THE OSIRIS-REX SAMPLE ANALYSIS MICRO INFORMATION SYSTEM (SAMIS)

P. Haenecour[1], C. A. Bennett[1], M. K. Crombie[2], M. Fitzgibbon[1], A. Ferro[1], D. Hammond[1], E. McDonough[1], M. M.Westermann[1], J. J. Barnes[1], H. C. Connolly Jr.[1,3], and D. S. Lauretta[1]. [1]Lunar and Planetary Laboratory, The University of Arizona, 1629 E. University Blvd., Tucson, AZ 85721-0092 (haenecour@arizona.edu). [2]Indigo Information Services, Tucson, AZ 85745. [3]Department of Geology, Rowan University, Glassboro, New Jersey 08028.

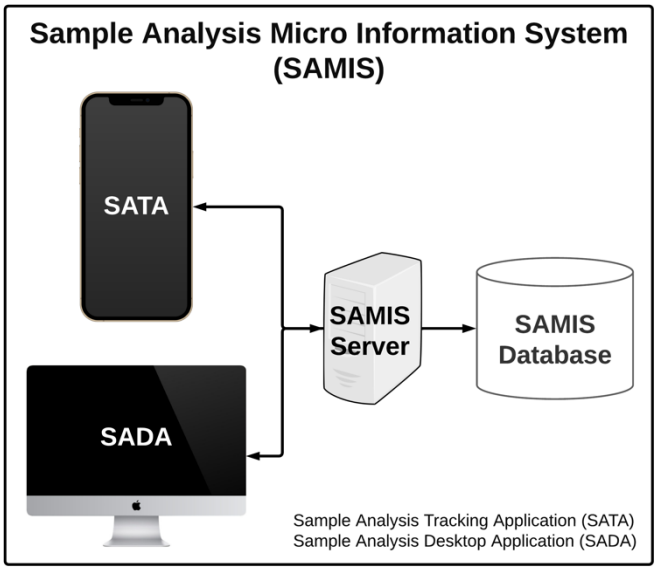
Not since the Apollo era has there been so much invested in returning rocks to Earth from space as there is now. From lunar samples (*e.g.,* Apollo Next Generation Sample Analysis initiative, Chinese Chang'e 5 mission, and NASA's Artemis program), to asteroid samples (NASA's OSIRIS-REx and JAXA's Hayabusa2 missions), and plans to return samples from Mars (*e.g.,* Mars Sample Return) and Phobos (JAXA MMX), sample-return missions and sample science are becoming a significant portion of space science activities.

As described in the final report of the NASA Planetary Data Ecosystem Independent Review Board (https://science.nasa.gov/researchers/science-data) — and unlike for the curation and management of astromaterials at Johnson Space Center — "there is no requirement levied upon sample return missions for the archival of mission-supported laboratory analytical data and metadata". More broadly, the sample science community does not have common agreed-upon archival standards and systems for all the data and metadata derived from the analysis of astromaterials, including mission-returned samples, meteorites, micrometeorites, and interplanetary dust particles.

The OSIRIS-REx spacecraft collected materials from the surface of asteroid (101955) Bennu on October 20, 2020, and will return those samples to Earth in September 2023. The mission is developing an information system with the goals of facilitating the study of the samples by mission scientists as well as fostering data stewardship practices that will be beneficial to future users and long-term preservation of all the data. The Sample Analysis Micro Information System (SAMIS) will track the physical state of the samples as they move between laboratories during the sequence of coordinated bulk and/or in-situ analyses. It will also collect, maintain, and distribute analytical data, both in the form of raw instrument output as well as processed data that has undergone additional analyses.

The SAMIS will consist of four main components to collect, store, and share all data generated during the sample analysis phase of the mission:

(1) the Sample Analysis Tracking Application (SATA), which will track the physical location and state of the sample as it moves between laboratories.
(2) the Sample Analysis Desktop Application (SADA), which will allow all team members to upload, download, search, share and view the sample analysis data generated by all laboratory and instruments on the mission.
(3) the SAMIS Server, which controls SATA and SADA access to the SAMIS Database.
(4) the SAMIS Database, a relational database with a GIS (spatial) extension that will store all data and metadata from the sample analysis phase of the mission and perform automatic spatial registration between datasets.



The SAMIS Database will be integrated with a visualization tool that will be hosted on the SADA. The tool will be based on the ArcGIS Enterprise software system and will allow team members to visualize, analyze, and share spatially registered sample analysis data project-wide.

The development of sample tracking and analysis data management, visualization, and archiving systems is crucial to support the safe-keeping of the samples and enable long-term archiving of all the data produced during sample analysis. Such systems would not only help to maximize the scientific outputs from sample analysis by facilitating the integration, visualization, and comparison of large datasets, but it would also ensure the long-term preservation and availability of the data for future generations.