



RFI response on Scope of Civil SSA Services

Issue 1, 27 Feb 2023

About INMARSAT

Inmarsat delivers world leading, innovative, advanced and exceptionally reliable global, mobile communications across the world – in the air, at sea and on land - that are enabling a new generation of commercial, government and mission-critical services. Inmarsat is powering the digitalisation of the maritime industry, making operations more efficient and safer than ever before. It is driving a new era of inflight passenger services for aviation, while ensuring that aircraft can fly with maximum efficiency and safety. Furthermore, Inmarsat is enabling the rapid expansion of the Internet of Things (IoT) and enabling the next wave of world-changing technologies that will underpin the connected society and help build a sustainable future. And now Inmarsat is developing the first-of-its-kind, multi-dimensional communications network of the future, ORCHESTRA. We currently own and operate 15 satellites in geostationary orbit, sitting 35,786km above the Earth. These satellites operate in L-band, Ka-band and S-band frequency bands.

INMARSAT Recommendation

The planned TraCSS services are critically important for flight safety and the long-term sustainability of the space environment. We applaud the Department of Commerce's vision in improving on the important services now being provided by the U.S. Department of Defense and demonstrating ongoing leadership and commitment by the United States in this area.

- TraCSS should holistically provide, to the greatest practical extent, accurate and timely positional knowledge suitable for generating actionable flight safety products for all space objects. This will require the gathering of best-available knowledge from spacecraft operators, government, and commercial SSA, agnostic of a space object's size footprint, orbital regime, maneuverability, or whether or not the object's owner or legal authority is a participant in DOC's services or cooperates with DOC by sharing their data.
- DOC should include the ability to refine planned maneuvers AND non-cooperatively detect, characterize, and recover from unknown maneuvers. This is critical to achieving accurate CA and must be incorporated as a foundation of basic DOC orbit maintenance. The DOD's current CA screening products have had limited usefulness for maneuvering spacecraft because they do not: incorporate operator maneuver plans and data, recover quickly from non-cooperative maneuvers, incorporate maneuver uncertainties to achieve covariance realism, solve orbits in the presence of maneuvers, and predict through future (planned) maneuvers.
- The DOC's robust catalog should be constructed as a part of DOC's basic services and fully leverage commercial SSA data and analytics. DOC should obtain necessary metric observational data to maintain accurate solutions for all objects (spacecraft, launch systems, debris), both cooperative and non-cooperative, in all orbital regimes, sourced from spacecraft operators, commercial SSA systems, and government tracking network(s).
- The DOC's resulting set of orbit solutions should be provided to the space community as a basic service, allowing spacecraft operators, commercial SSA analytics providers, and the research and

academic communities to further refine conjunction alerts, associated methodologies, and to develop risk mitigation strategies.

- We believe public authorities such as DOC are best suited to provide the fee-free Basic Services to ensure all responsible space operators benefit and that certain additional, specialized services may be provided commercially on the open market.
- While we agree that each of the planned Basic Service offerings offers value, we recommend amending the service definitions in some cases, as described above and by the Space Data Association. We also recommend including three additional services as part of the Basic Service, specifically: (i) Additional Concierge Services, (ii) Anomaly Resolution, and (iii) Breakup Detection, Tracking, and Cataloguing, to ensure parity with EU SST services and the resilience of publicly provided services. 24 x 7 x 365 support is essential in the space operations domain and should be a baseline TraCSS offering.
- Specifically, we endorse the idea of revising the service description for the Conjunction Assessment (CA) service to state: “To screen primary objects against a robust satellite catalog, both routinely and on demand; and to generate CDMs for objects that violate the predefined physical volumes and/or collision probability thresholds used for the screening activity.”
- We recommend adopting and incorporating internationally standardized CCSDS orbit and maneuver data exchange messages to ensure that a standardized terminology, timing systems, reference frames, and formats are used. TraCSS needs to be able to service satellite operators who are unable to provide data in the required frame and/or standardized format.
- We recommend TraCSS incorporate additional data from spacecraft operators such as spacecraft dimensions, attitude flight rules, and wet mass to help obtain better collision probability estimates, including realistic covariance information and/or scale factors to evaluate collision probability variability.
- We recommend that, in the design of all SSA services from the Department of Commerce, interoperability and compatibility with the EUSST should be prioritized and actively pursued.
 - In particular, in the European Commission’s Communication “**An EU Approach for Space Traffic Management**”, the EC explicitly favours a multi-lateral approach to STM and a “privileged discussion with the US”. The EC proposes building regional contributions to a global effort. We see that as the preferred long-term objective and the design of the new DOC services in SSA should consider and favour that long-term view.
- We recommend that the DOC provides users of the SSA service with as much information as possible on its own policies, operational processes and procedures, and operational and technological constraints. This is to build trust and allow operators to understand bottlenecks and suggest improvements.
- We recommend that the DOC organizes webinars and user conferences to provide updates and train operators to the use of the SSA service. We also recommend that the DOC includes in the SSA service a feedback loop to be used by operators to suggest improvements to the service.
- While we would expect basic SSA services to have no formal service-level agreements, we recommend that the DOC selects a number of Key Performance Indicators and monitors them.

Again for the sake of transparency and to build trust, we recommend that the DOC provides monthly KPI reports to the SSA service users, together with a list of open actions being undertaken with the objective to improve performances.