

Development of the Mountaineer Ice Drilling Automated System

Mountaineer Robotics Team



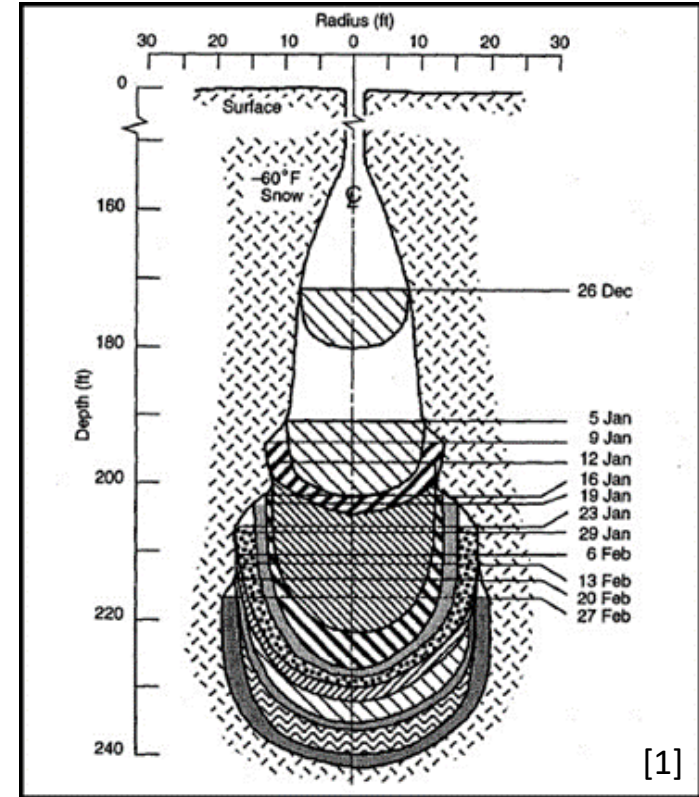
Objective

- Develop new technologies and methodologies in extracting usable water from Martian Ice deposits
- An ice block is buried underneath an overburden layer within a large ice cooler
- System has to penetrate overburden layer and extract clean water
- Moon to Mars includes prospecting task

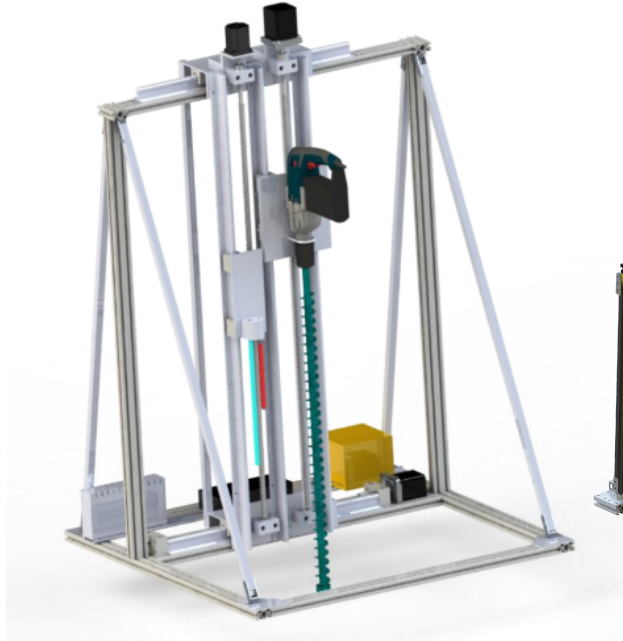


Approach

- Create a Rod-Well
- Simple as possible
- Filtration- mechanical, gravity-fed, and electrocoagulation
- Use WOB reading for Prospecting



