Dive Into Engineering

MICRO-G NEXT

Neutral Buoyancy Experiment Design Teams

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NASA Johnson Space Center

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Neutral Buoyancy Experiment Design Teams

Why take the dive to reach new heights?

Approximately **40%** of students that enter college seeking STEM degrees do not continue to matriculate in those fields

74% of people that have earned a STEM bachelor's degree are not employed in STEM occupations

1,000,000 more STEM professionals needed than the U.S. will produce at the current rate over the next decade

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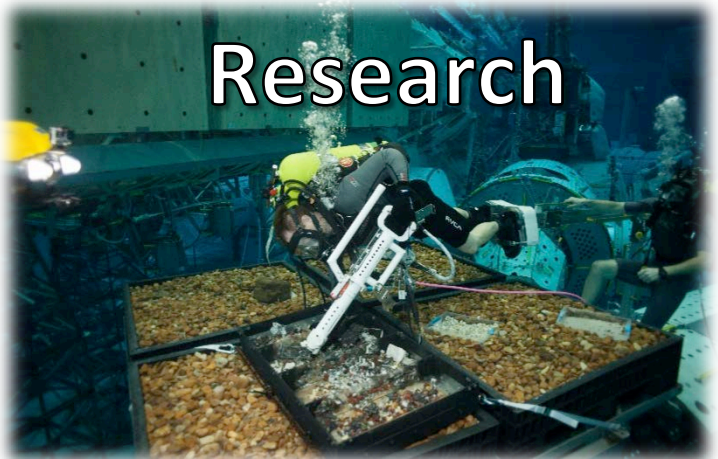

+ ***Cutting Edge***—students join NASA on the #JourneyToMars and provide innovative solutions to current space exploration challenges.

+ ***Dynamic***—establishes a direct path for your students to authentic NASA experiences

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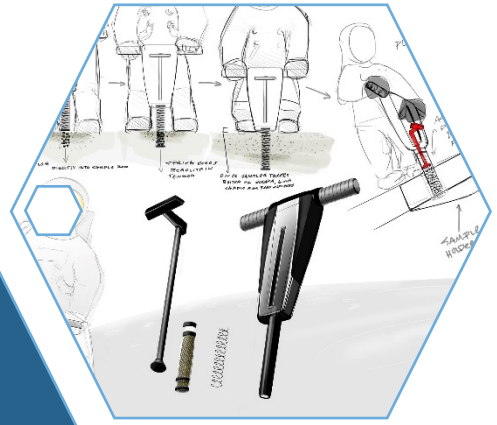

Design

Build

Test

+ ***Evidence***—External evaluation of Micro-g NExT shows the impact participation has on students' interests, attitudes, knowledge, and skills.

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NASA JSC Education added 3 new photos.
Yesterday at 9:57am ·

Week 2 of #MicrogNExT has begun! This morning, out at the NASA Neutral Buoyancy Laboratory (NBL), some of the mentors came out to greet their teams and check out the #spacewalk tool prototypes the teams designed.

Tomorrow and Wednesday, NASA divers will test the tool prototypes in NASA's 6.2 million gallon pool (a.k.a. the NBL)!

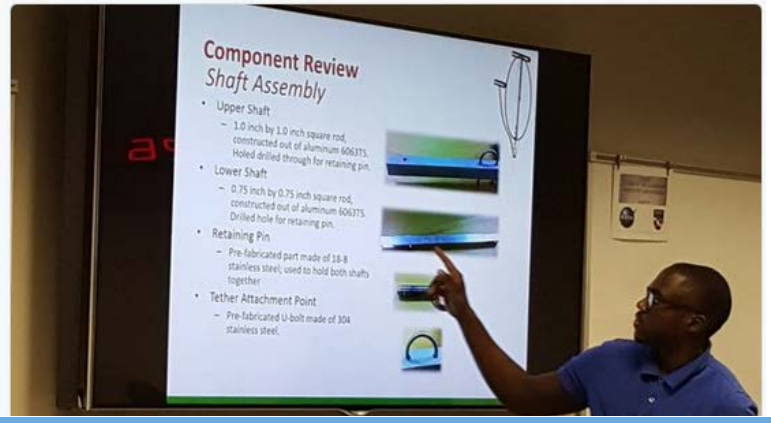
To see pics of the testing, be sure to follow #MicrogNExT on Twitter and Facebook this week.

