distant frontier into a place where adventurous people live, work, and thrive.

This opportunity is no longer theoretical. Space tourism is already happening. Private space stations are in development. Starship is designed for reuse and scale. With modest adaptation, we can convert its upper stage into a fully habitable luxury module. Its pressurized volume exceeds that of the entire International Space Station. From there, we can expand into artificial gravity platforms, orbital research campuses, and even astronaut staging hubs for missions to the Moon and Mars.

The race to build the first permanent commercial space habitats is underway. A handful of players are developing next-generation stations, each with distinct models, timelines, and target markets. Atlantis differentiates itself through its scalable use of Starship, its direct path to artificial gravity, and a phased business model anchored in guest revenue.

Unlike most players focused on labs or ISS augmentation, Atlantis prioritizes hospitality, usability, and scalability—with a clear path from microgravity to artificial gravity habitation. Our use of existing commercial launch and hardware (COTS + Starship) allows faster iteration and lower capex.

By building on flight-ready spacecraft and adapting them for long-term habitation, we can bypass the slow and expensive cycle of traditional space station development. This is the foundation for Atlantis.

Company	Core Focus	Approach	Launch Date	Total raised? ($)	Key Differentiator	Limitation
VAST	Mass-manufactured, modular habitats	Partnering with SpaceX to launch Haven-1 as a private lab/habitat	Launch planned for **2025–2026**	**$600M**	First-mover for private in-orbit hab	High CAPEX and yet unproven
Axiom Space	Axiom Space ISS replacement and private use-cases	Adding modules to the ISS, then detaching to form a standalone station	First module launch by **2026**	$300M plus $200M in contracts	Strong NASA backing, extensive training ops	Still tethered to legacy ISS infrastructure
Sierra Space	Orbital Reef space station for mixed-use	Inflatable LIFE modules + large truss-based design	Experimental hab already attached to the ISS	**$750M** revenue in 2024	High-volume, multi-partner platform	Complex to coordinate; long timeline
Gravitics	Space-based platforms for a variety of industries	Building functional habs for LEO customers	Launch planned for **2028**	VC-backed	Flexible use-cases	No end-to-end platform or GTM model
Atlantis	Luxury orbital hotel stays	Combines COTS hardware from commercial partners with converted Starship modules from SpaceX	First module launch by **2028**	Privately financed	Leverages mass-manufactured Starship hardware	Dependent on SpaceX & market creation

A Vision Long Imagined—Now Technically Achievable

The idea of building permanent communities in orbit isn't new. As far back as the 1950s, Wernher von Braun envisioned a rotating space station that used centripetal force to simulate gravity (NASA, 2016). The concept was sound. Einstein's equivalence principle shows that acceleration and gravity are indistinguishable to the human body. But for most of the last century, the hardware to execute that vision simply didn't exist.

Even during the Apollo era, infrastructure remained expensive and short-lived. Yet Apollo proved that bold, ambitious projects once considered science fiction could become reality.

The benefits of space exploration have already reshaped modern life: GPS, satellite communications, climate monitoring, disaster response, crop optimization, solar panel advances, and space-based science. A generation of scientists and engineers was inspired by a single moon landing. But the potential ahead is even greater. Like the early days of global exploration, space opens new terrain for progress—economic, technological, and social. Space tourism, orbital manufacturing of semiconductors and replacement organs (McKinsey & Company, 2022), asteroid mining, solar powered server farms (IBM, 2024) and new in-space communities will create meaningful opportunities for those willing to venture first.

Throughout history, the most transformative frontiers have been shaped by individuals bold enough to act—and by systems that rewarded performance over pedigree. Space could be no different. It has the potential to become a meritocratic environment, where contribution matters more than background, and where access is determined by skill, collaboration, and ambition.

In that sense, space is more than the next economic opportunity. It's a chance to build new systems—ones that are more open, more dynamic, and more focused on human potential than those we've inherited.

The greatest opportunity space offers is not wealth. It's the betterment of society.

NewSpace

Space exploration is at a turning point. Breakthroughs in lightweight, high-performance computing have made autonomous rocket landings routine—something not feasible until recently. As of 2025, only 6% of Falcon 9 launches use new boosters; many have flown over twenty times (SpaceNews, 2025).

This leap enables reusability. Launch vehicles that can fly repeatedly with minimal refurbishment reduce the cost of access to orbit dramatically. While full refuel-and-relaunch capability is no't here yet, the trend is accelerating.

Meanwhile, private space companies are rewriting how hardware is manufacturedgets made. Rather than sourcing from bloated supply chains, firms like SpaceX, Sierra Space, and VAST build most of their systems in-house. The result: lower costs, faster iteration, and systems that are built to scale.

Smaller players, too, are capitalizing on low-cost electronics and modular systems. Advances in energy storage, solar arrays, and compact avionics have enabled small science and communications payloads to reach orbit at a fraction of the historical cost.

Taken together—reusable launch systems, vertically integrated manufacturing, and accessible hardware—we are entering a new era. Space is no longer a government-led domain of billion-dollar line items. It is becoming a commercial, iterative, and increasingly affordable platform.

The space economy is already growing rapidly (Anderson C., 2023). But this, we believe, is only the beginning. A new generation of orbital industries—space tourism, in-space manufacturing, defense, and research—will materialise within the next decade.

Starship

At the center of this shift is SpaceX's Starship. Combining full reusability with ultra-heavy lift capacity greater than Apollo's Saturn V (SpaceX, 2020), it offers launch costs and payload volumes unprecedented in commercial space. Starship can carry large platforms to orbit—reducing or eliminating the need for expensive in-orbit assembly—and its original design is intended to house astronauts on 4-month interplanetary missions to Mars. In 2023, NASA selected SpaceX under its CCSC-2 program to explore converting Starship into a permanent orbital habitat (SpaceNews, 2023). It is even being considered as a Lunar habitat (Monat et al., 2021).

As configured to permanent in-space habitation, Starship architecture brings three major advantages;

1. Pre-integrated systems—propulsion, thermal regulation, shielding and ECLSS (Environmental Control & Life Support Systems)—reduce the need for custom engineering.
2. Mass manufacturing makes it inherently more cost-effective than developing and building bespoke station modules.
3. Volume efficiency—the vehicle itself becomes the habitat, avoiding internal payload packaging, thereby maximizing usable space.

A standard Starship offers over 1,000 m^3 of pressurized volume—on par with the entire ISS (NASA, 2025). Built-in systems could support a habitat in the following, specific ways:

- Main engines and secondary thrusters for propulsion
- Oxygen fuel tank to supply station air
- Fuel tanks and main engines as heat sinks
- Meteorite impact resistant hull for long-term habitation in LEO
- Interplanetary radiation shielding suitable for long-term habitation in LEO
- Additional engine and tank mass for station thermal stability
- Use of methane fuel tanks as nitrogen and water storage tanks
- Rocket propellant as fuel for back-up power generators
- Moon/Mars configuration ingress/egress section becomes an EVA hatch

Our approach combines Starship with Commercial Off-The-Shelf (COTS) hardware that is either already available or nearing readiness. Starship is more than a launch vehicle—it's a shortcut to infrastructure. SpaceX aims to manufacture x1000 Starships per year, with one factory already completed at Starbase in Texas and another one being built in Cape Canaveral (SpaceX, 2025). By adapting a mass-produced, human-rated spacecraft, we leapfrog the slow, costly cycle of custom station design. A private venture built on this platform can deliver high-capacity, modular habitats at a fraction of traditional costs.

This approach unlocks pathways to scalable orbital platforms for tourism, research, manufacturing, and defense. With modular Starships arranged in a rotating ring, artificial gravity becomes achievable—bringing comfort, safety, and accessibility to everyday human activity in orbit. Gravity simplifies everything from movement to meals to maintenance, making long-term presence not only feasible, but desirable.

The following sections outline the business model, design strategy, and project structure for building single and multi-module platforms based on Starship architecture.

Why Now, and Why Us?

A natural question arises: if this is so viable, why has it not happened already? Why has SpaceX — or anyone — not built an orbital hotel yet?

Only recently have the ingredients aligned: reusable launch systems with ultra-high mass capacity, low-cost avionics, and a viable market of ultra-high-net-worth individuals seeking unique experiences.

Earlier attempts failed because the infrastructure didn't exist, or because government programs weren't designed to move fast. What has changed is not the ambition—but the engineering.

Business model & timeline

From Solo Stays to Orbital Resorts: A Phased Model

Atlantis begins with two orbital platforms, developed in phases.

LUXE is the first. A single converted Starship upper stage, transformed into a microgravity luxury hotel in Low Earth Orbit. It offers four private guest suites, full crew support, and curated in-orbit experiences. Think of it as a remote mountaintop retreat—except the view is of Earth itself.

PRIME is the expansion. A rotating ring of eight Starship-derived modules creates artificial gravity and offers space for over 100 guests. With full amenities, large event spaces, and long-term crew support, it represents a new class of orbiting infrastructure: part floating resort, part research campus, part future city. PRIME feels less like a vessel and more like a place to call home. Its artificial gravity makes movement and human presence in space feel natural and permanent.

Rather than reinventing the station from scratch, we're adapting and integrating what already exists. The result is a cost structure that allows for profitability. Below we list fundamental cost assumptions for this new paradigm. They are based on direct quotes from SpaceX as well as indications by NewSpace players. They are relevant to a 2030 timeframe.

Item	Cost assumption (2030)
Single Starship launch (>100T to LEO)	**$10-30M**
Purchase price of single Starship module (upper stage only)	**$30-60M**
Ground training for clients & crew (per person)	**$0.1 – 1.0M**
Space hab provided by NewSpace contractor (e.g. Gravitics, Sierra Space or VAST)	**$40 - 110M**

Market

While space tourism, R&D, defense, and manufacturing are all viable markets for orbital platforms, this paper focuses on tourism as the initial revenue driver.

