

Chairman's Award - Team 5243

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2021 - Team 5243

Team Number

5243

Team Nickname

Aegis Robotics

Team Location

Clifton, Virginia - USA

Describe the impact of the *FIRST* 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 *FIRST* programs as mentors/sponsors.

FIRST has developed Aegis team members into leaders with a passion for STEM. 87% of our members indicate that their participation has led to a desire to pursue a STEM career. Of our alumni, 97% have gone on to college, and the other 3% went straight into a STEM-related field. Over 97% of our alumni who went to college are pursuing a STEM degree. FIRST has also helped us draw in young women and minorities, who make up 48% and 86% of our team respectively.

Describe your community along with how your team addresses its unique opportunities and circumstances.

Aegis Robotics seeks to seize every opportunity presented to us in order to influence our young community. During the pandemic, we had the opportunity to collaborate with local schools who felt students needed more access to STEM education, the Children's Science Center, and the Telugu Association of North America to put together STEM and FIRST courses which taught a combined 131 youths how to program, create models and physics' equations, and develop a foundation for FLL and FTC.

Describe the team's methods, with emphasis on the past 3 years, for spreading the *FIRST* message in ways that are effective, scalable, sustainable, and creative. How does your team measure results?

Through our annual events, we've been able to establish a bridge to our community and beyond to spread the FIRST message. Our annual STEM Fair, STEM Appreciation Day, and programming competition (Code Cville) have connected us directly with families in our community. Our collaborations with the VHSL, the partnership we established between the National Charity League and FIRST, and our work to promote FLL in India with TANA have all allowed us to reach students throughout the world.

Please provide specific examples of how your team members act as role models within the *FIRST* community with emphasis on the past 3 years.

Our members strive to exemplify leadership not only in our team but within our community. Through our RoboBuddy program, we've integrated new members into robotics and via our Virtual Robotics program we've provided support to FTC teams. We've also presented outreach strategies to other FIRST teams at the World Championship Conference in Detroit and have invited FRC teams 5587 and 612 to participate in several of our outreach activities, including our Girls in STEM Day and FLL Jr. Expo.

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

We've created youth robotics programs designed to encourage participation in FTC and FLL next year. We've also supported FIRST Global's Team Zimbabwe and started 10 FTC teams at Centreville High School. Furthermore, we've established an FTC team at our region's Catholic High School and are planning to grow it into an FRC program. At our state level, we've worked with the VHSL to recognize robotics as an academic activity which allows schools to allocate funding to create sustainable FRC teams.

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?

Our team fosters the spirit of STEM through our youth events. During the pandemic, we've held programming and engineering courses directed towards students in our region who seek to learn about STEM despite the limitations of virtual learning. Furthermore, we've run a Women in FIRST program along with supporting a Girls Who Code initiative to encourage female leadership in STEM. Through these programs, we've reached over 1,000 people virtually in 2021 and nearly 170,000 in the past 3 years.

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

Our team highly values our sponsors, and we maintain strong communication with them regarding all team activities. Our sponsors participate in outreach, competition and kickoff events, and many of them serve as mentors throughout our season. For the past four years, Leidos has run a booth at our annual STEM Fair. We have also volunteered at sponsor events, including George Mason University's booth in the U.S. Science and Engineering Festival and Leidos' booth at an annual community STEAM night.

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

Our team seeks to support the various cultures of our team members through outreach. This year, we promoted diversity in FIRST by running a mock FLL Competition with the Telugu Association of North America and establishing an FTC program at our county's local Catholic high school to facilitate minority representation in STEM. We work to promote equity through actively recruiting female students to join our team through our Women In First, GirlsWhoCode, and other empowerment initiatives.

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

To remain sustainable through future seasons, we've built strong relationships with a variety of sponsors - including corporate sponsors: Leidos, IBM, and TapHere Technology. Our sponsors provide financial assistance as well as mentorship to ensure guidance and future stability. Furthermore, we have developed a wide-encompassing web of outreach connections with over 25 schools and organizations to ensure that we can continue to influence and positively impact our community for years to come.

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

Aegis Robotics works to recruit sponsors through a large network of communication with local businesses and organizations with STEM affiliations. We attract potential sponsors by wearing our current sponsors logos on our shirts, fliers, and banners. We retain and engage our sponsors through developing a relationship with them; by inviting Leidos and George Mason University to our annual STEM Fair, we become emotionally invested in each other's success and work.

