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The ZERO: Zip-Tie Revolver

Nuha Akhtar
Boise State University

Dylan Brown
Boise State University

Adam Crayton
Boise State University

Joshua Fernando
Boise State University

Julian Darden
Boise State University

See next page for additional authors

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Abstract

The Boise State University Microgravity Team has been challenged with designing a mechanical Zip-tie tool to be used during EVA missions on the ISS. NASA is looking for a new tool that will allow astronauts to fasten zip-ties to secure wires and hoses. This tool would need to have a number of zip-ties stored internally, be quickly reusable, and would need to be easily and safely operated by an astronaut in a single handed operation.

Comments

Additional mentors: Megan Gambs and Sarah Haight

Authors

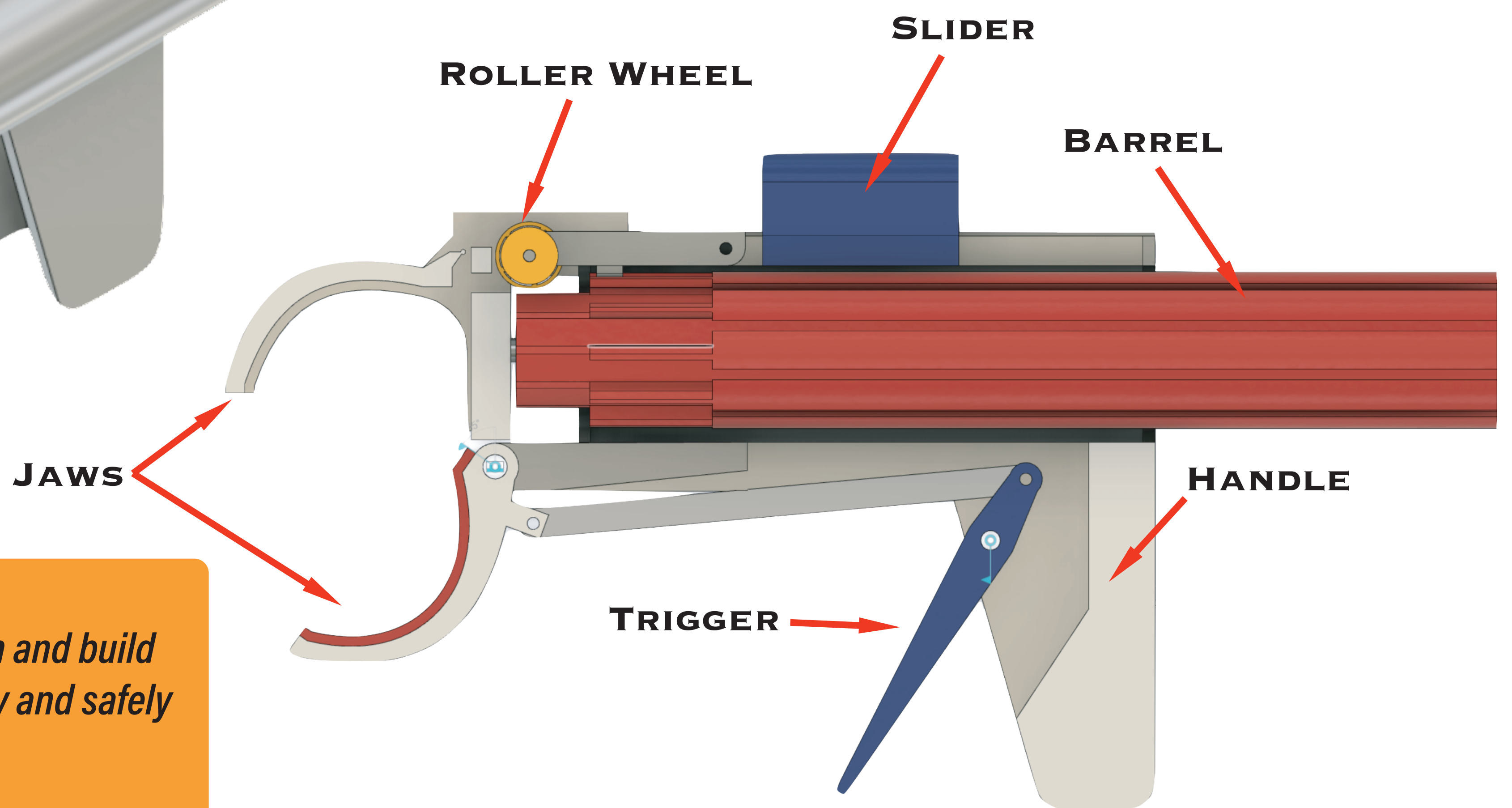
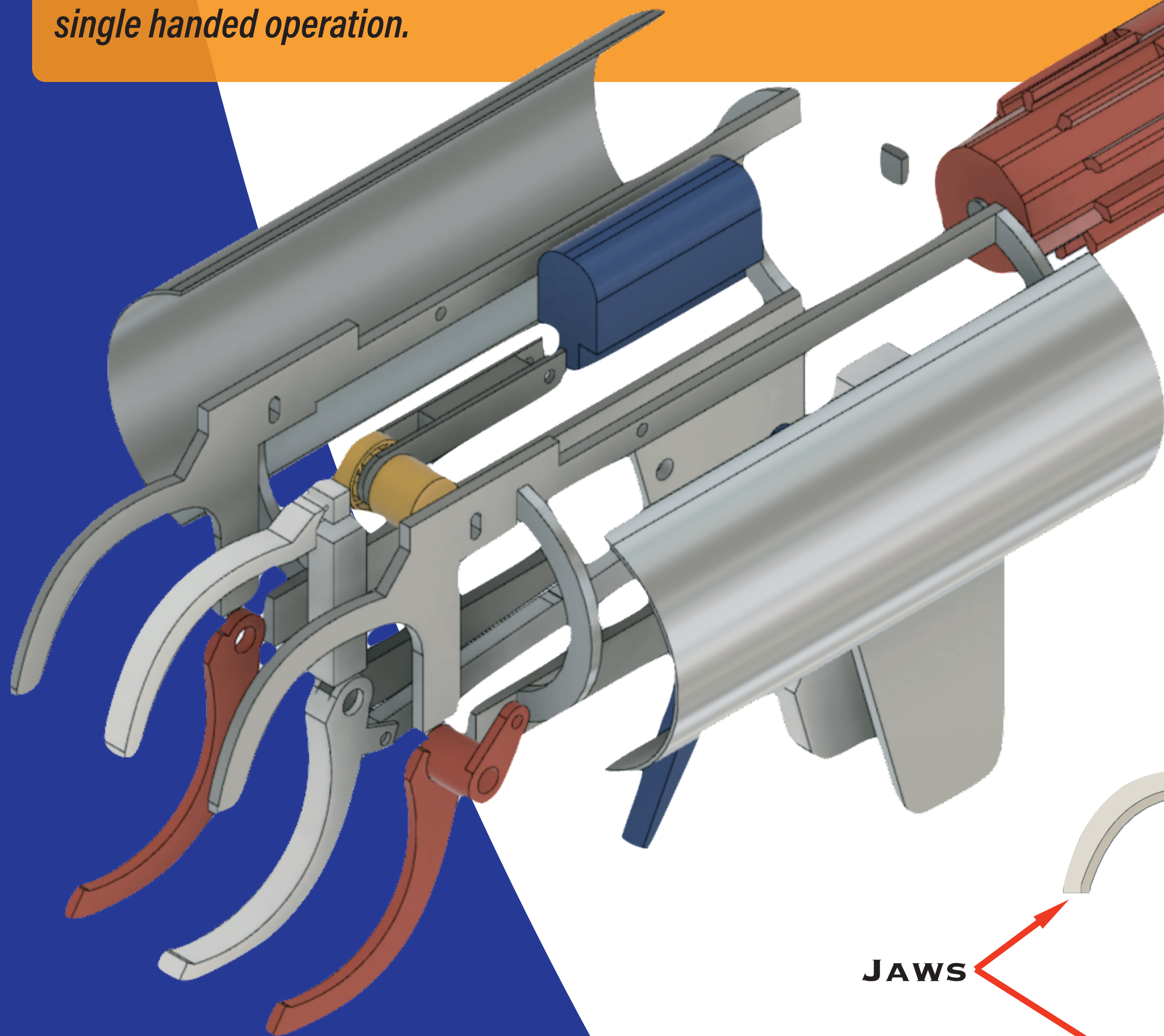
Nuha Akhtar, Dylan Brown, Adam Crayton, Joshua Fernando, Julian Darden, Keith Lindsey, Madison Long, Victor Nguyen, Genevieve Overmyer, Ian Peña, Morgan Roberts, Ryan Samolis, Alex Smith, Soren Witter, and Iz Varland

