

Written Testimony of Tom Stroup President, Satellite Industry Association
Before the United States Senate Commerce, Science & Transportation Committee Hearing on
Space Situational Awareness, Space Traffic Management, and Orbital Debris: Examining Solutions for
Emerging Threats

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Chair Hickenlooper and Ranking Member Lummis 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).^{1,2} SIA is a U.S.-based trade association providing representation of the leading satellite operators, service providers, manufacturers, launch services providers, space situational awareness companies, and ground equipment suppliers.

We are at an important time in the advancement and use of space with U.S. industry bringing vast innovation to space. There are many innovative ways to use space which drive the increased need for more precise orbital tracking, space situational awareness, and, in the future, a space traffic coordination and management (STCM) regime. These uses include everything from large constellations of communications satellites bringing broadband to everyone, commercial human spaceflight, position navigation and timing, and greater space exploration and monitoring. The safety of the space environment is critical to all of our operators: from navigating through debris fields, rocket bodies, and defunct satellites, to operators coordinating on orbital planes and best practices for collision avoidance, to our cubesat operators who must utilize innovative designs to maneuver their satellites without exceeding their size, weight, and power budgets.

SIA projects the profile of active satellites operating in low earth orbit will change substantially in the upcoming 5-10 years. Many ventures have been applying for regulatory approvals, seeking investment and developing designs and are operating on-orbit today, including providing high-speed, low-latency broadband, earth monitoring, and other critical capabilities from orbit. Although a number of large constellations have been proposed, it is important to understand that adding the total number of satellites proposed in regulatory filings worldwide does not equate with what will ultimately be viable, orbiting systems. Nevertheless, it is clear that the current framework of space regulations and policies requires review and, in some cases, revision to prepare for the continued utilization of space, encourage and promote innovation, drive continued investments in the U.S., and promote a safe space environment.

SIA urges thoughtful consideration of the SSA and eventual STCM regime in a way that facilitates operators appropriately responsible for safe space operations and fosters the ongoing safe and efficient use of the shared space environment.

The most important issues SIA sees today are as follows:

1. *Timeliness:* The current and forecasted rates of launch and spacecraft deployment have increased dramatically, with over 1200 satellites launching in 2020. Currently, space operators rely on

¹ SIA Executive Members include: Amazon; AT&T Services, Inc.; The Boeing Company; EchoStar Corporation; Intelsat S.A.; Iridium Communications Inc.; Kratos Defense & Security Solutions; Ligado Networks; Lockheed Martin Corporation; OneWeb; SES Americom, Inc.; Space Exploration Technologies Corp.; Spire Global Inc.; and Viasat Inc. SIA Associate Members include: ABS US Corp.; Amazon Web Services; Artel, LLC; AST & Science; Astranis Space Technologies Corp.; Blue Origin; Eutelsat America Corp.; ExoAnalytic Solutions; HawkEye 360; Hughes; Inmarsat, Inc.; Kymeta Corporation; Leonardo DRS; Lynk; Omnispace; Ovzon; Panasonic Avionics Corporation; Peraton; Planet; SpaceLink; Telesat Canada; ULA; UltiSat and XTAR, LLC.

² Viasat does not join in these comments

space situational awareness (SSA) services and conjunction messages to characterize the space environment and anticipate and avoid collision. While these SSA services are important and useful today, more advanced services are needed to support future space operations and establish space safety and sustainability of the space environment. SIA members believe that there is a need to revise the current space safety construct by procuring and implementing a viable and effective coordination approach for information sharing, transparency, and coordination among satellite owners/operators, U.S. government organizations, and foreign administrations. Given the safety aspect inherent in SSA and STCM, government and government-backed provision of these services is critical.

2. *Orbital accuracies.* Today's public, free SSA services feature suitable orbital accuracies to support flight safety decisions in some orbital regimes, but in many key orbital regimes they will fall short as space activity increases. Whether the accuracy is suitable is highly dependent upon the specific collision avoidance metric and threshold selected by the operator, the type of object, its size or reflectivity, tracking revisit and prioritization, the orbital regime it occupies, and its maneuverability. To accommodate these current orbital inaccuracies, some operators often rely on very conservative assumptions for decisions to implement collision avoidance decisions, resulting in a flood of warnings. A focus should be on improving the accuracy of these datasets.
3. *The continued development of commercial tools to augment current space sustainability and safety service.* Several versions of commercial SSA and STCM services exist today to augment government systems in a highly complementary way. The continued development and adoption of both government and commercial services in a diverse STCM system will improve accuracy of decision-grade information for space operators.
4. *Tracking and advanced SSA analytics.* Observations from diverse SSA tracking networks and sensor types is required to build a robust, accurate SSA system. The data from these observations must be brought together using modern data fusion engines and analytics to produce accurate, decision-quality SSA content and collision alert warnings that operators can rely upon to make timely decisions.
5. *Open Architecture Data Repository (OADR).* Today, satellite operators have proven a willingness to proactively contribute data on their spacecraft, to include spacecraft positional time histories and predictions, maneuver plans, launch, early orbit and reentry data, and other data relevant to safety of flight. Commercial entities continue to lead the development and implementation of OADR capabilities. We need to now extend that space operator data exchange model across the global space operator population under a robust STCM enterprise, providing an OADR that can serve as the gathering place for authoritative spacecraft operator data.
6. *Availability of information.* It is imperative that SSA and STCM data be made readily available to all space operators, whether commercial or government, regardless of mission, altitude or nationality. Given the critical space safety role that this data products and supporting analytics provide, such data must be highly available, with a minimum of SSA and STCM service outages, and operators need to contribute improved data to make this successful.

As such, SIA recommends the following actions:

Recommendation 1: Action and funding is needed now. The commercial satellite sector is innovating quickly and driving U.S. leadership in space. SIA urges the U.S. government act now to implement a more modern SSA/STCM environment to support this innovation, including leveraging both commercial and government capabilities to yield a U.S.-developed cutting-edge space sustainability model. This activity requires adequate funding and staffing.

Recommendation 2: The Framework should be established, but the specific technologies to meet requirements should not be dictated. Space companies are world-renowned for their ingenuity. Allowing innovative ways to meet the specified requirements of a modern space safety framework will encourage development and ensure the most cost-efficient and effective technologies are utilized.

Recommendation 3: Governments should encourage best practices. The commercial space industry has a long track record of responsible operations in space and counts on a safe environment to undertake ongoing and future space business. Solidifying the participation and support of the commercial industry to ensure wide-spread adoption of space safety practices is critical and will reduce the need for unnecessary and often burdensome regulations and is action that can be taken now.

Recommendation 4: Any effective solution must be whole of space and endeavor to meet global needs. A successful, modern and sustainable space traffic management system will include all of the types of space activities listed above, U.S. and international alike. The U.S. cannot accomplish this on its own and, if regulations are not appropriate, satellite operators will continue to “forum shop” and license systems in foreign administrations rather than the U.S. This will require the relationships and leadership of the U.S. government, commercial stakeholders and like-minded space-faring counterparts to meet the important goals of space sustainability.

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