

***FIRST* Impact Award - Team 2614**

2024 - Team 2614
Team Number
2614
Team Nickname
Mountaineer Area RoboticS (MARS)
Team Location
Morgantown, WV - USA
Describe the impact of the <i>FIRST</i> program on team participants within the last 3 years. This can include but is not limited to percentages of those graduating high school, attending college, in STEM careers, and in <i>FIRST</i> programs as mentors/sponsors.
In a state named the 'least educated' in the nation, MARS culture prioritizes learning, exemplified by the team's 100% high school graduation. Out of the last 21 graduates, 15 are pursuing STEM degrees and 4 are pursuing degrees in the arts. Those not attending college instead entered the job market using the expertise they acquired at MARS. In WV, STEM is not considered a viable option for most students. MARS provides exposure, opportunity, and inspiration for those who haven't had it before.
Describe your community along with how your team addresses its unique opportunities and circumstances.
Due to WV's rural nature and economic challenges, STEM education throughout the state is difficult. To solve this problem, MARS developed the Hybrid Model of outreach. Using in-person and digital methods we expanded outreach to more rural parts of the state quickly, effectively, and at no cost to participants. This allowed us to increase our impact as many activities occurred without direct team presence. From 2021 - 2023, 26,378 individuals have been reached using this strategy.
Describe the team's methods, with emphasis on the past 3 years, for spreading the <i>FIRST</i> message in ways that are effective, scalable, sustainable, and creative. How does your team measure results?
MARS is committed to STEM education through teamwork and community involvement. From 2021-23, MARS students spent more than 11,060 man-hours designing and preparing STEMcrafts and related educational materials, soliciting community organizations, and organizing and running outreach and FLL events. Our success is measured by the enthusiasm for the activities and the number of kits requested and provided. We've also sponsored 7 FLL teams in the last 3 years.
Please provide specific examples of how your team members act as role models within the <i>FIRST</i> community with emphasis on the past 3 years.
MARS, a HOF team, exemplifies Gracious Professionalism and Coopertition in our Tucker Team initiative. Started in memory of MARS founder Phil Tucker, MARS students provide hands-on technical help to teams at FRC competitions so no robot is "left behind." In 2021, MARS implemented an online

help desk to answer technical questions and provide assistance in non-technical areas like grant writing and award submission. In 2022 and 2023, MARS students assisted over 286 teams during competition season.

Describe your team's initiatives to Assist, Mentor, and/or Start other *FIRST* teams with emphasis on activities within the past 3 years.

In 2021-23, MARS seeded 7 new FLL-C teams, providing registration, robot kits, and a workspace and assisted local FRC teams with outreach and technical help and access to a practice field. In 2023, MARS coached 5 in-house teams with weekly practices and more than 400 hours of direct mentoring. MARS also hosted 4 public mentoring sessions, our FLL-C summer camp and our yearly FLL scrimmage, co-hosted an FLL-E Expo, and contributed more than 370 hours to the WV state FLL tournament.

Beyond starting teams, what initiatives have you done to help inspire young people to be science and technology leaders and innovators? What results have you seen from your efforts in the past 3 years?

In 2022, we implemented the MARS Innovation Process (MIP), a build-season principle to foster continued student-led design. Under guidance of a student MIP lead, students can prototype, test, and present new iterations of the robot's subsystems after the initial build. This provides an opportunity for members to gain confidence as leaders, and encourages refinement of concrete and abstract skills. MIP's 2023 Kickoff promoted brainstorming and an open design process with our sister team 4467.

Describe the partnerships you've created with other organizations (teams, sponsors, educational institutions, philanthropic entities, etc.) and what you have accomplished together with emphasis on the past 3 years

Through partnerships within FIRST and our 6 major sponsors, we built a bridge between STEM and community involvement with our famed 26-hour 14-minute, biennial, offseason event WV Robotics eXtreme (WVRoX). This contributed to 950+ student man-hours, and 310+ mentor man-hours in 2022. Additionally, MARS has partnered with GaCo to spread our presence throughout Appalachia, creating the "Appalachia Live" online presentation and visiting West Virginia Education conferences across the state.