Rep. Jason Smith @RepJasonSmith · May 23
Good luck to the @MinersInSpace from @MissouriSandT this week during testing this week at the @NASA_Johnson!

2 3

Temoc Space @TemocSpace · May 23
Everyone is making last minute preparations before the safety review! #MicrogNExT #NASA #NBL

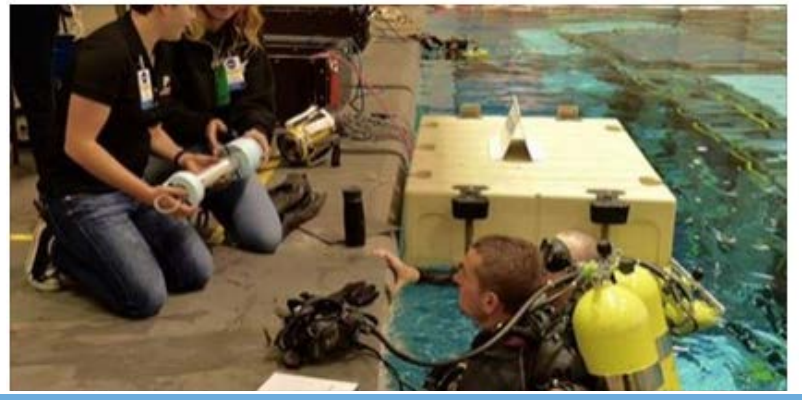
Temoc Space @TemocSpace · 23h
Jordan explaining our shaft design. #MicroGNExT



Columbia Space @ColumbiaSI · 4h
Our test was successful!!! Max recorded force was 30 pounds - 3 times more than required! #success #MicrogNExT

NASA JSC Education added 3 new photos.
26 mins ·

Earlier today, #MicrogNExT teams from Purdue University, Columbia University in the City of New York, and West Virginia University had their team-designed spacewalk tools tested in the NASA Neutral Buoyancy Laboratory!

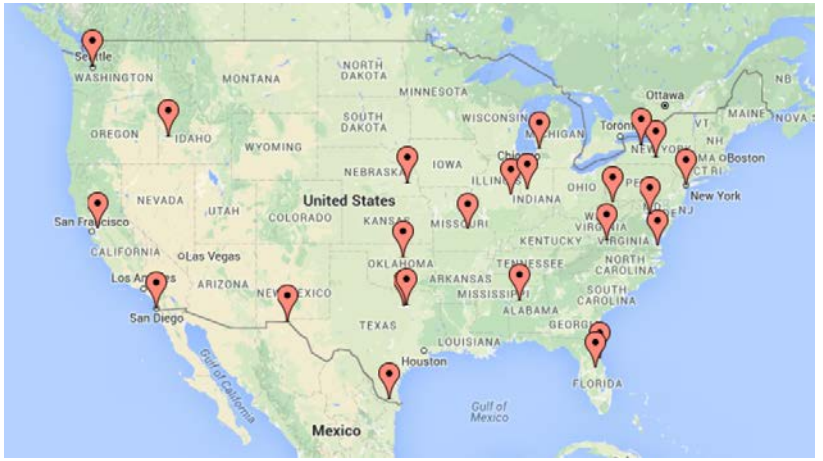


2016 Micro-g NExT challenges students to work in teams to design and build prototypes of spacewalk tools to be used by astronauts for spacewalk training in the Neutral Buoyancy Laboratory.