MIDAS I



MIDAS II



MIDAS III



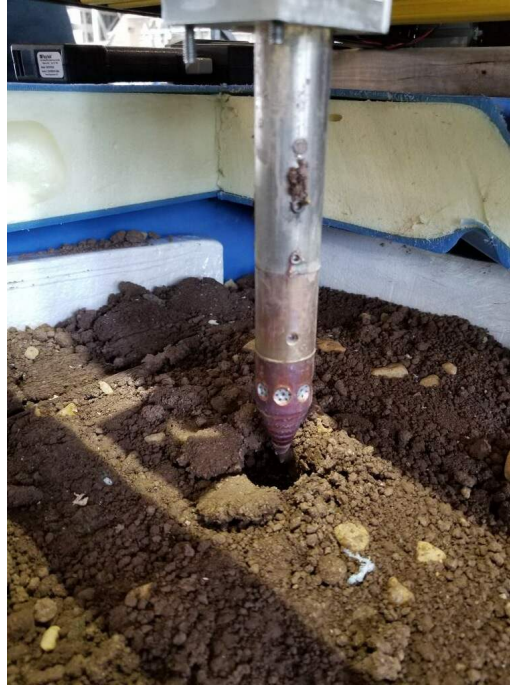
MIDAS I

- 1st Place Overall; Most Water
- 2-Stage System
- No trouble going through overburden
- Overburden collapse



MIDAS II

- 2nd Place Overall; Cleanest Water; Most Water Collected Unofficially
- 1-Stage System
- Hammer Action only
- Ice cracking issue

