EXECUTIVE SUMMARY

Permanent orbital infrastructure for a Scalable Space Economy

Nostos deploys a permanent pod network in selected Earth orbits; the coordination hub and resupply depot for a growing network of modular service vehicles. Every mission builds more infrastructure. Every client extends the network. Efficient & Reusable Scaling.

$20B+	17–18%	$650B
ISAM market by 2030	**Space logistics CAGR**	**Global space economy**
Multiple independent forecasts	Through 2032–35	Industry forecast horizon

THE PROBLEM

The hidden cost of self-sufficient satellites

Today, every commercial satellite must carry its own propellant for orbit corrections, redundant thrusters, and contingency mass; dead weight that inflates cost and complexity, yet sits entirely outside its core mission. A telecoms satellite should focus on telecoms, not on being its own tow truck, fuel station, and mechanic.

The car analogy: current satellites are like cars forced to carry their own tow truck, gas station, and mechanic in the back seat on every journey. Nostos is the shared road infrastructure; Always There, Always Ready.

THE MODEL

A network that grows with every mission

Nostos begins with a single asset: a permanent distributed mothership stationed in various orbits - the coordination hub, resupply depot, and assembly point. Modules are dispatched on demand, assembled into a tailored service vehicle, and deployed to the client satellite. When the mission is complete, some modules remain in that orbit, becoming the next node in a growing infrastructure.

01

Initial cluster deployed

First modules launched into target orbit. Decentralised coordination active from day one.

02

First missions

Modules assembled on demand, dispatched to client satellites. Un-spent modules remain in orbit.

03

Nodes accumulate

Modular pods across orbits form a distributed service network that is always local, always ready.

04

Constellation

A self-reinforcing orbital infrastructure — each new client funds the next node. The network that built itself.

The flywheel: every mission we fly leaves re-usable modular infrastructure behind. We don't just service satellites - we build the orbital network one client at a time. By mission 10, we have an always local, always ready network.

Market data: MarketsandMarkets, Straits Research, Aerospace America (2024–2026).

THE NOSTOS SOLUTION

Modular hardware · Autonomous coordination · Scalable by mission

The pod network carries a library of standardized modules. The constellation assembles the right modules for each mission autonomously. Decentralized multi-agent coordination orchestrates docking sequences, optimizes orbital logistics, and plans reusable servicing paths. Every mission makes the network smarter, faster, and more cost-efficient.

Core Service Unit

A self-propelled xenon tank that probe-docks onto the client satellite and provides station-keeping thrust for the duration of the contract. Assembles with other basics on-orbit for larger satellites.

Services: Life extension · Station-keeping · EOL de-orbit · Graveyard relocation · Probe docking

Residual nodes

Every module that completes a mission leaves infrastructure behind. Basic modules remain docked as passive propulsion nodes. RAFTI port open for Phase 2 refueling.

Value: Over time, the constellation becomes self-reinforcing: each client mission reduces the cost and response time of the next one.

Inspection module

Eyes before service. Surveys the client satellite with lidar and cameras before any docking attempt, assessing structural health, rotation state, and capture points. Always returns to the constellation.

Services: Anomaly detection · Health assesment · Pre-mission survey

Future nodes

The modular architecture is payload-agnostic. Debris removal nets, in-orbit manufacturing arms, deep-space relay antennas, and refueling tankers all plug into the same docking interface and coordination layer.

Value: Every new capability added to one node becomes available across the entire constellation.

Robotic arm module

The problem-solver. A robotic arm that handles what probe-docking cannot, capturing satellites without an apogee engine and performing mechanical repairs. Always returns to the constellation.

Services: Non-cooperative docking· Mechanical repair

Mothership network

Permanent orbital hubs positioned across key orbit regimes. Each mothership receives xenon resupply from Earth, stores module batches, and coordinates multi-client dispatch across the constellation.

Value: As the network matures, motherships eliminate the need for individual module launches. Every new mission draws from pre-positioned stock.

WHY THIS MATTERS FOR EUROPE

A strategic infrastructure layer Europe must own

Space is a strategic pillar for communications sovereignty, defence resilience, data infrastructure, and the long-term progression toward lunar and asteroid access. In-space servicing infrastructure is the layer Europe must not outsource.

Space sovereignty	Defence & dual-use	Commercial competitiveness
Sustainability & debris reduction	Deep-space readiness	Industrial scalability

Market data: MarketsandMarkets, Straits Research, Aerospace America (2024–2026).

SERVICE COST MODEL

Cost comparison vs Legacy

The legacy approach charges ~$13M/yr because they have to launch every time or group missions by delaying some clients. Nostos can charge $8–10M/yr and still be more profitable and provide faster service cycles; that is the structural advantage.

