AN OVERVIEW OF THE OSIRIS-REx SAMPLE ANALYSIS MICRO-INFORMATION SYSTEM (SAMIS).

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Introduction: On October 20, 2020, the OSIRIS-REx spacecraft acquired a sample from the surface of asteroid (101955) Bennu [1]. In preparation for the sample's return to Earth in September 2023, whereupon it will be distributed to the labs of OSIRIS-REx sample scientists, we are developing a comprehensive information system to manage all data generated during the sample analysis phase of the mission, called SAMIS: the Sample Analysis Micro-Information System.

Definition of Micro-Information System: The SAMIS will create a unified system of spatial and relational database capabilities that facilitates the processing, visualization, and preservation of the total dataset resulting from the OSIRIS-REx sample analysis effort across institutions and techniques. Like a traditional information system (IS), the SAMIS is a collection of components that includes hardware, software, and sociotechnical elements designed to collect, process, store, and distribute information. The origin of the name "Micro-Information System" is a play on the term Geographic Information System (GIS), which is a specific type of IS designed to capture, analyze, store, and visualize spatial and geographic data. By recognizing the spatial nature of many of the data products produced by the OSIRIS-REx sample scientists, and carefully customizing off-the-shelf GIS tools and technology, we will harness three important aspects of a GIS that will help with the storage, sharing, and analysis of OSIRIS-REx sample analysis data. These three aspects are: (1) The conversion of sample analysis data products into well-established and non-proprietary spatial data types where applicable. (2) The ability to co-register spatial data from the same sample, regardless of the form of the sample, such as an unprocessed particle or a thin section. Data can be co-registered across a wide range of formats, come from different analytical techniques and instruments, and span a vast range of spatial resolutions. (3) Access to GIS visualization software, spatial search capabilities, and spatial analysis tools, which will make the analysis of data across labs and instrument teams easier and more intuitive for the OSIRIS-REx sample scientists.

SAMIS Components: The SAMIS consists of four main components:

- *Sample Analysis Tracking Application (SATA)* - A phone application that tracks the physical location and condition of the sample as it moves between labs.
- *Sample Analysis Desktop Application (SADA)* - Used to upload, download, search, share and view the sample analysis data generated by all labs and instruments on the mission. Access point for the Sample Analysis Visualization Tool, which allows data with spatial components to be viewed at the correct location on a sample mount basemap and at the correct resolution.
- *SAMIS Server* - Controls SATA and SADA access to the SAMIS Database.
- *SAMIS Database* - A relational database with a GIS (spatial) extension. The database stores all sample analysis data and performs automatic spatial registration between datasets [2].

SAMIS Data: SAMIS is used to collect, store, process, and distribute all data produced during and pertaining to sample analysis. This includes:

- Raw data as the instrument records it
- Calibrated data after application of all corrections and calibrations to raw data to produce a science-ready data product
- Documentation of all algorithms, software, and/or other relevant analytical data used to produce calibrated and higher-level data products
- Higher-level products (those that combine multiple data calibrated data products)
- Foundational and Preliminary Examination data products (coordinate systems, basemaps, etc.)
- Appropriate metadata or ancillary data
- Physical sample tracking data from the SATA

Conclusion: The SAMIS is a crucial component of the OSIRIS-REx approach to sample analysis and data management. The SAMIS maximizes the scientific outputs from sample analysis by facilitating the integration, visualization, and comparison of large datasets.

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