Describe your team's efforts in the past 3 years to promote equity, diversity, and inclusion within your team, *FIRST*, and your communities.

In 2022-23, MARS created the student-led Diversity Committee to outline and promote MARS' goals of maintaining inclusivity for members irrespective of race, gender, sexual orientation, ability, neurodivergency, or economic circumstances. In the Equity Action Plan, MARS outlines internal and external initiatives to maintain and further inclusivity in STEM. MARS is also a menstrual ambassador, promoting equity by providing period products at competitions and partnering with local activist groups.

Explain how you ensure your team and the initiatives you have created will continue to run effectively for the foreseeable future

MARS' Student Leadership Council promotes sustainability by focusing on 1, 3, & 5 year goals reflected in the sustainability action plan, reviewed yearly. This practice ensures students critically consider both the season's goals and plans for the future. The council also conducts an annual SWOT analysis to adapt initiatives & capitalize on strengths and opportunities. Using this analysis led to restructuring the council to include younger members and using our workspaces to promote recruitment.

Describe your team's innovative strategies to recruit, retain, and engage your sponsors within the past 3 years

Recognizing the importance of sponsor recruitment and retention to team continuity, and to the our mission of STEM education, MARS seeks mutually beneficial relationships with local companies and organizations to ensure sponsorships. NASA provides funding and in return, MARS provides interns and help with NASA-sponsored robotics events. WVU provides workspace, tools, and funding, while 50% of our alumni from the past 3 years have enrolled. We also work with alumni for recruiting connections.

Highlight one area in which your team needs to improve and describe the steps actively being taken to make those improvements.

After the 2023 FRC season, MARS faced a 54 percent loss in students from graduation. This presented a unique challenge in training, as new students would have to fill the proficiency gap. They would need to go through multi-week orientation, followed by lengthy training. To address this, we developed the MARS Lander program. To make FRC accessible for students unfamiliar with FIRST, each subteam on Mars redesigned its learning curriculum focusing on teaching students with no prior knowledge.

Describe your team's goals to fulfill the mission of *FIRST* and the progress you have made towards those goals.

MARS emphasizes being student-led and mentor-guided, illustrated by initiatives created by students and implemented by the Student Leadership Council. While WV remains stagnant in job growth and only 52% of its high school students pursue post-secondary education, MARS students graduate with the skills to succeed, exemplified by the fact that 98% of MARS alumni attend college. Demonstrating self confidence, communication, and skills learned in MARS, our students are inspired to build the future.

Briefly describe other matters of interest to the *FIRST* Judges, including items that may not fit into the above topics. The judges are interested in learning about aspects of your team that may be unique or particularly noteworthy.

With 35 students from 6 counties in North-Central WV and PA, MARS is a family that promotes inclusion and economic accessibility. Team membership is free and student travel cost to regional competitions is covered. Also, families alternate providing meals during build season so cost of food doesn't inhibit participation. Board game nights, cookie exchanges, and team picnics promote team unity, resulting in MARS becoming a secondary support system for many and a primary support system for some.

Judge Feedback

Who/When

Feedback

Mar 02,
2024
09:31:27
AM EST

This team did not submit the optional question for the judges when entering their submission.

An area the team has an opportunity to improve.

Something that really impressed the judges.