MICRO-G NEXT
Neutral Buoyancy Experiment Design Teams

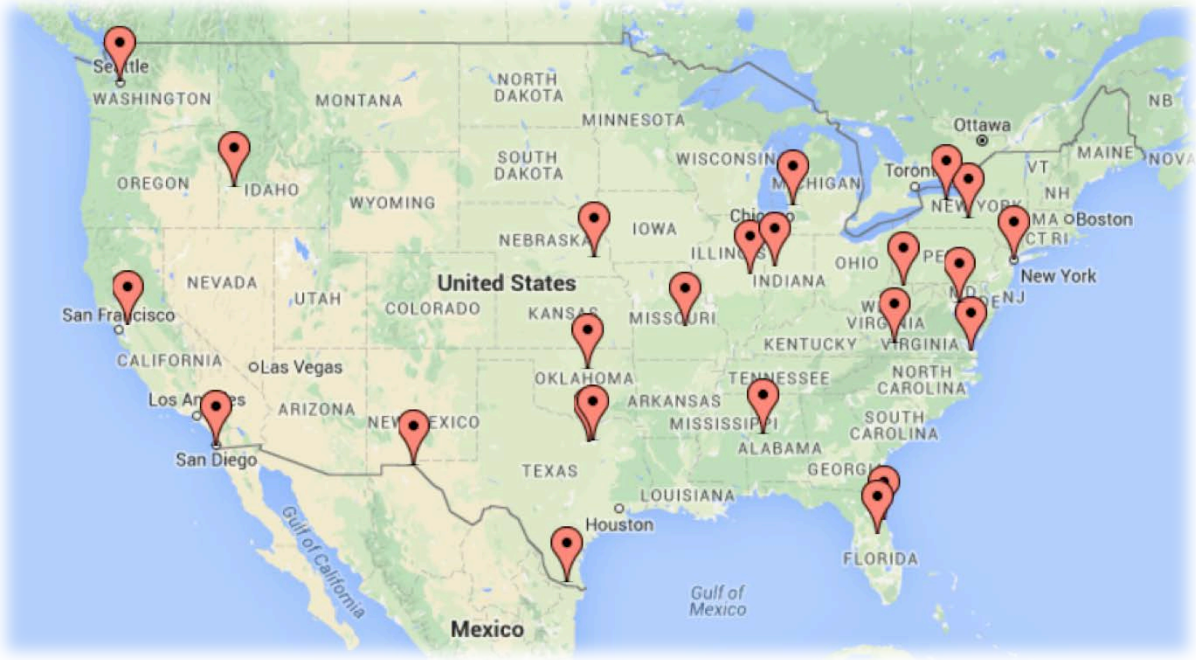
	2015	2016
Teams	19	24
Schools	17	24
Undergraduates	100	224
Community Colleges	1	3
Minority Serving Institutions	3	5

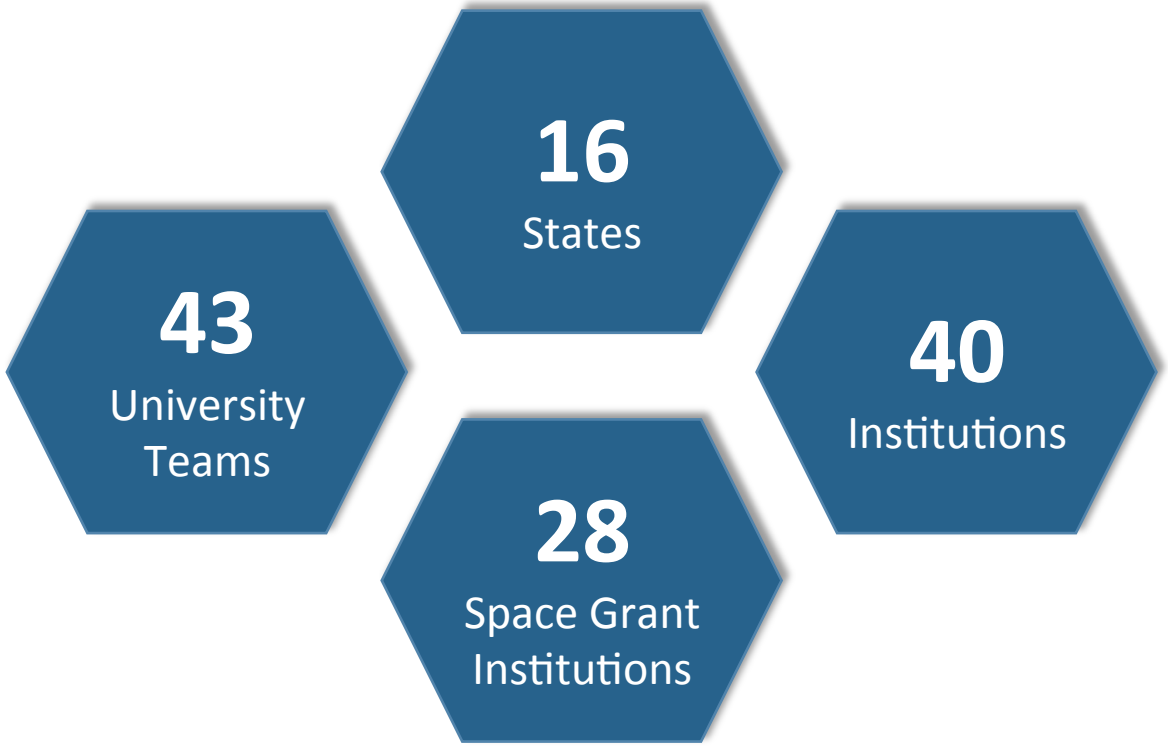
- Art Institute of Seattle
- Boise State University
- Columbia University
- Cornell University
- Embry-Riddle Aeronautical University
- Grand Valley State University
- Los Medanos College
- Missouri University of Science and Technology
- North Lake College
- Oklahoma State University
- Old Dominion University
- Purdue University
- Rochester Institute of Technology
- University of Alabama at Tuscaloosa
- University of California at San Diego
- University of Central Florida
- University of Illinois at Urbana/ Champaign
- University of Maryland at College Park
- University of Nebraska – Lincoln
- University of Texas at Dallas
- University of Texas at El Paso
- University of Texas Pan American
- Virginia Polytechnic Institute and State University
- West Virginia University



