



**Written Testimony of Tom Stroup
President, Satellite Industry Association
Before the
United States House Committee on Agriculture**

Hearing on Closing the Digital Divide in Rural America

Chair Thompson, Ranking Member Scott, and distinguished Members of the Committee, thank you for inviting me to testify before you today. I am Tom Stroup, President of the Satellite Industry Association (SIA).¹ SIA is a U.S.-based trade association that represents the leading satellite operators, service providers, manufacturers, launch services providers, space situational awareness companies, and ground equipment suppliers.

Satellite communications are transforming the operation of our nation's farms and ranches. Satellites, unlike terrestrial communications, bring a range of unique attributes that benefit our nation's farmers. This includes the ability to cover broad geographies without the need for expensive terrestrial infrastructure, increased resiliency, and rapid deployment. In addition, recent innovations in the satellite industry have made the delivery of high quality, high-speed broadband and Internet of things (IoT) connectivity to everyone everywhere across the United States a reality.

¹SIA Executive Members include: Amazon; The Boeing Company; DIRECTV; EchoStar Corporation; HawkEye 360; Intelsat S.A.; Iridium Communications Inc.; Kratos Defense & Security Solutions; Ligado Networks; Lockheed Martin Corporation; Northrop Grumman; OneWeb; Planet Labs PBC; SES Americom, Inc.; Spire Global Inc.; and Viasat Inc. SIA Associate Members include: ABS US Corp.; The Aerospace Corporation; Artel, LLC; AST Space Mobile; Astranis Space Technologies Corp.; Aurora Insight; Blue Origin; Comtech; Eutelsat America Corp.; ExoAnalytic Solutions; Hughes; Inmarsat, Inc.; Kymeta Corporation; Leonardo; Lynk; Omnispace; OneWeb Technologies; Ovzon; Panasonic Avionics Corporation; Skyloom; Telesat; ULA and XTAR, LLC.

Satellite communications and services are well-poised to help our farmers meet today's real challenges – from addressing food insecurity, to monitoring weather and water, to overcoming supply chain challenges. Satellites are capable of providing broadband and IoT to rural and remote areas of the country where it remains uneconomical for terrestrial services to deploy, and provide both speeds and prices comparable to terrestrial alternatives. These services are available directly to the consumer today, covering all 50 states and delivering broadband offerings up to 200 megabits per second (Mbps). Satellite broadband is also used by business and government enterprises, for both fixed and mobile purposes, using a range of spectral bands to deliver assured access to broadband communications. Further, satellites are providing critical backhaul Internet connectivity to local Internet Service Providers and community institutions in remote locations.

Satellite enables remote farms with livestock sensors, soil monitors, and autonomous farming equipment in rural America, far beyond where terrestrial wireless and wireline can reach or make economic sense to deploy. Precision GPS technologies allow farmers to increase crop yield by optimizing use of fertilizer, pesticides, herbicides, and applying site-specific treatments to fields. Earth imaging satellites provide regular high-resolution imagery that allows farmers to determine when to plant, water, or fertilize crops and can be used to provide crop yield estimates, conduct scout monitoring, and monitor global food security. Satellite advances in weather forecasting help farmers prepare for drought, floods, and other adverse weather conditions.

Satellites are critical to 5G and IoT applications that will enable the next generation of farming technologies. Satellite communications allow for remote control of driverless tractors, or networked connectivity between equipment at large farms where equipment may not be in the same sightline. According to John Deere CTO Jahmy Hindeman, the company is “pretty bullish

on the opportunity that the commercialization of all things space is bringing to agriculture at the moment...The response from farmers has been overwhelmingly positive. In the sense that for many of them, I call it the 0 to 1 problem, from no connectivity in places they wished that they had it to full connectivity in those places tomorrow...We don't think in many of those cases terrestrial cell will ever be a solution."² John Deere estimates 50,000-100,000 of its machines will be connected to satellites by 2026.³

The satellite industry today is investing constantly to ensure it can address the challenges of the future and to make its technologies available to every American. We are at a time of explosive innovation in the space industry, with nearly 8,000 active satellites on orbit today⁴⁵ and plans for tens of thousands more through the end of the decade, and individual geostationary communications satellites launching that provide greater capacity than entire existing fleets combined. Satellite companies are working to optimize the use of spectrum, by investing in high-throughput satellites and flexible, software defined payloads that allow for instantaneous reallocation of spectrum resources and the mitigation of harmful interference. Costs are dropping for both space and ground systems through the use of modular satellites, digital engineering, intersatellite links and cloud-integrated ground stations, which minimize the need for expensive ground architecture, which has resulted in a drop in cost of capacity of 90% over

² "Manifest Space: Space Enabled Farming With Deere CTO, 5/18/23" <https://closing-bell.simplecast.com/episodes/manifest-space-space-enabled-farming-with-deere-cto-5-18-23-Y23iyvUg>

³ Tita, Bob, "Deere Seeks Satellite Network to Connect Far-Flung Farms" Wall Street Journal, 1 May 2023, <https://www.wsj.com/articles/deere-seeks-satellite-network-to-connect-far-flung-farms-65c37b0f>

⁴ "NORAD GP Element Sets Current Data", CelesTrak, 14 June 2023
<https://celestrak.org/NORAD/elements/>

⁵ Up from 1167 in 2013; see Satellite Industry Association, "2014 State of the Satellite Industry Report"

the past eight years.⁶ Flat panel and phased-array antennas lower consumer costs and enable better connectivity that has been essential to the deployment of non-geostationary satellite constellations.

