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Infinite Possibilities

NOVASPACE

The Next Chapter of Satellite Communications

How new technologies, network convergence, and multi-orbit architectures are changing the industry

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Table of contents

The satcom market is undergoing a drastic transformation 4

Next-generation satcom is unlocking a limitless addressable market by embedding space into the global economy 6

In an evolving landscape, each orbit serves distinct operational needs and all of them must work together 8

Multi-orbit networks need a new kind of GEO: versatile, affordable and fast to deliver 10

Operators need a more agile GEO 2.0 approach to face new sector challenges 12

Delivering next-generation satcom requires aligning advanced technical & payload capabilities with a modernized operating model 14

About SWISSto12 16

Novaspace assessment of next-gen payloads 18

Novaspace assessment of compact GEO platforms 20

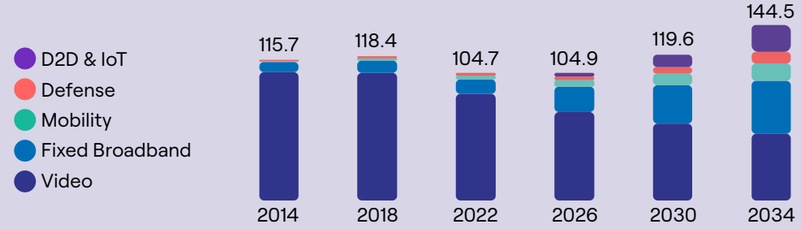
Glossary 22

The satcom market is undergoing a drastic transformation

The rapid deployment of non-geostationary orbit constellations, combined with breakthrough satellite payload and manufacturing technologies, is fundamentally reshaping the global space economy. Because advanced payload technology sits at the very heart of the satellite value proposition, these innovations serve as the primary catalyst transforming the satcom industry by driving massive expansions in space segment capacity. As this increased capacity combines with falling user terminal costs to reach consumer and enterprise mass-market viability, high-speed satellite connectivity is embedding itself directly into the broader global economy. This structural cost shift is unlocking vast, previously unaddressed commercial markets, driving exponential growth in network capacity demand, expanding subscriber bases, and creating new recurring revenue streams across the communications landscape.

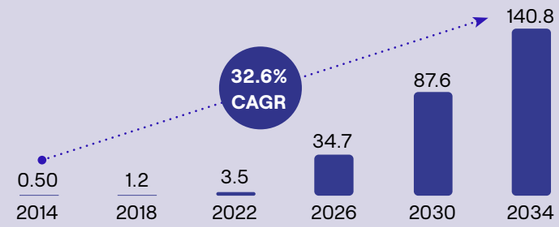
Fueled by these capital efficiencies and expanding technical capabilities, the satellite industry is undergoing a decisive transition from a specialized, niche connectivity provider into a critical global utility. High-capacity space architectures are no longer viewed merely as failover options for remote regions, but rather as foundational infrastructure for mainstream commercial, industrial, and government operations. This shift is accelerating enterprise and consumer adoption worldwide, fostering new digital ecosystems, and generating sustained, long-term economic value across every major vertical.

Increasing diversity of the satcom market
Global satcom revenue in US$ billion



Source: Novaspace research

Satcom demand to roughly double every two years, going forward
Global capacity demand in Tbps



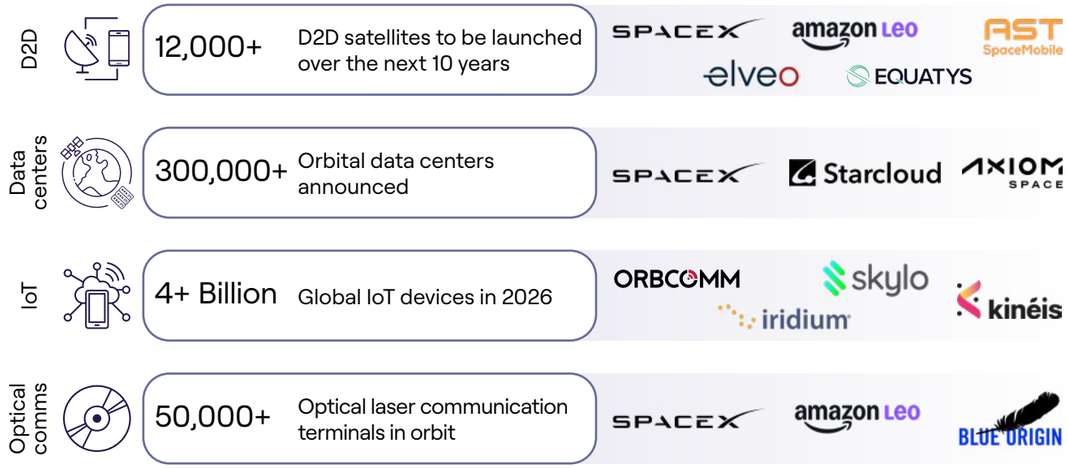
Source: Novaspace research

Next-generation satcom is unlocking a limitless addressable market by embedding space into the global economy

