



SPACE DATA
A S S O C I A T I O N

SDA Workshop June 2024

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Recent SSA Activities

- **Increased awareness of Space Sustainability**
 - Conferences
 - Best practices
 - Data sharing among operators
 - Data providers
 - Data analytic

- **Government SSA solutions**
 - CSpOC
 - TraCSS
 - EUSST
 - UK

SDA Activities

- **Promote lessons learned from over 14 years of SSA experience**
 - Participated in pilot projects and feasibility studies
 - SDA as an agile test bed for technology demonstration and proof of concepts
 - Conferences
 - Advocate on behalf Owners/Operators for “safe” SSA systems showing results on techniques to mitigate SSA vulnerabilities and solutions to improve reliabilities
 - Written papers showing results on techniques to mitigate SSA vulnerabilities and solutions to improve reliabilities
- **Remain as independent Trusted Third party**
 - Operator funded organization and non-profile status



Workshop Topics

- **Data Sharing – how to do it right?**
- **Government provided SSA Solutions**
 - EUSST, TraCSS
- **SDA among different SSA providers**
 - SDA Values and User Experiences
- **Space Sustainability and Best Practices**
 - Policy
 - Technical
 - Practical
- **STM next step – RFI coordination**

Wrapping Up Key Messages

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■ Data Sharing among Operators

– what to share?

- Orbit data – a good validation and improve confidence with non-cooperative tracking
- Maneuver information – cannot be obtained otherwise and has the most impact to CA
 - Important to update the maneuver as plan changes
- Ephemeris data included maneuver information
 - Preferred to use O/O vs. O/O for CA
 - » Maneuver information include in O/O ephemeris is one of the key benefits
- O/O Observations ?

Wrapping Up Key Messages

■ Using O/O ephemeris for CA

– O/O Ephemeris

- Need careful validation to make sure consistent with reference frame and time system
- O/O are limited due to ground system to provide the desired reference frame and time system
 - SDA provide a customer converter (O/O submit data in their system)
 - Leap second management are different w/ different ground systems
- Data time span
 - Need to have consistent time span for CA screening
 - The frequent upload are sometimes limited due to O/O software

Wrapping Up Key Messages

■ Using O/O ephemeris for CA

- While sharing ephemeris is good solution to capture O/O maneuver information
- Studies have shown it is no ideal
 - Ephemeris is vulnerable to errors in O/O frame conversion and inconsistent time systems
 - Latency lack
 - Subject to biases – limited resources for sensor calibrations
 - Difficult to improve via. fusion with third party data
 - Largely lack of covariance => limiting PoC

Wrapping Up Key Messages

- **Growing SSA Solutions – Good News**
 - Government providers
 - Commercial providers
 - Data sharing within solution providers
 - Fragmented local solutions
 - Data sharing needs to be global
 - CA and STM
 - Multiples CDMs for same events
 - Not immediate actionable
 - Possible contradicting solution strategies
 - SDA is advocating and positioning to fill the role of data consolidator as non-profit, trusted third party

Wrapping Up Key Messages

■ Data Catalog Discrepancies

- Different data sources
 - Sensor variabilities
 - Data processing
 - O/O ephemeris – maneuvers information
- Data fusion across different organizations and providers
 - Produces the “best” data for CA
- Miss distance only CA detection
 - Limited – not easy to account for data accuracies
 - Probability of Collision to account for statistical OD solutions
 - Realizable and practical covariance generation solutions



Wrapping Up Key Messages

- **Not Everyone wants to share**
 - Confidential and Proprietary data
 - Trust – data will not be misused
 - Restriction due to rules and regulations
 - Technologies
 - Costs
 - Rethink how to Share
 - Asymmetric sharing
 - Minimal data required for SSA purpose
 - Data rendition to mitigate data being misused?
 - Via. non-profit trusted third party
 - The SDA model