As of 2025, there exist roughly 28,000 people globally with assets over $100M, including 2,350 billionaires (Henley & Partners, 2023). Assuming a ticket price of $10M for a 5-night stay in space, bundled with transport & ground training, only a few of these wealthy individuals will need to part with 10% (or less) of their assets. If, as assumed in the PRIME concept, a ticket price of $1.5M per stay can be achieved, that opens up a market of 16 million people with assets over $10M who might be willing to part with <15% of their wealth for a trip to space.

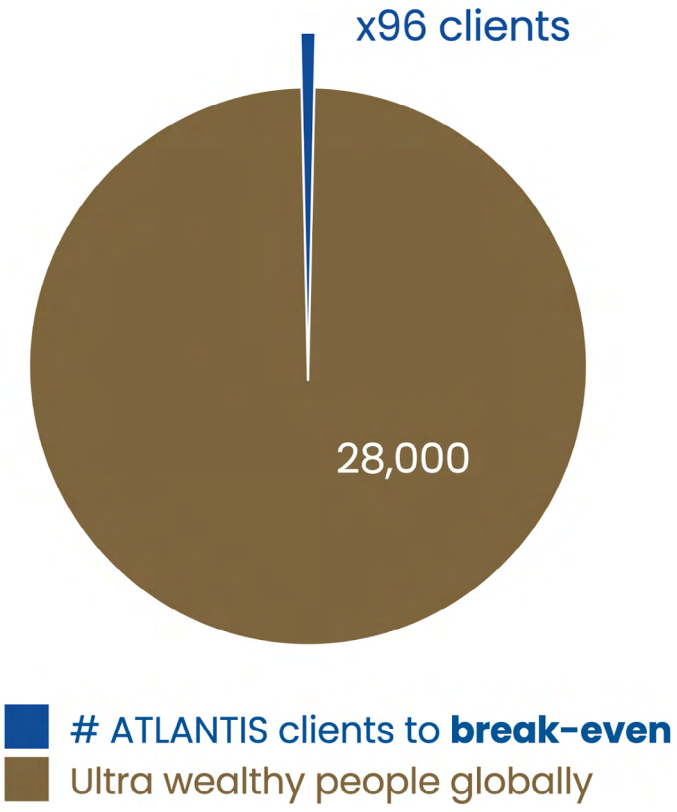
To avoid the overly optimistic projections of past space tourism ventures, we use a bottom-up model focused on breakeven thresholds.

LUXE Business Model: Breakeven Within Two Years

LUXE is designed to operate as a four-room luxury hotel in orbit, hosting monthly guest cohorts for five-night stays. With projected monthly revenue of $40 million and operating costs of $35 million, the model reaches breakeven within two years. After that, it generates approximately $60 million in annual recurring profit.

Initial development and deployment is estimated at $120 million, including launch, in-orbit validation, ground operations, and interior fit-out. Once operating, the station is serviced by a monthly Starship passenger launch that delivers guests, supplies, and crew rotations.

At $10 million per guest stay, LUXE reaches breakeven with just 96 bookings across two years. That's 0.34% of the world's 28,000 individuals with more than $100 million in assets.



The addressable market is real—and underexplored. Many of these individuals already invest in unique, high-end experiences. Some may book repeat visits or purchase entire cohorts for private events. The opportunity for LUXE is not volume, but exclusivity.

LUXE Specifications	
# of converted Starship modules	1
# of guest rooms	4
Artificial gravity	No
Amenities	Spa, fresh food & room service, observation & relaxation pods, micro-G playground, events & performances, gym, space yoga
EVA experience	Yes

Taking into account the cost assumptions in the previous section, we project a station cost of $120M, which includes launch, ground operations/ organisation, and the pre-fabricated interior of LUXE. **Below is a breakdown.**

LUXE cost estimate	Cost assumption
Pre-fabricated Starship upper-stage (incl. launch)	**$60M**
In-orbit testing & validation	**$40M**
Ground operations (incl. crew & guest training facilities)	**$20M**

LUXE assumes one guest cohort per month, each staying five nights. With four rooms priced at $10M, monthly revenue reaches $40M.

Operating costs are projected at $35M per cohort, including:

- $20M for Starship transport
- $8M for guest training
- $5M for maintenance (three annual service launches)
- $2M for operations and overhead

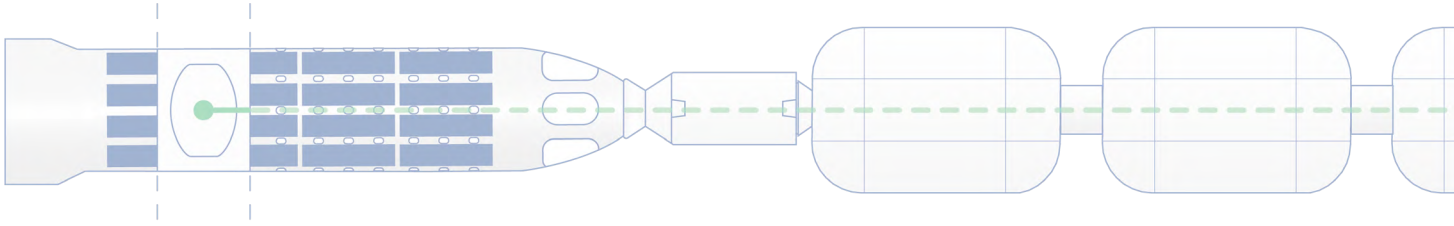
This yields $5M in monthly net income. Over two years, the $120M upfront cost is recouped, after which LUXE generates $60M in annual profit.

Below is a summary of the worst, best and standard-case (above) revenue and payback scenarios.

LUXE payback scenarios	Worst-case	Standard-case	Best-case
# guest launches per month	**0.5**	**1**	**2**
# guest rooms booked per year	**24**	**48**	**96**
Revenue per month ($M)	**20**	**40**	**80**
Costs per month ($M)*	**21**	**35**	**63**
Monthly net income ($M)	**-1**	**5**	**17**
LUXE payback period	**NA**	**2 years**	**7 Months**
Recurring annual net profit	**-$10M**	**$60M**	**$204M**

**Efficiencies are gained in the best-case scenario, where monthly station maintenance costs and company ground operations remain stable with increasing revenue.*

Traditional stations require complex life support systems to recycle air, water, and waste due to infrequent resupply. In contrast, LUXE benefits from monthly launches that deliver oxygen, water, food, and remove waste—enabling a simpler, lower-cost Environmental Control and Life Support System (ECLSS) design.



PRIME business model

PRIME is a larger platform designed for artificial gravity at 0.8g, achieved through rotation. Artificial gravity reduces training requirements and simplifies daily operations, from navigation and stowage to food prep and guest services.The principle of artificial gravity in space stations has been studied since the late 1800s. No novel approach or breakthrough in physics is required to generate it. A result of centripetal acceleration, the main challenge is achieving the structural integrity of the station required to accommodate it (Clément & Buckley, 2007).

PRIME Specifications	
# of converted Starship modules	**8**
# of guest rooms	**56**
Artificial gravity	**Yes**
Amenities	All those included in LUXE plus: botanical gardens, cocktail bar, multiple dining experiences, large event spaces, executive suites
EVA experience	**Yes**

Considering the base cost assumptions in the previous section, we project PRIME's design, development and assembly cost in the range of **$4 -11BN**, which includes launch, ground operations/organisation, and the fabrication of unique station elements.

PRIME cost estimate	#	Unit cost ($M) Best case	Unit cost ($M) Worst case	Total ($M)
Sierra LIFE 1400 / VAST / Gravitics modules	41	40	110	1640 - 4510
Construction launches (incl. Starhabs)	60	10*	28	600 - 1650
Operations (incl. assembly & ground testing)	1	350	960	350 - 960
Starhabs (pre-fabricated)**	8	30*	60	240 - 480
Central connecting hub	1	200	550	200 - 550
In-orbit assembly equipment	1	200	550	200 - 550
Control & station management software	1	100	275	100 - 275
Station interior	1	60	165	60 -165
Connecting cables & trusses	1	50	140	50 -140
ERV (Emergency Return Vehicle)	1	20	55	20 - 55
Project management (5%)	1	173	475	173 - 475
Other (10%)	1	346	950	346 - 950
Total ($M)				**3979 - 10759**

**Here we assume $10M/launch cost for Starship which drives significant efficiency. Considering the implementation of PRIME will occur a number of years after LUXE, we are simply assuming increased Starship launch efficiency achieved by SpaceX. The same goes for the cost of each individual Starhab.*
***We use the term Starhab to represent a Starship upper-stage converted into a long-term orbital habitat.*

The primary cost drivers for PRIME include modular habs (from Sierra Space, VAST, or Gravitics), construction launches, ground testing, and Starhab outfitting. Validating these inputs will be a key focus in the next phase of development.

PRIME hosts 112 guests across 56 double rooms, with premium suites priced at $1.5M and executive suites at $2.5M. At full capacity, each guest cohort generates $92M in revenue and $62M in net income, yielding $744M annually.

Key revenue assumptions:
- 8 executive suites per guest cohort = $20M
- 48 premium suites per guest cohort = $72M
- 1 launch per month = $1.1B annual revenue

Monthly costs total $30M, including:
- $10M per passenger Starship launch
- $10M for maintenance
- $5M for guest training
- $5M for crew, ops, and marketing

With a best-case development cost of $4B, PRIME reaches payback in 5–6 years. This requires **4,032** guests—or just 0.0042% of the 16 million individuals with $10M+ in assets. There is therefore capacity in the market for multiple PRIMEs.

