



# Comments on the Scope of Civil Space Situational Awareness Services

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## Introduction

Palantir Technologies Inc. (“Palantir,” “we,” “our”) respectfully offers our insights to the Office of Space Commerce (“OSC”) on the planned implementation of the Traffic Coordination System for Space (“TraCSS”) program.

The TraCSS program represents a significant, first-of-its-kind effort for a US federal government civilian agency to coordinate and deliver SSA safety services to the public and the commercial sector. Delivering these basic SSA safety services is no small task, but a necessary one. The available space for assets to orbit the Earth is a finite and increasingly constrained resource, absent of any borders around which to establish and enforce governance structures. As a result, the management of assets in space is a monumental coordination and data management challenge that spans countries, government agencies, and private companies. Public-private cooperation and data sharing is a precondition for publishing basic SSA safety services via a TraCSS ecosystem.

OSC’s central mission—to foster the conditions for the economic growth and technological advancement of the U.S. commercial space industry—positions the Office well to lead such a complex program requiring extensive engagement with industry. Palantir recognizes the significant research, planning, and private sector engagement that OSC has conducted to date as it designs the TraCSS program. OSC’s continued engagement with industry partners sets the stage for an optimal working model of the TraCSS program, which OSC will need to sustain for its long-term success.

Palantir has seen first-hand the powerful outcomes that can be achieved when the government and industry seek to innovate together in a true mutual partnership. We have also witnessed the financial and public safety costs when best practices for such complex programs are ignored. Our organization worked closely with the Department of Defense (DoD), including the United States Space Force (“USSF”), to implement similar SSA solutions through the capabilities of software. Today, we provide the national space enterprise with a global digital twin representation of assets in space and on the ground. Based on Palantir’s experience supporting similar programs, we offer OSC our insights and feedback on the planned implementation of TraCSS. Our remarks first include a summary of recommendations that we urge OSC to incorporate into the delivery of TraCSS. We then provide some additional feedback on specific areas requested by OSC.

## Recommendations for a Successful TraCSS Program

**Recommendation 1: The necessary capabilities, technology, and services are often most clearly revealed through building and refining in a real-world setting. OSC should move forward with prototyping an initial operational capability (IOC) TraCSS to better understand how to address the needs of satellite owners/operators (O/Os) and determine the demarcation of free basic SSA safety services versus more advanced services.**

OSC provides a list of proposed orbital safety services for inclusion in the initial TraCSS delivery. While industry can provide feedback on these notional services, OSC should ideally validate the core basic services by employing them within an IOC setting and collecting feedback from participating partners and O/Os. The scope, priority, and distribution of services can be better understood through practice. Iterating on a prototype TraCSS will allow OSC to:

- Define the breadth of services required as well as the sub-components and features required of each unique service
- Ensure that the proposed services will be beneficial to industry as fully operational services and will achieve adoption
- Identify which services may be more or less advantageous to industry to better prioritize the allocation of resources and funding to more relevant services
- Reduce long-term risk to the acquisition and technical delivery of a fully operational TraCSS
- Demonstrate a viable prototype that instills confidence in the success of a fully operational TraCSS

**Recommendation 2: To the greatest extent, OSC should embrace the capabilities developed by the private sector and proven to successfully perform in operational contexts.**

Industry is consistently successful at building performant technologies. Open, competitive markets will naturally promote products and services that work while also optimizing costs. The competition experienced by commercial companies in the open marketplace also accelerates innovation at a pace that is often difficult to replicate in the public sector.

In comparison, the government is well positioned to direct resources toward public good and safety, including leveraging private sector capabilities for public safety applications and fostering common standards across commercial vendors. This approach is likewise reflected in the Federal Acquisition Regulations (FAR), which explicitly directs the government not to incur the cost, time, and risk to build custom IT systems when proven commercial products are available to meet requirements.

For these reasons, Palantir urges OSC to embrace proven private sector capabilities to the greatest extent throughout the TraCSS architecture in order to:

- Harness the best-of-breed capabilities, technologies, and services to underpin TraCSS
- Accelerate timelines to implementing a fully operational TraCSS
- Alleviate the cost and performance risks associated with development
- Embody the core mission of the Department of Commerce of promoting economic conditions for industry to thrive

**Recommendation 3: In line with the preceding recommendations, OSC should construct a modular, flexible TraCSS infrastructure backed by commercial capabilities that demonstrate interoperability and openness.**

No component of TraCSS—at either an infrastructure or service delivery layer—should be entirely dependent on a single capability provider. OSC should maintain the ability to migrate away from a service provider without introducing significant technical risk to TraCSS performance. Risk of vendor lock can be mitigated through the construct of a modular infrastructure that embeds common standards, open data formats, and other vendor-neutral principles into its design. A flexible, modular TraCSS design enables OSC to:

- Continuously incorporate best-of-breed capabilities into the TraCSS ecosystem without requiring extensive developmental or re-configuration projects
- Begin prototyping rapidly while maintaining the flexibility to adjust or add future capabilities over time
- Adapt faster to evolving SSA needs within a burgeoning space industry

**Recommendation 4: To encourage maximal participation in the TraCSS ecosystem, OSC should prioritize interoperability throughout the TraCSS architecture and services.**

TraCSS information and services will compound in value as more and more satellite O/Os participate and contribute to the ecosystem. Participation and data sharing, however, can be limited by constraints such as differing data formats and calculation standards. We recommend OSC prioritize interoperability principles throughout the architecture and services of TraCSS in order to:

- Ensure that a satellite O/O's participation in or receipt of information from TraCSS is never limited due to interoperability constraints
- Enable cohesive, secure data sharing among TraCSS participants across public and private sectors
- Reduce burdens on either industry or the government to accommodate custom formats and bespoke standards

## A. Scope of Proposed Basic SSA Safety Services

***For each of the services discussed, OSC is seeking public input about whether the service should be included in TraCSS, and if so, whether it should be part of the initial offering or added in the future. Additionally, OSC seeks input on whether the services should be developed by the government or purchased from commercial vendors and redistributed.***

The burgeoning commercial space industry is still at the forefront of innovation. Human presence and capabilities in space will continue to evolve and expand in the coming decade. The basic SSA safety services needed in 2023 may be fundamentally different to the needs of 2033. Palantir offers the following remarks on the services that should be included an initial TraCSS today, at the same time that we expect these services to evolve over time.

We recommend OSC consider implementing TraCSS services according to the criticalness of a given service for satellite O/Os to maneuver safely in space. OSC could, for example, prioritize the implementation of services according to some of the following criteria:

1. Higher Priority for an initial TraCSS: Services that are imminently critical to safely operate assets in space and should be incorporated into an initial TraCSS
2. Medium Priority for an initial TraCSS: Services that can provide additional confidence to safely operate assets in space and could be value additive in the near-term lifecycle of TraCSS
3. Lower Priority for an initial TraCSS: Services that can advance science and research related to space-based operations and could be value additive in the long-term lifecycle of TraCSS

We also recommend that OSC consider how it is delineating between the public-facing services/products and the infrastructural backbone of these services to achieve a cohesive architecture and performant, scalable service delivery.

Of the 14 services proposed to be included in an initial TraCSS offering, Palantir recommends that OSC prioritize the following services that would likely meet one of the first two criteria (Higher/Medium Priority) described above:

- Satellite Attributes, Capabilities, Status, and Point of Contact
- Receipt and Sharing of Predictions O/Os Ephemerides
- Routine Collision Assessment (CA) Screening and Conjunction Data Message (CDM) Production
- Special CA Screening and CDM Production
- Launch Collision Avoidance (COLA) Screenings

- Re-entry Management and Assessment
- Precision Probability of Collision Calculation
- Collision Consequence and Debris Production Potentials
- Risk Assessment Time History Plots
- Space Weather Sensitivity

While potentially valuable in future versions of TraCSS, the remaining services below are not immediately paramount to the provision of basic SSA safety services on day one of TraCSS operation. However, the back-end infrastructure of TraCSS should still be able to facilitate each of these services.

- Data Quality Evaluation
- O/O Ephemeris Generation and Curation with Covariance
- Conjunction Object Solution Improvements with Additional Tracking
- Expected Tracking Determination

In regard to these 14 services proposed by OSC for inclusion in an initial TraCSS offering, Palantir offers the following points of feedback for OSC:

- We recommend that OSC consider defining the parameters for “on-demand” CA screening, as such screening can be a compute-intensive process.
- We recommend that OSC define cooperating parameters and responsibilities regarding the screening of civil and DoD assets, including the responsibility for generating civil-on-civil CDMs and civil-on-DoD CDMs.
- We recommend OSC consider how it will evaluate and determine that varying O/O ephemeris are of sufficient quality to perform CA screening. If OSC intends to both ingest and generate O/O ephemeris data, we recommend considering how these sources will be calibrated to a common baseline.
- We recommend OSC consider the frame/format for accepting O/O ephemeris and how such data can be provided in standardized formats to reduce the technical burden imposed upon TraCSS to calibrate incoming data.