$50M	10–25%	25–35%
Avg. Client revenue per 5yr life extension	Realistic gross margin, early missions, co-orbit deployment	Target gross margin, mature pod. modules , optimally pre-positioned

Mission 1–3

$54–72M cost

Actively investing or marginally breakeven. Building pod network heritage and client relationships.

Mission 4–10

$35–50M cost

Ops experience reduces ground costs. Network keeps growing. Margin 10–25%.

Mission 10+

$25–40M cost

Pre-positioned nodes cut travel ΔV. Module reuse amortized. Margin 25–35%.

FEASIBILITY VERDICT

Technology & commercial assessment

Core technology (docking, propulsion, GNC)	✓ **Flight-proven**
Multi-module assembly sequence	Autonomous navigation & docking: TRL 7-9 (flight-proven) · Structural integration, CoM estimation & mission-ready assembled vehicle: **Nostos key innovation**
Distributed constellation model	Decentralised modular orbital nodes: scalable from first launch · Autonomous multi-client dispatch coordination across constellation: **Nostos key innovation**
Orbital mechanics (single orbit)	✓ **Well-understood, manageable**
Orbital mechanics (cross-orbit)	⚠ Fuel-intensive across orbit regimes — manageable via electric prop (Isp 3,000s) or aerobraking. Nostos solution: orbit-specific just-in-time node clusters + decentralized coordination · **Nostos key innovation**
Market demand & willingness to pay	✓ **Proven, contracts signed ($13M/yr, MEV-2 extended 2025)**
Regulatory path (EU clients)	✓ **Clear within ESA/EU framework**
Regulatory path (non-EU clients)	⚠ **Bilateral government agreements required per country**
Launch cost	✓ **Decreasing rapidly — Starship changes the model**
Supply chain (propulsion, sensors)	✓ **Mature COTS ecosystem available**
Xenon / propellant supply	⚠ **Design for krypton dual-fuel**
Business model breakeven	✓ **2-3 GEO missions at ~$50M each**
Constellation flywheel model	✓ **Structurally unique competitive advantage**

Conclusion: Nostos is technically and commercially feasible. No single element requires a breakthrough. The biggest challenge is sequencing: the right first orbit, the right first client, and the right commercial entry point. Recommended path: GEO cluster first, targeting the 80% of the fleet with apogee engines, modular assembly and autonomous coordination as the differentiator, EU-registered clients as the regulatory starting point.

Market data: MarketsandMarkets, Straits Research, Aerospace America (2024–2026).

THE FOUNDERS

The team behind Nostos

Panos Marantos

PhD · Robotics, Navigation & Autonomous Systems

Panos has spent 15 years building autonomous systems that work in the real world. His PhD focused on vision-based navigation and real-time control for autonomous helicopters, combining custom electronics, embedded firmware, computer vision, and nonlinear control into hardware that actually flew. He has applied the same end-to-end mindset across AUVs, ROVs, robotic drilling platforms, UAVs, mobile robots, anthropomorphic robotic hands, and a CubeSat navigation algorithm that ran on an actual in-orbit mission. He has built and led engineering teams on complex multi-sensor, multi-robot distributed systems. Nostos is the convergence of everything he has built.

Embedded systems & PCB · Autonomous navigation

Computer vision · Nonlinear control

Sensor fusion · CubeSat (in-orbit)

Robotic manipulation · AI / ML

Distributed multi-robot systems · Engineering leadership

Christos Konispoliatis

Product Manager · Elect. Engineer · Marketplaces · IoT

Christos has spent the past 12 years turning complex technical products into businesses that scale. At FREENOW, he revamped the entire communications infrastructure for the ride-hailing platform in LATAM and led the launch of Beat Tesla in Mexico City. As Group PM at Skroutz, he drove Go-To-Market for Next Day Delivery and EU expansion into Cyprus and beyond, accelerating the business model transformation. His IoT prototype won the bronze award in the EU Product Safety Awards. His track record spans blockchain, e-commerce, ride-hailing, and marketplace platforms — with a consistent pattern: find the product and go-to-market lever that matters, build the cross-functional teams to pull it, and scale. He brings that same instinct to Nostos.

Product strategy · Go-To-Market

Revenue model design · Cross-functional leadership

International expansion · Ride-hailing & mobility

E-commerce & marketplaces · IoT

CONTACT

Founders	Panagiotis Marantos & Christos Konispoliatis
Organisation	Nostos Space
Location	Athens, Greece · European Union

nostos-orbit.com

Market data: MarketsandMarkets, Straits Research, Aerospace America (2024–2026).