Regolift: Modular Regolith Transport Solution for the Moon

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Abstract

- Efficient, lightweight and reliable transport system for lunar regolith
- Consists of an enclosed conveyor belt, a rock filtering system and an Old's Elevator

Horizontal System: Conveyor Belt

- Enclosed 5 m conveyor belt system with wear resistive Teflon cloth belt
- Tried and tested solution for transporting dusty and abrasive materials
- Simple, durable and reliable
- High efficiency and high degree of automation

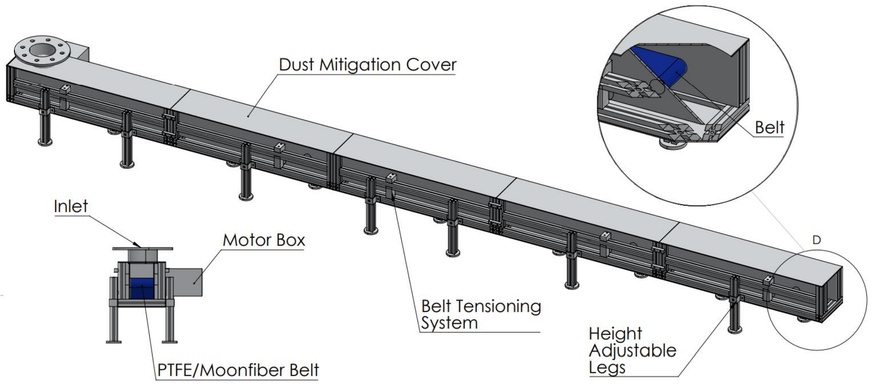

Figure 1: Horizontal System (Conveyor Belt)

Vertical System: Old's Elevator

- Inverted Archimedes' Screw
- Enclosed system featuring a rotating tube, a fixed screw inside it and a sieve mesh that filters out rocks larger than 3.5 cm
- Already proved its efficiency in the industry
- Innovative solution that has been overlooked in space applications

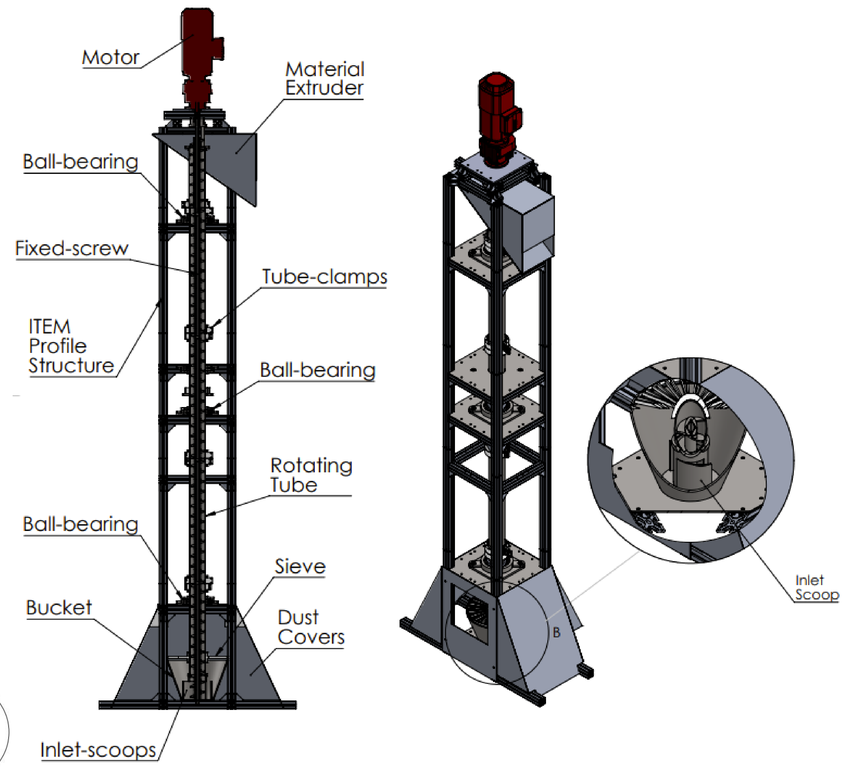

Figure 2: Vertical System (Old's Elevator)

Rock Filtering System

- Rotating sieve mesh that filters out rocks larger than 3.5 cm
- Connected to the rotating tube of the vertical system

Figure 3: Rotating sieve mesh

System Performance

- Mass flow: 240 kg/hour
- Power consumption: 400 W
- Weight: 230 kg
- 25 kg of regolith per day per landed kg
- 14 kg of regolith per day per W