Below is a summary of the worst, best and standard-case revenue and payback scenarios.

PRIME payback scenarios	Worst-case	Standard-case	Best-case
# guest launches per month	0.5	1	3
# guest rooms booked per year	336	672	2016
Room occupancy*	12.5%	25%	75%
Revenue per month ($M)	46	92	276
Costs per month ($M)	22.5	30	60
Monthly net income ($M)	23.5	62	216
Recurring annual net profit	$282M	$744M	$2592M
PRIME payback period | 4BN – best case construction cost	14 years	6 years	1.5 years
PRIME payback period |11BN – worst case construction cost	38.5 years	16.5 years	4 years

**75% occupancy (or x3 guest cohorts per month, staying 7-nights each) allows a minimum of seven days per month for station maintenance and crew downtime*

A major dependency of the business model is launch cadence. If only a low launch cadence is achieved, it will significantly extend the payback period for PRIME. If however, a full guest occupancy can be achieved (75% with station downtime) at three launches per month, profitability of PRIME dramatically increases.

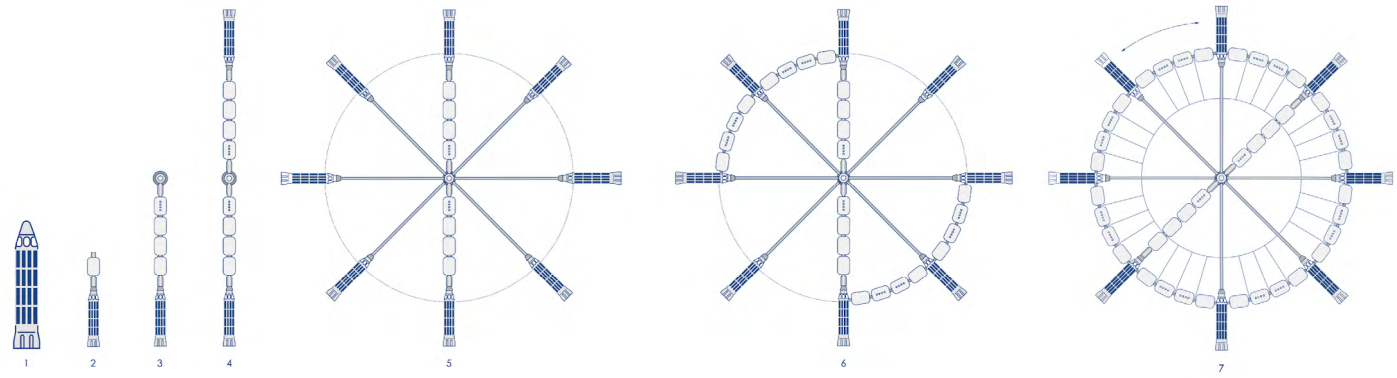
The construction of LUXE and PRIME can be combined. As LUXE is built and launched, it will generate revenue and market credibility. That revenue can be used as leverage for further expanding the station into PRIME (with LUXE as the anchor module). At the same time, the PRIME development will build on LUXE's design, partnerships, and component sourcing.

PRIME is a more complex project, so starting with LUXE allows us to mitigate risk and validate operations. With Starship already in development at SpaceX, the critical path for LUXE lies in partnerships, pre-sales, and orbital testing.

A realistic timeline is:
- 3–5 years from project kickoff to LUXE operations
- 5–7 additional years to expand into PRIME

If funding begins in 2026, guest operations could start by 2028, with PRIME completed around 2035.

The following diagram outlines the proposed construction sequence.



Concept construction sequence for PRIME

1. The LUXE Starhab is launched and operates as a luxury space hotel
2. As credibility is generated and further financing is raised, LUXE is expanded. During this phase, normal LUXE hotel operations continue.
3. The central connecting hub is installed
4. A second Starhab is installed, at which point initial spin tests are conducted to validate artificial gravity
5. PRIME's Starship ring is assembled. The noses of the Starhabs are connected to the connecting hub through steel tethers.
6. The connecting hubs are installed (eg. VAST/Sierra Space/Gravitics) along with the secondary tethers
7. With the assembly complete, final spin tests are conducted after which guest operations begin.

Market Approach: Designing the World's Most Memorable Hotel Stay

Space is unfamiliar, even intimidating. For most people, it's something only astronauts or thrill-seekers consider. To make space tourism truly viable, that perception must change. The goal is not just to visit a station—it's to create an experience as refined, seamless, and unforgettable as the most exclusive destinations on Earth.

This begins with design. LUXE and PRIME are more than space hardware—they're hospitality environments. From private guest suites and observation pods to curated dining and wellness experiences, every detail is meant to evoke comfort, elegance, and wonder. Partnerships with established luxury brands—such as hotel groups, event curators, and premium airlines—will help deliver that standard from end to end.

A guest's experience begins well before launch. Training and orientation will take place at a partner resort where future guests meet, attend talks from former astronauts and prior guests, and prepare together. This shared anticipation creates both readiness and community.

Once in orbit, guests will be offered microgravity or artificial-gravity stays depending on the station, along with optional EVA training for spacewalks. Events onboard will include intimate concerts, talks by renowned thinkers, and private gatherings with Earth as the backdrop. Every moment is curated for meaning and memory.

After the mission, guests return not just as tourists but as members of a rare community. Medallion ceremonies, reunion events, and an exclusive members club extend the experience far beyond reentry. For many, it will be the most unique—and perhaps transformative—journey of their lives.

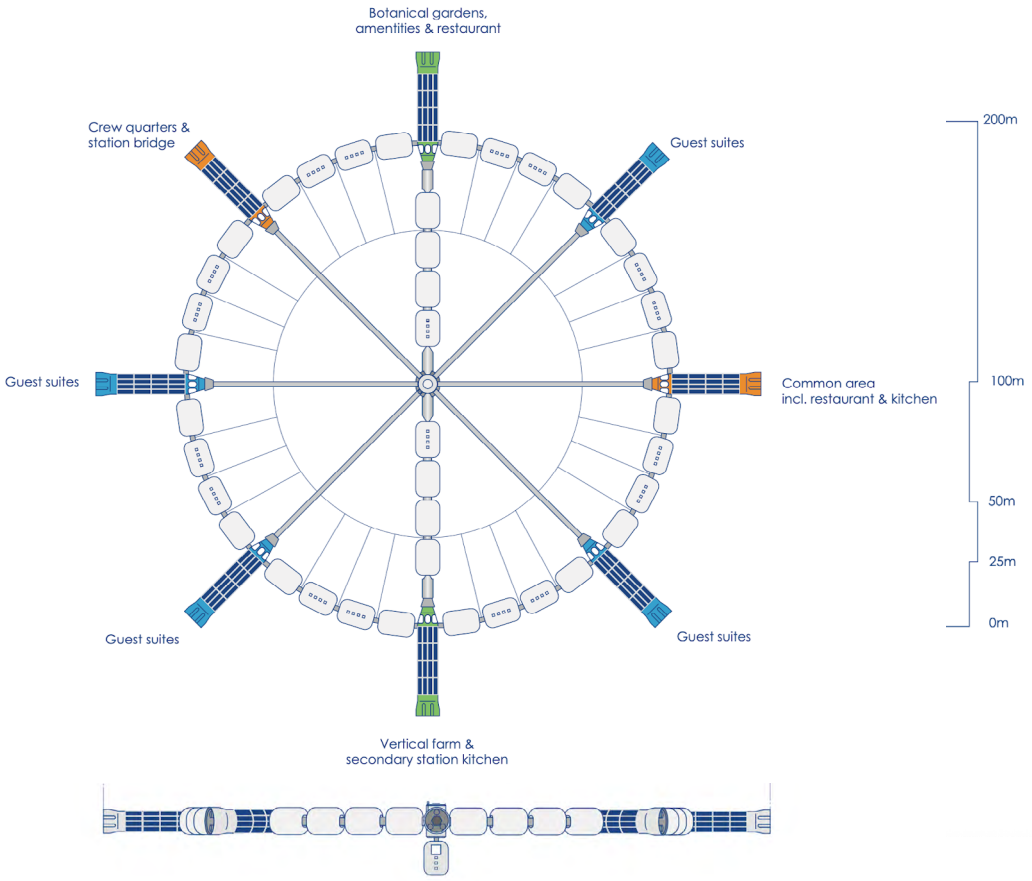
Design Concepts

Both LUXE and PRIME are based on converted Starship upper stages, which offer over approximately 1,000 cubic meters of pressurized volume—equivalent to the entire pressurized volume of the ISS. The difference lies in scale and gravity.

LUXE is a single-module microgravity hotel. Guests float between private suites, a central dining space, a yoga and wellness pod, and an open observation zone facing Earth. A crew of ten manages operations, service, and safety. The station is periodically resupplied, reducing the need for complex life support systems and allowing for fresh food, frequent cleaning, and comfort amenities. The layout is designed for clarity and calm: crew and guest zones are separated, and every space is shaped around ease of movement in microgravity.