Most importantly, satellite services are available now across the entire country without the need for additional buildout. As the Information Technology & Innovation Foundation notes, “No single broadband technology holds all the advantages. With finite resources and widely varying topography, we need a flexible combination of all available access technologies to bridge the digital divide... if we try to subsidize fiber everywhere, overbuilding will crowd out private investment.”⁷ In some remote areas, the cost of the USDA ReConnect program’s fiber buildout has allocated costs per passing of up to \$204,000 per passing,⁸ and according to Tarana Wireless, a full-fiber approach to BEAD would cost upward of \$200B,⁹ staggering amounts for communities that can receive satellite broadband today. Additionally, fiber has been plagued by supply chain and labor shortages, in many cases doubling the cost of fiber programs supported by the Rural Development Opportunity Fund.^{10,11}

⁶Satellite Industry Association, “2023 State of the Satellite Industry Report”

⁷ Brake, Doug, and Bruer, Alexandra, “Broadband Myth Series: Do We Need Symmetrical Upload and Download Speeds?” , Information Technology & Innovation Foundation, 12 May 2021 <https://itif.org/publications/2021/05/12/broadband-myth-series-do-we-need-symmetrical-upload-and-download-speeds/>

⁸ Goovaerts, Diana, “The cost of running fiber in rural America: \$200,000 per passing” <https://www.fiercetelecom.com/broadband/cost-running-fiber-rural-america-200000-passing>

⁹ Ferraro, Nicole, “'Fiber-only approach' to BEAD would cost over \$200B, says Tarana”, Light Reading, 17 Apr 2023 [https://www.lightreading.com/broadband/fttx/fiber-only-approach-to-bead-would-cost-over-\\$200b-says-tarana/d/d-id/784398](https://www.lightreading.com/broadband/fttx/fiber-only-approach-to-bead-would-cost-over-$200b-says-tarana/d/d-id/784398)

¹⁰ Goovaerts, Diana, “ISPs: Inflation has doubled RDOF build costs”, Fierce Telecom, 24 Oct 2024, <https://www.fiercetelecom.com/broadband/isps-inflation-has-doubled-rdof-build-costs>

¹¹ Haiar, Joshua, “Inflation Drives Up Cost of Broadband Internet Projects” 11 June 2023, <https://www.mitchellrepublic.com/news/inflation-drives-up-cost-of-broadband-internet-projects>

In order to foster further broadband and IoT connectivity, we recommend the Committee prioritize:

- **Incentives for Satellite Internet Providers:** Include provisions that offer financial incentives or tax breaks to satellite internet providers (broadband and IoT) to encourage their participation in rural broadband expansion. This could help attract more companies to invest in satellite infrastructure and services.
- **Funding for Satellite Broadband and IoT Projects:** Allocate specific funds or grants to support the development and deployment of satellite broadband and IoT projects, particularly those focused on serving rural and remote areas, including directly to farms/ranches for last acre buildout. This can help lower the financial barriers for satellite companies to expand their networks and reach underserved regions.
- **Making Requirements Technology-Inclusive:** Ensure that legislation adopts technology-inclusive language and requirements, allowing for flexibility and inclusivity in broadband and IoT deployment strategies. By avoiding prescriptive mandates that favor specific technologies, bills can encourage competition and innovation among various broadband and IoT providers, including satellite companies, and allow for the affordable solutions to reach rural America where fiber buildout is not economically feasible. This approach would enable satellite internet providers to compete on an equal footing and encourage the development of cutting-edge satellite technologies and infrastructure. Moreover, technology-agnostic requirements can also facilitate collaboration and partnerships between different types of broadband and IoT providers, enabling hybrid solutions that leverage the strengths

of multiple technologies to deliver robust and reliable broadband and IoT connectivity to rural areas.

- **Streamlined Regulatory Processes:** Interagency collaboration is needed to simplify and streamline the regulatory processes for satellite internet providers. This includes working to adopt and implement a common set of performance targets to reflect the needs of Agriculture, a recommendation supported by the Precision Ag Connectivity Task Force.¹² Additional work could involve reducing bureaucratic hurdles and improving the reporting process for programs such as the Rural Utilities Service (RUS), expediting license approvals, and promoting cooperation between government agencies to facilitate satellite deployment.
- **Spectrum Availability:** Ensure sufficient spectrum resources are available for satellite broadband and IoT providers to deliver high-quality and high-speed services. The bill could advocate for the protection of satellite spectrum and explore opportunities for sharing or repurposing underutilized spectrum bands.
- **Collaboration and Partnerships:** Encourage partnerships between satellite companies and other stakeholders, such as local communities, educational institutions, and public agencies. Collaborative efforts can help leverage existing infrastructure, share resources, and expand the reach of satellite broadband and IoT services.
- **Research and Development:** Allocate funds for research and development initiatives focused on advancing satellite technology, capacity, and affordability. This can

¹²"Task Force for Reviewing the Connectivity and Technology Needs of Precision Agriculture in the U.S.", 10 Nov 2021, <https://www.fcc.gov/sites/default/files/precision-ag-report-11102021.pdf>

support innovation within the satellite industry, leading to improved performance, lower costs, and increased opportunities for rural connectivity. This includes increasing awareness and recruitment efforts in STEM programs.

I appreciate the opportunity to appear before you and I am happy to answer any questions.