

Constellations: Telco Race in outer space

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How satellite constellations are reshaping the telecommunications landscape

Satellite constellations, led by Starlink, are turning satellite connectivity into a mainstream solution through massive investments (USD 10–30 bn) and disruptive LEO technology. With costs dropping (–15% per year since 2021), adoption is surging—especially in rural US areas lacking fiber—where 4 million customers now rely on it. Next, direct-to-cell and eSIM are expected to enable seamless mobile coverage, letting smartphones connect via satellite. This shift depends on access to scarce low-band spectrum (600–900 MHz), pushing constellations to secure deals with local operators. The fragmented telecom landscape favors them, as at least one operator per country is likely to cooperate. In response, telecom players will have to decide whether to block entry, partner with satellite providers, or develop their own solutions—shaping the industry's future.

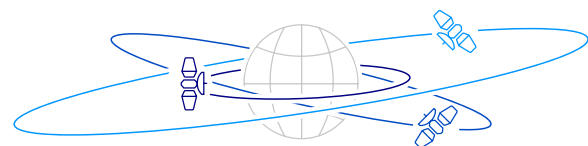
Growth in satellite capacity supply and the rise of constellations

The satellite communication industry is undergoing a profound transformation, driven by the rapid expansion of new-generation constellations in low and medium Earth orbits. Unlike traditional geostationary satellites, which remain fixed above a specific point on Earth, these newer systems offer lower latency and seamless global coverage. Their capacity is set to double every 2 years until 2028, far outpacing the growth of older geostationary models.

Constellations are ramping up their capacity deployment at an unprecedented scale

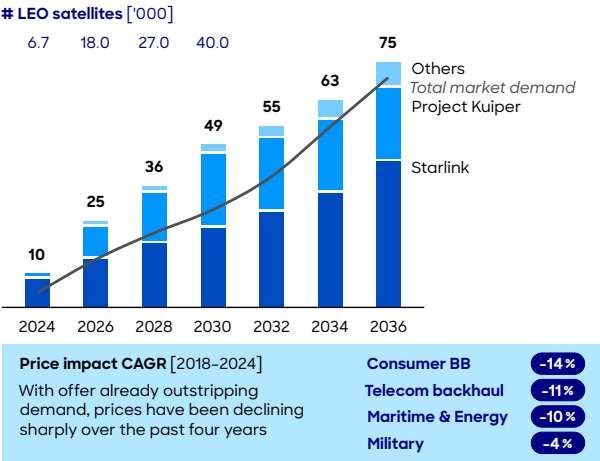
LEO constellations at a glance

LEO satellite	MEO satellite	GEO satellite
• <2,000 km orbit	• 5,000–20,000 km orbit	• 35,768 km orbit
• In motion	• In motion	• Static



	Latency	Gateways required	Cost to deploy network	Replacement cycle
LEO	~50 ms	Numerous, local	USD 5.0–15.0 bn	5–7 years
MEO	~150 ms	Several, flexible	~USD 1.5 bn	12 years
GEO	~700 ms	Few, fixed	USD 1.0–1.5 bn	15 years
4G	~40 ms	n/a	n/a	n/a

Capacity demand [Tbps] and key LEO players' supply evolution



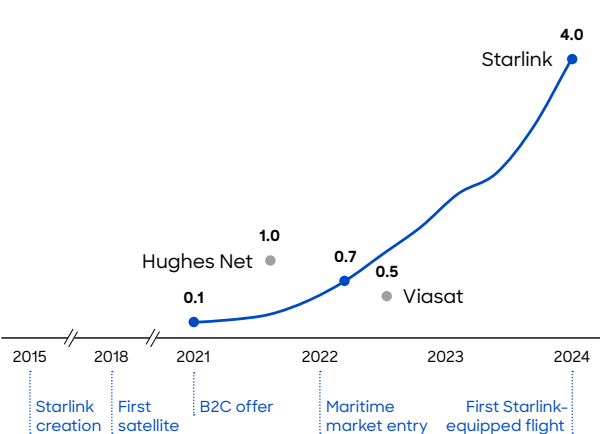
Source Starlink, Kuiper, Nova space, NSR 2024 report, Roland Berger