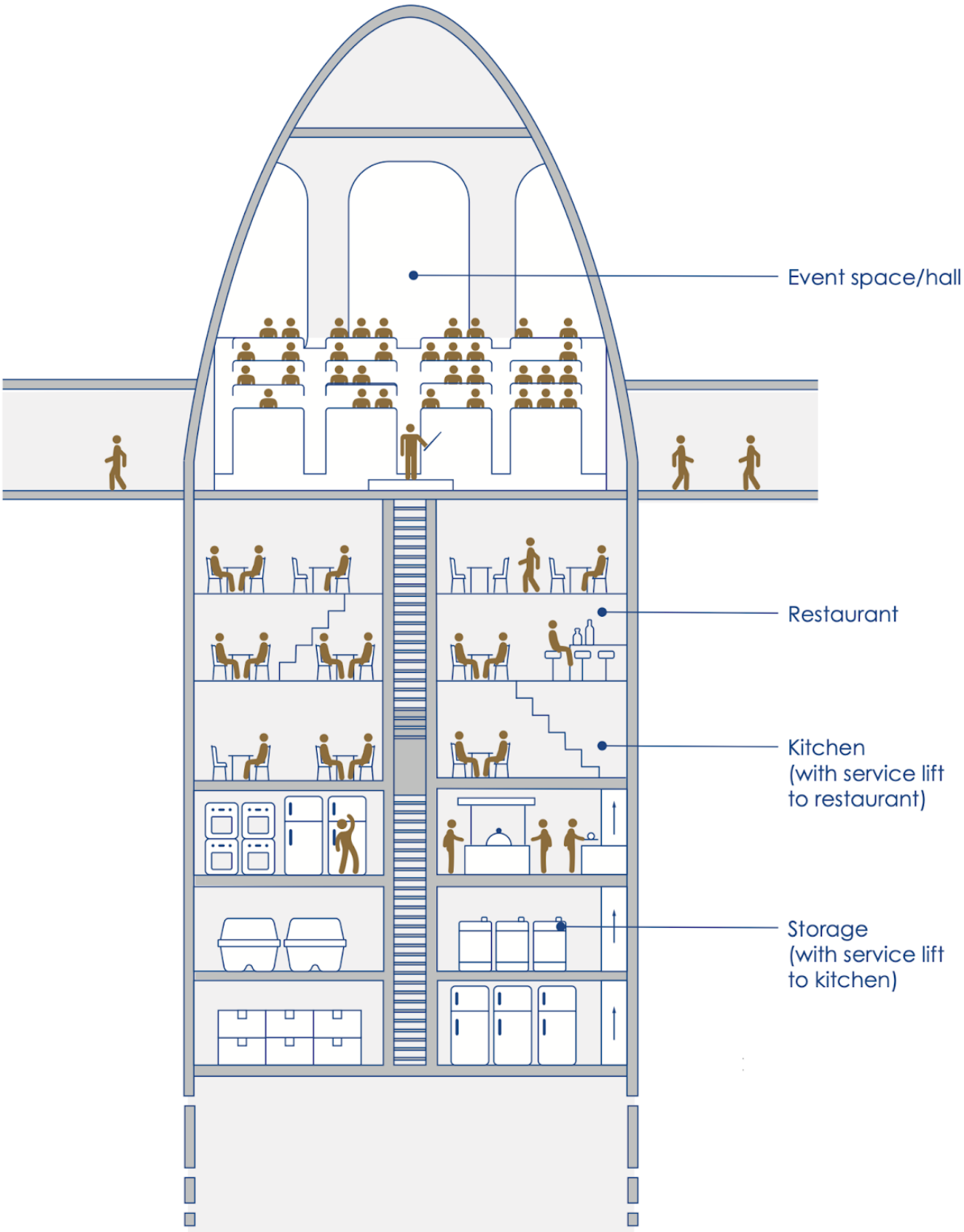
PRIME is a rotating ring of eight interconnected Starhabs that generates 0.8g of artificial gravity through rotation. With up to 112 guests, it feels more like a resort or campus. Suites line the outer ring; botanical gardens, lounges, restaurants, and performance spaces are distributed throughout. Guests arrive through a central, zero-gravity docking hub and travel outward via elevator shafts to the ring. PRIME is engineered for livability, allowing for ordinary routines—walking, dining, exercising—in an extraordinary location.

Where LUXE is intimate and elemental, PRIME is expansive and social. Both are designed to maximise comfort, orientation, and usability while minimising any anxiety of being in space.



Overhead and cross-sectional views of PRIME
The inner diameter of the rotating ring is 200m - large enough to create 0.8g on the main deck without risking nausea in guests - and the different Starhabs will function as guest suites, common areas, restaurants, vertical farms, a botanical garden & wellness center, crew quarters and a station bridge.

PRIME Starhab – Restaurant & Event Module
A concept layout showing the main restaurant and events space, with internal stairs and elevators operating under artificial gravity.



LUXE design

Starship's upper stage offers a uniquely spacious platform for orbital operations. When repurposed for habitation, unnecessary reentry systems—such as heat shields, header tanks, fins, and landing legs—can be removed, freeing up payload mass (Monat et al., 2021). The hull is micrometeorite-resistant and structurally suited for features like large cupola windows.

A docking port near the midsection, already present in the HLS variant, enables safe crew transfer. The ship's in-orbit refueling design also allows for contingency return-to-Earth options.

For LUXE, we propose the following onboard features:

- Four en-suite double guest rooms
- Yoga and workout space
- Dining area and hotel kitchen
- Microgravity playground
- Vertical farm and spa pod
- Crew quarters for 10, with separate mess, gym, and social space
- Observation and relaxation pods next to panoramic cupolas

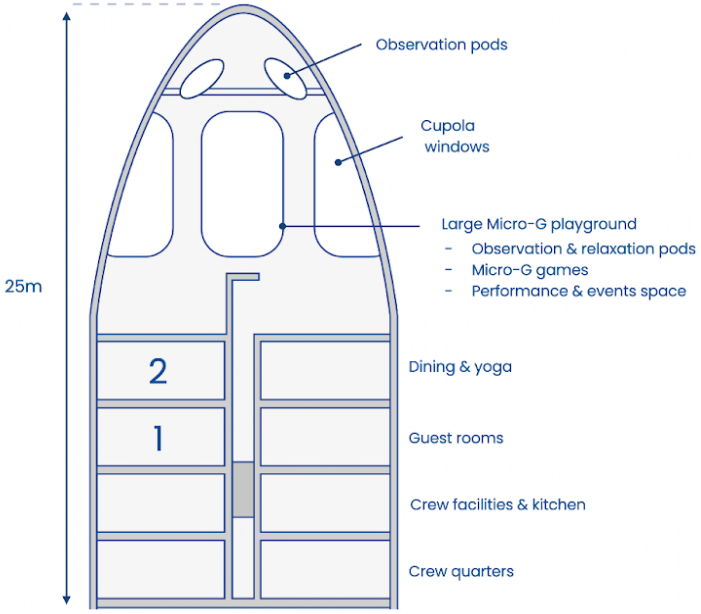
These elements are distributed across multiple decks, connected by a central spine for zero-G navigation. Clear separation between guest and crew zones ensures both comfort and operational efficiency. The considerable internal space offered by Starhab means that multiple configurations and variants are achievable.

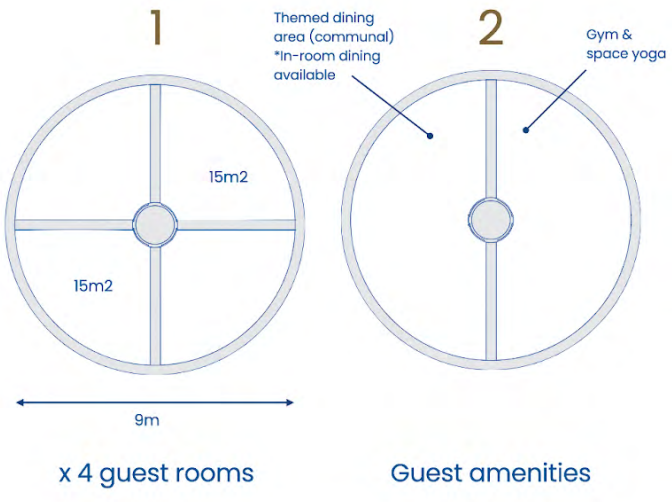
Atlantis LUXE - a luxury orbital hotel
A single converted Starship upper-stage (aka 'Starhab') retrofitted before launch.

We see potential for the following amenities and guest experiences:

- Fresh food from the station's vertical farm & zero-G recipes as part of the guest dining experience
- Comfortable and cosy suites which provide guests ample space to float around privately. Each guest suite offers at least one viewing portal. An en-suite bathroom and zero-G shower make guests feel at home and ensure privacy.
- A micro-G playground offers different games for guests to enjoy by themselves or amongst one another
- Observation pods offer privacy and a chance to reflect. These are located in the guest rooms as well as the micro-G playground. Guests can strap themselves in, don headphones and reflect upon the view of Earth in a cocoon of comfort and peace
- Live performances and talks given in the zero-G common space
- Station tours explaining facilities and the technicalities of the orbital hotel
- In-room dining
- An EVA experience which is trained for before the fligh

It's possible for LUXE to accommodate more guest rooms. However, doing so risks overcrowding the luxury experience and may also strain the ship's resources including limited crew. We therefore recommend fewer rooms and a richer experience along with a higher price tag. As an optional add-on, EVA experiences are offered to guests. However, these will require training beforehand and should only be selected by those most adventurous souls.





Concept layout of the interior of LUXE
The hotel will house guest rooms, dining & wellness areas, crew facilities & kitchen, a vertical farm, crew quarters and a large micro-G playground including observation pods.

PRIME design

PRIME is an ambitious expansion of the LUXE model, offering over 60,000 m³ of pressurizable volume—roughly 60 times that of the ISS. The primary engineering challenges include connecting Starhabs into a rotating structure and reinforcing it to withstand centripetal forces. Both are manageable using near-term solutions.