Essay

Woven through the rolling hills and cascading valleys of West Virginia is a culture that inspired generations – one that embraces grit, hard work, and innovation. Mountaineer Culture laid the

groundwork for breakthroughs from steamboats to pepperoni rolls. While this culture provides a sturdy framework for success, it is not perfect. The Mountain State has the nation's third highest poverty rate, is known for its hostility towards members of the LGBTQ+ community, and has the poorest mental health in the nation. Further, WV remains stagnant in job growth, with only 45.9% of its high school students pursuing post-secondary education, illustrating a substantial loss of opportunity. Mountaineer Area RoboticS (MARS) strives to be the inspiration embodied by the best of Mountaineer Culture, by expanding social, economic, and geographic opportunities in STEM through implementing hybrid outreach, building FIRST® programs, and enabling team growth. The state's statistics are indeed daunting, but by spreading opportunities throughout FIRST, our state, and our team, we can push the boundaries of what is possible.

OPPORTUNITIES WITHIN FIRST With only three teams, West Virginia has one of the lowest participation rates in FRC. To address this need and assist other teams who face economic or geographical barriers, we partnered with team 1629, GaCo, to host Appalachia Live, a quarterly series of online conferences designed for a worldwide FIRST audience covering issues such as outreach, fundraising, and build season. This initiative helped us spread our collective Appalachian voice throughout the FIRST community and share stories of success despite limited financial and community resources. To further support the FRC FIRST community, we utilized our Tucker Teams initiative. Named after our late founding mentor, Phil Tucker, Tucker Teams is a program we operate on and off the field, offering teams technical assistance, extra materials, and new perspectives either in-person or digitally through our website. With the hybrid implementation of Tucker Teams, we aided over 286 teams from 2022-2023, ranging from assisting a Brazilian team with their writing strategies over Zoom to helping a New York team with robot construction at a regional competition. Further, last year we became FIRST Menstrual Equity Ambassadors, providing period products at 2023 regional competitions, and will continue that in 2024. Lastly, as part of our push for neurodivergent equity, MARS supplied earplugs at 2023 FRC competitions to students who wanted relief from loud noises and plans to make earplugs and fidget toys available at 2024 competitions. Additionally, we used our visibility and connection to FIRST to lay the groundwork for life-changing STEM opportunities for youth in our state. As 40% of MARS students are FIRST LEGO® League alumni, we are aware of the obstacles to starting new teams. To combat this, we funded 7 FLL-C teams in the past 2 years, raising \$900 per team to cover registration, robot kits, and more. Lifting the financial burden is just the beginning of our work. MARS students and mentors acted as coaches for 5 in-house FLL-C teams. MARS also held FLL mentoring sessions and scrimmages and supported the FLL-C and FLL-E state tournaments. In the last year, we hosted over 1,125 hours of outreach in our MARS Innovation Building including 65 weekly FLL-C practices, our FLL-C summer camp, and weekly MARS drone team practices. By being active members of the FIRST community, we are building a bridge between STEM-interested students and FIRST involvement.

OPPORTUNITY WITHIN APPALACHIA Statewide impact begins in our communities. We encourage interest in STEM through traditional and socially distanced outreach. Utilizing digital resources developed during the pandemic, we are reaching a larger audience with STEM education. One of our primary initiatives involves engaging activities called STEMcrafts that demonstrate basic technical skills, such as circuitry and motor mechanics. This includes mailing STEMcraft kits across the state with links to their instructional videos. These videos give explanations and steps for each STEMcraft. Using this Hybrid Model of Outreach, MARS distributed 4,039 STEMcrafts and impacted a total of 26,547 individuals between 2021-2023. Additionally, using our presence on social media platforms, MARS offers free, online STEM education - anytime, anywhere. Our digital arsenal includes LabVIEW and Java programming tutorials, promotional materials, and a read-aloud of a MARS storybook, Marvin's Mighty Mission. MARS