Students solving authentic, current space exploration challenges

+ ***Collaborative***—gives your Space Grant another partnership activity with a NASA center.





2015 & 2016 Participation Profile

+ ***Diverse***—provides opportunity for community colleges, 4-year universities, and minority serving institutions.

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Neutral Buoyancy Experiment Design Teams

Microgravity NExT Tool Reference Guide

EC7 – Advanced Exploration EVA Tools Team

HOW TO NAVIGATE THIS DOCUMENT

There are three levels to this document:

1) The top level (this page) lists **all the categories** of tools. This page can be navigated to by clicking the button on any page.
2) The middle level is made up of a main page for **each type of tool.** These pages can be navigated to by clicking the buttons below on this page, or the buttons in the top right corner of all of the other pages.
3) The lower level is made up of a page for **each tool** with specific details and photos. These pages can be navigated to by clicking their respective buttons on the middle level page for that type of tool.

- ANCHORING DEVICES
- CHIP SAMPLE DEVICES
- CORE SAMPLE DEVICES
- FLOAT SAMPLE GRABBERS
- GAP SPANNER BOOMS
- SIMULANT MATERIALS
- SURFACE SAMPLE DEVICES

FLOAT SAMPLE DEVICES

ANCHOR | CHIP | CORE | BOOM | SIMULANT | SURFACE

FLOAT 1	FLOAT 2	FLOAT 3	FLOAT 4	FLOAT 5	FLOAT 6	FLOAT 7
Boise State 2015	Illinois 2015	Nebraska Lincoln 2015	Oklahoma State 2015	South Florida 2015	Trinity University 2015	University at Buffalo 2015

FLOAT 8	FLOAT 9	FLOAT 10	FLOAT 11	FLOAT 12	FLOAT 13	FLOAT 14
UT Dallas 2015	UTEP 2015	Alabama 2016	Boise State 2016	Cornell 2016	Oklahoma State 2016	Rochester 2016

Core Sample Device 1

ANCHOR | CHIP | CORE | FLOAT | BOOM | SIMULANT | SURFACE

Los Medanos Community College
2016, Test Week 3

Basic Operation:

- Start with 'IRIS' tool fully assembled
- Twist into regolith using turning wheel
- Hold the wheel with one hand and turn the top handle clockwise ~2 turns to close Flex Iris
- Push down on the top handle to compact sample in tube
- Remove whole device from regolith
- Take out retaining pin to release sample tube
- Remove PIP-pin to detach sample tube
- Attach new sample tube and repeat to take another sample

Notable Features:

- Flex Iris to contain sample
- Ability to compact sample inside sample tube
- Rotating tether point

'IRIS' Tool Fully Assembled

Flex Iris, open

Flex Iris, closed

Sample Tube

Success/Failure During Testing:

- Easy to use and ergonomic
- Operations were intuitive and able to be repeated without much direction from test director

Additional Notes:

