

The Collaborative Acceptance and Distribution for Measuring European Samples (CADMES) Sample Delivery System for a Future Europa Lander

An efficient and effective approach to preserving sample integrity and minimizing payload mass for a future Europa Lander can be realized by integrating the sample handling functions into a single subsystem, while providing flexible and customizable interfaces to the instrument suite that is ultimately selected. The Collaborative Acceptance and Distribution for Measuring European Samples (CADMES) system was selected and built using ICEE2 funding, providing a robust and flexible delivery mechanism that leverages GSFC and Honeybee experience from prior flight sample handling systems, here applied to the unique and challenging environment of Europa. The CADMES system, Figure 1, is a sample handling system that can accommodate multiple instrument interfaces, while preserving and maintaining composition and integrity of a European sample. CADMES has worked closely with both the JPL pre-project Europa Lander team, and with each of the analytical instruments which were awarded ICEE2 studies, driving CADMES to develop a flexible sample handling mechanism which can eventually be adapted to suit many different instrument combinations. The swing arm is able to access each custom cup individually, latch onto them with a gripper, remove them from a passive launch restraint, and move them to a sample delivery funnel for sample acceptance from the lander. The swing arm then moves to one of three sample delivery instrument ports. Each cup shares similar interface features to the passive launch restraint and gripper mechanism, but customization of other features to suit individual instruments is expected for a future Europa Lander implementation. CADMES hardware has completed a full TRL6 testing campaign and verification plan, demonstrate flexibility of the design.



Figure 1. CADMES TRL6 Brassboard Hardware, with and without dust shield