

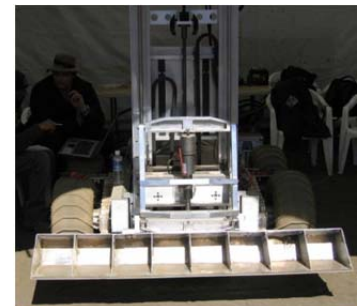
## Ploughs and Load, Haul, Dump Systems

The plough and load, haul, dump (LHD) systems were designed, developed and tested by Deltion Innovations Ltd. They were designed as interchangeable payloads for an In Situ Resource Utilization (ISRU) mobility chassis for use in landing pad construction and material delivery to lunar processing plants.



The plough blade is 30 cm high by 173cm long. It is adjustable in 8 degrees. A series of three ploughs were installed on mobility chassis and operated autonomously in a multi-agent teaming scenario to clear a simulated landing pad site during a lunar analogue mission on the slopes of Mauna Kea in 2010.

The LHD is a two stage lift system capable of handling a load up to 136kg. It has two interchangeable buckets. The small bucket is approximately 51cm wide x 46 cm deep. The large bucket is approximately 163cm wide. The system can excavate, transport (in conjunction with a mobility chassis) and dump material.



The LHD system was successfully tested as a regolith delivery system to a NASA processing plant during a lunar analogue mission on the slopes of Mauna Kea in 2010. During the testing, it excavated Hawaiian tephra, transported it to a hopper on the processing plant and dumped the material into the hopper.