***Does the proposed basic SSA safety service provide sufficient data to allow ongoing operations of orbital assets at a level equal to or beyond that currently provided by the DoD? What, if any, additional capabilities beyond those currently provided by the DoD should be included in the TraCSS?***

OSC has identified basic SSA safety services that would be on par with or exceed those currently provided by the DoD. To truly expand past the capabilities of DoD, OSC might also consider building a potential roadmap for its own civil catalog independent of the DoD’s space-track catalog. Observations provided via space-track today are primarily collected from the Space Surveillance Network. OSC can amplify the data foundation by integrating other sources, types, and quantities of observations such as those collected by commercial ground radar networks. However, OSC should first take steps to

determine how data received from different TraCSS contributors and participants will be calibrated and integrated into a single source of truth.

***Where applicable, at what level or how often should the service be performed? For example, comments may address how often routine collision assessments should be conducted as part of the basic SSA safety service. DoD currently provides these assessments three times a day. How often should OSC's basic safety SSA service provide these assessments?***

The cadence of these services will likely be driven by both data availability and compute. Basic SSA safety services, such as CA screening, could be refreshed when new observations are available and of sufficient quality to provide an updated state of an object in space. However, as OSC integrates increasingly higher scales of observations, the frequent provisioning of services could burden TraCSS infrastructure. We recommend leveraging resilient, scalable storage and compute technologies that enable the TraCSS system to automatically distribute and scale compute resources up and down without requiring human intervention.

## **B. Impacts of Proposed Basic SSA Safety Services on Commercial SSA Providers**

***OSC is evaluating the potential impacts that the basic SSA safety services provided through TraCSS may have on the commercial SSA industry. OSC is seeking public input on whether there are any concerns with respect to commercial SSA providers with their own services or other value-added providers that may rely on governmental SSA basic safety services.***

***Are any of the basic SSA safety services readily available from the current U.S. SSA industry?***

Many of these capabilities do exist in some form in either the open marketplace or as part of satellite O/Os' internal technology stack. As previously mentioned, the government is well positioned to evaluate the range of commercial solutions available in order to select and bring together the best-of-breed components powering TraCSS. Leveraging available technologies will not only accelerate OSC's timeline to implementing TraCSS but is also aligned with both i) the core mission of the Department of Commerce to facilitate economic growth for industry and ii) FAR requirements to use commercial technologies when such commercial options are available and meet requirements.

***Are there unique advantages to the government purchasing and redistributing certain commercial services rather than leaving these to the commercial marketplace?***

The government often has greater latitude than the private sector to freely publish and democratize information in support of public safety. The government is also uniquely

positioned to be a trusted curator of the best-of-breed services, technologies, and capabilities offered by the private sector.

As a trusted source of SSA information and services, OSC can provide unique value—compared to the commercial marketplace—in ensuring that the minimal information to operate safely in space is centralized, calibrated, and made available to participating O/Os. Increased market confidence in safe space operations only drives further investment and innovation in the space economy. OSC has a unique opportunity to advance to the broader space economy by promoting interoperability standards among commercial services, facilitating data sharing, reducing risk in space operations, and facilitating the conditions for further economic growth.

### **C. Tenets of Participation and Receipt of Basic SSA Safety Services**

***OSC is seeking public input regarding what should be required to receive “free of fee” basic SSA safety services through TraCSS. OSC recognizes that certain basic SSA safety services should be made publicly available. For example, space objects from a current DoD catalog that are not sensitive to national security are currently made accessible to the public through the Space-Track.org website. OSC also recognizes that other basic SSA safety services should be available to all owners and operators. In response to previous RFIs, some comments suggested that OSC require owners and operators to provide operational information or act in good faith in response to the basic SSA safety services in order to participate in TraCSS.***

***Which basic SSA safety services identified for inclusion in TraCSS should be made publicly available? What, if any, information should owners and operators of spacecraft be required to provide to OSC to participate in TraCSS?***

TraCSS should at minimum provide the foundational information that satellite O/Os need to safely coordinate their operations with one another, including the identification of objects in space and appropriate satellite contact information. To instill trust in the TraCSS ecosystem and encourage participation from industry, the onus will be on the government to demonstrate both i) how the information traversing TraCSS from different sources will be quality checked and calibrated and ii) how the security posture of TraCSS will protect proprietary satellite O/O data.

We recommend OSC consider the following elements in the design of TraCSS:

- OSC should consider how diverse data sources from participants will be calibrated and determined to be of sufficient quality without over-burdening industry with data transformation requirements.
- OSC should consider how TraCSS will demonstrate data protection and governance throughout an ecosystem with numerous public-private participants. The TraCSS system should enable multi-tiered security permissions to allow for the highest degree of secure data sharing at variable government-to-government and government-to-industry levels.