TENNESSEE VALLEY ROBOTICS

2024/2025 IMPACT REPORT

Advancing the Workforce of the Future

Note from the Tennessee Valley Robotics Board

TNVR was established in 2016 to provide financial resources and expertise to assist students in the STEM activities of robotics, drones, and electric cars. This work was begun in 2005 by Tennessee Valley Authority (TVA) employees, and we continue it to this day. We work with students in a variety of public, private, and home schools in addition to students as a part of organization like Girls & Boys clubs, 4-H clubs, Beta clubs, community groups, scouting, and STEM groups. Our work takes us to the 7 state TVA service territory and TVA river watershed.

Our goal is to help prepare our students in the TN Valley for the high-tech jobs that exist not only in the future but are with us now. We could not accomplish this goal without the help of our sponsors, the robotics, drone, and electric car competition nonprofits we partner with, and the incredibly devoted teacher/coaches that work with students on a daily & weekly basis to guide them in their journey towards the competitions and in class work.

By working together, we hope to accomplish our vision.

Dr Richard Manning – President
Tracy Hightower – Vice President
Scott Rosenow – Secretary
Charley Spencer - Treasurer

We are transforming lives and preparing for the future to benefit the next generation. The students we support today will be the leading workforce in the TN Valley in the future.

About Tennessee Valley Robotics (TNVR)

TNVR is a 501C-3 nonprofit registered in Tennessee. We provide the equipment and training for students and teachers to succeed in robotics, drones, and electric car competitions and in the classroom. The future of industry and the economy is in the hands of today's students to succeed in the highly developing world of robotics and Artificial Intelligence. It is imperative that we help these students to become proficient in these areas in order for us as region and a country to succeed and flourish.

What TNVR Does

Equipment:

We provide seed money to schools and organizations to get started with their programs. Some schools decide to have after school clubs and other schools decide to have their programs in classrooms during the day. We rely on the good judgement of school administrators to choose the right option for their students and teachers and then we support those decisions.

Training:

Training is vital for teachers/coaches to succeed with their programs. We have a network of teacher-trainers in the Tennessee Valley whom we rely on and enlist to get these coaches what they need to succeed.

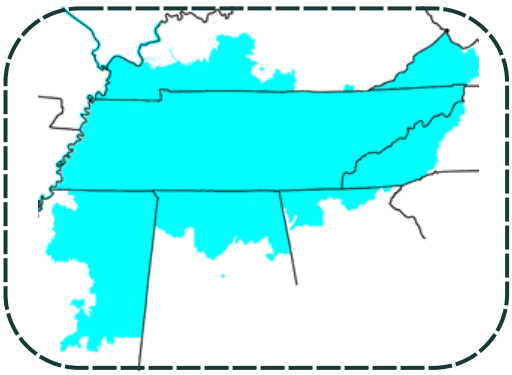
"Thanks so much for your generous support of our robotics program. Your financial help allows us to host excellent events for teams from the Chattanooga area and the state of Tennessee. The students of our local robotics community are deeply blessed to be supported by your organization and all those who support it. **Please let them know that their investment in the next generation is already yielding a handsome return."**

- Matt Monahan
Chattanooga Christian School

Who We Support

While we primarily support public schools across the Tennessee Valley region we also will as necessary support private, religious based, and home schools along with organizations that meet after the school day such as 4-H clubs, Beta clubs, Boys & Girls Clubs, scouting organizations, and community groups. Wherever the need is to assist today's students in our programs we will do it. Over 20,000 students participated in our programs during this year in classrooms and competitions.

Area that TNVR Serves Students:



Student Story: Samuel

Before I competed in robotics, I participated in local theater. When I was younger, I imagined my life going in a vastly different direction. During the pandemic, theatre stopped being an option for me, so I started gaining interest in computers, and even built my own. After the pandemic, Jackson Area Robotics presented itself as something that would allow me to pursue my interest in technology that developed during the pandemic, but it turned out to be so much more.

In addition to all of the technical skills I've gained in over my years in robotics, **these challenges have also taught me leadership and presentation skills, and how to make more meaningful friendships.** Robotics has gave me a community full of STEM-minded kids in a region that seemed like nothing but farm animals and tractors. Robotics has given me opportunities to meet people from around the globe, and develop friendships formed on a common ground of curiosity and problem-solving. **Note:** Samuel is on the World Champion RECF VEX V5 Team - a first for the Tennessee Valley.

