

TEAM MISSION STATEMENT

To inspire students at Mercy High School in science, technology, engineering and math (STEM). Through our FIRST Robotics program, we encourage young women to choose STEM career paths. We promote learning through a mentor-guided and student-led effort to design, build, program a robot and manage a competitive team.

HISTORY

Team 1481 was initially established in 2004 at North Farmington High School. The team disbanded in 2007, and in 2014 Team 1481 was reestablished and rebranded as the Riveters at Mercy High School. A small group of experienced mentors in Farmington Hills, including mentors previously affiliated with 1481, wanted to bring the FIRST Robotics experience to an underserved population. The mentors worked closely with FIRST in Michigan and connected with Mercy High School, an all-girls Catholic school. This affiliation provided a unique opportunity to introduce STEM to young women in a school that was yet to adopt the program. Team 1481 was resurrected and The Riveters were born.

Through the hard work of our students and mentors and the support of our sponsors and administration, The Riveters expanded from a small group of students trying to salvage Team 1481 into one of Mercy's largest and most successful teams. We started with low funding and limited workspace, but through our team growth and success, we managed to develop our own workspace for all functions of our team, procure more sponsors, and increase student participation. We worked through the past four competition seasons to prove ourselves as a viable FIRST competitor at the regional, state, and national level, and we hope to continue our prosperity this competition season.

TEAM GROWTH

For the past two years, recruitment has been a main goal of our team as we prepare to lose our experienced seniors. Through our extensive in-school recruiting events we have been able to keep our student membership consistent for the past two years at around 40 students. We have also been able to maintain our low student to mentor ratio, roughly 2:1, allowing every new student to have direct mentor guidance. During the past two years, we have not only maintained all of our current sponsor relations, but we have also formed partnerships with General Motors, Consumers Energy & DTE, and Renesas. Between 2017 and 2018 we doubled our workshop CAD space. With increased space and sponsors and consistent mentor and student commitment we have been able to sustain our team from 2017 to 2019.

ORGANIZATIONAL STRUCTURE

BOARD OF DIRECTORS

A board of directors consisting of parents, mentors, and Mercy administration oversees the team. The board sets and administers the budget, and the books are audited annually. In 2018 the board of directors established our team as a non-profit now known as Riveter Robotics. Our Board is a support system for our team, they give us critical guidance regarding the logistics and functions of our team.

MERCY HIGH SCHOOL

Mercy High School is the home of The Riveters; housing our entire workshop and allowing us full access to the school's resources and flexible meeting hours. Without the cooperation of our administration, our team would not have a venue to meet. Mercy also allows us to participate in many in-school recruitment events, supporting our team growth.

SPONSORS

Our sponsors not only provide us with the money, materials, and mentorship necessary for the success of our team, but they also offer professional guidance to help our team function as efficiently as possible. For example, it was our sponsors who suggested we transition our programming system to JAVA to simulate a more realistic career environment. Overall, our sponsors support us in every way they can and are crucial to the success of the Riveters.

SUBTEAMS

Team 1481 is organized into 5 groups: Project Management, Strategy and Drive, Business and Development, Fabrication Assembly and Design, and Programming, Electronics, and Pneumatics. This year the team also uses what we call “swim lanes,” which are student-led groups of six students and two mentors. Each swim lane works on a specific component of the robot from design to fabrication to programming. Swim lanes keep students focused and allow the entire FAD subteam to share space in the workshop.

FAD

FAD stands for Fabrication, Assembly and Design and is composed of Mechanical and CAD students who work together to create the robot. The team Safety Captain and pit staff are also part of FAD, even though they may have roles in other subteams. CAD generates full 3D renderings of all aspects of the robot in Autodesk Inventor, giving the Mechanical group an understanding of what they need to fabricate.

SAD

The Strategy and Drive (SAD) subteam formulates a well-thought-out game plan and requirements for the robot design. The SAD leader works closely with FAD and PEP to make sure that the robot will achieve the team’s goals and be competitive. During the build season, SAD holds tryouts and interviews to choose the Drive team members. After being carefully chosen, the Drive team will practice with the test robot, allowing them to become familiar with the game and how to play it. During competitions, Strategy focuses on scouting. Scouts will interview teams in the pits and record their performances during competitions. SAD uses this data to rank teams so we know who we want to partner with in the finals.

