

# UW Crater Cowboys Little Lunar Saddlebag



NASA Micro-g Next 2023-2024

Hand Carrier for Lunar EVA Tools

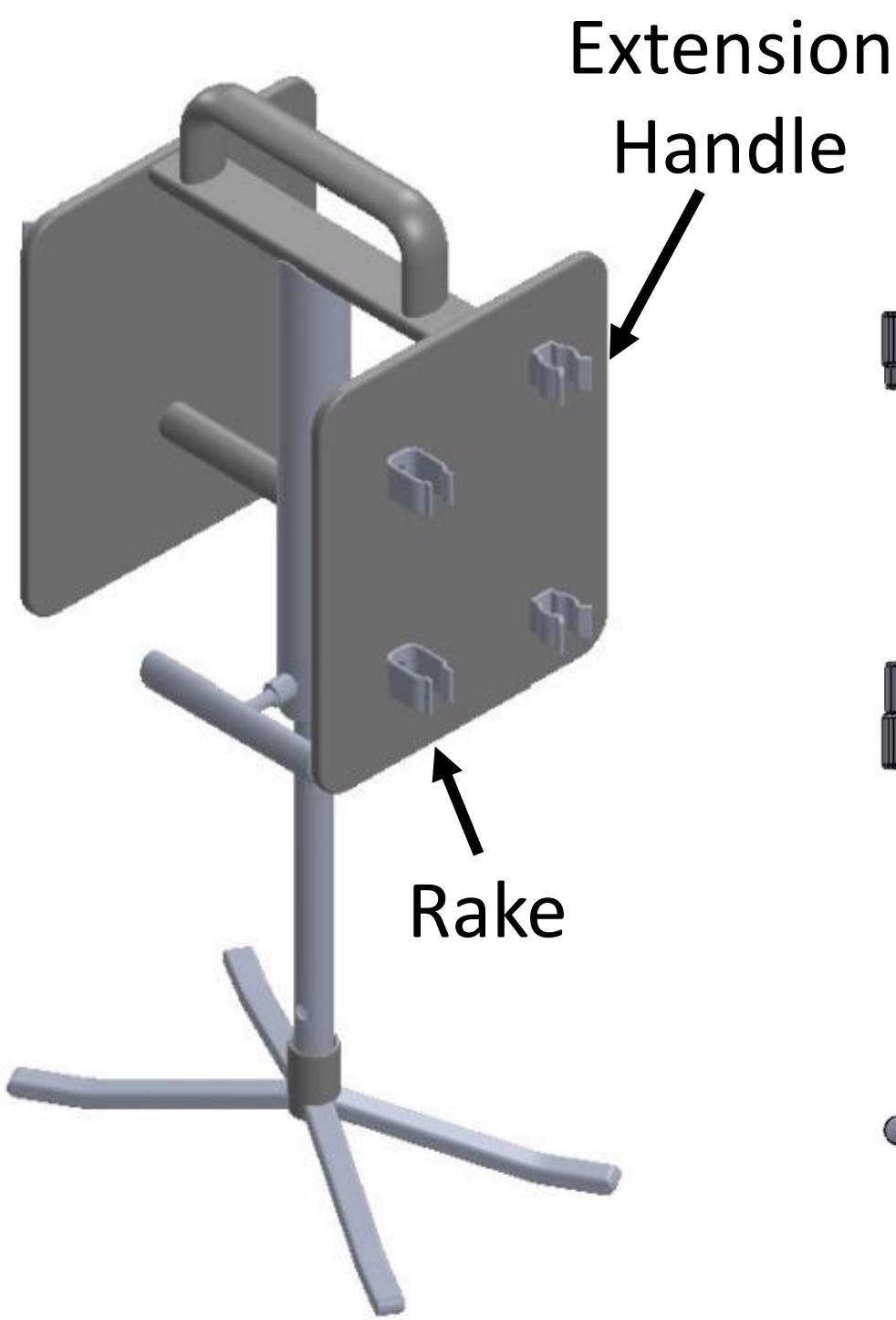
Team Members: Maria Allen, Hanna Detmer, Autumn Highland, Hunter Kindt, Ivan Leon, Erin Poyer, and Michael Richardson

