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SATELLITE BROADBAND IS NOT A RELIABLE BROADBAND SERVICE OR AN APPROPRIATE LONG-TERM SOLUTION FOR THE VAST MAJORITY OF UNSERVED AND UNDERSERVED LOCATIONS

As states begin awarding grants to internet service providers under the $42 billion Broadband Equity Access and Deployment (BEAD) Program funded by the Bipartisan Infrastructure Law, satellite broadband providers like Starlink are lobbying public officials to reverse the current National Telecommunications and Information Administration's (NTIA) policy of prioritizing investment in fiber. Low Earth orbit (LEO) satellite broadband has been marketed as a lower-cost solution for unserved and underserved areas. However, LEO has significant limitations compared to fiber and fixed wireless broadband. Policymakers should be skeptical of satellite technology and consider its technical shortcomings, long-term sustainability, and economic impact before publicly subsidizing it.

LEO HAS SPEED AND PERFORMANCE LIMITATIONS

- **Slower Performance with More Users:** Unlike fiber, which offers scalable infrastructure, satellite bandwidth is finite. As more users connect to a given satellite network, speeds drop, making large-scale adoption impractical.[1] Satellite does not provide the speed that communities will need - and current speeds will

[1] Newsweek, "Satellite May Sound Like the Future, But it Could Stick Broadband Users in the Past," www.newsweek.com/satellite-may-sound-like-future-it-could-stick-broadband-users-past-1824701.

change depending on the number of individuals subscribed to a given satellite network.

- **Inconsistent Speeds:** Starlink and other satellite broadband providers often advertise high speeds, but real-world performance varies significantly based on location, the number of individuals connected to a satellite network at a given time (network congestion), and atmospheric conditions. Starlink's website states that download speeds range between 25 and 220 Mbps.[2]

- **Insufficient Upload Speeds:** Industry experts have said Starlink struggles to meet BEAD's upload speed requirements. The company reports average upload speeds of 5 to 20 Mbps, below what is necessary for modern broadband applications. In contrast, major ISPs offer plans with symmetrical gigabit or multi-gigabit speeds.

- **High Latency Rates:** Broadband latency is the time it takes to send data and receive a response over the internet and is measured in milliseconds (ms). A 2024 report by Netforcast shows the median download latency of Starlink at 52 ms compared to Verizon FiOS's (fiber) 24.9 ms, and Cox's (cable) 29.8 ms.[3]

- **Weather Vulnerability and Service Interruptions:** Unlike fiber, which is largely immune to weather-related disruptions (especially if it is deployed underground through conduit), satellite signals degrade in bad weather, especially in areas with heavy cloud cover or precipitation.[4] This is a critical issue for rural users who rely on internet service for work, education, and emergency services.

- **Long-Term Cost Inefficiency:** Unlike fiber, which is a one-time infrastructure investment with decades of lifespan, Starlink satellites have a short lifespan of approximately five years, requiring continuous spending on launches,

[2] Starlink Specifications, https://www.starlink.com/legal/documents/DOC-1400-28829-70 (Last accessed February 20, 2025).
[3] NetForecast, "Quality of Experience: Insights into the State of Internet Connectivity. In-depth Research Covering Services from Leading Internet Service Providers" (May 2024).
[4] Starlink, "Does weather impact my service quality?" https://www.starlink.com/support/article/529bf751-3cad-f460-d653-4af162f195da.

maintenance, and user equipment upgrades just to keep the current service running.[5] Policymakers should use a 30-year investment payback period (i.e.estimated lifespan of fiber) when evaluating costs of LEO satellites, and not make short-sighted decisions that stick rural residents with inferior broadband options.

