



January 7, 2021

Dear Mr. Muzzin and Mrs. Rowinski,

The Square One Education Network was honored to support the Robotics Alliance of Macomb, the Macomb Intermediate School District and the Macomb County Planning and Economic Development organization with the rapidly deployed Masters of Mobility: Robots on the Road project.

Over the course of six short weeks the Square One team deployed nearly 400 off-the-shelf robotic vehicle kits, 26 document cameras, and 26 PRUSA 3D printers specially built and rush-shipped from the Czech Republic. These items were ordered, shipped and, in many cases, hand-delivered expediently to teachers and schools throughout Macomb County. As promised, our expert team worked quickly to develop quality, accessible, and fun training opportunities resulting in more than 20 hours of educational resource for teachers, leaders, and students.

Teachers and mentors were encouraged to distribute materials to individual students or small groups of students to develop and apply coding skills (simple drag and drop block coding to more complex student-developed Arduino sketches) to simulate real world connected and autonomous vehicle technology. These robotic vehicles would then be put to the test on a variety of Advanced Driver Assist Systems (ADAS) mission challenges, including collision avoidance, parallel parking, and lane assist all in a digestible mission challenge that incorporated skills desired in application to FIRST Robotics games.

The Square One team offered students and teachers access to professional development relative to Michigan's leading industries, manufacturing and mobility, through two webinar events featuring high level industry experts. These events and the trainings are all available online as an ongoing resource and benefit to these schools.

The following proposal was introduced:

Goals:

Despite COVID-19 interruptions to the many robotics experiences, students will have the opportunity to continue building their skills independently through a hands-on, engaging activity in their own homes or classrooms.

Students will develop skills associated with programming, information technology (IT), electrical and mechanical engineering by building vehicles that embody programming, IT, electrical and mechanical concepts.

Students will be exposed to career pathways in the mobility industry with an emphasis on robotics, sensors, connected, and autonomous vehicle technology.

Objectives

Provide training and materials to learners in a virtual group setting leading to understanding of how this robotic technology works and is being applied in our world.

Provide real world, relevant application of student built robotic vehicles utilizing Square One-provided mission challenges around connected and autonomous vehicle technology.

Provide program participants with virtual tours and virtual exposure to technology and career paths in this space.

Outcomes

Approximately 300 students will build working robotic vehicle platforms (individually or in small groups) and gain hands-on experience in electronics, small assembly, programming and utilizing sensors, coding, reading schematics, CAD design, and problem solving.

22 FIRST coaches (and those designated by MISD) and their students will have access to 3D printers.

Approximately 300 students will gain basic knowledge about the skills needed for careers in the mobility and manufacturing industry.

Deliverables:

- 381** Robotic Vehicle Kits distributed, a blend of Micro: Bit and Arduino vehicles
- 28** Document Cameras
- 26** PRUSA 3D Printers
- 24** Hours of training made available in Micro:Bit, Arduino, TinkerCAD, 3D Printing, as well as two webinar events with industry leaders

Recipient Teams/Schools/Districts Included:

Roseville	Anchor Bay	New Haven
Romeo	East Pointe	Chippewa
Warren Woods	Armada	Center Line
De LaSalle	Fraser	Fitzpatrick
Utica	Richmond	Mt. Clemens
Merritt Academy	South Lake	Lakeview
Clintondale	L'anse Creuse	Warren Consolidated

Lincoln
Team 6567
Team 7854

Team 2851
Team 818

Team 4130
Team 7188

Commentary from Teachers:

- *“The premise of the program, equipment, and support have been great. I'm stretched thin now, but am hoping to participate in MoM program in the future. Thanks again!”*
- *“This is a pretty engaging set of concepts and challenges. I like the automotive connections.”*
- *“Awesome and well done. A real good stepping stone and fun challenges. Thank you.”*
- *“This was a fun mini-competition that my team enjoyed competing in. The printer and CNC will be put to good use.”*

Commentary from Students:

- *“I really liked what we did for the Masters of Mobility robot on the road project. It was fun and enjoyable, but very different this year.”*
- *“It was amazing to have something to do while we were quarantined”*
- *“I would have liked more guidance. Figuring things out...was very frustrating at times.”*
- *“Materials provided very interesting to work with. Enjoyed experimenting with a hands-on activity in these hard times.”*

Competition:

A virtual competition was held and [students demonstrated](#) their initial efforts in accomplishing [various mission challenges](#), and students have been recognized for their achievements. Trophies, t-shirts, and certificates will be awarded as soon as they are shipped in.

Conclusion:

Square One is dedicated to providing additional support and guidance, especially to those schools that lacked the skills, opportunity, or access to participate within the given timeframe designated by the grant funding. We believe that the original goals, objectives, and outcomes, are valid and achievable. The materials are sustainable, versatile, and applicable to the FIRST Robotics program, supporting the goals and values of technical and personal skill development.

Your investment in the selected materials will provide recruiting and skill building opportunities well into the future. The items provided to teams were well received and much appreciated. They were carefully selected as robust, user friendly, and flexible learning tools and equipment. We firmly believe that the Masters of Mobility: Robots on the Road program will be a tool in the toolbox to building more well-skilled students and more successful FIRST robotics teams in Macomb County.

Respectfully submitted,

Barb Land, Square One Education Network

