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## LEVERAGING THE DATA AND REASONING FABRIC FOR SPACE SITUATIONAL AWARENESS

**Abstract**

The demand for Space Situational Awareness (SSA) solutions grows in tandem with the number of space assets, both active and dormant, in orbit. There is an urgency and growing need for accuracy in detecting, identifying, tracking, air and space objects as well as coordinating operations and maneuvers for a comprehensive Space Domain Awareness (SDA).

With a plethora of SSA systems, ranging from nation-to-nation and community-to-community, the lack of uniformity presents challenges in both technical operations and effective cross-communication within the global Space Traffic Management (STM) domain. Many of the present-day SSA systems and processes for STM are manual and disconnected; they require human operators to intervene and make snap decisions based on a variety of dynamic data sources and variables. While this method has been the traditional means of collision avoidance, this process is not designed to cope with the projected volumes of air and space traffic in the future, nor does it consider next generation and autonomous air and space vehicles and assets.

This paper presents a digital ecosystem, called the Data and Reasoning Fabric (DRF), as a tool to enable the full potential of air and space awareness and mobility. DRF is an open and decentralized platform which enables exchange and interplay between many complex systems and end-users, including government and industry stakeholders. DRF provides access to a catalogue of “data services”, consisting of diverse and dynamic datasets, as well as “reasoning services”, data converted into meaningful information utilizing Artificial Intelligence (AI) based decision-making support. The digital “fabric” is an interwoven layer of data and reasoning services which is designed to increase situational awareness and meet the needs of an evolving commercial space sector and marketplace.

Already tested in an aerial emergency response and urban airspace scenarios, this paper will present a use case and potential applications of DRF within the space domain to aid in STM.