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CHALLENGES AROUND SSA DATA FORMATS: WHAT PREVENTS EFFICIENT SHARING OF SSA DATA?

Abstract

Due to a rising number of launched objects, existing satellites and space debris, it is of high importance to gather and share data to provide a situation report of those objects in near Earth orbits. This is the basis for any space situational awareness and a keystone for keeping space a safe and sustainable operations area.

Remarkable solutions have been developed by the Space Situational Awareness (SSA) Community in the recent years, but progress is still facing a number of challenges. One of the keystones of safe and sustainable space flight is secure and efficient data sharing, be it orbital propagation data, ground based sensor measurement for orbit prediction or results of conjunction analyses. One of those challenges is the unmanageable amount of different data formats used by the SSA ecosystem.

Starting directly on sensor level, almost no standardized formats exist for the raw data collection and thus, each sensor operator provides a unique data format, some of them kept confidential.

To be able to share their data, the sensor operators need to convert the raw data into other formats; CCSDS is one present standard and a good choice for data sharing; but, the processing of data in that format is not performant. Most existing spatial software suites for data processing and cataloguing come with their own data format for internal use, leading to an additional step of data conversion. A lot of users seem to use self-written code to convert data sets from one format to the other.

Working on internal data conversion and/or sharing solutions seem to be a necessity in the SSA community. This introduces an unnecessary technological overhead, which makes the community inaccessible to potential data suppliers.

A literature review is done to get an overview of standards and overviews in the domain. By interviewing a sufficient number of SSA community members, this paper analyzes the gap between the amount of data formats and the lack of common tools to tackle the conversion, which is commonly done on all levels of spatial data collection and processing.

Based on interviews and user inputs, we analyze the current situation of widely used data formats in the SSA ecosystem. We investigate on issues that SSA data users and other players in the SSA domain struggle with most. We present our findings and provide an overview of standards and data formats with their advantages and deficiencies.