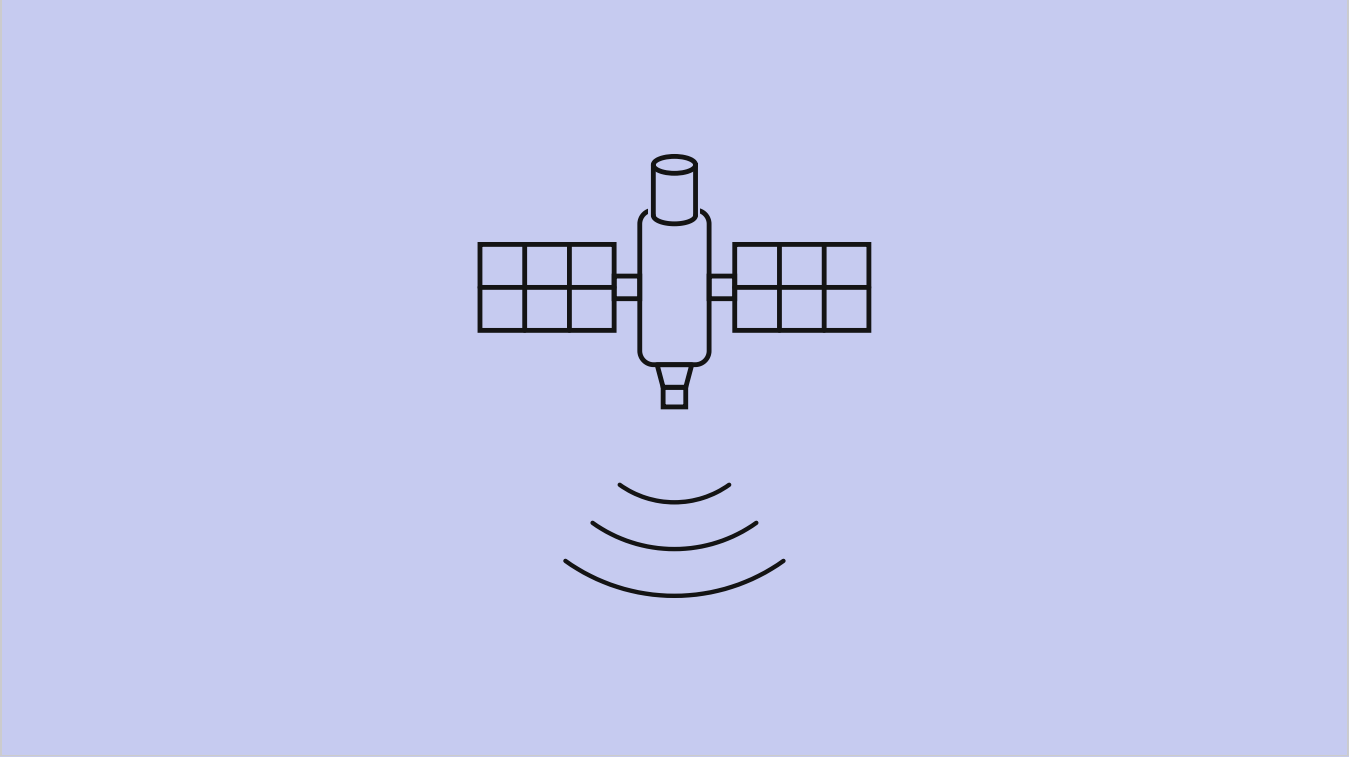
Infrastructure

How Does Starlink Work?

Once considered impossible, Starlink is now critical internet infrastructure. But how does it actually work?



Emmanuel Awosika ▪ 23 June 2026 ▪ 4 min read

Starlink (https://www.starlink.com/) delivers internet from a constellation of thousands of small satellites[1] flying in low orbit, close enough to the ground that a signal reaches a user in a few hundredths of a second rather than the long delay of traditional satellite service parked far out in space.[2] The idea of internet from orbit is decades old. What changed was the cost of getting there.