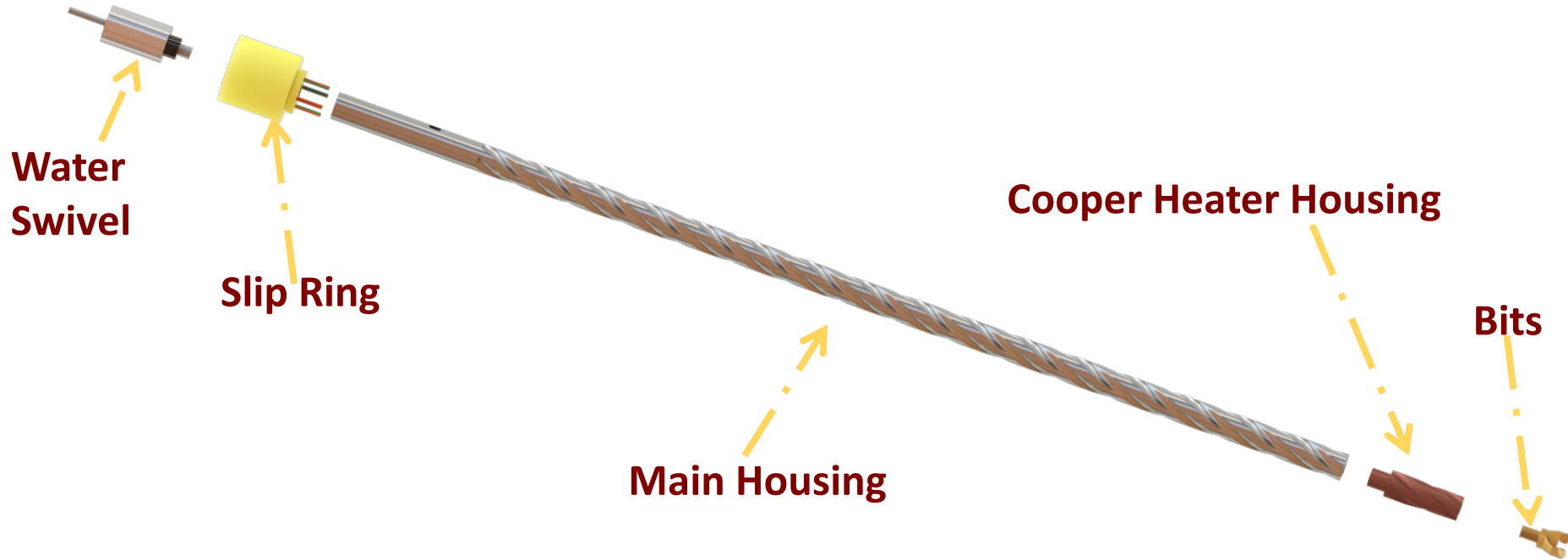


MIDAS III

- 1st Place Overall; Most Water Collected
- 1-Stage System
- Rotary only



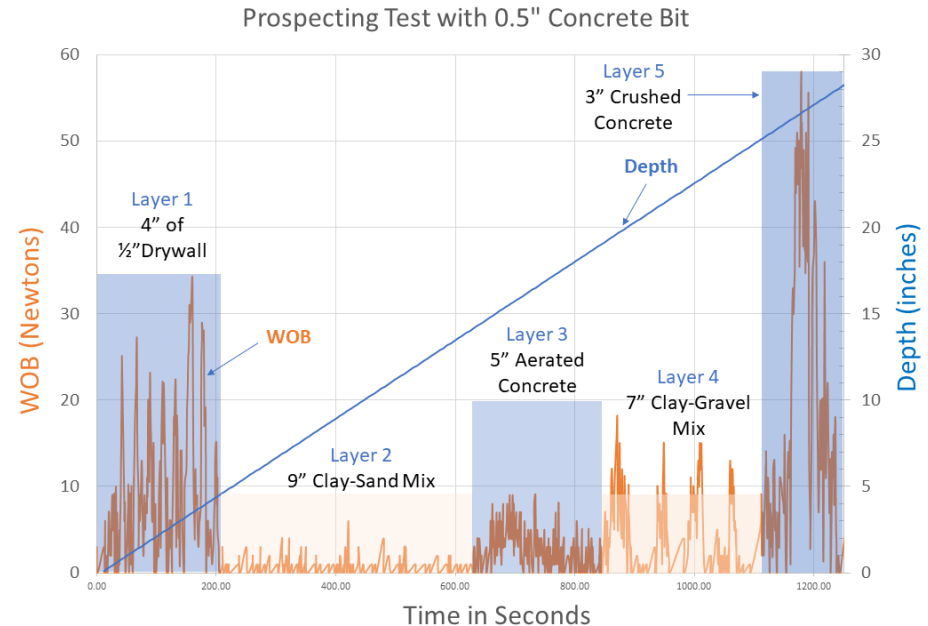
All-In-One-Probe





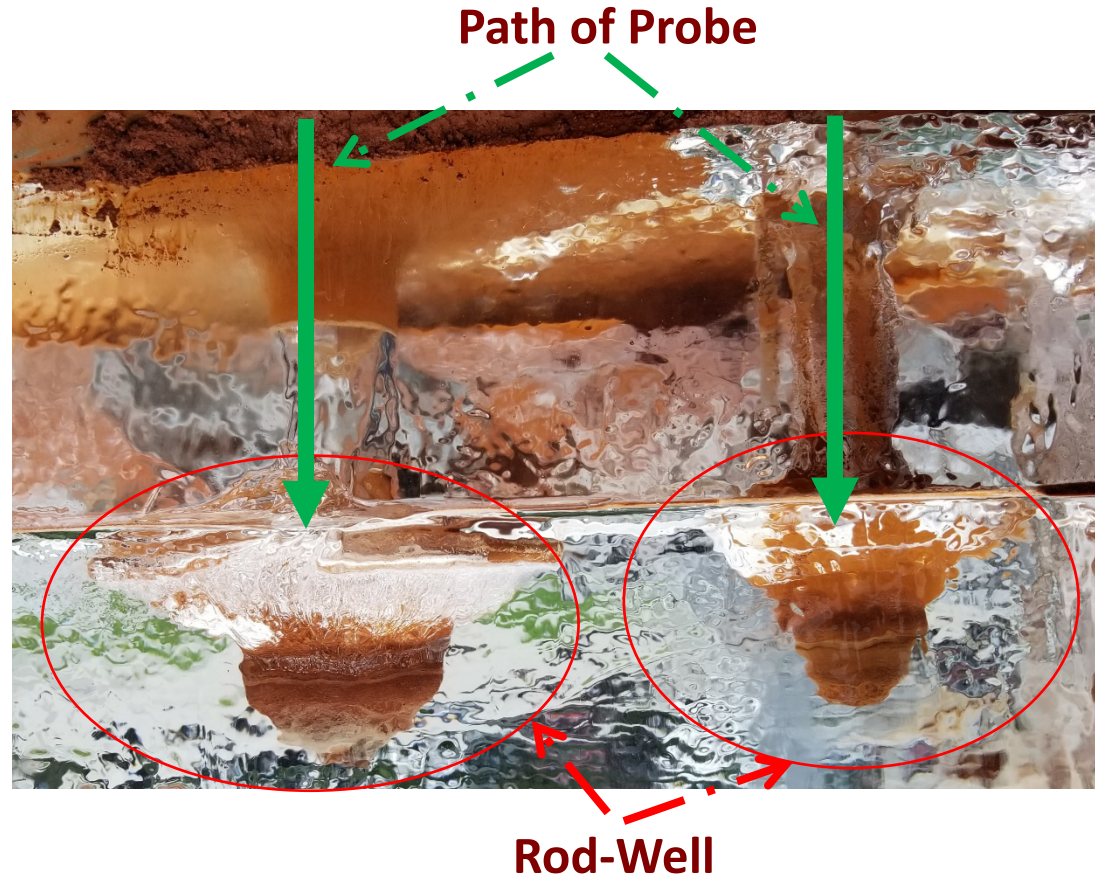
Prospecting

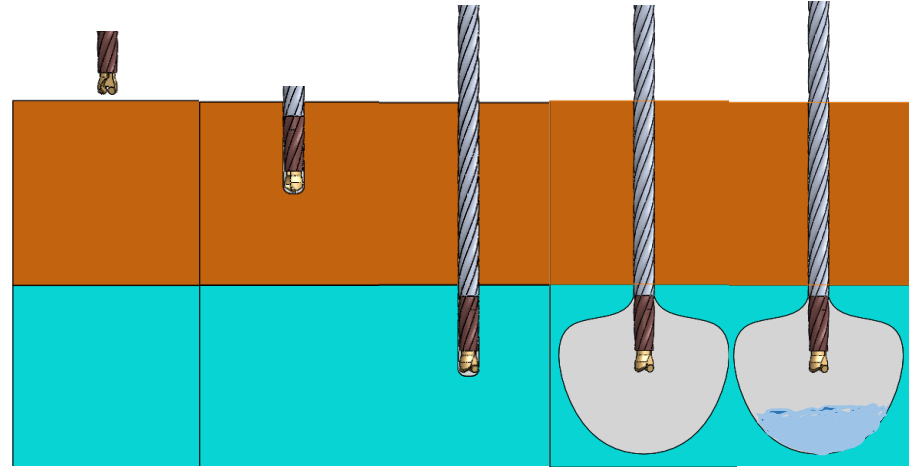
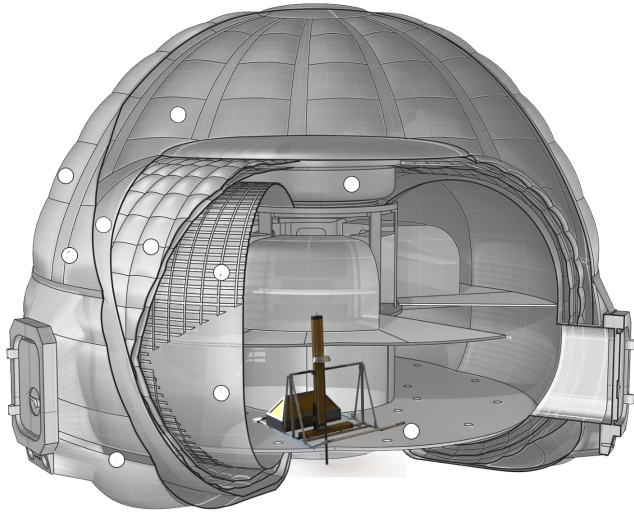
- 1/2" Concrete Bit Used
- Probe Plunges at Constant Rate
- WOB, Depth, and Time used to produce digital core of the overburden
- Cross Referenced with Plunging Data
- Needs Additional Development



Results

- 2000 mL collected hands-on
- 5000 mL collected hands-off
- Rod-well formed
- Prospecting needs development





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