Before the
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
OFFICE OF SPACE COMMERCE

In the Matter of	)	
	)	
Request for Information on Scope of Civil Space Situational Awareness Services	)	Docket No. RTID: 0648–XV190
	)	
	)	
	)	

COMMENTS OF VIASAT, INC.

Viasat, Inc. submits these comments in response to the Request for Information ("RFI") published by the National Oceanic and Atmospheric Administration's Office of Space Commerce ("OSC") on January 26, 2023 in the above-referenced proceeding.[1] OSC has spent the past several years working on development of the capability to collect space situational awareness ("SSA") data and disseminate those data to satellite operators, and the time is ripe for OSC to complete these efforts and make its new SSA solution available to satellite operators as quickly as possible.

As OSC is well aware, the number of space objects, particularly those launched by commercial operators, is growing rapidly. Multiple NGSO systems have already been authorized and begun to deploy thousands of satellites in low-Earth orbit. As the number of space objects increases, it is increasingly clear that the Department of Defense's "limited traffic management activity and architecture will become inadequate" to address the risks posed by these new satellite systems.[2] While minimizing on-orbit risks—including through responsible

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1 *See Request for Information on Scope of Civil Space Situational Awareness Services*, Request for Information, 88 FR 4970 (rel. Jan. 26, 2023) ("SSA RFI").

2 *Space Policy Directive–3; National Space Traffic Management Policy,* 83 FR 28969 (rel. Jun. 21, 2018).

constellation design and debris mitigation strategies—is the best way to preserve a safe orbital environment in the first instance, a high-quality SSA service can also play an invaluable role in mitigating risks to space safety. Viasat is committed to proactively addressing risks that threaten the safe and sustainable use of space and therefore welcomes this opportunity to comment on what characteristics OSC's forthcoming basic SSA service should entail.

I. Scope of Proposed Basic SSA Safety Services

The United States government has long been the global leader in the provision of SSA services and Viasat strongly advocates continued U.S. leadership in this area. That said, the SSA services currently provided through the U.S. Department of Defense are inadequate to meet the needs of the growing commercial space industry and are insufficient to ensure safe operations. As a result, U.S. SSA leadership is being challenged by other governments as well as commercial operators seeking to enter this field, including organizations such as the UK Space Agency's Monitor Your Satellites service, the European Union Space Surveillance and Tracking ("EUSST") Consortium, and the Space Data Association. For the U.S. to maintain leadership in SSA, it is critical that the SSA services that it provides surpass the capabilities of these other organizations.

To that end, the basic SSA service provided by OSC should aim to provide a level of better than that currently offered through the U.S. Department of Defense. Specifically, the basic service should provide timely, accurate, and actionable SSA information based on a robust satellite catalog and realistic covariance information. OSC should also combine best-available information on space objects from operators, government tracking data, and commercial SSA data to ensure that the basic service provides highly accurate positional knowledge suitable for flight safety and predictive collision avoidance.

The RFI identifies twenty-three SSA services for consideration as part of the basic service. Viasat agrees that all of the services identified as "included" in the RFI should be part of the basic service.[3] Each of these services is essential for securing ongoing operations and maintaining a safe space operating environment. However, there are several additional services identified as "not included" in the RFI that Viasat believes should also be included in the "basic" service tier. These include:

- ***(17) Additional Concierge Services***: These services are currently provided by the EUSST system and, as discussed above, the basic services provided by OSC should exceed those provided by other organizations. These services are also critical for ensuring that less experienced operators operate their spacecraft safely.
- ***(18) Anomaly Resolution***: While most experienced operators will not need or request the service, having it available to assist a less experienced operator could help reduce the potential creation of additional orbital debris. This is a service that could provide emergency support, triage help, and potentially recommend a commercial service for more in-depth support and resolution.
- ***(22) Breakup Detection, Tracking, and Cataloguing***: Breakup events resulting in fragmentation can put commercial satellites at risk. It is critical to provide operators with timely alerts and assessments of breakup events.
- ***(23) Maneuver Detection and Processing***: Maneuver detection of non-cooperative objects is key to understanding the threat that it may pose to an operator's satellite.

OSC should also work to make updated SSA information available as soon as possible, and at a minimum more frequently than the current SSA services provided through the Department of Defense. Viasat recognizes that timing of information updates may depend on the orbit(s) in question. For example, systems in low-Earth orbit may require alerts on an expedited basis. That said, geostationary satellite operators would also benefit from receiving updates every 2 to 3 hours, instead of every 8 hours as occurs under the current SSA system. To the

[3] A summary of Viasat's views on each proposed SSA service is included in the attached Annex 1.

extent possible, OSC should provide updated information on an event-driven basis such that updates are provided as soon as new space objects enter orbit and predictions are obtained.