- Device used at NEEMO 21

MICRO-G NEXT at NEEMO 21

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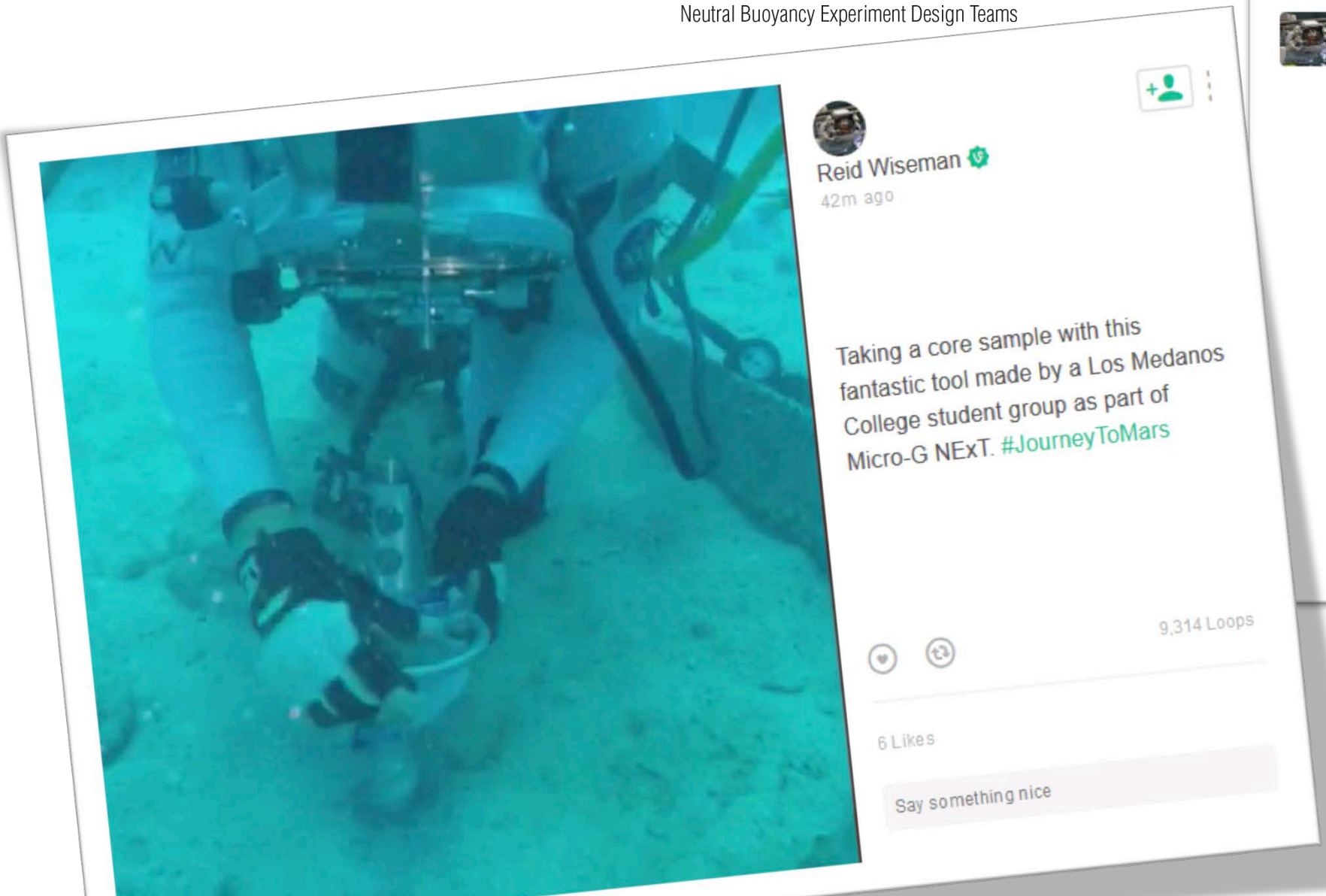

