

PRESS INFORMATION

NASA

National Aeronautics and
Space Administration



Robotic Mining Competition

Kennedy Space Center Visitor Complex

May 19 - 23, 2014

Kennedy Space Center
Visitor Complex

**Design it.
Build it.
Dig it.**



For more information visit:
www.nasa.gov/nasarmc

Artwork by
Pat Rawlings/Eagle Applied Sciences

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What is the Robotic Mining Competition?

The Fifth Annual NASA Robotic Mining Competition is for university-level students to design and build a mining robot that can traverse the simulated Martian terrain features, excavate basaltic regolith and deposit the regolith into a Collector Bin within 10 minutes. The complexities of the challenge include the abrasive characteristics of the basaltic regolith simulant, the weight and size of the limitations of the mining robot, and the ability to control it from a remote center. The scoring for the mining category will require teams to consider a number of design and operation factors such as dust tolerance and projection, communications, vehicle mass, energy/power required, and autonomy.

Who is eligible to compete?

Undergraduate and graduate student teams enrolled in a U.S. college or university are eligible to compete in the NASA Robotic Mining Competition. Design teams must include: at least one faculty member with a college or university and at least two undergraduate or graduate students. NASA has not set an upper limit on team members. A team should have a sufficient number of members to successfully operate its robot. Registration is limited to the first 50 approved teams. Registration is limited to one team per university campus.

What are the requirements to compete?

In accordance with the rules, teams will compete in up to five major competition categories including: on-site mining, systems engineering paper, outreach project, slide presentation (optional), and team spirit (optional). Additionally, teams can earn bonus points for mined and deposited BP-1 regolith simulant in the competition attempts.

What can teams win?

The team with the most points from all categories will win the grand prize, the Joe Kosmo Award for Excellence, and will receive a trophy, team certificates for each member, Kennedy Space Center launch invitations and a \$5,000 team scholarship. Awards for other categories include monetary team scholarships, a school trophy or plaque, team certificates, and Kennedy Space Center launch invitations.

How are the teams chosen?

The teams are selected on a first come basis. Once registration is open, the first 50 teams who submit a valid registration are the teams who are allowed to compete.





Why do we do it?

The technology concepts developed by the university teams for this competition conceivably could be used to mine resources on extraterrestrial bodies including Mars. NASA will directly benefit from the competition by encouraging the development of innovative planetary regolith excavation concepts from universities, which may result in clever ideas and solutions that could be applied to an actual excavation device or payload. The unique physical properties of basaltic regolith and the reduced 1/3rd gravity make excavation a difficult technical challenge. Advances in Martian mining have the potential to significantly contribute to our nation's space vision and NASA space exploration operations. Recent data from NASA Mars missions indicate a global presence of at least 5% water in the Martian regolith. In order to obtain this water for use as life support and propellants, it must be mined and processed. Time delays in communications to Mars will necessitate autonomous regolith mining robots to acquire the water resources.

The competition is also a forum for collaboration and innovation among students. NASA technical experts, sponsors and students engage in unique discussions about robotic mining. One faculty member stated that "my students learn more about implementing engineering in this week [of competition] than four years of college". A NASA researcher remarked that "my budget allows one prototype per year; RMC provides 50 prototypes in one week."

2013 Competition Statistics

Fifty teams competed with 1,002 students and faculty advisors representing 32 teams from 24 states and 18 teams from around the world to mine 2,431 kg of basaltic regolith simulant during the event. It took over one-hundred volunteers, nine corporate sponsors and two contributing sponsors to staff and judge the competition. This event would not be possible without their dedication, support and enthusiasm.

2014 Competitors

Arizona State University

Case Western Reserve University
"Case Lunabotics Team"

Clark College
"Robo-Aptenodytes"

Colorado School of Mines
"Blasterbotica"

Temple University
"The Owlscavators"

Texas A&M University Corpus Christi
"Sand Pipers"

The University of Akron
"C.H.R.I.S.T.E.E."