Our Lifetime Impact

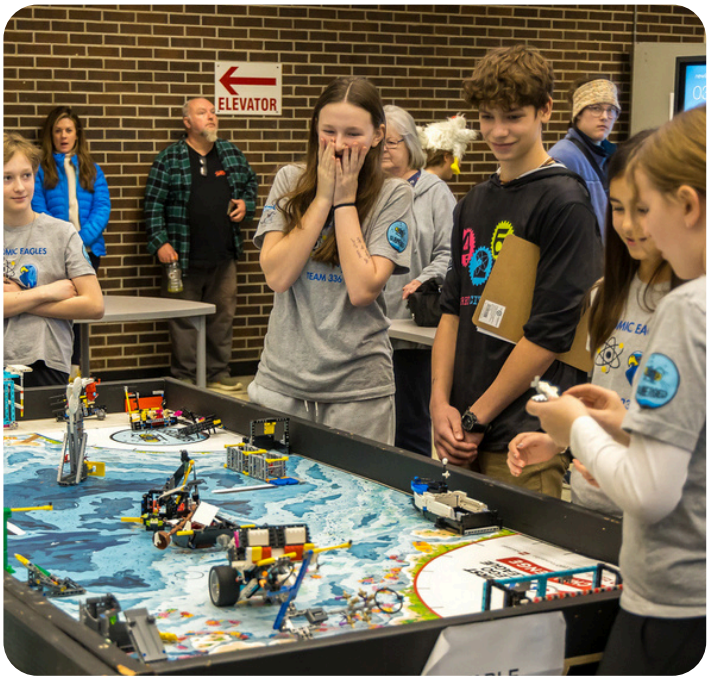
20 years
involvement in robotics, drone, and electric car programs

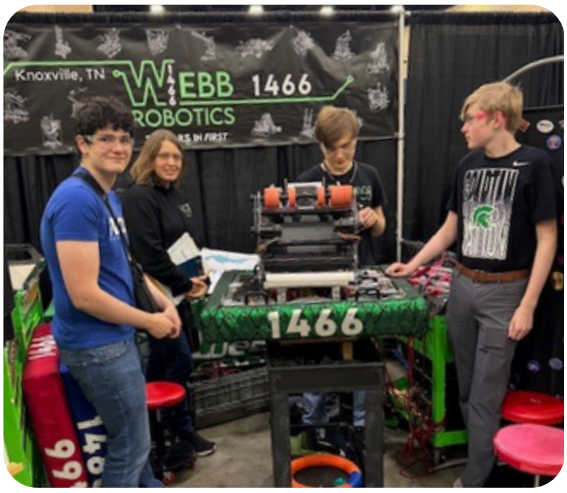
$10million +
awarded to teams & classrooms

250,000 +
students helped across the Tennessee Valley

300+
number of competitions

20x
increase in number of competitions





Making a Difference in 2024/2025

1,676 teams

362 competitions

20,000 students

Student Story: Zachary

I am a 2025 FIRST Dean's List Winner, the 1st recipient - from the Tennessee Valley area, and 1 of only 10 selected from over 120,000 participants around the world. I would like to say thank you. Thank you for the unwavering support that TNVR and TVA have given to STEM education. You have helped my teams since I started robotics in the 5th grade.

Through my participation in robotics, I've gained much more than just technical knowledge. I've developed skills in communication, collaboration, and leadership. Today, I mentor and assist teams not only across the United States, but globally, helping others find the same passion of discovery that robotics sparked in me. I also serve on multiple youth advisory councils, working to expand access to STEM and robotics education.

Your support has helped me become a high school senior at the Alabama School of Cyber Technology and Engineering, where I'm preparing to pursue a degree in mechanical engineering.

I intend to continue my involvement with FIRST even in college and beyond, volunteering to help younger students know that they can not only dream it, but build it. Once again, thank you for investing in students like me. You're not just powering homes. You're powering futures.

Our Economic Impact

The robotics, drone, and electric car compeitions supported by Tennessee Valley Robotics is a contributory to the economic health in the Tennessee Valley.

Workforce:

We are assisting with the development of a highly qualified workforce of the future in the fields of science, technology, engineering, and math (STEM). Statistics show that STEM jobs in general lead to jobs that pay twice as much as non-STEM jobs.

