

Starlink ...a rising LEO broadband star?

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As many are aware, Starlink low earth orbit (LEO) broadband internet service is now live for beta testing with many terminals deployed. Some 700,000 US residents asked for service availability updates [5]. Here is a quick compendium of what we know so far.

Coverage: As the first Starlink orbital shell fills with satellites, coverage will extend from an initial continuous service band between about the 44th and 52nd parallel [1] to between the 30th and 57th parallel by early 2021 [2]. In Canada, this means initial service is available south of a line through Bella Coola and Williams Lake in BC, Red Deer in Alberta, Saskatoon in Saskatchewan, Swan River in Manitoba, the south end of James Bay and all of Newfoundland but not much of Labrador. When service extends up to the 57th parallel, this will be a line through Bob Quinn Lake in BC, Manning and Fort McMurray in Alberta, the south part of Hudson Bay and most of Labrador. Outside of the coverage band, service will be intermittent to the south and trail-off to non-existent in the north [3], [4]. However, some good news for northerners, the FCC recently granted permission for Starlink to launch the first 10 out of a planned 348 polar orbit to begin coverage of Alaska [8].

Performance: Starlink performance claims are being confirmed by early customer reports that are leaking out (beta testers sign nondisclosure agreements). Downlink speeds vary between 50 and 150 Mbps [1], [5], [6]. Uplink speeds vary between 10 Mbps and 30 Mbps [5] and may reach 40 Mbps [5], [6]. Delay should be in the 20 to 40 ms range [6] and depends on proximity to a Starlink internet gateway (obviously closer is better). Jitter is expected as the satellites are moving and inter-satellite links are used (9 ms jitter was reported but this may not be typical). Beta service usage is unlimited (no monthly cap). Until the satellite constellation is sufficiently dense, there will be short service outages when there is no satellite overhead. These gaps will not be noticed for many applications (e.g., no impact on Netflix if the streaming buffers do not empty but gamers could be inconvenienced if the delay suddenly increases to seconds or longer). The beta service is provided "as is" with no service level agreements. Starlink may discontinue the service at any time and ask for the return of the terminal.

Cost: The U.S. beta test terminal kit is US\$499, then US\$99 per month for service [1]. Canadian pricing was announced at C\$649 for the terminal and C\$129 per month. However, with taxes and shipping, the terminal kit delivered is reported to be in the C\$800 to C\$820 range [7]. These prices should be attractive for isolated customers in remote areas. See the graph for a plot of total cumulative cost from the customer's view point for Starlink versus fiber to the premises (FTTP) where the customer pays the upfront cost to lay the fiber and then \$80 per month.

Conclusion: The current trajectory shows Starlink on track to replace geostationary earth orbit satellites as the internet service platform of choice for remote customers. However, communities with enough size and density to reach FTTP economies of scale, will find fiber more economical and more scalable in the long term.

References

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