Roland Berger

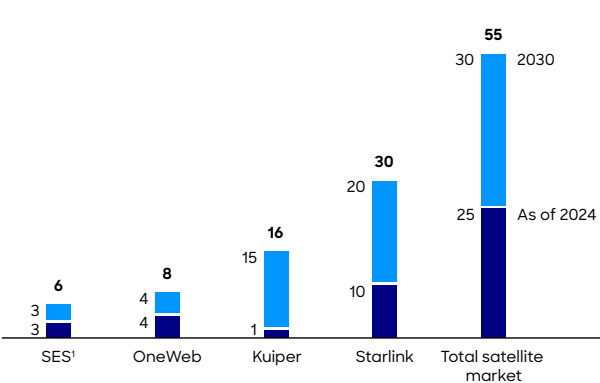
This surge in satellite deployments is triggering a sharp decline in connectivity prices, as various operators compete to fill their growing networks. With large-scale rollouts planned by multiple players—including Starlink, Amazon’s Kuiper, OneWeb, and Telesat—the trend of decreasing prices is expected to continue well beyond 2035, fundamentally altering the economics of satellite communications.

With an increasing customer base and substantial investments, Starlink is leading the LEO race

Subscriber base evolution of key B2C players [in millions]



Constellation investments vs. satellite market size [USD bn]



1 Estimated capex spending since Starlink launch (2019)

Source Starlink, Nova Space, NSR 2024 report, Roland Berger

Roland Berger

Among these players, Starlink remains the most advanced, with over 4 million subscribers as of 2024, significantly outpacing competitors. Its constellation of more than 4,500 satellites has enabled a broad range of services, from home broadband to maritime and in-flight connectivity, making it the dominant provider in the consumer satellite market.

Compared to legacy satellite operators like SES, new entrants have committed unprecedented investments to their constellations—led by Starlink, whose spending now exceeds the total investment of the traditional satellite sector. This marks a strategic shift from a historically niche, business-focused industry toward a mass-market consumer offering.

In home broadband, constellations already compete head-to-head with traditional telecom providers, challenging them on both pricing and performance. In the US, it serves as a vital alternative in regions with little or no fiber access, where customers pay a premium for high-speed internet. Meanwhile, in Kenya, constellation pricing is directly competitive with local telecom operators, and their superior speeds are making them an increasingly attractive choice for consumers.

Constellation products already compete globally with telecom operators where fiber is not available

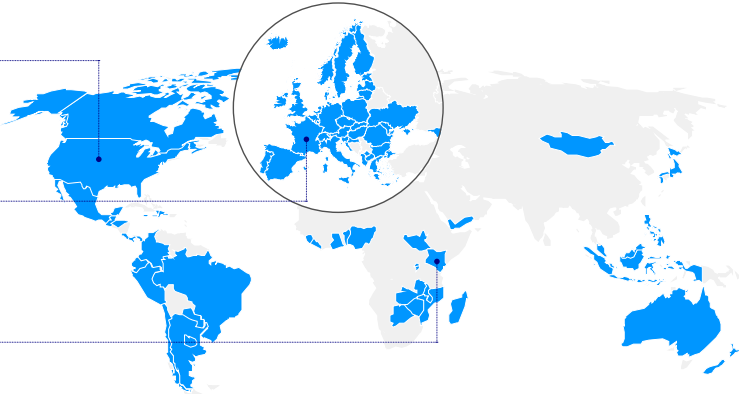
B2C broadband offer comparison across the globe (residential, as of Jan. 2025)

	Satellite B2C	Residential broadband
Monthly fee for residential	USD 120/month	USD 71/month
Download speed	50-300 Mbps	~270 Mbps
Upload speed	10-30 Mbps	~40 Mbps
Latency	20-50 ms	13 ms
Monthly fee for residential	USD 42/month	USD 31/month
Download speed	110-260 Mbps	~280 Mbps
Upload speed	15-30 Mbps	~210 Mbps
Latency	30-40 ms	9ms
Monthly fee for residential	USD 50/month	USD 40/month
Download speed	100-150 Mbps	~15 Mbps
Upload speed	20-40 Mbps	~15 Mbps
Latency	25-40 ms	12 ms

USA

France

Kenya



■ Satellite availability

Source Starlink, Speedtest.net, Numbeo, Speedtest Global Index, Roland Berger

Roland Berger

As next-generation satellite networks continue to scale, the industry is at an inflection point—one where traditional telecom and satellite operators must adapt or risk being left behind in the race for global connectivity.

• SatCom towards the mobile connectivity

Three technologies would enable the constellations to directly offer services to mobile users:

1 *Direct-to-cell*

Direct-to-cell technology allows satellites to connect directly with standard mobile phones, providing seamless coverage in areas without terrestrial network infrastructure. Several satellite operators, including AST SpaceMobile, Lynk and Starlink, have already demonstrated the feasibility of this technology, with 4G connectivity being established from space without requiring hardware modifications on mobile devices.