Satellite communications sit at the heart of the New Space Economy. Emerging space applications, from Direct-to-Device (D2D) connectivity and orbital data centers to IoT and optical networks, are steadily embedding themselves into the global economy, supporting everyday operations in telecoms, logistics, finance, energy and defense. Satcom underpins every one of them, acting as the essential backbone that moves data between orbit and the ground and turns space infrastructure into a core layer of the modern economy.

At the same time, the boundaries between satcom and other space applications are fading. Companies once defined by a single mission increasingly operate across several, with satellite manufacturers deploying their own connectivity constellations and satcom operators expanding into new dual-use services. Each of these crossovers extends the reach of communication technologies, places satcom at the center of a broader space value chain and opens a far larger addressable market. As satellite and terrestrial networks merge into a single, seamless connectivity fabric, this convergence requires a step-change in payload architecture: satellites must move beyond fixed-pipe designs toward high-power onboard computing and flexible, software-reconfigurable payloads. Capturing these opportunities also requires industry actors to rethink their traditional operating models. In an era of rapid technological iteration, success hinges on two imperatives: achieving sustainable cost efficiency across the value chain and accelerating organizational and procurement agility to keep pace with market demand.

Key technologies defining the future of satcom



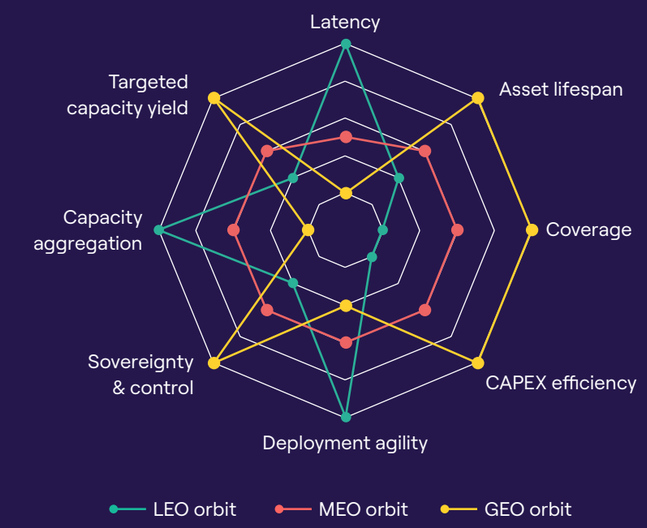
Source: Novaspace research

In an evolving landscape, each orbit serves distinct operational needs and all of them must work together

No single orbital regime can serve every operational need, as LEO, MEO, and GEO each unlock distinct technical capabilities across the connectivity spectrum. Low Earth Orbit provides the ultra-low latency required for real-time applications, Medium Earth Orbit balances latency with broad regional coverage, and Geostationary Earth Orbit offers unmatched resiliency and coverage. Rather than operate in isolation, these orbital layers must work together in a fully integrated, multi-orbit framework to guarantee true network resilience and meet strict sovereign requirements across target markets.

By tailoring payload architectures to function across these interconnected orbits, operators can maximize operational flexibility and optimize network performance. Non-geostationary constellations deliver high-throughput, dynamic global coverage, while GEO platforms provide dedicated, stationary capacity over high-density population centers and strategic regions. Defense organizations, sovereign nations, and regional telecom operators increasingly rely on this combined multi-orbit approach to ensure continuous operational uptime, keep sensitive data streams strictly within domestic regulatory parameters, and avoid single-point network vulnerabilities. Equally important is how a hybrid multi-orbit strategy optimizes overall economic efficiency. Integrating GEO's targeted, stationary capacity over primary trade routes and commercial corridors with NGSO coverage eliminates the financial burden of underutilized capacity over unpopulated areas and oceans. Unlike moving constellations that waste substantial bandwidth over oceans and unpopulated areas, GEO avoids capacity leakage entirely and yields a significantly higher revenue yield per megabit.