The University of Alabama





Embry-Riddle Aeronautical University,
Daytona Beach
"Moon π "

Florida Institute of Technology
"NASAbotics"

Florida International University
"MEC Panthers"

Hampton University
"Pirates"

Iowa State University
"Cyclone Space Mining"

John Brown University
"Eaglenauts"

Kapi'olani Community College
"Hawai'i Marsbot Team"

Miami University

Middle Tennessee State University

Milwaukee School of Engineering
"MSOE: Robotic Mining Solutions"

Mississippi State University
"Mississippi State Mechanical Bulldawgs"

Montana State University
"MAMBA (Mars Autonomous Mining robot
Agent)"

Montana Tech of the University of Montana
"Team Oredigger"

University of North Carolina at Charlotte
"49er Miners"

University of Alaska Fairbanks
"Aurora Robotics"

University of Arkansas
"Space Hogs"

University of Central Florida

University of Florida
"AggreGator"

University of Illinois at Chicago
"Chicago Engineering Design Team"

University of Illinois at Urbana-Champaign

University of Michigan
"Robotic Exploration of Space Team (REST)"

University of Nebraska-Lincoln
"Red Rover"

University of New Hampshire
"UNH LunaCats"

University of North Dakota
"Team RAPTOR (Robot Automated for The
Procurement and Transportation of Regolith)"

University of South Alabama
"USA Aerobotics"

University of Virginia
"HoosMining Team"





NYU Polytechnic School of Engineering
"Team Atlas"

University of Wisconsin - Milwaukee

Oakton Community College "Oaktabots"

Virginia Tech

Purdue

Washington University in St. Louis
"SPARC"

South Dakota School of Mines & Technology
"Moonrockers"

West Virginia University
"Mountaineers"

Stanford University

Wright State University "WS Lunar Robotics"

Schedule of Events

Monday, May 19, 2014

8:00 a.m. – 3:00 p.m.

Team Check-In & Mining Robot Unloading/Uncrating

8:00 a.m. – 7:00 p.m.

Pits Open

9:00 a.m. – 12:00 p.m.

Robot Inspections

10:00 a.m. – 12:00 p.m.

Practice Time

12:00 p.m. – 1:00 p.m.

Lunch

1:00 p.m. – 6:00 p.m.

Robot Inspections

1:00 p.m. – 6:00 p.m.

Practice Time

Tuesday, May 20, 2014

7:00 a.m. – 6:00 p.m.

Pits Open

9:00 a.m. – 12:00 p.m.

Robot Inspections

9:00 a.m. – 12:00 p.m.

Practice Time

12:00 p.m. – 1:00 p.m.

Lunch

1:00 p.m. – 6:00 p.m.

Robot Inspections

1:00 p.m. – 6:00 p.m.

Practice Time





Schedule of Events

Wednesday, May 21, 2014

7:00 a.m. – 7:00 p.m.	Pits Open
8:00 a.m.– 9:00 a.m.	Opening Ceremony
9:00 a.m. – 12:00 p.m.	Official Competition
12:00 p.m. – 1:00 p.m.	Lunch
1:00 p.m. – 6:00 p.m.	Official Competition

Thursday, May 22, 2014

7:00 a.m. – 7:00 p.m.	Pits Open
8:00 a.m. – 8:30 a.m.	Opening Remarks
8:30 a.m. – 12:00 p.m.	Official Competition
12:00 p.m. – 1:00 p.m.	Lunch
1:00 p.m. – 6:00 p.m.	Official Competition

Friday, May 23, 2014

7:00 a.m. – 7:00 p.m.	Pits Open
8:00 a.m. – 8:30 a.m.	Opening Remarks
8:30 a.m. – 12:00 p.m.	Official Competition
12:00 p.m. – 1:00 p.m.	Lunch
1:00 p.m. – 4:00 p.m.	Official Competition
6:00 p.m. – 8:00 p.m.	Awards Ceremony





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End of Press Information