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

In years prior, our team has struggled with communication primarily due to reliance on one application to relay ideas. In order to remedy this problem, we've developed a multi-level network of communication - we convey big updates related to FRC via email, reminders by text notifications on Remind, and general information through a community page on Slack. By using multiple sources to keep in touch with our members, we've streamlined our operations to ensure they remain sustainable.

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

Aegis Robotics strives to embody the mission of FIRST by working with members of our community to inspire students to be innovators of STEM. This season, we organized and ran a national mock-FLL competition to encourage students to creatively address an issue in society, the competition was then broadcasted to Telugu speaking regions in India to inspire them to be the driving force of change in their areas and be proactive members of the STEM community.

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.

Our team's reach is not only limited to our community, we've been a FIRST Global partner since the program's inception.

We have published FIRST Global manuals that were provided to all Global teams and served as mentors for teams Ukraine, Slovakia, and Zimbabwe. Moreover, we actively seek to promote inclusiveness through Women empowerment groups such as Women in FIRST and GirlsWhoCode to facilitate female representation in STEM leadership and provide a platform for everyone to engage in FIRST.

Essay

As Aegis Robotics, we strive to foster a brighter future for upcoming generations by providing them with the tools they need to be the leaders and innovators of tomorrow.

In order to create opportunities for under-represented communities and those who are unable to afford STEM activities, our team founded the Centreville Robotics Outreach Program (CROP) which consists of all FIRST teams that Aegis Robotics established, from our FLL introduction programs to our ten FTC teams. What started as simple acts of community service, blossomed into an expansive outreach program dedicated to our community's needs.

Seeding a New CROP

In our early seasons we formed and fully funded three FTC teams at our high school, and thus our outreach program, CROP, was planted. In order to branch out beyond seasonal competitions, we looked to provide our school community with STEM resources. Starting in the spring of 2016, we opened a Makerspace with 3D printers and a brand new CNC, welcoming in students and faculty.

In our fourth year we fully funded and mentored four FTC teams at our high school and started an Introduction to FLL program at a local elementary school. We hosted our first annual STEM Appreciation Day where we went around our community to distribute information about FIRST and gave tips on how to encourage the development of STEM.

On a larger scale, we realized that in order to make real advancements in STEM education, we needed to extend our CROP beyond our community. We advocated for increased funding for afterschool STEM programs through the Every Student Succeeds Act (ESSA) and the Perkins Acts. ESSA has provided more quality education and changed the lives of 1 in 5 disadvantaged children. Additionally, by participating in the National Advocacy Conference in Washington, D.C. we were able to work with other teams to persuade national policymakers to vote in favor of state grants promoting afterschool STEM programs.

Cultivating the Seeds

Our team participated in the Global STEM Corps by serving as mentors to teams Ukraine, Slovakia, and Zimbabwe. We volunteered at the 2017 inaugural FIRST Global Competition in Washington D.C. as team ambassadors and helped staff prepare for the 2018 competition in Mexico. During 2017 and 2019, we worked with other FIRST teams to create an introductory robot build and mentor guide which are provided to all FIRST Global teams.

For the past 4 years, our team has partnered with Leidos and George Mason University to hold our annual STEM Fair. At our STEM Fair, we showcase our 10 FIRST teams through FTC scrimmages and FRC robot demonstrations. We invite our sponsors to set up interactive exhibits. At the root of our STEM Fair are 50 interactive STEM booths which have welcomed over 600 children and their parents.

Within our school, we worked with administration to develop a STEM program that allows students to learn and implement an engineering design process throughout all four years of high school. The program was first introduced with a STEM Engineering course, and in just two years, we've been able to introduce a four course progression program of STEM Design, Engineering, Robotics, and Advanced Engineering. Our team has fundraised over \$5,000 to help seed the program when county funds were not available. Our advocacy and support for STEM courses have helped 308 students get familiarized with FIRST in the classroom.

Tending the Plants

We have reached approximately 203,800 people over a period of eight years and 168,764 specifically in the past three years. We are made up of a diverse group of students from different backgrounds, with 86% of our members belonging to at least one minority group. Our student leaders have actively recruited more females to participate in our team, increasing our female representation from 19% in 2015 to 48% in 2021. The team is also spread across age groups, with 42% being underclassmen and the other 58% being upperclassmen (juniors and seniors), giving members access to experienced student-leaders in various fields.

We've also assisted multiple clubs such as Science Olympiad and Red Cross by sharing our Makerspace and helping them launch community service projects. Our impact is shown by our over 100 alumni, 97% of whom are pursuing STEM degrees at colleges around the country.