has donated copies of Marvin's Mighty Mission to more than 10 organizations ranging from schools to children's hospitals. Inspired by this success, MARS produced a comic book geared towards middle school children. This book instills FIRST Core Values and debuts a nonbinary protagonist, representing a broader effort toward inclusion. MARS also used its community connections to help facilitate "Period of Giving", a menstrual product drive connecting 25 sponsors and raising more than \$800. By integrating STEM in our local community, along with focusing on groups traditionally left out of STEM, we pioneer STEM opportunities in WV with a record-breaking 144 outreach events and over 15,000 volunteer hours from 2021-2023. We also create excitement about FIRST in our community through our FRC event, WVRoX, the only robotics endurance event in the world and the only FRC event in WV. In 2022, MARS hosted 24 teams from across the world and is currently working with Fairmont State to expand this year's event. To prioritize an inclusive environment, 2022's WVRoX featured quiet rooms for neurodivergent participants to escape overstimulation while still enjoying the event via Twitch streams. We also marked gender-neutral bathrooms throughout the venue, ensuring participants felt as comfortable as possible. This event brings STEM to a historically underserved population, inspiring Appalachian students and encouraging community involvement.

OPPORTUNITY WITHIN MARS By addressing economic injustice, social inequity, and geographic barriers, we use the values of FIRST to maximize the potential of our members. To remove individual financial concerns, MARS is free to join. This opens the door for students to advance their concrete skills in important technical and nontechnical areas. Further, understanding that one thrives in an environment where one feels comfortable, we established a Diversity Committee to ensure that we promote equality within MARS. Our Diversity Committee is charged with annually reviewing our Equity Action Plan, which identifies goals and initiatives - from safe zone training to accessibility for neurodivergent or disabled individuals - designed to make MARS a safe space. Moreover, we strive to promote an inclusive environment within the family culture of MARS. Through long practices, group meals, and countless non-FIRST get-togethers, MARS becomes a support system for many. In addition, to maximize the reach of opportunities present at MARS, we admit students from 6 counties over 2 states, which provides a wide diversity of thought and background. These ideals are further fostered by our major team initiatives, such as the MARS Innovation Process (MIP). MIP is a build-season principle that emphasizes student-led projects and regular improvement. After the initial design of the robot is completed, students can model, prototype, and test new iterations of its subsystems. Once students have created new designs, they must prove why they are better than the original. This culminates in a presentation to Student Leadership, MIP Student Lead, and Lead Technical Mentor who decide if it is implemented. MIP encourages skill refinement, providing experiences that translate throughout students' lives. This initiative was furthered by our new MIP Kickoff, a five-day brainstorming event with team DarkSide; and the MARS Lander program, a student training that emphasizes learning through hands-on personal projects. Through MARS Lander, we have introduced a record-breaking 20 new students to the MARS family. Along with giving MARS students the tools they need to succeed, we instill a commitment to service within them, with 100% of MARS students volunteering at outreach events. This invigorates students to care for their communities and strive to improve them.

OPPORTUNITY FOR ALL Focusing efforts on our communities, our projects, programs, and initiatives are part of the 5-step MARS Plan. First, we ENGAGE with our communities by expanding our visibility and establishing ourselves as active members within them. By integrating STEMcrafts in classrooms and youth programs across North-Central WV and hosting large community events such as WVRoX, we successfully instill excitement for STEM education throughout WV. To facilitate bridging the gap from STEM interest to FIRST participation, we INSPIRE by directly seeding and coaching FIRST teams. We

publicize availability of our workspaces and the Tucker Teams Help Desk Initiative to SUSTAIN the impacts of Engage and Inspire. As students age, we promote the PROGRESSION OF PROGRAMS through combined FLL-E and FLL-C scrimmages. We also emphasize use of our workspaces to house FLL-E, FLL-C, and FRC events and equipment, to give students a taste of what is in store for them in each level of FIRST. As students reach MARS, we strive to CREATE LEADERS AND INNOVATORS by providing an accepting environment filled with opportunities to hone concrete and abstract skills. This has provided key opportunities to our students, evident in the fact that 98% of MARS alumni pursue post-secondary education. President John F. Kennedy once said, "The sun doesn't always shine in West Virginia, but the people do." We are inspired to be the light that illuminates Mountaineer Culture, revolutionizes our state, and impacts our communities and beyond.;

