

SPACE EXPLORATION SYMPOSIUM (A3)
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DESIGN AND PRELIMINARY TEST RESULTS OF THE HELIUM EXTRACTION AND
ACQUISITION TESTBED**Abstract**

The Helium Extraction and Acquisition Testbed (HEAT) is a prototype volatiles extraction system built to demonstrate a process for acquiring helium-3 from mare region lunar regolith. This would be used to fuel future fusion power plants that would produce little to no radioactive waste. Helium-3 is only a small portion of the volatiles released from the extraction process being investigated. Hydrogen, helium-4, carbon dioxide, carbon monoxide, methane, nitrogen, and water (from hydrogen reduction of ilmenite) are by-products of the process. These volatiles could be vital in supporting people in space (space stations, Lunar or Martian outposts) for extended periods of time. HEAT extracts volatile gases from helium implanted <100 micron JSC-1A regolith simulant by heating the material to 700°C within a heat pipe heat exchanger. In this paper, key aspects of the HEAT design will be presented along with preliminary test data on the system's thermal performance and volatile gas release rates.