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MANEUVERING INTO THE FUTURE: OPEN-ARCHITECTURE DATA REPOSITORY (OADR)
PROTOTYPE: TOWARDS CIVIL AND COMMERCIAL SPACE TRAFFIC COORDINATION

Abstract

In 2018, the US National Space Council released Space Policy Directive-3 (SPD-3), which instructed relevant US government agencies to begin re-assigning many aspects of space traffic management (STM) and space traffic coordination (STC) serving non-military US space operators. This was identified as a ‘whole of government’ approach, and the organization identified to lead many of the efforts was the National Oceanic Atmospheric Administration (NOAA) Office of Space Commerce (OSC), in the US Department of Commerce. The US Congress, in Public Law 116-93, Consolidated Appropriations Act, 2020, legislation directed that the Secretary of Commerce contract with the National Academy of Public Administration (NAPA) to study the Administration’s proposal . The NAPA study affirmed OSC would be best suited. Congress also mandated that OSC accomplish an important first step: assemble an Open Architecture Data Repository (OADR) prototype to demonstrate the efficacy of the approach and architecture.

The OADR prototype demonstrates how to provide STC services, incorporate diverse data, and offer

a platform for innovation. It is envisioned to be more than the database of orbital data. It potentially has two instantiations: an “operational” area where operational data and services are provided by the commercial and government providers, and a segregated “sandbox” area that allows for experimentation and product and service development without interfering with the operational portion of OADR: the Application Development Environment (ARCADE), to serve STC needs beyond conjunctions, e.g. predicting light pollution impacting Astronomy, and monitoring compliance with space laws and guidelines such as the UN convention on space object registration.

The OADR will advance the science of STC and create new tools and technologies to improve safety and sustainability in space. The OADR may also encourage establishment of an industry consortium for the development of interoperable STC/STM service standards. OSC and several partners assembled a working prototype in 2021. The authors obtained two-months of data from the Space Surveillance Network (SSN), along with data from commercial space surveillance data providers and satellite operator ephemerides. Using the prototype, the authors analyzed the data, identified potential satellite conjunctions, calculated probabilities of collision, and generated conjunction data messages (CDMs). The authors compared the results to existing operational systems, and the agreement was uniformly excellent. OSC and their partners demonstrated the OADR prototype results to the Congress, as funded and directed by Public Law 116-260, the Consolidated Appropriations Act, 2021. This paper describes the elements of the prototype, the results, and next steps.