Among these, Starlink is again the leader, with its V2 Mini satellites already equipped with direct-to-cell functionality, enabling smartphones to connect without modifications.

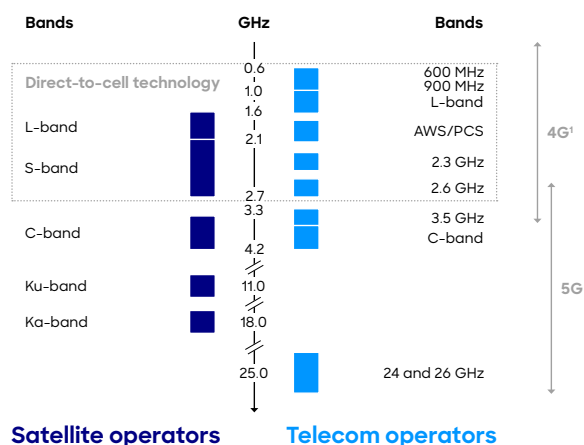
2 *eSIM*

An eSIM is a built-in digital SIM that allows users to activate mobile plans without a physical card. For satellite operators, it would enable direct customer connections, helping bypass traditional mobile telcos by eliminating the need for local SIM distribution and carrier partnerships.

For example, constellations could rely on the multiple eSIM platforms such as Airalo, Nomad and Holafly to directly address customers as a connectivity provider in underserved areas, or for international packages, bypassing traditional operators.

LEO players can use L/S or traditional LTE bands, but must coordinate with local operators, as bands are already allocated

Spectrum competition



Technical constraints

- Direct-to-cell is only possible with low and L/S bands due to smartphones limited emission power and reception capabilities
- Used bands must be compatible with LTE/5G standards to enable direct communication with smartphones

Reglementary constraints

- Spectrum is a finite resource, and allocation is strictly regulated to avoid interferences with critical systems (e.g., GPS, military)
- In space, the ITU operates on a "first-come, first-served" basis, leading to tensions with operators like Starlink, which faces criticism for monopolizing spectrum resources
- At a country level, each local regulator follows its own set of rules and strategy for allocation (e.g., auctions)

Partnerships

- Given the lack of available compatible spectrum, Starlink partnered with T-Mobile to use their frequency for the first direct to cell tests (600 MHz)

3 *Spectrum*

Direct-to-cell technology relies on L, S and 600–900 MHz frequency bands, which are already allocated to terrestrial operators. As a result, satellite providers must negotiate agreements with local telecom players to secure access.

In Europe, where the market remains highly fragmented, at least one operator in each country is likely to be open to leasing its frequencies, particularly for underutilized spectrum with limited profitability. Regulators could also play a key role in facilitating these agreements, viewing satellite-based solutions as a way to bridge connectivity gaps in rural and underserved areas.

• **Role of traditional telcos and their strategic options**

Telecom operators have several strategies in response to satellite companies entering the mobile market such as the following:

- 1 Resisting constellation's entry by influencing regulatory bodies
- 2 Partnering with constellations to distribute B2C satellite-based products
- 3 Developing their own alternative products, and competing directly with constellations

Each of these strategies comes with its own set of pros and cons for telecom operators. Below is a comparison of the options:

Adopt a resistance position

Pros: Delayed satellite market entry

Cons: Not a long-term solution; May only delay market entry

Build on first mover advantage

Pros: Extra revenue opportunities

Cons: Potential cannibalization of traditional revenues; Opens market to new entrants, potentially disrupting control

Develop an alternative

Pros: No cannibalization; Future proof strategy

Cons: Requires significant investment and time to develop

Conclusion

The rise of non-GEO satellites and the rapid adoption of new technologies are reshaping the satellite communication industry, blurring the lines between traditional telecom and satellite operators. LEO constellations like Starlink offer high-speed broadband services in regions where alternatives are not available and positioning themselves as a key contender in the global connectivity race.

As satellite networks push further into the mobile market with innovations like direct-to-cell, the need for spectrum collaboration with local operators will become increasingly critical. Securing access to L, S, and 600-900 MHz bands will determine the pace and extent of satellite-based 4G services, making regulatory and industry partnerships essential for expansion.

For traditional telecom operators, this shift presents both a challenge and an opportunity. Whether through strategic alliances, direct competition, or the development of their own satellite-enabled solutions, they must adapt to an industry where seamless global coverage is no longer a distant vision but an emerging reality. The choices made today will define the competitive landscape of tomorrow.

Further reading

➔ [IS IT TIME FOR EUROPE TO LEAD IN TELECOM INNOVATION?](#)

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