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Earth Observation Data Management Systems (4)

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A NEW TECHNICAL APPROACH FOR PRESERVATION OF YOUR MISSION DATA

Abstract

To harness the Power of The Past, you need Digital Preservation. This empowers the Promise of the Future.

This paper will address these items: (1) Summary-level introduction to the importance of long-term digital preservation and the background on OAIS, a preservation practice developed by the CCSDS Data Archive Interoperability (DAI) Working Group; (2) Discussion of the track record of spaceflight missions in the realm of digital preservation; (3) Explanation of the new technical approach for data archive standardization for interoperability. (4) The implications of developing this standard using Model Based Engineering, and the promise that MBE brings for implementers of a modeled standard.

As software, technology and knowledge evolve, digitally encoded information becomes unusable. Loss of access to historic data is not a problem unique to space organizations. The foundation of the CCSDS solution is the Open Archive Information System (OAIS) Reference Model. It has garnered worldwide acceptance among national archives, libraries and data repositories. However, adoption by space agencies and missions has been largely limited to major science archives.

As a result, most spacefaring organizations do not properly preserve their data for the long term; there are many examples of data loss. There is historic data from Apollo that has been lost to the ages, and even examples of International Space Station data that are no longer usable. Moreover, mission development organizations are finding that much more should have been preserved, such as engineering data and enterprise data, to help plan new missions. Mission termination seldom funds preservation. Some examples will be discussed in the paper.

The next phase of OAIS is moving beyond preservation practices to technical standards which leverage the OAIS information model, for interoperability between users and archives. This new innovative scheme consists of a consistent user interface and framework, with unique plug-in drivers (APIs or protocols) that adapt the framework to each unique archive. This will facilitate cross-discipline research capabilities which will allow great strides in the research community and great efficiency in the operations community.

This new data architecture is being developed using Model Based Engineering. At the conclusion of the effort we envision that the model will be made accessible to mission developers, who can then integrate it into their MBE efforts to develop their mission ground systems. This report will have late-breaking news on the model development.

This approach and standard will be relevant to every current and future spaceflight program.