



# The Rover Report

Mars Rover Design Team  
Fall, 2015

## MRDT Places 10<sup>th</sup> at European Rover Challenge

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This September, six team members and one of our advisors traveled to Kielce, Poland to compete in the European Rover Challenge (ERC). S&T was the only United States team to qualify for the competition this year and the only U.S. team to ever compete in Poland. We are extremely proud to say that we placed 10th out of 44 teams!

The team spent two weeks in Poland preparing, including six stressful days attempting to communicate with the Polish customs. Once we obtained our rover, we reassembled it, tested, and prepared for competition. While it was a lot of work, we had a lot of fun exploring Poland in the meantime!



Similar to the University Rover Challenge, the team competed in four tasks and a presentation. Teams were also judged on reports and a promotional video. During competition, the teams were required to take on endeavors, such as operating the rover using only GPS coordinates, picking up rock & soil samples, carrying a tool to a designated location, and manipulating switches on a "reactor" panel. Each exercise was meant to test our rover's ability to operate in situations that could be encountered if there were humans on Mars. Overall, ERC was a wonderful experience for MRDT. It was an honor to represent our team, our school, and our country. While we do not plan to return to ERC next year, we learned a lot and we hope to compete again in the future!

## THANK YOU!

As you already know, Mars Rover Design Team is full of passionate and dedicated students who spend their days finding new and innovative ways to create the next generation of Mars rovers. But our dream wouldn't have become a reality without your support!

THANK YOU to our friends, family, and sponsors who made ERC possible. The team conducted a successful crowdfunding campaign this past spring and raised over \$19,000 to fund our trip to Poland. We couldn't have done it without you!



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## From the CEO

Hello, and welcome to the 2015-2016 competition year! My name is Alyssa McCarthy, and I am the Chief Executive Officer this year. I am a junior in Engineering Management from Valmeyer, IL, and am so excited for the opportunity to lead such an incredible team. This year has been quite a whirlwind already. Competing in the European Rover Challenge was an unbelievable opportunity and I want to thank each and every one of you for making it possible. The team is so grateful for your support-whether you gave us a generous contribution or spent valuable time helping the team in some capacity, your support does not go unnoticed. Now that we are back from Poland, the team is hard at work designing for next year. We want to hear from you! Please feel free to contact me at any time with comments, concerns or questions at [alyssa.mccarthy@mst.edu](mailto:alyssa.mccarthy@mst.edu).



## Schedule

### **MinerFest—S&T Homecoming**

Oct 23<sup>rd</sup> Silver & Gold Banquet  
Oct 24<sup>th</sup> Homecoming Parade  
Oct 24<sup>th</sup> Design Center Reception

### **Space Week**

Nov 4<sup>th</sup> Dr. Huebner  
Nov 5<sup>th</sup> Dr. Riggins  
Nov 6<sup>th</sup> Hubble3D  
Nov 7<sup>th</sup> Tour of the Planets



### **Critical Design Review Nov 13**

## Space Week

Space Week 2015 is a collaborative effort of several student run design teams with the goal of promoting space related technologies and research being done at Missouri S&T. The design teams participating in Space Week consist of Advance Aero Vehicle Group (AAVG), Mars Rover Design Team (MRDT), Miners in Space, and Missouri Satellite Team (MSAT). These teams work to bring the campus and Rolla communities together through a common passion and enthusiasm for the final frontier.



## Space Week Collaboration

This will be the third year Space Week has been hosted and the Missouri S&T campus. The week will consist of two speaker events, an outreach event for middle-schoolers hosted by AAVG and MSAT, an outreach event for elementary children hosted by MRDT and Miners in space, and a showing of Hubble 3D. The teams hope to inspire a new generation with a high love and curiosity regarding space by the end of the week.

For more information and a full calendar of events, check out our website <http://web.mst.edu/~spaceweek/info.html>.

## Public Relations

Name: Andrea Moore  
Year: Senior  
Major: Engineering Management  
From: Tulsa, Oklahoma



"I am excited about expanding our outreach efforts to a greater community and growing together as friends and teammates."



## Science Team

Name: Caroline Dziak  
Year: Senior  
Major: Geology and Mining Engineering  
From: Bridgewater, New Jersey



"I'm excited to keep up our own standard for competition, as well as doing a lot of useful geology on the Mars Rover Design Team."

## Mechanical Team

Name: James Zandstra  
Year: Junior  
Major: Mechanical Engineering  
From: St. Charles, Missouri



"I am excited to see the rover perform and be dependable. I'm optimistic that the changes we are implementing will fix the issues that have held us back in competition."



## Telemetry & Controls

Name: Judah Schad  
Year: Junior  
Major: Computer Engineering  
From: Kansas City, Missouri



"I am most excited about the modular embedded device platform and intuitive robotic arm control scheme."

## Power Team

Name: Josh Jetter  
Year: Senior  
Major: Electrical Engineering and Computer Engineering  
From: El Dorado Hills, California



"I am most excited to see a new generation of students take the Mars Rover Design Team to the next level."

## Shop Manager

Name: Tasmia Mustaqim  
Year: Junior  
Major: Mechanical Engineering  
From: Sylhet, Bangladesh



"I am most excited about enriching team culture through teaching machining and organizing trainings for new members."



## Where Are We Now

The Mars Rover Design Team is hard at work developing their 2016 competition rover. The team is currently in the design phase; concepts have been selected, research has been conducted, and designs are being flushed out. A frame made of composites with aluminum bulkheads is being pursued along with a sample carousel that will allow for multiple soil samples to be analyzed in the field, a camera gimble that will enable greater visibility at a greater distance than previous rover cameras, and custom motor controllers for the rover's brushless DC motors. Other innovations such as, drop boxes to increase performance in the Astronaut assistance task, a haptic controller and inverse kinematics for the robotic arm, a coring drill, and the capability to drive the rover with a tablet are also being explored. The team is constantly striving to push Space Technology further and hopes to create their best rover yet this season.

The team will close out the design phase with their Critical Design Review on November 13th. This is an opportunity for the team to get feedback from mentors, sponsors, alumni, and faculty on their designs and on the system as a whole before they begin fabrication and integration. The goal is to have the rover driving by February 27th. From there testing, integration, and travel team training will continue up until the University Rover Challenge, which is being held June 2nd-4th.

If you would like to subscribe to our monthly technical updates, please email us at [marsrover@mst.edu](mailto:marsrover@mst.edu).

Keep up with the team at:

 MissouriMRDT

 @MissouriMRDT

 [marsrover.mst.edu](http://marsrover.mst.edu)



## Mars Rover Design Team

Today. Tomorrow. Forever.



Thank you for your support!

## Team Recruitment

Recruitment season is here! The team attended the MinerRama event on campus to talk to new and returning students about joining MRDT. After MinerRama, we hosted two Open Houses, where the team leaders described the team vision, goals, and structure. Recruitment efforts proved to be successful this year. The team grew by over 100 members, spanning 5 different sub-teams.