

The Acquisition, Containment, and Curation of Mars Samples on Earth

Andrea D. Harrington¹, Michael J. Calaway², Aurore Hutzler³, and Francis M. McCubbin¹

¹Astromaterials Acquisition and Curation Office, NASA Johnson Space Center. ²Jacobs Technology, NASA Johnson Space Center. ³Lunar and Planetary Institute, NASA Johnson Space Center

The Astromaterials Acquisition and Curation Office at NASA Johnson Space Center (henceforth AACO) is responsible for receiving and curating all of NASA's extraterrestrial samples, current and future (as per NASA Policy Directive (NPD) 7100.10E "Curation of Extraterrestrial Materials"). As such, the AACO coordinates sample capture, containment, and transportation to the curation facility as well as documents, preserves, prepares, and distributes all of the samples within NASA's astromaterial collections for research, education, and public outreach.

Since the lunar rock and soil samples returned during the Apollo Program, NASA's first Class V Restricted Earth Return Missions, the AACO curates six other astromaterials collections. Lessons learned from each collection and respective missions (e.g. Apollo, Genesis, Stardust) as well as advancements in science and technology have informed the AACO's plan for acquiring and curating Martian samples. Given the nature of the collection, a mobile and modular facility is recommended.

The two broad requirements a Mars sample facility must maintain are: 1) the ability to contain the samples to protect the public from exposure of an "unknown unknown" biological agent and 2) ensure the scientific integrity of the samples are maintained (while maximizing scientific outcome). Although Apollo samples were eventually deemed safe and released to the scientific community for evaluation, there is no guarantee that this will be the case for Martian samples. Therefore, the facility in which the samples will be contained and investigated must be modular and able to accommodate an array of instrumentation that could be highly variable depending on the initial scientific outcomes. Furthermore, in order to facilitate proper sample capture and containment upon landing as well as sample distribution to other laboratories with proper containment, a mobile facility is a valuable investment.