

Auger Conveyor Dryer Technology

A NEW PARTNERING OPPORTUNITY

Reference No: 80JSC021ACDT

Potential Commercial Applications:

Bulk handling industry, agriculture, food processing, mining industry, commercial space in-situ resource utilization (ISRU), and others

Keywords: Screw Conveyor Dryer, Auger Dryer, Screw Feeder, Worm Conveyor, Archimedean Screw, Spiral Conveyor, Hopper

Purpose:

NASA JSC seeks to advance the technology associated with auger conveyor dryers, also known as screw conveyor dryers, to move and dry lunar surface material (soil, a.k.a. regolith) with the goal of producing water from the lunar soil.

While augers are effective devices for terrestrial use, technology advances are needed to produce a capable auger dryer that will work on the moon. Continuous icy regolith processing in a lunar environment is complex with many variables including, but not limited to: low gravity, thermal effects from extreme temperatures, pressure effects from hard lunar vacuum, and solid and vapor flow rates suitable for water production while balancing the regolith transient time (physical flow rate) versus residence time (thermal flow rate).

In pursuing technology improvements to achieve a lunar capability, new and improved features for auger dryers will provide additional options for terrestrial applications.

Technology:

Technology goals, include, but are not limited to: reduce system size (i.e. volume and mass), improve heating efficiency and thermal control, increase energy efficiency, accommodate a wider range of material types and sizes, higher durability/reliability, torque and temperature sensing, re-configurability, variable pitch augers, and hopper feed technology.

Research is planned to determine the viability of manipulating the shaft and auger threads to create a steady-state material plug at the inlet and outlet of the auger system, thereby removing the need for mechanical isolation valves.

R&D Status:

NASA JSC is equipped with an auger dryer testbed that will be used to validate mechanical and thermal models using a lunar regolith simulant. Technology goals noted above will be evaluated using the current testbed. Data from these tests will feed into a second generation testbed to verify improved capabilities.

Intellectual Property (IP):

This Partner relationship may produce new IP that could be jointly owned by NASA and the partner or may become the property of the partner.