PEP

The PEP subteam is responsible for the Programming, Electronics and Pneumatics systems of the robot. Each programmer is assigned to a function of the robot so that they can work with their code throughout the season and develop it. To code, PEP team recently switched from LabVIEW to JAVA, a more sophisticated programming language. PEP also designs and builds the electrical board and determines the sensors which will be needed for the robot. When pneumatics are used, the PEP subteam works to plumb, wire, and program that system as well.

PROJECT MANAGEMENT

Project Management (PM) is the control center of the team, driving the Riveters’ schedule, goals, and budget. PM keeps the team on budget by developing our Cost Accounting Worksheet. The PM keeps track of the team’s activities by using a Gantt Chart, and our operations follow a System Engineering V. These two resources are developed by the PM in collaboration with other subteams, and are crucial to aligning team activities with our specific goals.

BAD

Business and Development (BAD), is in charge of procuring sponsors, team branding and imagery, developing the business plan, and outreach. Spirit wear design, team logos and uniforms, and the team website are all developed by BAD. For our team imagery, we focus on our iconic uniform design, team logos, pit design, and our website.

MARKETING

Imagery is very influential in our team marketing and advertising. We use our team uniforms and spirit wear to promote our team name and our sponsors’ companies. We also utilize social media platforms such as Instagram, Facebook, and Twitter to communicate with other teams, parents, sponsors, and FIRST. Our sponsors’ logos also appear on our robot, so our name as well as theirs has lots of exposure at competition and outreach events. We also organize Riveter outreach events to encourage young students not only to explore STEM, but also to explore FIRST and the Riveters. Our most effective marketing platform is our team website, 1481Riveters.com, where we post competition updates, pictures of the team, our business plan, and our team lead contacts to encourage collaboration between the Riveters and other teams.

RISK MITIGATION PLAN

By analyzing our organizational structure, we found five areas that are crucial to a functioning team: students, mentors, sponsors, space, and equipment.

STUDENTS

Throughout the four years of our team's existence, we have nearly doubled the number of participants. This exponential growth presents the risk that we cannot effectively engage all of our members with the mentors and other functional areas within our organizational structure. However, because our student and mentor population has been consistent since 2017, we have been able to avoid these risks.

MENTORS

Even with our current consistent low student-to-mentor ratio, we are always at risk of losing mentors, especially when their children graduate. To reduce this risk, The Riveters set a goal for mentors and student leaders to train the younger students in the engineering and mechanical skills they need to build a robot. We plan to continue this “train the trainer” approach between mentors and student leaders, so if we lose skilled mentors, the students already have those skills.

SPONSORS

The team operates with a budget surplus so that, if we were to lose funding in the areas of sponsorships, grants or student fees, we could continue with a small adjustment to expenses until funding can be replaced. We also actively look for new sponsors to replace any that leave us.

SPACE

Our official workspace has been at Mercy High since 2016. In 2017 our team was offered another storage room adjacent to our shop, which we converted to a dedicated space for PEP. This year our CAD team was able to expand their previously crammed “CAD closet” to almost twice its size. BAD frequently uses an administration conference room when they need to meet or collaborate on writing projects.

EQUIPMENT

Our equipment is old and was donated, so in the case of a break down we would need to spend money from our budget and our surplus from the previous year to replace it immediately. The team is slowly purchasing new machinery, such as the new Velox CNC machine purchased in the fall of 2017, however we would need a major fundraising campaign to replace multiple pieces at once.

FINANCIALS

SPONSORS

Our team's budget depends greatly upon sponsorships, grants, and membership fees. From our sponsors, The Riveters seek four essential elements for our team: money, materials, services, and mentors. We are currently sponsored by Autodesk, Consumers Energy & DTE, Novelis, Metrobolt, General Motors, Renesas, Ford, and Fiat Chrysler.

Our sponsors are important to us and our goal is to represent their brands well by conducting ourselves in the true spirit of FIRST. We have five tiers of sponsorships with additional benefits depending on the amount of support a sponsor offers our team. All of our sponsor logos appear on our team website and banner. Some higher tier benefits include large logos on our uniforms and robot. We also represent our sponsors at FIRST or other outreach events.

INCOME AND EXPENSES

The team's budgeted income for 2019 is \$80,715. Our expenses for 2019 are estimated to be \$74,775, including the cost for building our two robots. We are expecting a surplus of about \$5,940 which will be saved or used for necessary team improvements in the off season. More information regarding the individual components of our income and expenses can be found in the appendix.