Orbit strengths & weaknesses



Source: Novaspace research

Revenue per Mbps over asset lifetime

	LEO Mega-Constellation	LEO Small B2B Constellation	Legacy GEO HTS	Small GEO Flex Satellite
Typical Total Sellable Capacity (Gbps)	100,000	1,000	75	40
Typical asset lifetime	5 Yrs	7 Yrs	15 Yrs	15 Yrs
Typical Yearly Revenue (in US$ million)	$8,000	$180	$35	$30
Revenue/Mbps over asset life time	$400	$1,260	$7,000	$11,250

Source: Novaspace research

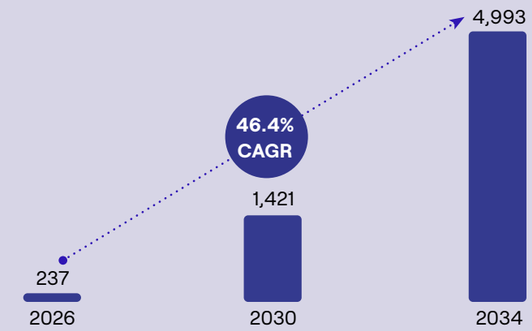
Multi-orbit networks need a new kind of GEO: versatile, affordable and fast to deliver

Building on this distinct role, GEO platforms serve as an essential operational anchor in hybrid architectures, a shift reflected in major operators forming strategic partnerships with LEO providers. Within these multi-orbit ecosystems, GEO platforms strategically augment non-geostationary capacity over high-density, high-demand geographic regions, absorbing localized peak-traffic spikes to prevent network degradation. Beyond capacity management, GEO provides a vital layer of active redundancy, ensuring uninterrupted operational continuity during orbital outages, ground segment failures, or constellation disruptions.

To fulfill this role in a multi-orbit future, GEO requirements are fundamentally changing. Success now demands agile, modular, and highly versatile GEO payloads and platforms with capital costs and delivery timelines that reflect fast-changing market realities. This operational evolution extends directly into national security and regional autonomy. As sovereign requirements intensify globally, next-generation flexible GEO assets remain vital for delivering high-availability, protected coverage, serving as an adaptable building block for emerging multi-national projects. By integrating responsive GEO capabilities alongside LEO and MEO layers, governments can guarantee autonomous control over critical defense and civic communications while optimizing network performance. Keeping beam footprints, gateway infrastructure, and network routing firmly under local regulatory jurisdiction insulates strategic operations from foreign policy shifts, external cross-border interference, and geopolitical supply chain vulnerabilities.

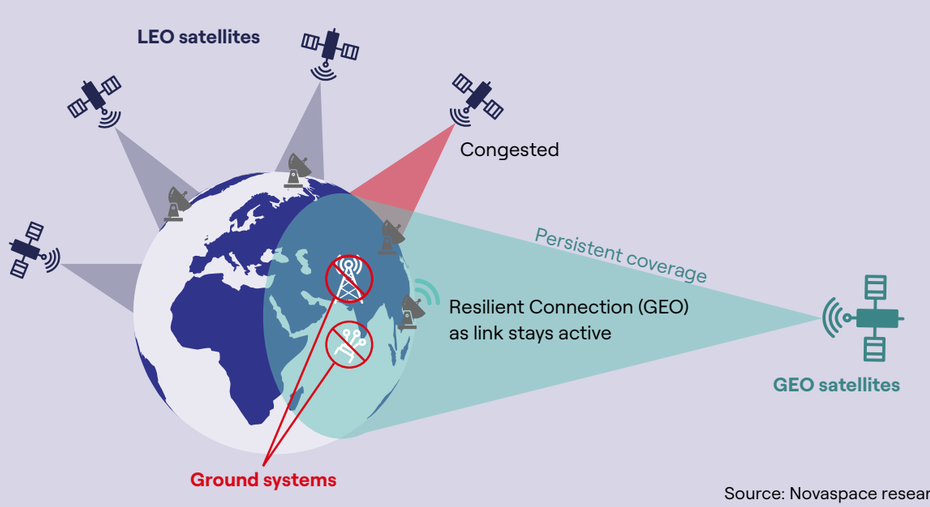
Furthermore, next-generation software-defined GEO platforms offer a dramatically more capital-efficient, rapidly deployable pathway to orbit. By reducing time-to-market and lowering upfront expenditure, agile GEO solutions make advanced, sovereign satellite capabilities financially accessible and operationally resilient for operators, mobile network providers, and nations establishing independent space infrastructure.

