

Geostationary or geosynchronous (GSO) orbit satellites

Geostationary or geosynchronous orbit (GSO) satellites are positioned > ~35,000 km above the surface of the Earth, as measured from the equator. These satellites include the Anik series launched by Telesat between 1972-2013¹³⁹. Currently, GSO communications satellites provide the majority of satellite internet services to Canadian users, through service providers such as Xplornet. These satellites typically provide long-term coverage over a large area by moving at the same angular velocity as the rotation of the Earth.

The costs associated with sending a satellite into GSO are high (> \$100 million). As one example, the estimated costs for ViaSat's ViaSat2 Ka-band satellite system were \$625 million¹⁴⁰, when factoring in the build, launch, insurance, and ground infrastructure.

In general, GSO satellite launches have a smaller payload capacity and require more propellant (leading to more mass) to reach orbit. This leads to higher costs per satellite, per launch, compared to lower Earth orbit destinations. The GSO satellites are typically large (> 1,000 kg in mass, e.g. ViaSat-2 is 6,400 kg)¹⁴¹, and have long (planned) life spans (e.g. > 10 years). For communications purposes, they carry technologies that enable large coverage areas and bandwidth (ViaSat-2's bandwidth capabilities are estimated at 350 Gbps¹⁴²).

This technology allows satellite-based internet providers to serve a large number of consumers at higher bandwidth, with a single satellite. However, due to their high orbit, data transmission times from GSO satellites experience a path latency in excess of ~230 milliseconds. Although the data packets are being transmitted at a relatively fast rate, because they are transmitted over time, the larger latency often leads to a delayed distribution of network data, which can impact webpage load times.

References

¹³⁹Telesat. [Our Fleet](#) (2016). Accessed 18 May 2016.

¹⁴⁰Peter B. de Selding. [ViaSat-2's 'First of its Kind' Design Will Enable Broad Geographic Reach](#). Space News. 17 May 2013. Accessed 10 June 2016.

¹⁴¹Gunter Krebs. [ViaSat2](#). Gunter's Space Page. 17 April 2016. Accessed 10 June 2016.

¹⁴²Space News. [ViaSat-2's 'First of its Kind' Design Will Enable Broad Geographic Reach](#), 17 May 2013. Accessed 10 June, 2016.