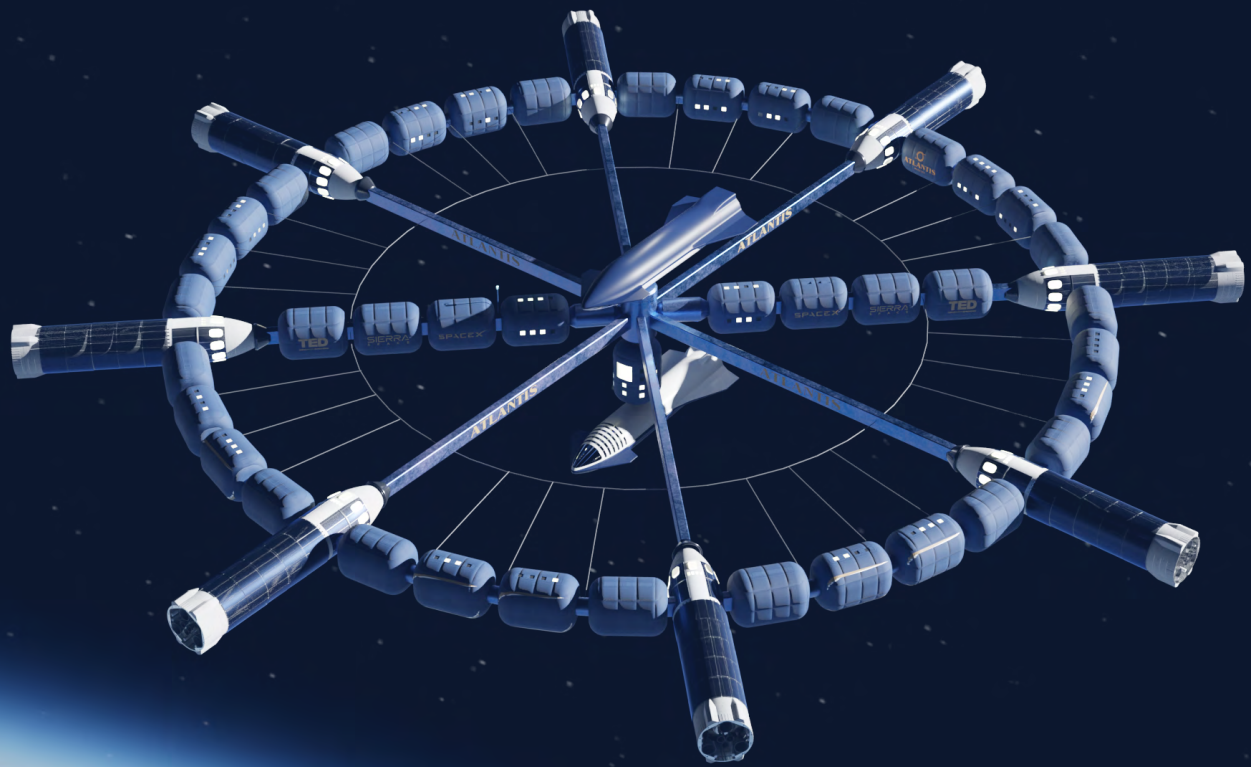
Our concept builds on NASA's CCSC-2 collaboration with SpaceX to explore converting Starship into orbital habitats (SpaceNews, 2023). It combines the "Starhabs" with Commercial Off-The-Shelf (COTS) hardware that is currently available or will be in the near future.

The design consists of eight Starhabs connected in a ring by standard or inflatable habs which are angled at their connection points to create curvature. From the nose of two opposite Starhabs, a central spine of connecting habs extends inwards towards a central hub and docking bay. The central hub is the most challenging element of the station as it must be designed to withstand significant centripetal load. Along with the central spine, it is connected to anchoring tethers which extend to the noses of the other Starhabs and through secondary tethers to the docking ports between the ring habs.

Specifically avoided in PRIME's design is the use of novel trusses or walkways between the Starhabs. These would involve the design of completely new hardware and pose significant implementation risks. By connecting existing hab designs (e.g. provided by Sierra Space, VAST or Gravitics) in series, the risk is mitigated. The connected habs also provide more pressurizable volume which can be used for stowage, ECLSS, event spaces and crew quarters.

A crucial aspect of PRIME's design are its load-bearing points. The Starhab hulls are already robust as Starship is designed to be lifted by its nose on Earth (Ringwatchers, 2024). However, additional design features reinforce the load-bearing points along the ring – mainly those on the Starhabs. Load-bearing cross-members are installed across the ports connecting the Starhabs to the ring. These are internally connected by a tether to the Starhab's nose which itself connects to the main support tethers emanating from the central hub.

Concept design of PRIME
A central hub supports a connecting spine and radiating trusses. Secondary tethers bear centripetal load across the connecting hubs. In the centre, a large hab serves as a docking bay as well as micro-G playground for guests. Guests and crew navigate along the spine using elevators.



We have summarized the main engineering challenges along with the relative risk of implementing them:

1. Design of central hub to withstand centripetal load (risk level: 8/10)
2. Reinforced, loadbearing points on Starhab hulls (risk level: 8/10)
3. Complex assembly procedures including installation of the tethers (risk level: 7/10)
4. Conversion of Starhab tanks into oxygen/nitrogen storage as well as heat sinks (risk level: 6/10)
5. Curved connection points between ring habs (risk level: 6/10)
6. Automated docking software (risk level: 4/10)
7. In-space rotation tests and ground load tests (risk level: 4/10)

As these challenges are overcome, we see potential for PRIME to offer profound and unique guest experiences in orbit. These include but are not limited to:

- Large double rooms and executive suites with all the amenities typically found in a luxury hotel on Earth, including normally functioning bathrooms and showers
- Multiple dining options along with in-room service
- Access to fresh fruit, fish, eggs and chicken through extensive onboard vertical farms, aquaponic facilities and chicken coops
- A large micro-G playground
- Auditorium for talks and live performances
- Event spaces
- Cocktail bars and whiskey rooms
- Observation, relaxation areas and quiet spaces including an on-board botanical garden
- Gym, yoga and personal training options
- Personal coaching
- Station tours
- EVA experiences
- Earth and deep space views from every room

A more detailed exploration of PRIME's technical design can be requested from the Atlantis website.

Operations

LUXE & PRIME's operational requirements are paradigm shifted compared to typical space stations. This is due to monthly or even bi-weekly resupply flights, access to retrofitted Starship upper-stage systems and artificial gravity introduced on PRIME.

Guests & crew

Re-supply flights
Both LUXE and PRIME will benefit from monthly resupply flights in the form of Starship passenger shuttles transporting guests. As Starship is designed to carry well over 100 tons to orbit, there will be plenty of extra capacity to carry additional supplies to the hotels – even in the case of delivering 112 guests to PRIME.

Additional supplies could include fresh water, oxygen, food and other consumables. The ability to regularly top up the station water supply means the ECLSS systems can be greatly simplified. Water will not need to be recycled as much or as long. And a lot can be used by guests and crew. The same goes for oxygen. Where long-term space missions look to break-down CO2 exhaled by astronauts into oxygen, reinjecting that oxygen into the cabin (European Space Agency, 2025), doing so will not be necessary for LUXE or PRIME. Simple scrubber systems will do the job of maintaining safe CO2 levels, and oxygen tanks will be topped up regularly through resupply flights.

Food can be fresher and less compact. We say goodbye to freeze dried, stale astronaut meals and hello to fresh produce prepped daily for guests. Doing so leads to healthier crew, happier guests and a better mindset for all. Consumables including wet wipes, paper towels, utensils for daily use will all be regularly replenished. Conversely, trash as well as black water will be regularly removed from the stations, reducing stowage and compacting requirements.

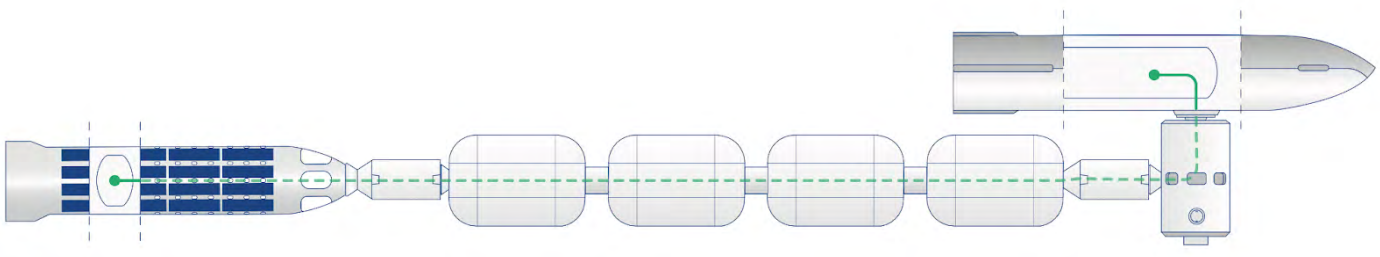
Crew requirements
LUXE and PRIME, despite serving as luxury hotels, are fundamentally space vehicles travelling at high velocity around the Earth. An emergency situation would be extremely critical for all, whether that is a meteorite impact, solar flare, system malfunction or debris avoidance manoeuvre. Therefore, it will be important to have a clear crew hierarchy, with clear lines of authority leading up to the station captain who is the ultimate authority. We recommend that ranks be introduced along with uniform insignia denoting such.

Both LUXE and PRIME will require the following expertise of their crew:

- Guest services, event coordination, fitness and wellness
- Navigation, engineering, ECLSS, and EVA operations
- Medical, IT, and security

To provide this expertise, we estimate a crew requirement of ten people for LUXE and forty-two for PRIME. Crew rotation rates can vary depending on seniority and role, with higher ranking positions and those involved in guest services (eg. head of guest relations, head chef etc) generally remaining for longer durations. Rotations are shorter for LUXE to mitigate the adverse physical effects of micro-G but could range from 6 to 24 months for PRIME.