Multi-orbit revenues are set to grow exponentially
Global multi-orbit service revenue in US$ million



Source: Novaspace research

GEO has an essential role in multi-orbit architectures

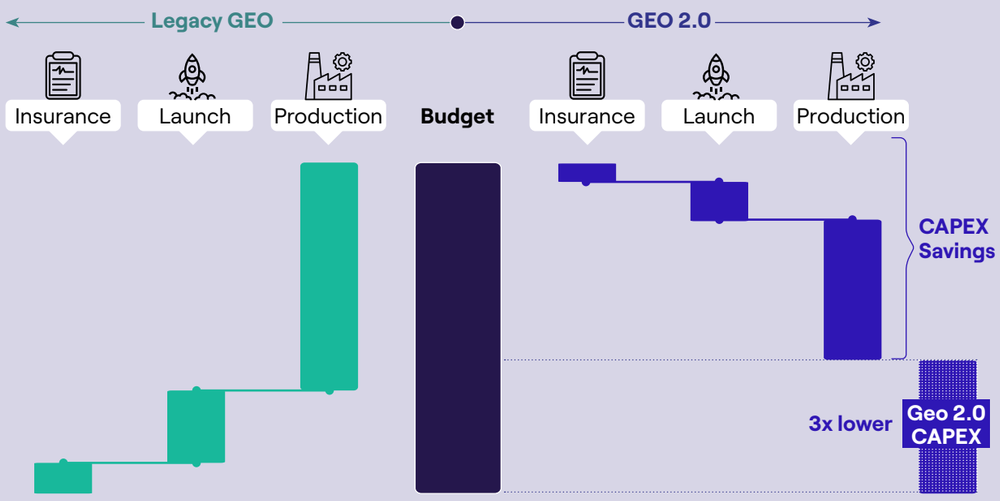


Source: Novaspace research

Operators need a more agile GEO 2.0 approach to face new sector challenges

Beyond new market requirements, operators' financial constraints make the move to a more adaptable GEO layer urgent. Today, satellite operators face an increasingly complex financial landscape of tightening capital constraints and competing balance-sheet priorities. They must fund legacy fleet renewals, invest in strategic NGSO partnerships, upgrade digitized ground infrastructure and launch new software-enabled services, all at the same time. Pursuing these capital-intensive initiatives concurrently puts heavy strain on balance sheets, stretches return-on-investment timelines and forces executive teams to rethink traditional asset deployment strategies. GEO 2.0 has to relieve this pressure without sacrificing capability by applying principles pioneered in non-geostationary systems to the geostationary orbit. The shift toward lower-cost, software-defined GEO platforms can fundamentally change the economics of orbital asset deployment. This modular approach would let operators phase capital expenditure incrementally, adding capacity mission by mission as demand materializes rather than committing to a single large upfront investment. Agility in delivery is just as critical. Traditional procurement cycles of four to five years leave operators exposed to market volatility between order and launch, while compressing delivery to 24–36 months would align capital outlays with near-term revenue opportunities and accelerate return on investment in an unpredictable satcom ecosystem. At the very heart of GEO 2.0 sits the payload. High-performance, highly flexible payloads would give the model its versatility, allowing operators to dynamically reconfigure beam patterns, frequency allocations and coverage zones on orbit. By redirecting capacity on demand to wherever commercial priorities move, these payload architectures can maximize asset performance and sharply reduce the risk of premature commercial obsolescence. Ultimately, GEO 2.0 will depend on payload innovation to deliver the operational agility and capital de-risking that long-term fleet viability requires.