The students who founded our team envisioned that Centreville High School would be known as a STEM school, and students from our team have made this happen through starting multiple STEM organizations chapters such as: CyberPatriot, GirlsWhoCode, Women in Math Society, STEM Research Club, Science Olympiad, App Development Club, Science Bowl, Physics Bowl, Computer Science Honor Society, Science Honor Society, Women in FIRST, and the Future Women in Engineering Society.

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Spreading our Roots

In our sixth year as an organization, we expanded to 20 new STEM outreach events. Our team hosted two FTC Competitions in the 2018-19 season and sent volunteers to 3 FTC events. In 2018, we expanded our advocacy efforts to include robotics in the Virginia High School League (VHSL). Our team met with VHSL activities directors to inform them about FIRST and lobby for VHSL recognition of FRC teams. By helping robotics get recognized as a state-sponsored activity, we have given Virginia schools a greater incentive to start FRC teams and sustain existing teams by increasing funds allocated for robotics.

We have also focused on increasing female participation in STEM through our partnership with the National Charity League (NCL) and FIRST. NCL is a mother-daughter volunteer organization that began volunteering at FIRST events last year due to our collaboration. Our efforts have established FIRST as NCL's only STEM related philanthropy group, meaning this partnership is allowing girls to get involved in the FIRST community who have never been exposed to it before.

This year, we also started a Women in FIRST program which aims to facilitate female participation in FIRST by providing a platform for female students to empower themselves and become leaders within their communities. Women in FIRST serves as a safe space for innovators to come together and forge new ideas as well as get introduced to robotics for the first time. Through organized discussions and informative materials, we aim to shape the next generation of FIRST and STEM. Moreover, through supporting our school's GirlsWhoCode initiative, we've further increased community female representation in STEM and have armed female students with the ability to challenge themselves and become pioneers of STEM.

Despite our county preventing in person meetings and relegating us to virtual interaction, our team has continued to expand its reach through over 30 virtual outreach events, with 24 events focusing on increasing the quality of youth participation in STEM. In order to accomplish this goal, we established youth online robotics, CAD, FIRST enrichment, and programming courses across several schools in Virginia reaching out to nearly 1,000 students.

Furthermore, we partnered with the Telugu Association of North America (TANA) to run and organize mock FLL competitions for students across the country as well as to spread STEM awareness to Telugu speaking-regions in India via broadcasting the competition. Our aim was to bring STEM to India as over 30 million impoverished Indian children don't receive an adequate education. The TV broadcast by TANA was done through their affiliate, MANA TV, who streamed concurrently on one of the world's largest international streaming platforms, YUPP TV, which has 25 million viewers. MANA TV serves over 50,000 people plus 17,000 subscribers on YouTube. Through this televised transmission, we were able to connect to the youth of India and promote STEM awareness.

Thriving under the Sun

With the COVID-19 Pandemic, Aegis Robotics took a virtual approach to the season to sustain an active participation in FIRST. However, this meant that we were unable to organize in person outreach events, or work on the robot. Despite this, the team managed to adapt to challenging circumstances. We were able to continue our FTC mentorship program through a modified series of virtual challenges, as well as further expand our reach by establishing 3 FLL start-up programs at local schools. We also made new connections with organizations such as ChildSci and TANA to encourage students both regionally and nationally to engage in STEM outside of school.

As we garnered more attention, we developed a strong youth base with an interest in robotics. Due to the restrictions on in-person meetings imposed by our region, we were unable to form traditional FLL teams. In spite of this, we created virtual FLL programs with elementary students to teach them skills necessary for FLL and to keep them engaged prior to the next season.

Nurturing Future Harvests

In our eighth year we are striving to sustain our organization for many years to come. Our leaders take pride in training and inspiring our younger students so they are able to fill the shoes of graduating seniors. This allows for the continuation of our program, and helps us retain institutional knowledge so we can build upon our experience in the future. In the past three years we have benefited from local alumni who serve as mentors and role models for younger students. In addition to our local alumni, our nation-wide alumni network continues their work with our team through our Slack and Discord channels, serving as supportive resources for current members.

FIRST in STEM

As Aegis Robotics, we are shaping a brighter future for the next generations of STEM. Through CROP, we've been able to plant the FIRST seeds of STEM throughout the world. We continue to grow taller, greener, and spread our reach to our community and beyond. We are team 5243 from Clifton, Virginia, and we are Aegis Robotics.