Cross sectional view of PRIME's docking bay and refilling lines
Central refilling lines (green) run from the docking bay to various storage tanks, supplying them with water, oxygen, nitrogen and fuel.



Pre-flight training

Although LUXE and PRIME uniquely offer luxury hotel experiences akin to those found on Earth, with all the amenities expected and hopefully more, the environment guests find themselves in will be different to anything they've ever experienced before, and any emergency situation will be far more critical than on Earth. Space is a dangerous place, and all precautions must be taken.

Training requirements will be lower for PRIME due to its artificial gravity and larger size (and thus greater redundancy). Guests will need to prepare mainly for the micro-G environment of LUXE. Key training here will include; How to deal with disorientation? How to navigate through the station? How to use the facilities? How to drink and eat? How to exercise? How to sleep?

The most important training exercise will be what to do in an emergency situation or if the hotel needs to be evacuated. This will include how to don a flight suit quickly, the general layout of LUXE including the docking port and egress procedure. In a situation where the hotel is critically compromised (e.g. hull breach, ECLSS malfunction, thruster/navigation failure) an Emergency Return Vehicle (ERV) will be sent up to retrieve the guests and crew. Ideally, it will be possible to prep and launch the ERV within 24 hours of any emergency. Training for the rapid onboarding of the ERV and preparation for descent (seat straps & physical readiness) will need to be provided to every guest before their stay.

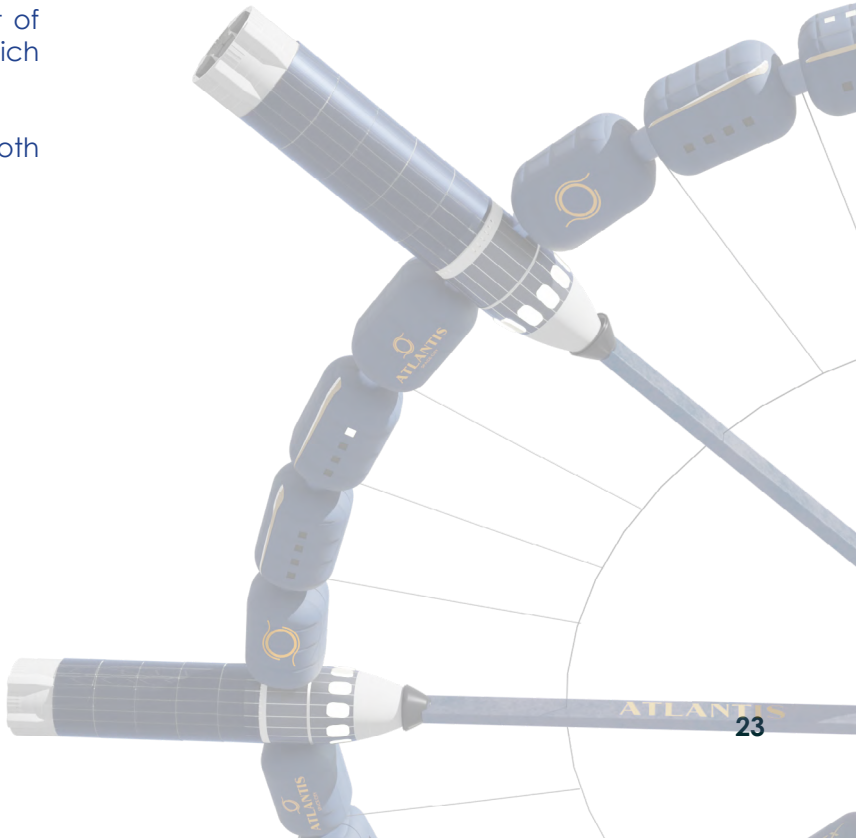
It is difficult to predict how long this training period will be, and how involved, however it's likely that at least 4-6 weeks will be asked of each guest. This period will be shorter for a PRIME guest (eg. 5-days) for the reasons already mentioned. The training for PRIME will focus on the egress procedure which will consist of navigating the station's central spine to its ERV, which is permanently docked to the station.

A doctor and med bay will be available on both stations, for crew or guest injuries/conditions,

Guest orientation experience

Most guests of LUXE and PRIME will not be willing to make the commitments and sacrifices accepted by professional astronauts. During their pre-flight training and orientation, guests will be thoroughly looked after and guided. To begin with, a 5-star luxury resort will be used as accommodation during their training. Socials, dinners, community events and talks are offered to make their stay more enjoyable. Indeed, talks by former LUXE/PRIME crew or guests will serve not only to help orient the new guest cohort, but also to reassure them.

Meeting each other before their stay will garner community cohesiveness and crystalize a post-flight bond, hopefully to continue well after their stay. This is the beginning of their exclusive Atlantis guest club membership. Talks by former astronauts will add a certain flair to the proceedings, and even an amount of anticipation for the orientation itself.



Station

Power

In the case of both LUXE & PRIME, primary power can be provided by solar tiles attached to the outside of the Starhabs and back-up power by fuel cells running off retrofitted Starship upper stage fuel tanks. SpaceX's crewed Dragon capsule is a perfect example of how solar tiles can be attached directly to the hull of a vehicle (Futurism, 2018), removing the need for extensive and bulky solar arrays. There is ample room on the exterior of the Starhabs for solar tiles. Whether the Starhabs can provide enough area to power the entire energy needs of the hotels requires further analysis. But at the very least, solar tiles will be able to provide a non-negligible amount of power to both LUXE and PRIME.

In the case of PRIME, back up power can be provided by fuel cells running off methane and oxygen i.e. rocket propellant. Starship tanks can be pre-retrofitted to allow secondary fuel lines to run to the payload bay area of the ship. These can be used to fuel generators which kick in whenever there's a shortage of power. Tesla power walls can also be installed within the hotels to store excess solar power in the case of peak load or solar eclipse events.

Starship fuel tank conversion

Beyond utilising rocket propellant to power back-up generators, Starship upper stage tanks can be put to use in other ways. Their massive bulk and liquified propellant could serve as ideal heat sinks for both LUXE and PRIME. Temperature fluctuation during orbit in space is a massive issue. Incident sunlight without Earth's atmosphere to absorb and filter it causes ambient temperatures in Low Earth Orbit (LEO) to exceed 125°C (NASA, 2004). Without a place to go, this heat could cause the interior of any spacecraft cabin to heat up significantly, putting the lives of the occupants at risk. It's important in spacecraft systems to have effective heat pumps and heat sinks to distribute this energy. Usually, they are effectuated in the form of bulky radiators that extend from the spacecraft. However, not only does this add another system to malfunction, it is also unsightly.

To maintain a sleek external appearance, one which is attractive to potential guests, it's our recommendation to use Starship fuel tanks as heat sinks, both in LUXE and PRIME.

A primary propellant for Starship's raptor engines is oxygen. Oxygen is vital to any human sealed inside a tin can orbiting 200 miles up. It makes sense to install secondary lines that allow for the syphoning off of this oxygen propellant into the pressurized area of the Starship. The gigantic size of the tank will mean that re-filling will only seldom be required, both in the case of PRIME and LUXE. The capability to re-fuel in-orbit has already been designed into Starship by SpaceX (SpaceNews, 2024). Leveraging this existing source of oxygen means volume is saved and system complexity reduced. Indeed, a back-up oxygen tank could be installed as a redundancy, but it can be small.

In-built engines for manoeuvring

Any structure in Low Earth Orbit needs continuous course correction to avoid it plunging back down into Earth's atmosphere. The International Space Station often performs orbital manoeuvres to avoid large pieces of debris hitting it (Space.com article, 2023). All this requires thrust, usually provided by small thrusters installed on the outside of a station. Nothing is different for LUXE and PRIME, apart from the fact that a multitude of thrusters come pre-installed on Starship. These are in the form of manoeuvring thrusters around the ship as well as its main vacuum engines. The latter will not be needed by LUXE, being severely oversized for small orbital manoeuvres. However, they may come in handy for the much larger PRIME in short bursts. Both LUXE and PRIME will come with built-in manoeuvring capability, requiring no design and development work that hasn't already been put into Starship.

Artificial gravity

Living and working in microgravity is difficult. Blood does not circulate properly, the digestive system works less effectively and nausea is common (Iwase et al., 2020). The simple acts of drinking, eating, going to the bathroom, exercise and even sleeping are complicated. Food preparation is made nearly impossible. Staying in micro-G for more than a few weeks can also cause bone and muscle atrophy which takes months to recover once back on Earth (Baran et. al, 2022). It's therefore crucial to provide long-term, non-planetary settlements with artificial gravity. Artificial gravity greatly simplifies hotel operations, makes PRIME more accessible, reduces training requirements, allows for food preparation and reduces health risks for long-term crew.

Guests are already taking a massive leap into the unknown by flying to space. If that unknown can be mitigated by reproducing Earth-like gravity in space, many will be more likely to take the plunge. In short, artificial gravity makes orbital space accessible. The challenge is that though the phenomenon of centripetal force has been well studied, and Einstein has proven that there is no perceivable difference between force produced by gravity and that produced by acceleration (Britannica, 2025), reproducing it in space has never been done at scale before.