Single satellite CAPEX budget legacy GEO vs GEO 2.0



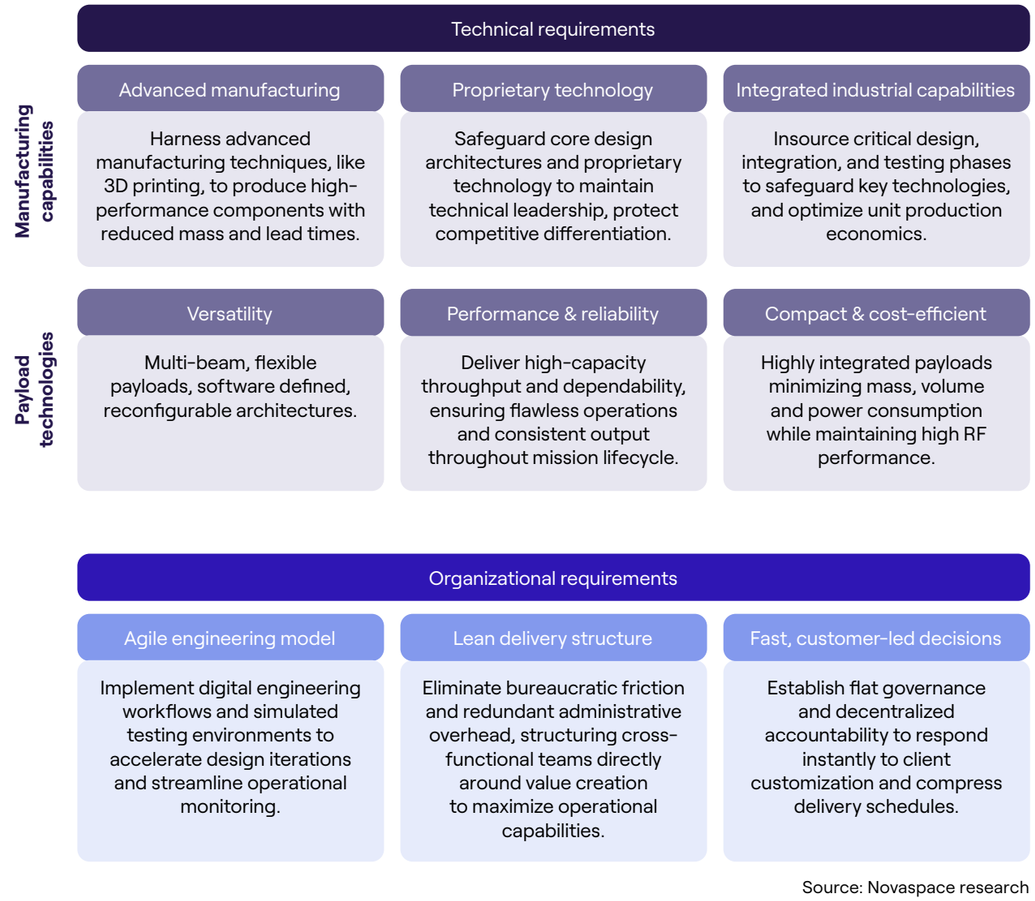
Source: Novaspace research

Delivering next-generation satcom requires aligning advanced technical & payload capabilities with a modernized operating model

Delivering next-generation satcom, whether multi-orbit constellations, flexible GEO platforms or advanced payloads serving every orbit, requires a fundamental evolution in internal technical capabilities. Satellite providers must harness disruptive technologies, secure proprietary intellectual property and insource critical engineering processes rather than relying entirely on traditional third-party vendors. Bringing software-defined architectures and modular payload capabilities in-house gives providers direct ownership of their technology stack, allowing them to cut development timelines, reduce supply chain dependencies and rapidly deploy customized, high-performance assets across LEO, MEO and GEO. At the heart of this evolution is the payload itself, which must combine high throughput and cost-efficiency within a compact, lightweight footprint. Powered by software-defined, modular architectures, next-gen payloads provide full on-orbit agility, dynamically reconfigure frequency, power and beam coverage to adapt to shifting market demands over the satellite's lifespan, whatever its orbit.

Fully capturing these technical advantages, however, requires that engineering agility be mirrored across the entire operating model. Organizational processes must evolve in lockstep with space segment innovation. Satellite providers must cultivate leaner decision-making frameworks, digitize core operational workflows and build agile cross-functional teams that remove cross-departmental bottlenecks. When internal capabilities, technical IP, digital processes and procurement strategies are fully aligned, providers can compress time-to-orbit and maximize the commercial value of next-generation satcom assets across every orbit.

Next-generation satcom building blocks



Source: Novaspace research

About SWISSto12

SWISSto12 is one of the few manufacturers positioned on both sides of the multi-orbit equation. Through its HummingLink product line, the company already supplies advanced RF payloads and antennas for LEO, MEO and GEO missions, with more than 2,000 units operating in orbit today. Built on proprietary additive manufacturing, these solutions combine bespoke RF performance with industrial-scale production, giving operators flight-proven building blocks for whichever orbit their network architecture requires.

