

**Title:** From Apollo to Artemis: Opening and Processing Lunar Core 73002 for the ANGSA Program

**Authors:** C.H. Krysher<sup>1</sup>, A.B. Mosaic<sup>2</sup>, J. Gross<sup>3,4,5,6</sup>, R.A. Zeigler<sup>3</sup>, F.M. McCubbin<sup>3</sup>, J.H. Allton<sup>3</sup>, and the ANGSA science team.

<sup>1</sup>HX5 – Jacobs JETS Contract, NASA Johnson Space Center, Houston, TX 77058

<sup>2</sup>GeoControl Systems - Jacobs JETS Contract, NASA Johnson Space Center, Houston, TX 77058

<sup>3</sup>NASA, Johnson Space Center, Mail Code X12, Houston, TX, 77058

<sup>4</sup>Dept. of Earth & Planetary Sciences, Rutgers University, Piscataway, NJ 08854

<sup>5</sup>Dept. of Earth & Planetary Sciences, American Museum of Natural History, New York, NY 10024

<sup>6</sup>Lunar and Planetary Institute, Houston, TX 77058.

The Apollo mission returned 382 kg of lunar material comprising rock, soil and core samples. Some of these samples were intentionally set aside after their return from the Moon for future study, including samples sealed on the lunar surface, frozen samples and samples stored under Helium. The Apollo Next Generation Sample Analysis (ANGSA) program was established to study these samples, in part to help bridge the gap between Apollo and the next generation of lunar science and exploration.

Apollo 17 double drive tube core sample 73001/73002 was collected about 50 meters east of Lara Crater from a landslide deposit originating from South Massif. After separating the two halves, the lower drive tube 73001 was immediately sealed in a special vacuum container. Both drive tubes were then placed in an Apollo Lunar Sample Return Container (ALSRC) and returned to Earth under vacuum. Total sample weight and length of 73001/73002 is 1263.0 g and up to 60 cm, with the upper drive 73002 containing 429.7 g and 23 cm of material (which was then compressed to 18.5 cm during extrusion in the lab).

We will present the meticulous methods involved in preparing for, opening and processing lunar core 73002, the upper half of the double drive tube. This includes searching and locating procedures and tools, practicing assembly and extrusion in a mock-up, and finally opening and dissecting the core sample 73002. Challenges (both expected and unexpected) encountered along the way and lessons learned during this project will help pave the way towards improving future lunar sample return missions and advancing insight into the Moon's history.