THE ZIP-TIE REVOLVER

PROJECT OVERVIEW

The Boise State University Microgravity Team has been challenged with designing a mechanical Zip-tie tool to be used during EVA missions on the ISS. NASA is looking for a new tool that will allow astronauts to fasten zip-ties to secure wire and hoses. This tool would need to have a number of zip-ties stored internally, be quickly reusable, and would need to be easily and safely operated by an astronaut in a single handed operation.

"We got loose wires out here!"



OBJECTIVES

The main objective of the Microgravity Team is to design and build the ZERO as a prototype that will help astronauts quickly and safely install zip ties during space walks on the ISS.

- Capable of installing and tightening a zip-tie around objects
- ranging from 0.5" to 2" in diameter/width
- Capacity of 10 zip-ties that it will be able to dispense
- Operate using only manual power
- Designed with geometry that will allow air and water to move freely through the device

HOW IT WORKS

Activated by a trigger mechanism, the lower jaw closes around the intended object and guides the spring loaded zip tie from the revolver barrel into a loop around the target.



NASA MICRO-G NEXT TEAM

Students:

Nuha Akhtar, Dylan Brown, Adam Crayton, Joshua Fernando, Julian Darden, Keith Lindsey, Madison Long, Victor Ngyuen, Genevieve Overmyer, Ian Peña, Morgan Roberts, Ryan Samolis, Alex Smith, Soren Witter, Iz Varland

Advisors and Mentors:

Megan Gambs, Sarah Haight, Steve Swanson

EDUCATIONAL OUTREACH

The team's research is shared with K-12 students and the local community in the hopes of inspiring the next generation of scientists and engineers. Below is a list of some of the outreach events the team has participated in this year.

- Idaho Science and Aerospace Scholars
- Seven Oaks STEM Night
- Girl Scout's STEM Exploration DAY
- Sacajawea Elementary School Trunk or Treat
- Mountain View Elementary STEM Night