Understanding how it works means understanding why low orbit matters, why launching thousands of satellites only recently became affordable, and what the system still cannot do.

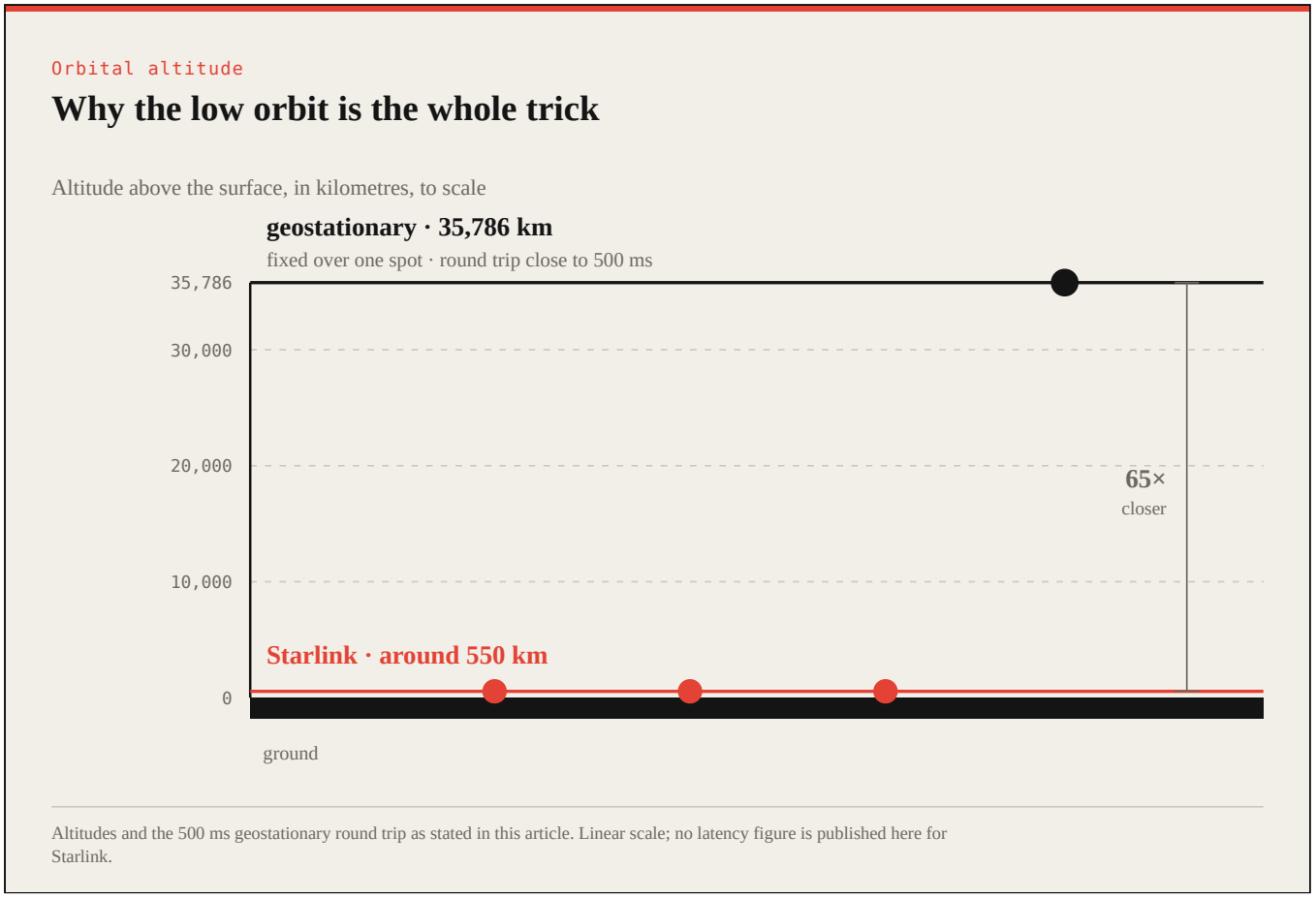
The old idea, revived

Delivering internet from space is not new. Earlier satellite services placed a small number of large satellites in a very high orbit, where each one could cover a huge area from a fixed position in the sky. That arrangement works, but it comes with a heavy penalty in delay, because the signal has to travel a long way up and back.