On top of this multi-orbit payload foundation, SWISSto12 brings HummingSat, a next-generation small GEO platform developed in partnership with ESA. Designed around software-defined, reconfigurable payloads, lower capital outlay and faster delivery, HummingSat embodies the GEO 2.0 model described above. Tier-1 operators including SES and Viasat have already selected the platform, with seven contracts signed to date. By combining payload expertise across every orbit with an agile GEO platform, SWISSto12 is positioned not only to participate in the multi-orbit future, but to help define how it is built.

SWISSto12 positioning & key strengths

	Market segment	Opportunity assessment
HummingLink	Large constellations	SWISSto12 is well positioned to enter the mega-constellation segment as a payload supplier to vertically-integrated players, as well as LEO platform primes
HummingLink	Government missions	HummingLink is well positioned in the government mission market, particularly in Europe, as a subcontractor to both established manufacturers and new entrants
HummingLink	Other commercial missions	A secondary opportunity for HummingLink, as its strengths are less aligned with customer requirements centred on ultra-low cost and high manufacturing rates.
HummingSat	Commercial satcom	HummingSat's competitive pricing and platform versatility position it well for the commercial satcom market
HummingSat	Sovereign missions	SWISSto12 is strongly positioned in the sovereign satellite market, particularly in Europe, where its Swiss base, private ownership and neutral, non-polarising profile are key assets
HummingSat	Other commercial missions	HummingSat's competitive pricing and platform versatility also position it well for non-telecom opportunities

Strong positioning Weak positioning

Source: Novaspace analysis

Novaspace assessment of next-gen payloads

RF payloads are becoming the main source of differentiation and value in modern satellites. Across every orbit, operators increasingly require high-density, software-defined architectures capable of multi-beam coverage, in-orbit reconfiguration and direct integration with terrestrial networks. Demand is driven by several converging trends: the deployment of large NGSO constellations, the rise of Direct-to-Device and 5G NTN services, the renewal of GEO fleets with flexible capacity, and growing defense and sovereign requirements for resilient, secure communications. At the same time, missions are moving toward higher frequency bands and active phased-array antennas, raising payload complexity and performance expectations.

These shifts are reshaping how payloads are designed and produced. Constellation programs require hundreds or thousands of units, pushing the industry from bespoke, one-off builds toward modular architectures, standardized building blocks and industrialized production. New manufacturing techniques, including additive manufacturing, digital engineering and automated testing, are being adopted to reduce mass, cost and lead times while maintaining space-grade reliability. The market is also evolving structurally, with vertically integrated primes developing payloads in-house alongside specialized suppliers serving platform integrators and operators across orbits. Overall, Novaspace estimates the Total Addressable Market (TAM) for third-party satellite RF payloads at $86.9 billion over the 2027–2031 period, making payloads one of the most dynamic segments of the satcom value chain.

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SWISSto12 capabilities: HummingLink

SWISSto12 manufactures advanced, multi-orbit payload solutions. Active array antennas leverage integrated designs that can only be manufactured using 3D printing.

With powerful electronically steerable beams, we are enabling the next generation of software-defined payloads: smaller, lighter and more capable than legacy builds.

Our approach: modular architecture with deep customization

The HummingLink product family is a full range of antennas and antenna systems, in different frequencies, and manufactured as single monolithic blocks. These blocks act as modules, which are then customized to deliver a solution that aligns seamlessly with your mission needs.

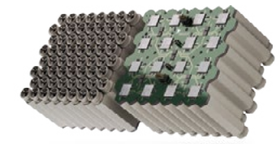
From system design to delivery: the SWISSto12 approach

Engagement starts with discovery. We explore the use case, objectives, and pain points with our customers. We examine what success looks like. We ask what the impossible looks like.

We take time to gain a depth of understanding that will shape a customized, mission-fit payload. And only then, do we build the solution.

Reasons to believe

- **Speed** Rapid design-to-delivery, based on pioneering 3D printing
- **Deep customization** Payloads based on modular architecture (pre-existing building blocks)
- **Performance** Product design freedom & unique RF performance
- **Low-Cost** Efficiencies driven by size, materials, design-to-delivery times
- **Under one roof** Everything from design and development through AIT
- **Flexibility** Payload product portfolio across LEO, MEO, GEO and broad spectrum (UHF, L, S, C, X, Ku, Ka, Q, V and optical bands)
- **Brilliant people** Deep expertise; multi-cultural teams
- **Complete system design** Includes printed parts, electronic PCBs, software.