A number of challenges are introduced when attempting the feat, including:

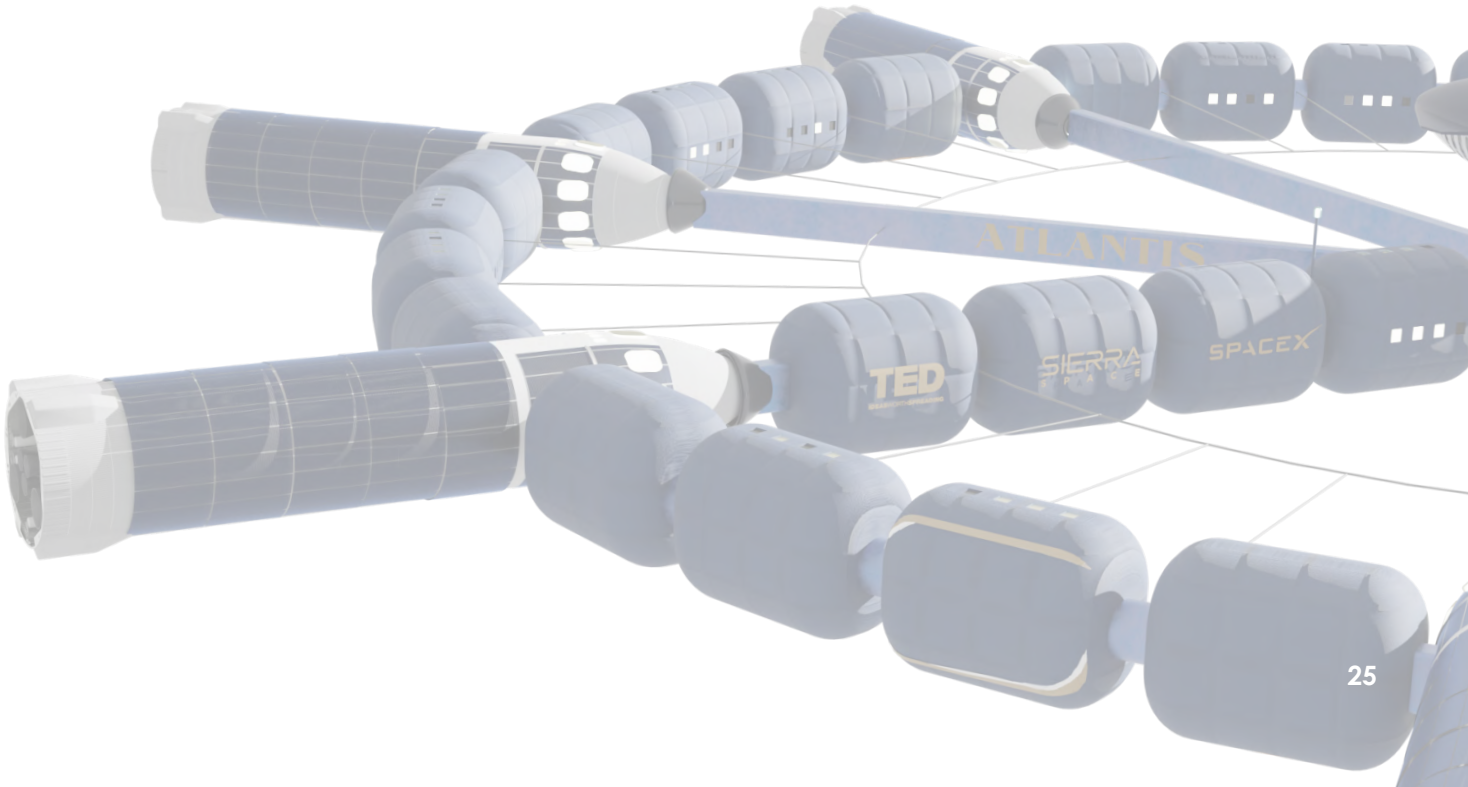
- Centripetal strain on all the load-bearing points of a rotating station. We're no longer in micro-G, and recreating gravity means that mechanical components need to be designed as if they were standing on Earth.

- The gravitational effect varies with distance from the centre of rotation, reaching its maximum at the furthest point from the centre. For small rotational radii, the difference could even be perceived across the human body, with the head experiencing less gravity than the feet. This could introduce physiological complications.

- Disorientation through rotation and perception of inertia. If the radius of the rotating body is small, the rate of rotation needs to be increased to generate the same level of gravity and vice versa. It has been proven that humans can handle about two rotations per minute. Anything over that, and a person becomes very disorientated when looking out the window.

To address these challenges for PRIME, we propose a station radius of 100 metres. This means that perceived gravitational force will be stable across the bodies of the occupants, and that the station need not rotate more than 1.89 times per minute. Even at this low rate of rotation, 0.8g (80% Earth gravity) can be reproduced on the main deck. The rate of rotation is stable and continuous to ensure crew and guest well-being. Docking passenger shuttles will need to match the rotation to mate safely with the hotel. Elevators will slowly take guests from the micro-G environment of the docking bay to the main deck. Guests will perceive gravity slowly kicking in but already secured in the elevator, they thankfully will not start free-falling uncontrollably.

Rotation may need to be suspended for certain maintenance procedures, but it will not take much thrust to get it going again. There is not much of a limit to how often the station rotation can be stopped and restarted. During in-space assembly of PRIME, the mechanical strength of the station can be tested and validated by gradually raising the rate of rotation. If, when producing 1.2g of gravity on the main deck, the station maintains its structure over an extended period, it can be assumed that it will operate safely at 0.8g. Much of this testing and validation can be done on the components before launch, simply by leveraging Earth's gravity. Orbital maneuvers can be timed to minimize disruption, with onboard automation managing timing and orientation.



Project & funding structure

The LUXE and PRIME ventures under Atlantis are fully private. Part of the cost reduction compared to other space habitats (eg. the International Space Station) is that governments will not be involved but instead hungry industry players.

Below is an overview of the organisational structure for the LUXE and PRIME projects. Atlantis will focus solely on fundraising and marketing, without engineering the vision from scratch. Existing, more experienced players will contribute effectively to the other activities, whether they're from the space, events or hospitality sectors.

Roles and responsibilities of the LUXE & PRIME stakeholders

Atlantis Inc. serves as an umbrella entity and focuses primarily on marketing and fundraising. Discussions with potential project partners are ongoing.

If development costs remain contained and launch cadence is sustained, the value of the umbrella company could reach the billions of dollars, opening doors to future orbital platforms, commercial use cases, and defense applications.

Phased Funding Strategy

Once LUXE is operational, its revenue and credibility can be used to finance PRIME. But reaching that first milestone is the hardest step.

We propose funding LUXE through a combination of:
- High-value ticket pre-sales
- Private angel and early-stage investors
- Strategic partners in aerospace and hospitality

A key unlock is early buy-in from SpaceX. If they see LUXE and PRIME as long-term drivers of launch volume, they may offer material or in-kind support. Their endorsement would legitimize the project across the industry.

An alternative path is direct financing from a major hospitality group or sovereign-backed investor—particularly in geographies like the Middle East where centralized decision-making and available capital can accelerate timelines.

In either case, early revenue from LUXE reduces perceived risk by generating short-term returns and long-term brand credibility

Scope for the future

Establishing an orbital platform the size of PRIME will be a game-changer for the space industry. It will mean that people can work safely and for extended periods of time in space, with significant resources at their disposal and operations eased by artificial gravity. Said orbital platform could, for example, serve as long-term accommodation for factory workers producing semiconductors or growing replacement organs in orbit (McKinsey & Company, 2022) or for large scientific teams pursuing R&D and space-based experiments. It could be a platform for housing and operating vacuum-cooled servers (IBM, 2024) or even space-based solar power (NASA OTPS, 2024).

Orbital platforms the size of PRIME, and with extensive crews, could serve as safe havens for vessels in distress or vessels on their way to the Moon or Mars, in need of refuelling or maintenance. They could act as astronaut staging platforms, allowing burgeoning planetary explorers to get acquainted with space safely in LEO first. Practice EVAs could be organised and emergency scenarios simulated. It would give space program managers time to assess how their crew performs under real-world conditions, before being launched on even riskier missions.

Finally, PRIME has the potential to act as a defence asset for governments, allowing for easy geospatial intelligence gathering, secretive research projects, manned orbital armaments and even in-space fighters. In all these cases, varying business models could be pursued, including:

- Commercial leasing of orbital assets to individuals, companies, institutions or governments
- Servicing fees for re-fuelling, ship maintenance and astronaut staging
- The outright sale of hardware to third party operators

We've also shown that the tourism market has capacity for multiple PRIME's. As launch and hardware costs fall with mass manufacturing, ticket prices will also fall – and that will enlarge the addressable market. It is easy to envision a version of PRIME with a larger diameter. Even larger inflatable habs (eg. Sierra Space's LIFE 5000) could be connected in a ring to accommodate 1000's of people and host a variety of industries across multiple floors.

Next Steps

To move from concept to execution, several key technical and commercial milestones must be validated. These will shape the scope of the initial development phase and inform funding structure, partnership engagement, and regulatory planning.

We aim to:

- Confirm retrofit costs and design feasibility for converting Starship into a Starhab
- Secure estimated pricing and timelines for Starship upper-stage delivery
- Lock hardware pricing and timelines with NewSpace partners (e.g. Sierra Space, Gravitics, VAST)
- Establish preliminary design agreements with SpaceX and assess potential for hardware cost alignment or co-marketing support
- Validate projected launch cost trends through 2028–2035 and define fallback price scenarios
- Identify minimum training duration and protocols for commercial passengers
- Conduct feasibility analysis for artificial gravity implementation, including spin testing and structural load assessments

Partnership conversations are underway. With the right backers, we believe we can reach orbital deployment of LUXE within 36 months and begin structured development of PRIME shortly after.

Atlantis is more than a concept. It's a commercially grounded, technically plausible, and emotionally compelling next step in space infrastructure. The time to build it is now

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FAQ

1. What is Atlantis building, exactly?
Atlantis is developing private orbital infrastructure—starting with a luxury space hotel (LUXE) and scaling to a rotating space platform with artificial gravity (PRIME). Both concepts are based on converted SpaceX Starship upper stages.