Community Economies:

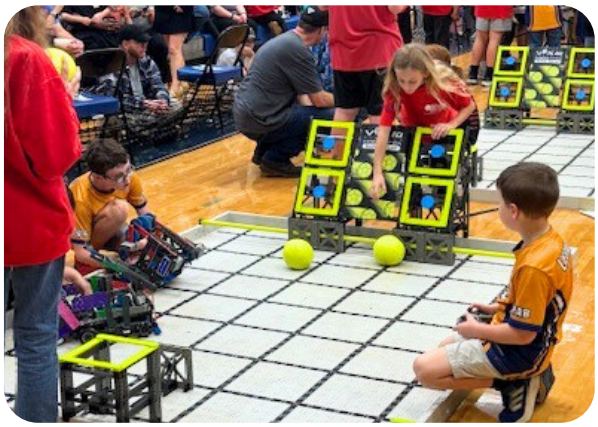
The 300 plus competitions generate a positive contribution to communities through the purchase of food, gas, employee compensation, and hotel rooms.

$200M–$500M
estimated added value to the Tennessee Valley workforce

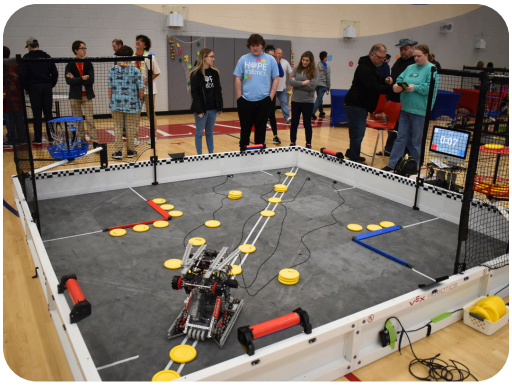
$2M
approximate value added from 300 smaller competitions

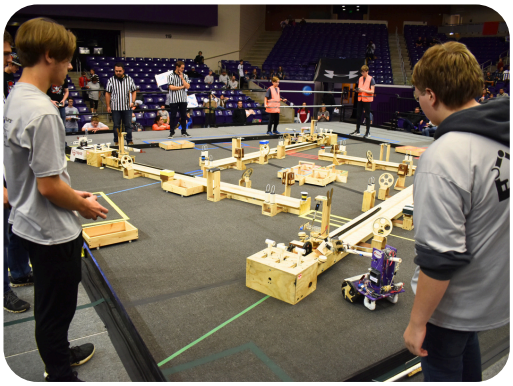
$1.8M
approximate value to communities from 5 major regional and national competitions this past year

$3.8M
total estimated value added to the Tennessee Valley communities



Nonprofits & Competitions We Support





Robotics Competitions:

- **First Inspire**
  - First Lego League (FLL Discover, FLL Explore, FLL Challenge)
  - First Tech Challenge
  - First Robotics Competition (high school, alumni/college)
- **Robotics Education & Competitions**
  - VEX 123
  - VEX GO
  - VEX IQ
  - VEX V5
  - VEXU
  - VEX AI
  - VEX Factory Automation
- **BEST Robotics**
- **Robo Challenge Extreme**
- **Electric Car Competition**
  - GreenpowerUSA
  - Greenspaces (Chattanooga)

Underwater Robotics:

- **MATE ROV Competition**
  - Scout
  - Navigator
  - Ranger
  - Pioneer
  - Explorer
- **Seaperch**

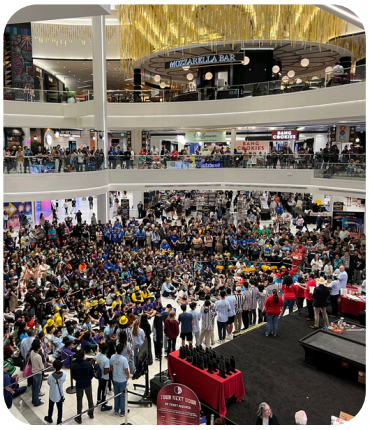
Drone Competitions:

