TraCSS Conjunction Data Message Specification **Stakeholder Listening Session** *April 30 | 2:00 – 3:00 PM (EDT)*





Listening Session "Ground Rules"

General Guidelines:

- Stay on schedule Respect everyone's time.
- Be respectful & professional Maintain a courteous tone.
- Keep questions brief & relevant Submit via Q&A panel.
- **No marketing pitches** This is for feedback, not promotion.

Confidentiality & Conduct:

- This session is **recorded** and subject to **FOIA**.
- Do **not** share proprietary or sensitive info.
- Disruptions may result in removal.

Participation Protocol:

- You will be muted when not speaking.
- Videos are turned off.
- Use chat responsibly.

Q&A Process:

- Submit questions in the **Q&A Panel**.
- Pre-submitted questions will be addressed live.
- Speakers will be called on **by order of** hands raised



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TraCSS & Conjunction Data Messages

Purpose:

- DOC has developed a proposal for conjunction data messages (CDM) fields in the CDM product that TraCSS will deliver for on-orbit conjunction assessment (CA).
- This work is based on the Consultative Committee for Space Data Systems (CCSDS) CDM recommended standard 508.0-B-1, understanding this version is under formal review by CCSDS
 - Conjunction Data Message. Issue 1. Recommendation for Space Data System Standards (Blue Book), CCSDS 508.0-B-1. Washington, D.C.: CCSDS, June 2013 (This current issue includes all updates through Technical Corrigendum 2, dated October 2021. Available at: https://public.ccsds.org/Pubs/508x0b1e2c2.pdf
 - TraCSS is working with CCSDS NAV WG and understanding the review version CCSDS 508.0-P-1.2 PINK BOOK November 2024
 - This work is also building from our April 10, 2024 listening session.

TraCSS & Conjunction Data Messages

Today's presentation:

- Fields that are proposed based on CCSDS 508.0-B-1, and taking into consideration the document under formal review (CCSDS 508.0-P-1.2 PINK BOOK November 2024)
- Proposed fields are those based on input from beta users participating in TraCSS from Phase 1.0 (September 30, 2024) to increment Phase 1.1 (March 2025).
- Alignment with the CCSDS document is underway.
- DOC welcomes feedback the proposal discussed, as well as these questions:
 - Are there significant operational impacts to the community with the proposed data fields?
 - TraCSS is choosing to output state vectors in the EME2000 frame. Are there alternates OSC should consider as the default rather than the proposed, and why?
 - The TraCSS CDM spec does not include any comment fields. OSC is interested in feedback from the community on the operational impacts if comments are not included in a CDM.
 - In addition, and probably most importantly, is the change to the prevailing concept that a CDM is intended for object1 (often called the primary object) and that additional calculations must be performed to generate a CDM representing the same conjunction from object2's (often called the secondary object) perspective. Instead, TraCSS will generate a single message and distribute it to both users. The community is encouraged to provide feedback on this specification and start discussion on ways to improve this specification to enable satellite operators to more easily retrieve SSA information.

TraCSS CDM Spec – New SSA Fields

- MAHALANOBIS_DISTANCE
- COLLISION_MAX_PROBABILITY
- COLLISION_MAX_PROBABILITY_METHOD
- DILUTION_STATUS
- DILUTION_SIGNIFICANCE
- ENVIRONMENTAL_IMPACT_FRAGMENTATION
- FRAGMENTATION_MODEL
- APPROACH_ANGLE

Existing DoD Fields

- APOAPSIS_ALTITUDE
- PERIAPSIS_ALTITUDE
- INCLINATION
- DCP_SENSITIVITY_POSITION_R
- DCP_SENSITIVITY_POSITION_T
- DCP_SENSITIVITY_POSITION_N
- DCP_SENSITIVITY_VELOCITY_R
- DCP_SENSITIVITY_VELOCITY_T
- DCP_SENSITIVITY_VELOCITY_N



TraCSS Transparency Fields

- OPS_STATUS
- SCREENING_DATA_SOURCE
- RUN_ID
- CORRELATION_ID
- MEETS_ALERTABLE_CRITERIA

SAT1_ and SAT2_ Prepends



Prepending Sat1_ and Sat2_ to object specific fields to make true KVN format

State Vector Reference Frames





Symmetrical CDMs



- Instead of having a primary, and a secondary, moving to just having two objects
- Satellites may show up as object 2 in CDMs
- Moving following fields to each object section:
 - RELATIVE_POSITION_R
 - RELATIVE_POSITION_T
 - RELATIVE_POSITION_N
 - RELATIVE_VELOCITY_R
 - RELATIVE_VELOCITY_T
 - RELATIVE_VELOCITY_N
 - APPROACH_ANGLE
 - SCREEN_VOLUME_SHAPE
 - SCREEN_VOLUME_FRAME
 - SCREEN_VOLUME_X
 - SCREEN_VOLUME_Y
 - SCREEN_VOLUME_Z
- Eliminates wasted effort for the TraCSS system, promotes communication, and removes edge case of lost CDMs. 11

TraCSS Conjunction Notifications



- TraCSS equivalent to space-track "Public CDMs"
- Subset of TraCSS CDMs that meet certain Alertable criteria.
- Initial TraCSS Alertable criteria based on current emergency criteria from 19th space-flight safety handbook.



Feedback Session

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