### Micro-g NExT Competition

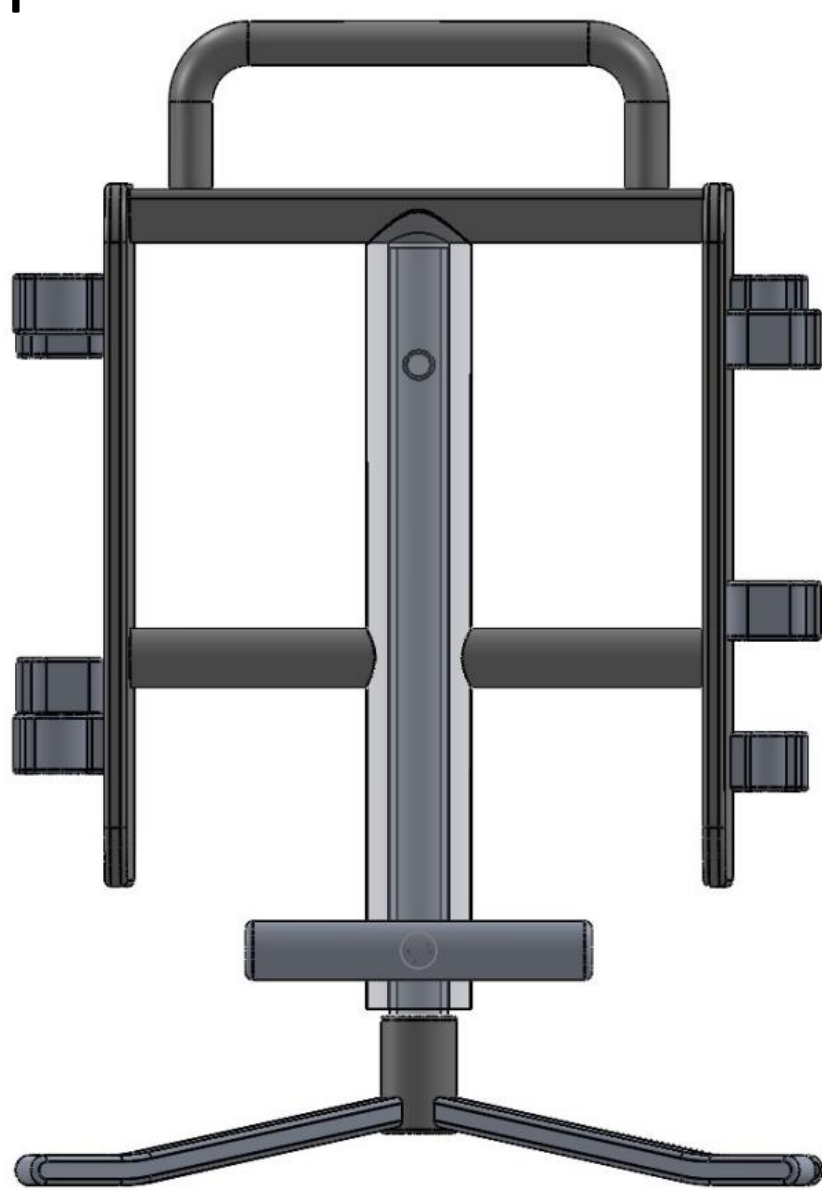
- The Micro-g Neutral Buoyancy Experiment Design Teams (Micro-g NExT) challenges undergraduate students with the design, construction, and testing of a device aimed at addressing a current space exploration challenge.
- The Hand Carrier for Lunar EVA Tools challenge requires teams to devise a means to transport lunar tools with height adjustment capabilities. The tool carrier will be in a short configuration for transporting tools, and it will be in a tall configuration for collecting geological samples. The height mechanism will be dust tolerant and will withstand the harsh lunar environment.

