



Breakthroughs in Trusted Space Data

Leveraging Digital Traceability to Enhance Knowledge Management in Space Cyber Operations; A Step Toward Improved Safety and Quality

Space operations are becoming increasingly interdependent. Operators rely on information from external sources to ensure safety in congested orbits. Emerging services that depend on proximity operations will increase the reliance on multi-party information sharing. This requires end-to-end trust of the information because parties may choose to act on that data, applicable to both cyber information sharing and multi-party space operations. This paper introduces emerging means to implement end-to-end trust in data.

Shaping the Future

Industry feedback identified significant gaps in the information sharing construct for space situational awareness. The two key trust gaps are (a) data integrity and (b) data understandability, across multiple stakeholders who are sharing space data.

Civil Applications from Defense Innovation

There is an opportunity to leverage trusted data in an environment where space data is shared among multiple space participants—in this case, the 100+ Space Domain Awareness, Tools Applications Processes, Laboratory (SDA TAP LAB) industry contributors to the Battle Management System.

The introduction of trusted space data approaches—both data integrity and understandability—can encourage constructive and dynamic exchanges between stakeholders, leading to the development and evolution of conventions and standards where they are needed the most.

The Government Role

While the commercial sector can provide data, expertise, and services, the development of requirements and diplomacy are inherent government functions. The development of minimum viable information (MVI) requirements for cyber and other data can form the basis for initial regulatory conventions and eventual standards. Global harmonization of those conventions and standards emerges from government-to-government diplomatic processes.

Actionable Recommendations

Develop trusted space data approaches and initial MVI data sets that can aid both cyber reporting and multi-party cooperation and coordination for space operations.

Session Details

IAC Session: 58th IAA Symposium on Safety, Quality and Knowledge Management in Space Activities

Date: September 30

Time: 1015

Location: C2.2 ICC Sydney

Presenters

Harvey Reed, MITRE

Contact Information

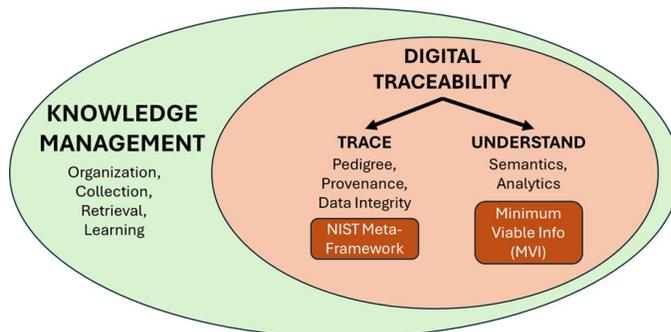
For inquiries, please email ndailey@mitre.org

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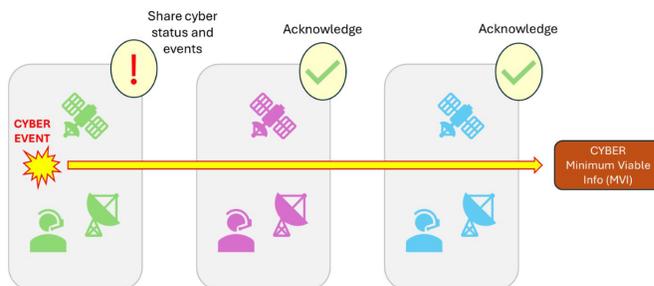
Why This Matters

Space operations without trusted cyber reporting, or multi-party space operations without trusted data, risk the safety and success of space missions. This risk is driven by stakeholders using each other's exchanged data and information that may be incomplete, corrupted, misunderstood, or redundant, resulting in accidents and mishaps.

MITRE, working with industry partners, is developing an internal research and development project for Space Policy Impact Assessments and immersion technology modeling. MITRE collaborated with an industry member (Spaceprotocol, Adelaide) that is participating in the U.S. Space Force SDA TAP LAB, developing a trusted space data layer for a minimum viable product of an Anti Satellite Battle Management System. The trusted space data layer enables the use of machine learning to formulate candidate courses of action for a commander to choose. The trusted data method is based on the National Institute of Standards and Technology, National Cybersecurity Center of Excellence (NIST NCCoE) Meta-Framework for Manufacturing Supply Chain Traceability (NIST Internal Report 8536), which is an approach to add trusted supply chain data to manufacturing supply chain activities.



Digital traceability adds pedigree, provenance, data integrity, as well as semantic understanding to knowledge management



Traceable and understandable data, including cyber data, improves knowledge sharing and management across multiple space operators

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