448,000 Potential Twitter Impressions

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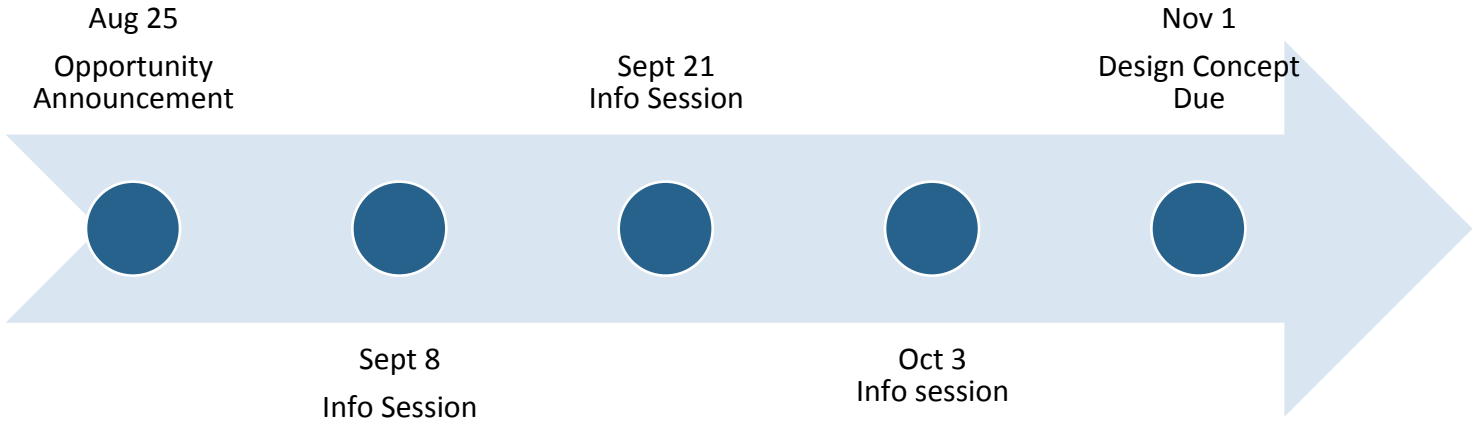
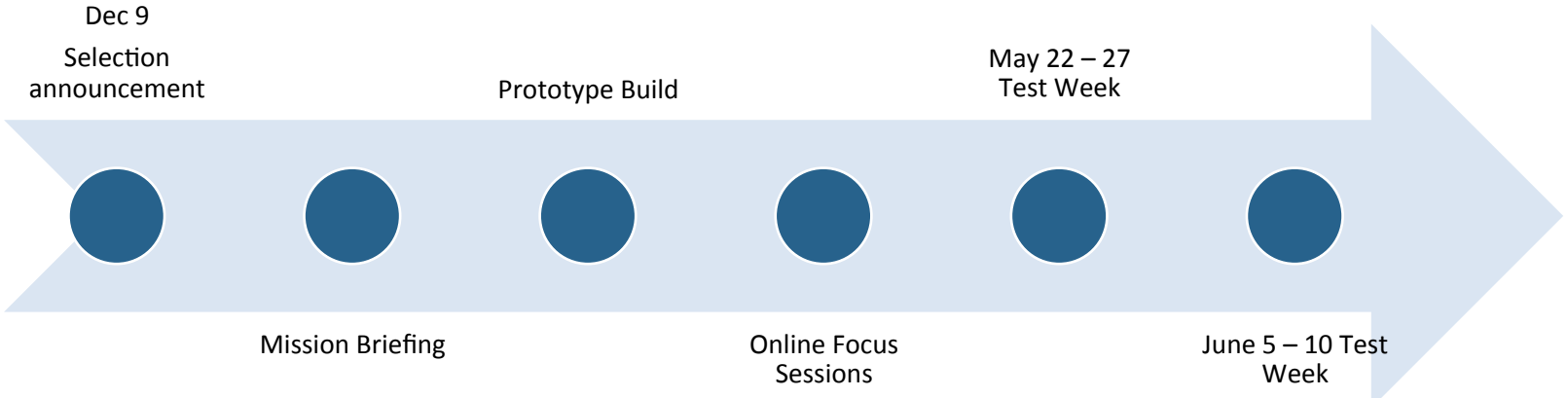
- Phase 1 – Happening Now!



- Phase 2



How Can You Be Involved?

- ***Travel***—Students will travel to Houston for Test Week Events at the NBL. Sponsorship of team travel will help students maximize the opportunity to test in a NASA facility.
- ***Hardware Manufacturing***—Student teams will build their own spacewalk hardware. Sponsorship of team hardware supplies will aid students in the successful mission of delivering a viable prototype for future spacewalks.