2. Why now?
Reusable rockets, modular habs, and vertically integrated hardware from NewSpace companies have shifted the economics. For the first time, we can build habitable platforms in orbit without government-scale budgets.

3. What's the business model?
LUXE monetizes high-net-worth space tourism at $10M per guest. It breaks even with just 96 customers. PRIME expands capacity and introduces gravity, enabling broader commercial use cases: events, research, and long-duration stays.

4. Why isn't SpaceX doing this already?
SpaceX is focused on launch and planetary transport. Atlantis complements that by focusing on habitation, hospitality, and user experience. We aim to create destinations for SpaceX's vehicle.

5. How do you address station complexity and safety?
We reduce system complexity through the use of Commercial Off-The-Shelf (COTS) technology, regular resupply and reliance on Starship's existing systems for life support and maneuvering.

6. What are the top technical risks?
Key risks include station assembly (for PRIME), managing artificial gravity loads, and Starship retrofitting. Each is mitigated by phased testing, partnerships with proven vendors, and simplified architecture.

7. Who's building the hardware?
We will source from providers such as SpaceX, Sierra Space, VAST, and Gravitics for hab modules. Our approach is integrative rather than proprietary—focused on time to orbit and operational reliability.

8. How much capital is required to get to orbit?
We estimate LUXE development at $120M and PRIME between $4B and $11B depending on scope and partner pricing. We aim to phase financing with pre-sales and revenue from LUXE before expanding.

9. What is your regulatory strategy?
We plan to coordinate with the FAA, FCC, and NASA as needed, and will engage early with spaceflight medical, safety, and liability experts. Tourism-specific frameworks are already emerging.

10. Why is this more than just a space hotel?
LUXE is a proof point. PRIME unlocks gravity-enabled orbital life: not just tourism, but long-term living and working in space, and staging for the Moon and Mars. We're building a platform for space life, not just a product.

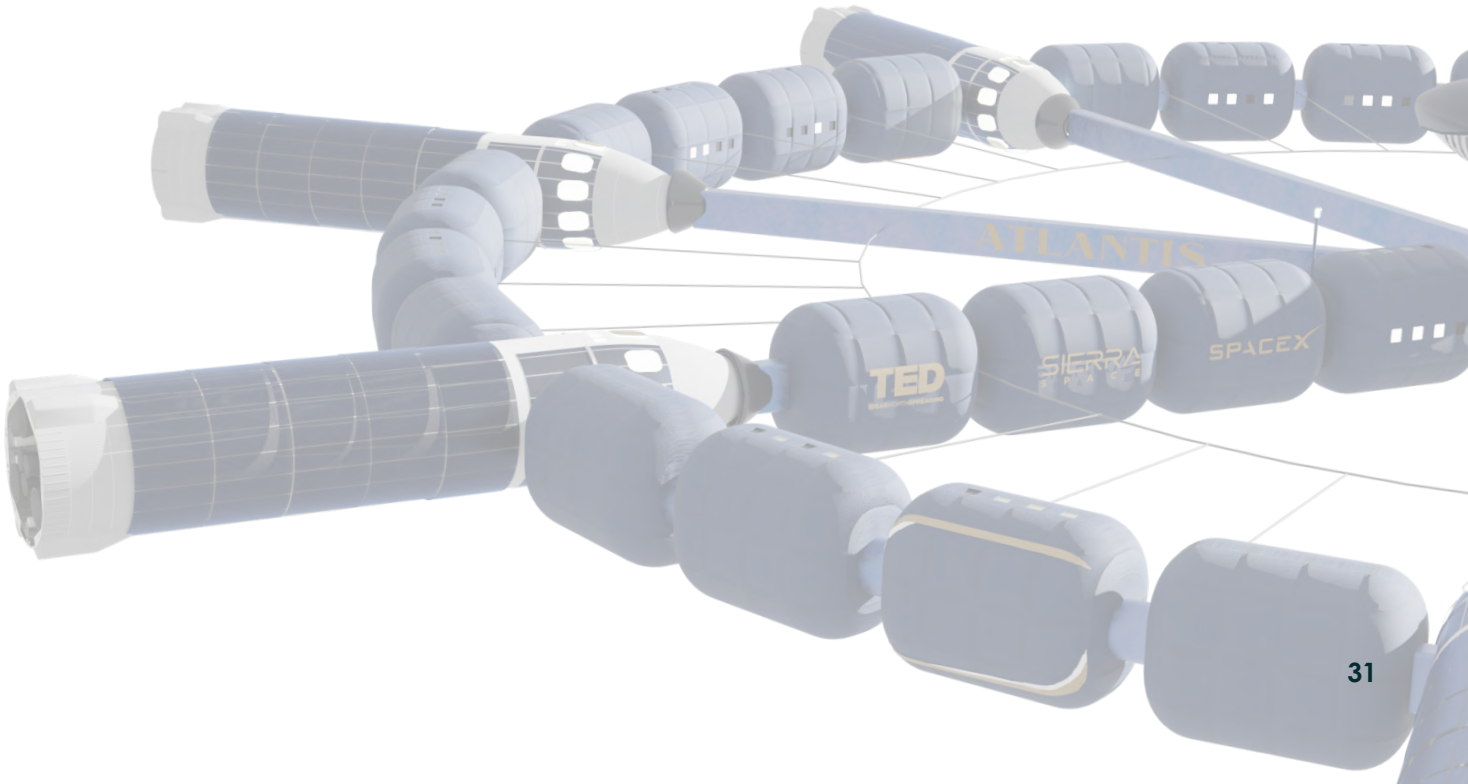
Say hello

We're always open to thoughtful conversations

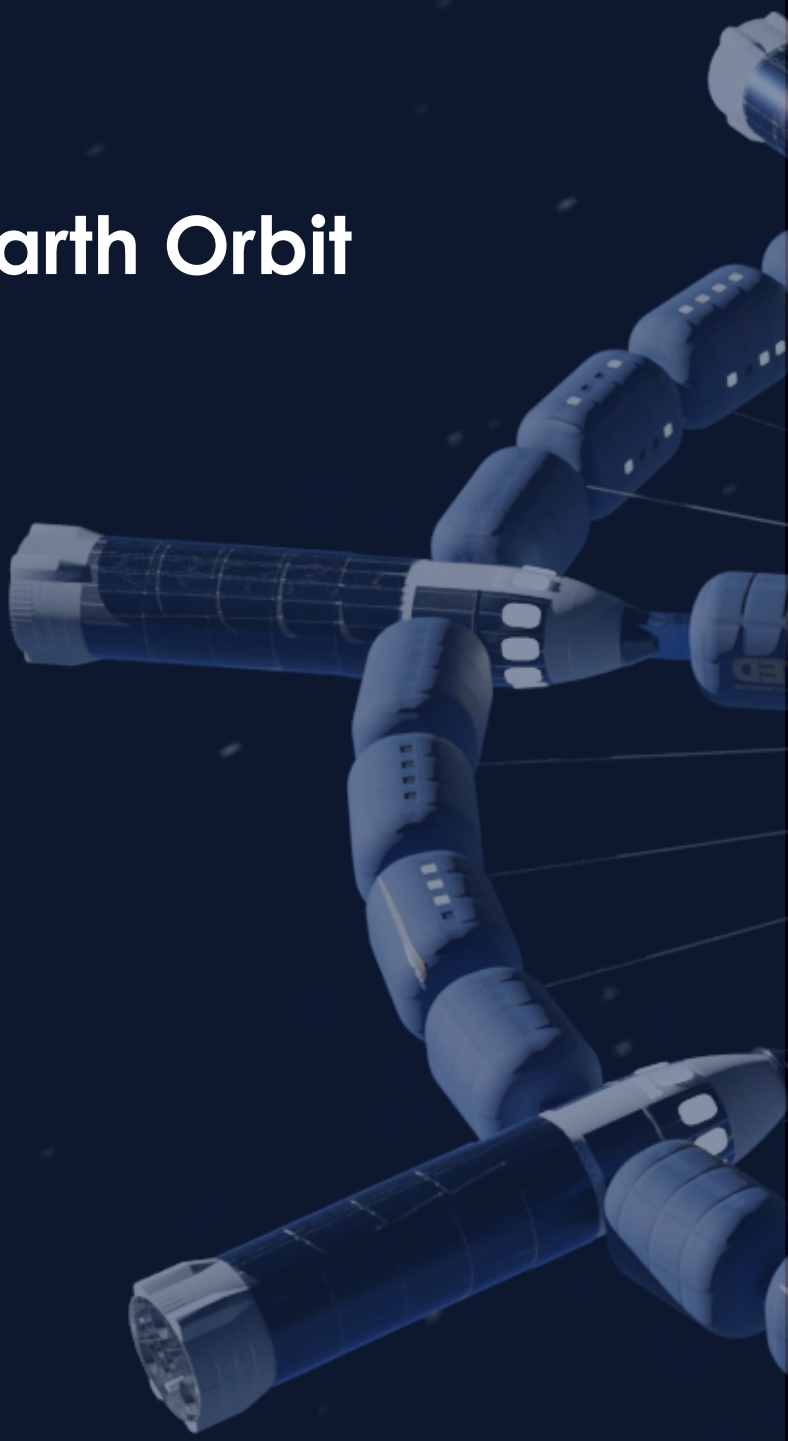
For partnerships: max@atlantis-spacecity.com
For investor inquiries: john.q@atlantis-spacecity.com

The Atlantis website offers further resources including a Company Deck, Techical Deck and Request For Information (RFI) for contractors.

atlantis-spacecity.com



Opening up Low Earth Orbit



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