The government should not provide long-term funding for a service that will literally fall out of the sky in five years and require another significant investment. The State of Maine has recognized this dilemma by creating a stopgap subsidy for 9,000 remote locations that covers the cost of Starlink equipment, provides installation support, and pays for extra capacity to ensure reliable connections while at the same time using its BEAD funds to deploy fiber to all of the 28,800 unserved and underserved locations.[6]

Furthermore, Starlink has capacity constraints. Starlink's current 6,957 active LEO satellites have the theoretical capacity to take on 395,000 BEAD subscribers, which is less than 5 percent of the estimated 8.5 million unserved locations.[7]

- **Risk of Monopoly and Limited Competition:** As the only operational LEO satellite provider, Starlink has a first-mover advantage, raising concerns about monopolistic control over satellite broadband. Other LEO competitors like Amazon's Kuiper haven't yet established active networks. The BEAD program rules do not consider LEO a reliable broadband service, meaning it can only be considered for grant funding after fiber, cable, DSL, and qualifying terrestrial fixed

[5] Space Magazine, Starlink satellites: Facts, tracking and impact on astronomy, https://www.space.com/spacex-starlink-satellites.html.
[6] Maine Connectivity Authority, "Maine's Starlink Program Open for Applications,' https://www.maineconnectivity.org/news/maine's-starlink-program-open-for-applications (December 11, 2024).
[7] Space.com, "Starlink satellites: Facts, tracking and impact on astronomy," https://www.space.com/spacex-starlink-satellites.html (January 30, 2025); Fiber Broadband Association letter to members, https://fiberbroadband.org/wp-content/uploads/2025/01/4Q24-FBA-CEO-Update.pdf (January 2, 2025) ["Starlink has the capacity to support 1.7 million subscribers in the U.S. Starlink currently has 1.4 million subscribers. 215,000 of these locations are BEAD eligible. The available spectrum today supports one housing unit per square mile. The opportunity for incremental BEAD is limited to 180,000 locations."]; NTIA, "Internet for All - The Broadband Equity, Access, and Deployment (BEAD) State Allocation Totals," https://www.internetforall.gov/state-allocation-totals; Pots and Pans, "Technology Neutral," https://potsandpansbyccg.com/2025/02/10/technology-neutral (February 10, 2025).

wireless services are judged too costly under a high cost threshold determination.[8] If NTIA changes the definition of "reliable broadband service" to include LEO satellite, states may award Starlink many times more locations. This could entrench Starlink's first-mover advantage and risk monopolizing the industry's early development.

- **Lack of quality jobs:** Satellite employs fewer workers, and there are currently no union-represented LEO satellite internet providers. Public funds should help create good, union jobs in our communities, not boost the profits of billionaire-owned satellite companies.

- **Space debris, collisions, and light pollution:** Starlink's goal of placing 42,000 LEO satellites in orbit increases space light pollution, creates space debris, may interfere with NASA programs, and increases the risk of collision with other satellites or space missions.[9]

LEO SATELLITES, ESPECIALLY STARLINK, HAVE FUNDAMENTAL FLAWS, MAKING THEM AN UNRELIABLE AND EXPENSIVE ALTERNATIVE TO FIBER

LEO is not a future-proof investment. It doesn't provide the speed communities will need and is more costly long-term because of equipment replacement needs. Policymakers should limit LEO satellite use only to extremely high cost locations, which likely constitute fewer than 3 percent of BEAD eligible locations.

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[8] National Telecommunications and Information Administration, Broadband Equity, Access, and Deployment (BEAD) Program: Alternative Broadband Technology Policy Notice, https://www.ntia.gov/sites/default/files/publications/ntia_bead_alternative_broadband_technology_policy_notice.pdf (December 19, 2024).

[9] Business Insider, "Everything we know about Elon Musk's Starlink satellites and future internet plans," https://www.businessinsider.com/elon-musk-starlink-satellites-internet; Aneli Bongers & José L. Torres, "Low-Earth Orbit Faces a Spiraling Debris Threat," Scientific American (April 22, 2024), https://www.scientificamerican.com/article/low-earth-orbit-faces-a-spiraling-debris-threat; Business Standard, "Falling Starlink satellites worry scientists, 120 fell from space in Jan," https://www.business-standard.com/world-news/failing-starlink-satellites-worry-scientists-120-fell-from-space-in-jan-nc-125020701419_1.html (February 10, 2025); Cheri Beranek, "Satellite May Sound Like the Future, But it Could Stick Broadband Users in the Past," Newsweek, www.newsweek.com/satellite-may-sound-like-future-it-could-stick-broadband-users-past-1824701.