II. Impacts of Proposed Basic SSA Safety Services on Commercial SSA Providers

Viasat agrees with the OSC that basic services should be provided by the U.S. government and that "advanced" SSA services should be offered by the private sector. Viasat does not anticipate that there will be any significant impact on the SSA industry if the U.S. government makes basic SSA services available to the public. Most commercial SSA services available today already rely on data provided by U.S. government sources and in many cases the government SSA data is more reliable.

Viasat agrees that OSC can support the commercial SSA marketplace by purchasing and redistributing certain information as part of the basic service. The purchase of commercial SSA services for inclusion in the basic service would increase the accuracy of the data included in the basic service and thereby improve space safety for all users of the OSC's services. Further, the purchase of commercial services by OSC would provide steady demand for such services and scale, thereby attracting more potential commercial SSA providers to enter the marketplace and provide innovative new services. OSC could also provide funds to commercial SSA operators to explore potential improvements to the basic services provided by OSC, such as improvements to the process of generating covariance information or methods for integrating data provided by owners/operators with observational data. At the same time, commercial SSA providers would be able to provide advanced services not provided by the OSC.

III. Tenets of Participation and Receipt of Basic SSA Safety Services

All basic SSA services provided by OSC should be made publicly available. Additionally, all owners/operators participating should be encouraged to provide additional

detailed information for each object and should be required to work with OSC to resolve any issues with reference frame and time systems to ensure consistency of data.[4] This owner/operator information would improve the quality of OSC's basic SSA service and by extension space safety. However, detailed owner/operator information should not be widely distributed and should only be provided to other owner operators who have (i) have signed an agreement that all owner/operator data are only to be used for the designated space safety purposes, and (ii) agreed to provide the same information about their space objects.

When owners/operators fail to provide detailed information on their space objects or otherwise fail to take actions consistent with the Tenets of Participation, OSC should review the owner's/operator's actions. If necessary, OSC should take corrective action, such as by withholding access to information provided by other owners/operators information until the owner/operator comes back into compliance with the Tenets of Participation

Respectfully submitted,

/s/

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[4] A detailed list of the information that owners/operators should provide is included in the attached Annex 2.

ANNEX 1
Proposed Scope of SSA Basic Service

Service	Viasat Position
(1) Satellite Attributes, Capabilities, Status, and Point of Contact	Basic service
(2) Receipt and Sharing of Predictions O/Os Ephemerides	Basic service
(3) Routine Collision Assessment (CA)	Basic service
(4) Special CA Screening and CDM Production	Basic service
(5) Data Quality Evaluation	Basic service
(6) Launch Collision Avoidance (COLA) Screenings	Basic service
(7) O/O Ephemeris Generation and Curation with Covariance	Basic service
(8) Re-entry Management and Assessment	Basic service
(9) Precision Probability of Collision Calculation	Basic service
(10) Collision Consequence and Debris Production Potentials	Basic service
(11) Conjunction Object Solution Improvements with Additional Tracking	Basic service
(12) Expected Tracking Determination	Basic service
(13) Risk Assessment Time History Plots	Basic service
(14) Space Weather Sensitivity	Basic service
(15) Fusion of CA Products	We suggest excluding from the scope of the basic service. Fusion of observational data from owners/operators and other sources along with the data provided by the DoD SSN would provide a more robust catalog and would be a better option.
(16) PC Variability	We suggest excluding from the scope of the basic service so long as OSC provides robust, realistic covariance information that does not require scaling.
(17) Additional Concierge Services	Basic service

(18) Anomaly Resolution	Basic service
(19) Design-time Assistance for Improved CA	We suggest excluding from the scope of the basic service.
(20) Maneuver Trade Space	We suggest excluding from the scope of the basic service. However, it could be a helpful tool if made available by OSC.
(21) Optimized Maneuver Recommendations	We suggest excluding from the scope of the basic service.
(22) Breakup Detection, Tracking, and Cataloguing	Basic service
(23) Maneuver Detection and Processing	Basic service

ANNEX 2
Information that Owners/Operators Should Provide to OSC on Space Objects

- Object point of contact information
- Identity of authorizing administration(s)/registry
- Pre-service calibration
- Description of the data product reference frame and time systems
- Ephemerides
- Maneuver information (time, thrust, delta-v, etc.), including planned maneuvers
- Ten-day predictive ephemeris incorporating planned maneuvers
- Source of orbital products procured by owner/operator
- Observation data and related metadata
- Spacecraft characteristics
    - Dimensions (HRB)
    - Mission/Flight rules
    - GEO – station keeping longitude/latitude control box
    - LEO/MEO – altitude/inclination plane control rules
    - S/C mass
    - Operational status:
        - Operational
        - Decommissioned
        - Degraded operations
        - No maneuvering ability
        - Not able to receive telemetry
        - Not able to track and/or produce orbit knowledge of the object
        - S/C anomaly status
        - Investigation
        - Recovery
        - Extended mission
        - Mission extension – docking
        - Backup/Storage/Standby mode
        - Reentry mode
        - Decayed
        - Unknown