Novaspace assessment of compact GEO platforms

Compact, software-defined GEO platforms are gaining momentum as a growing segment of the satcom market. After several years of subdued procurement, geostationary demand is recovering: Novaspace data shows 14 GEO satellites ordered by September 2026, compared with 10 in all of 2025. Part of this renewed interest reflects a capital trade-off. While NGSO constellations require multi-billion-dollar investments in hundreds of satellites before delivering full service, a single GEO satellite can cover an entire region, making it a far less CAPEX-intensive way to add or renew capacity. Compact GEO platforms push this advantage further, allowing regional operators, mobile network providers and sovereign customers to secure dedicated capacity at an accessible cost.

To meet this demand, GEO satellites themselves are evolving. Software-defined payloads allow beam coverage, power and frequency plans to be reconfigured in orbit, extending the commercial relevance of each asset over its lifetime. Lighter platforms benefit from lower launch costs and rideshare options, while modular architectures and industrialized production are compressing delivery schedules with a target of two to three years. As a result, GEO is increasingly bought as a scalable, adaptable building block within multi-orbit networks rather than as a one-off flagship asset. Novaspace estimates the Total Addressable Market (TAM) for compact GEO platforms at $36.5 billion over the 2027–2031 period.

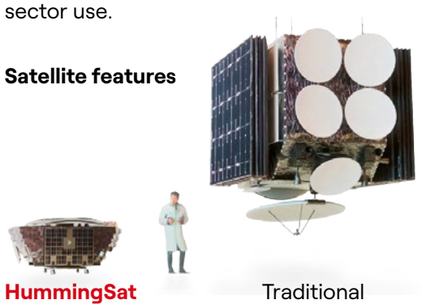
SWISSto12 capabilities: HummingSat

SWISSto12's HummingSat introduces a new category of small geostationary satellite. HummingSat leverages our advanced payload technology to deliver a reliable, cost- and schedule-efficient platform that enables new business cases and helps you shape the future of innovation in space.

For commercial satellite operators, HummingSat offers a compelling solution for customized GEO missions, helping leaders to close the business case for services and bring new applications to market. Thanks to the rapid build-out times (<3 years), satellite operators can respond more rapidly to customer needs and take advantage of satcom-related opportunities that new technology brings, such as direct-to-device and the integration of terrestrial and non-terrestrial networks.

For governments, the result is a right-sized path to dedicated, sovereign capacity: persistent coverage, improved affordability, accelerated deployment, and mission flexibility for public-sector use.

Satellite features



HummingSat

- Mass: 1,000kg
- Low cost
- Build time: 2–3 years
- Service life: 15 years

Traditional

- Mass: 7,000kg
- Cost: 300–1'000m
- Build time: 5–6 years
- Service life: 15 years

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Features

- Rideshare launch strategy (launch agnostic)
- Payload power end of life (2kw)
- Orbit raise (GTO-GEO capability built-in)
- HTS/BSS/FSS/MSS/D2D/optical or advanced payloads
- Payload capability (250kg)
- Performance – High payload capability per unit volume/ higher payload density
- Longevity – Up to 15 years (mission in GEO)

Reasons to believe

- **Flexibility** Bespoke payloads, integrated on a standardised platform with qualified subsystems
- **Low Cost** Size reduction, faster design-to-delivery times, rideshare launch strategy
- **Reliability** Strong product architecture; diversified supply chain in Europe and the US
- **Under One Roof** Switzerland's largest end-to-end satellite production site
- **Driving Force** Deep expertise, experience; multi-cultured team

Infinite Possibilities

- World's largest IP portfolio for additive manufacturing for RF products
- 2000+ payload products in space, since 2019
- First large deployable reflector subsystem, enabling first D2D solution for media broadcast from commercial geostationary satellite

Glossary

CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditure
D2D	Direct-to-Device
GBPS	Gigabits per second
GEO	Geostationary Earth Orbit
HTS	High-Throughput Satellite
IOT	Internet of Things
LEO	Low Earth Orbit
MBPS	Megabits per second
MEO	Medium Earth Orbit
NGSO	Non-Geostationary Satellite Orbit
NTN	Non-Terrestrial Network
TAM	Total Addressable Market

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