**COMMUNITY SCIENCE ON THE MOON, THE GREAT LUNAR EXPEDITION FOR EVERYONE.** B. Sobhani[1], V. Andersen[2], A. Marlow[2], and J. Claxton[2], [1]University of Colorado Boulder (Barbra.sobhani@colorado.edu); [2]University of Colorado Boulder

Introduction: The Great Lunar Expedition for Everyone (GLEE), funded through the Artemis Student Challenge, is a unique mission to demonstrate a new data collection strategy using a large network of inexpensive, student designed, sensing packages on the lunar surface. The GLEE mission will deploy hundreds of solar-powered 5 cm x 5 cm sensing boards, called LunaSats, over approximately 300 square meters on the lunar surface. Each LunaSat will autonomously record and transmit thermal, magnetic, acceleration, and regolith capacitance data over 6 Lunar hours (one Earth week) using a radio mesh network.

GLEE is engaging thousands of higher education students and faculty around both the U.S. and the world in authentic lunar science, meeting the goal of the NASA Global Road Map to "Inspire and Educate" and "Create opportunities for participation in space exploration" that will stimulate international engagement in space exploration and development. GLEE will demonstrate a novel form of distributed data collection - a type of study not possible with current single-instrument missions - inspiring a future generation of space scientists and helping to kickstart the next era of planetary science.
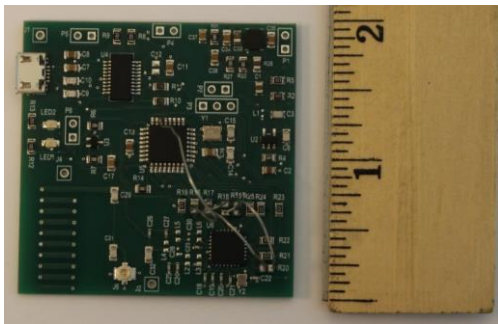
Fig 1: LunaSat, a unique ChipSat design

Distributed Science on the Lunar Surface: Geology and geophysics has long utilized distributed network scientific measurements – that is, recording physical variables in multiple locations at the same time. Simultaneous distributed measurements historically have not been utilized in extraterrestrial planetary science, however. GLEE aims to fill that gap by collecting distributed data on the moon. The LunaSat network will allow for the investigation of magnetic anomalies, lunar seismicity and characterization of the lunar regolith in the landing area. Dispersing hundreds of LunaSats on the surface presents some unique challenges in sensor location and orientation. Testing the sensor network in lunar analog environments will allow for test datasets to be acquired and analyzed.
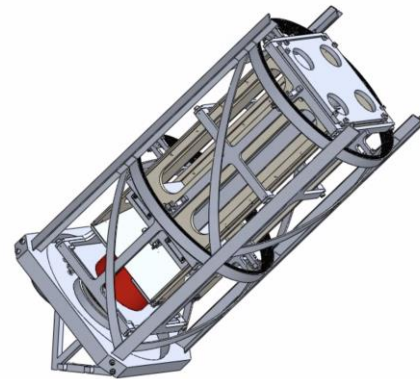
Fig 2: LunaSat Housing and Deployment Module

Student Engagement: GLEE is not only a technology demonstration, but also an outreach mission engaging thousands of students from around the world in the process of scientific discovery. In October 2021, GLEE hosted an in-person workshop in Boulder, Colorado with over 100 students from around the country taking part in a multi-day educational program about GLEE, the LunaSats, planetary science, electronics, and coding. An asynchronous virtual workshop is also in progress engaging over 1200 more students with the GLEE mission. The online Workshop platform includes the training modules, video, quizzes, help resources and live chat. In the workshops, students envision their own unique applications for the GLEE dataset and go through the process of designing a sensing system for a science investigation using the LunaSat's suite of sensors. Further, the GLEE data will be made publicly available for students to conduct true lunar science after the mission, giving students hands-on experience that may lead them to careers in planetary and space sciences.

Next Steps: The next phase of development for the GLEE project includes finalizing the lunar version of the LunaSat and the deployment module and testing it in a variety of environments, including near space and in simulated lunar regolith testbeds. The GLEE project needs to secure space on a lander mission. During this final phase, the global teams are encouraged to design and test applications of the LunaSats and share their results.