### Major Components

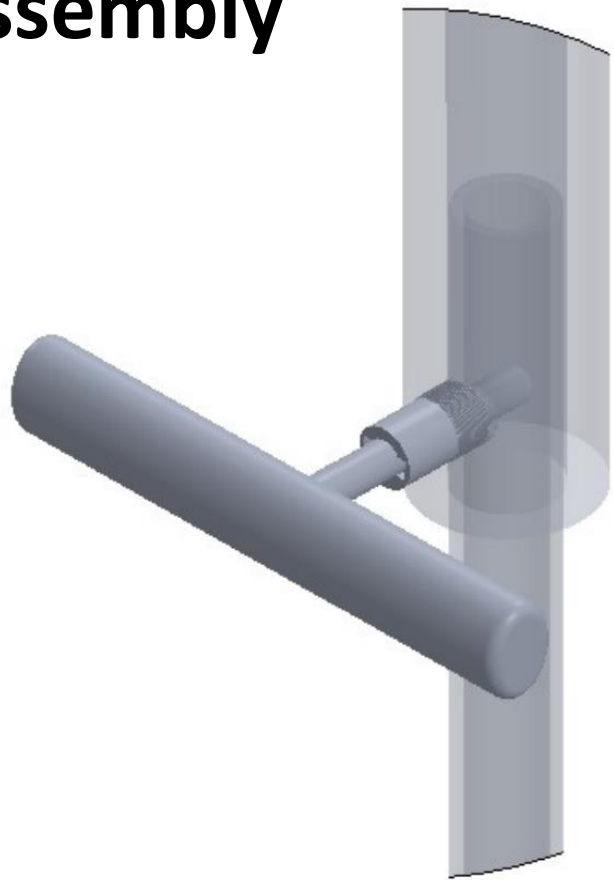
#### Deployed Configuration



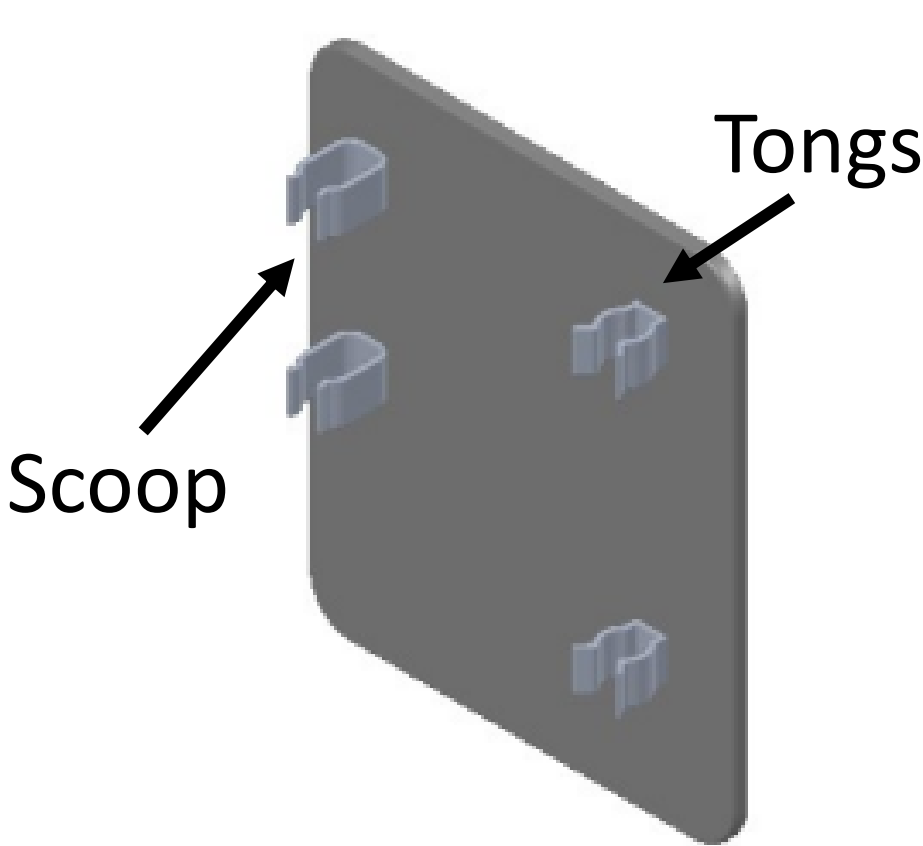
#### Carrying Configuration



#### Pin & Nesting Shaft Assembly



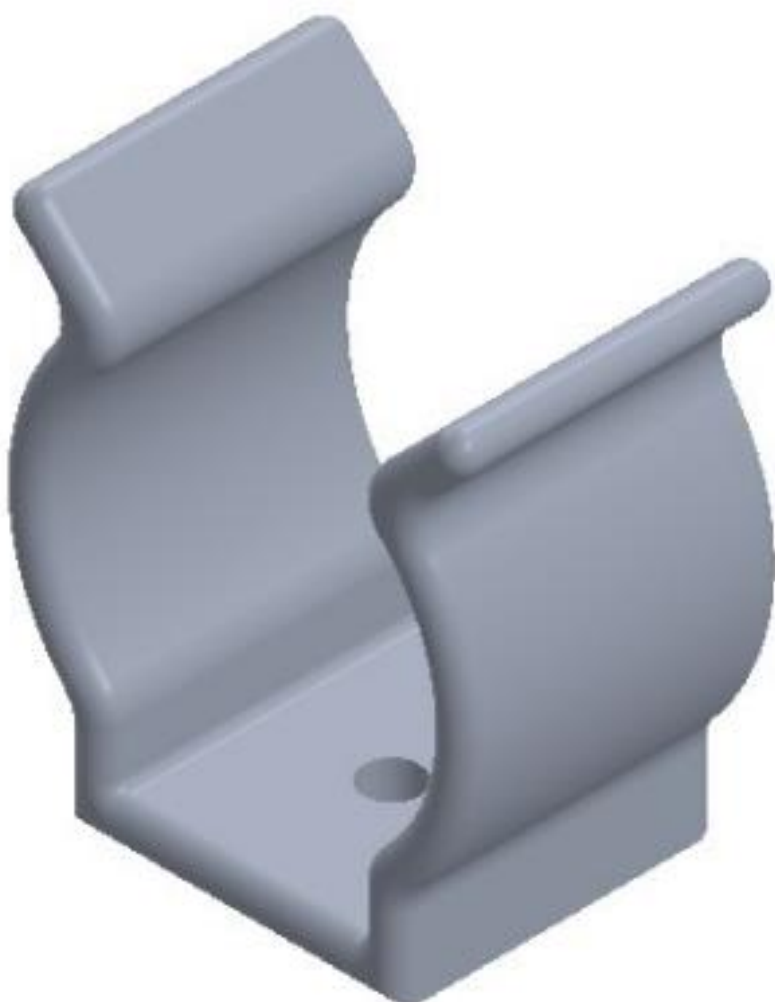
#### Tool Plates



#### Scoop & Rake Clip



#### Extension Handle & Tongs Clip



### Design Requirements

#### Volume Requirements:

- Deployed Configuration: 32" x 25" x 30"
- Carrying Configuration: 20" x 25" x 10"

#### Weight Requirements:

- Weight must not exceed 10 lbs
- Must hold 9 lbs of EVA tools
- Each tool must have a designated location

#### Safety Concerns:

- Sharp edges
- Impede astronaut mobility
- Pinch points

#### Linear Actuating Mechanism Requirements:

- Must not exceed 20 lbf
- Dust tolerant
- Made of metal
- Height adjustment capability
  - Carrying: 16.5" - 20"
  - Deployed: 28" - 32"

### Materials

- 6061 T6 Aluminum is the primary material
- Tough PLA will be used for smaller components
- Regular PLA will be used for prototyping
- Stainless steel will be used for the spring-loaded pin and the tool clips
- Screws, nuts, and springs and will be purchased from online suppliers

### Outreach

NASA prioritizes outreach because future NASA scientists are in classrooms right now across the country. To align with this rationale, each team had to create an outreach plan to educate students and share their Micro-g NExT experience with the community.

- The Crater Cowboys will be conducting two visits with the 4-6th grade classes at Laramie Montessori School.
- Students will participate in a design challenge to learn about the Engineering Design Process as well as learn about the Little Lunar Saddlebag.