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# DEVELOPMENT OF THE VERTICAL LUNAR REGOLITH CONVEYOR (VLRC) TECHNOLOGY

**Abstract**

Regolith conveying will be essential for delivering granular material to In-Situ Resource Utilization (ISRU) regolith processing plants for resource extraction on the Moon. Mission costs require low mass, low power solutions for regolith delivery. Spiral, vibratory conveyors are a highly matured technology used in industry to convey granular material vertically. Vibratory conveyors are lower power than screw conveyors, less susceptible to complications from cohesive or abrasive materials, can handle a wide range of particle sizes, can size sort particles, and are vacuum compatible. The Vertical Lunar Regolith Conveyor (VLRC) is a regolith conveying technology being developed at NASA Kennedy Space Center (KSC). The VLRC is a spiral, vibratory conveyor that is 1 meter in height and is designed to operate in vacuum conditions. The VLRC vibrating conveyor uses two eccentric weight motors to generate the needed out-of-balance vibration and motion to convey the granular material vertically along the spiral conveyor surface. Additionally, the VLRC can be modified to accommodate a stick-slip conveying method, to directly compare the conveying rate and power consumption of the two separate methods in vacuum. The VLRC is designed to convey lunar regolith simulant at a minimum rate of 1 kg/min. The VLRC is equipped with accelerometers and a load cell to measure the conveyor motion and the granular material convey rate in vacuum. The work presented here details KSC's past work on small scale VLRC experiments, the 1-meter scale VLRC design, and the laboratory testing performed with the VLRC technology.