

Development of the Advanced Regolith Ground Operations (ARGO) Test Bed – A Robotic Excavation and Construction Test Facility with Simulated Lunar Environments. E. A. Bell¹, N. J. Gelino², M. W. Nugent³

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NASA's Artemis Program is working towards developing a sustained presence on the Moon and eventually Mars. To achieve this goal, robotic excavation, site preparation and construction technologies are under development to establish the capability to construct infrastructure such as launch/landing pads and radiation protection shelters. Technologies must be proven in simulated Lunar conditions prior surface demonstration missions. To that end, the Relevant Additive Construction Technology (REACT) Announcement of Collaboration Opportunities (ACO) project with AI Space Factory and the NASA Kennedy Space Center's (KSC) Granular Mechanics and Regolith Operations Laboratory (a.k.a. Swamp Works) has developed the Advanced Regolith Ground Operations (ARGO) Test Bed.

ARGO includes a ~1.5m x 1.5m x 1.2m (~5x5x4ft) vacuum chamber, cryogenically cooled thermal shroud, a 3-axis robotic positioning system, and a regolith bin. For the REACT project, a pellet extruder, feed hopper, and heated 600mm x 600mm (23.6x23.6in) build plate have been installed on ARGO to advance the Technology Readiness Level (TRL) of regolith-polymer composite Fused Deposition Modeling (FDM) additive construction systems, processes, and materials. This paper will focus on the design and operational characteristics of the ARGO Test Bed with pellet extruder.