Starlink inverts the design. Instead of a few satellites far away, it uses thousands close in. That choice trades simplicity for performance, and it only makes sense if you can afford to put an enormous number of satellites into orbit and keep replacing them.[3]

Why low orbit matters

A satellite in low orbit is a few hundred kilometers up[4] rather than tens of thousands. The shorter distance cuts the round trip for a signal dramatically, which is what makes the service feel closer to a normal broadband connection than to old satellite internet.



> Drawn to a linear scale, because the gap is the argument. At geostationary distance the whole Starlink shell is a line just above the ground.

The trade-off is coverage. A low satellite sees only a small patch of ground and moves across the sky quickly, so covering the whole planet continuously requires a large fleet in carefully arranged orbits, with many satellites overhead at any given moment.

The launch problem

The hard part was never building a single satellite. It was launching and replacing them cheaply enough to keep thousands in the sky at once. For most of the space age, reaching orbit was expensive enough that a constellation on this scale was simply uneconomic.

Reusable rockets changed the arithmetic.[5] Bringing the cost of each launch down far enough made it possible to loft satellites in large batches and to keep sending more as older ones are retired, which is what turns the design from a concept into a running service.

Tracking and handoff

Because each satellite is in view for only a few minutes, the connection has to move from one to the next without interruption. A flat antenna on the ground, sometimes called a phased array (https://en.wikipedia.org/wiki/Phased_array)[6], steers its beam electronically to track the satellites passing overhead and hands off from one to the next as they move.

To the user, none of this is visible. The dish points itself, follows the fleet across the sky, and keeps the link continuous even though no single satellite stays overhead for long.

What it can and cannot do

Starlink is transformative where laying cable is impractical, in rural areas, at sea, in disaster zones, and anywhere the ground infrastructure does not reach. For those places it offers a connection that simply was not available before.

It is not a replacement for dense urban fiber, where a shared satellite network cannot match the capacity of a wired connection, and the growing number of satellites raises real questions about crowding and astronomy.[7] It is best understood as infrastructure for the places the old networks left out. ■

Footnotes

1. The constellation passed 6,000 working satellites in 2024 and is cleared to grow far larger, which already makes Starlink the operator of more than half of all active satellites in orbit. ↩

2. Traditional services park a few satellites in geostationary orbit about 35,786 km up, where each stays fixed over one spot on the ground. The catch is distance. The round trip runs close to 500 ms, fine for broadcast but hopeless for a video call. ↩

3. At these low altitudes faint traces of atmosphere slowly drag satellites down, so each is built to last only about five years and to burn up on re-entry. Keeping the network running means launching replacements constantly. ↩

4. Starlink satellites orbit around 550 km up. At that height they circle the Earth in roughly 90 minutes and stay in view of any given spot for only a few minutes at a time. ↩

5. SpaceX lands and reflies the first stage of its Falcon 9 rocket, the part that carries most of the cost. Reusing that booster cut the price of reaching orbit far enough to make launching satellites by the thousand practical. ↩

6. A phased array steers its beam by shifting the timing of many small antenna elements rather than by physically turning a dish, so it can lock onto a satellite crossing the sky and switch to the next one with no

moving parts. ↩

7. Thousands of low, sunlit satellites leave bright trails across long exposure images. Astronomers have flagged the streaks, along with the collision risk of a crowded low orbit, as a growing problem. ↩