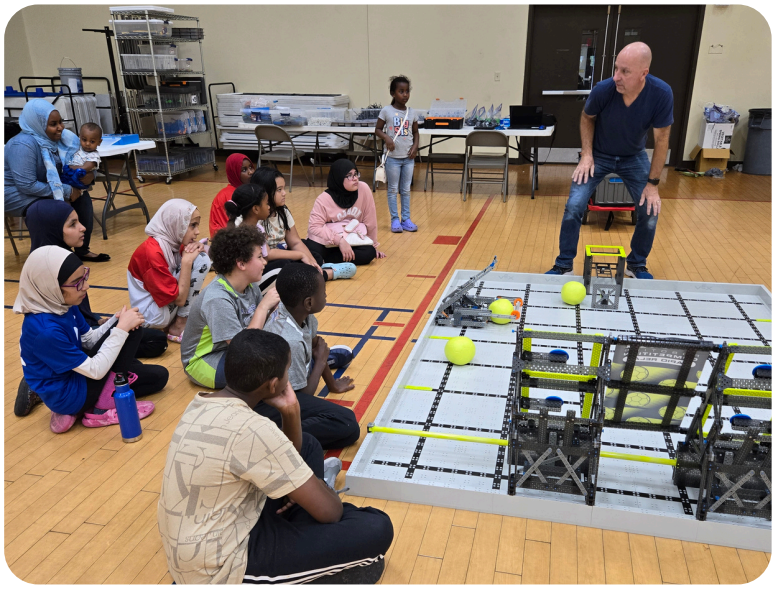
- **VEX AIR drone competition**
- **RECF Aerial Drone Competition**
- **RECF Aerial Drone Competition Pro**
- **Robot Drone League**

Feedback from Student Teams

"The Gadget Girls robotics team appreciates the sponsorship from TN Valley Robotics to attend the American Robotics Invitational this past weekend in East Rutherford, NJ. We were inspired and overwhelmed by the innovative teams in the competition. We learned a lot and brought back several ideas for our future seasons and to share with other teams locally. We connected with teams on the other side of the country with whom we will stay in touch to empower one another next season.

- Catherine Anglin
Gadget Girls Coach





"I want to thank [TN Valley Robotics] for the tremendous help I have received in **starting a new VEX IQ robotics team(s)**...I have registered three teams for this year...and we prepare for our first competition on November 9th."

- Abdul R. Ofoli, Ph.D., P.E., SMIEEE
University of Tennessee at Chattanooga

Feedback from Student Teams

"Thank you so much for your support of the Jefferson Middle School FIRST Lego League teams. With your support the JMS FLL teams were able to host an event for area middle school students: **the 11th Atomic City Invitational**...The JMS FLL teams thank all the volunteers that helped make this event happen. We are especially thankful for the team members from Oak Ridge High School FRC 4265 Secret City Wildbots who volunteered as refs for this event."

- **Janie Shanafield**
Oak Ridge Schools
Oak Ridge, TN

"Thank you so much for the TN Valley Robotics' support of our First Lego League Challenge team. Their team name is the AV8RS....We are happy to report that **they took 3rd place at the regional competition in Bowling Green on Saturday.** We are headed to the state tournament on February 8th."

- **Cara and the AV8RS**
Aviation Heritage Park
Bowling Green, KY

Student Story: Ethan

When I look back on the path that brought me to where I am today—working on the cutting edge of technology and contributing to the advancement of space exploration—I can trace it through many milestones. On paper, it's the coursework and degree I earned from The University of Alabama in Huntsville, or the internships that offered real-world exposure. It's the late nights spent wrestling with dynamics problems, the countless hours devoted to job applications, interviews, and networking, and the summers spent working in machine shops and manufacturing facilities. But the roots go much deeper.

They reach back to a fourth-grade classroom at Battle Academy, where I was programming Lego Mindstorms robots to complete missions for the First Lego League. That year, my team and I designed and built a four-wheel-drive robot to conquer the high bridge on the competition table—my first real application of the engineering design process. From there, it was STEM School Chattanooga and the First Robotics Challenge (FRC), where each season brought a new set of complex problems. We weren't just learning engineering—we were living it: designing, fabricating, wiring, programming, and iterating as a team to meet real challenges.

Even today, when I'm tasked with developing a new manufacturing process or addressing a non-conformance, I find myself drawing on those early experiences—cutting FRC parts on a CNC machine, troubleshooting electrical systems, or revising design specs with my team.

I know I wouldn't be where I am now—helping build the next generation of liquid fuel rocket engines as part of the BE-4 program at Blue Origin—without the opportunities I had through programs like FLL, FRC, and Greenpower USA. These initiatives gave me hands-on experience, sparked my curiosity, and built the foundation for everything that's come since.

I'm deeply grateful for the teachers, mentors, and volunteers who made those programs possible—and for organizations like Tennessee Valley Robotics that continue to create the spaces where students like I once was can learn, explore, and ultimately become the engineers and innovators of tomorrow.

Student Story: Anna

Robotics drew me in through art. It kept me hooked with engineering. In elementary school, I had always dreamed of becoming an artist, maybe an actress. I wanted to be in the school play, but I ended up joining the robotics team instead. That was probably one of the best things that ever happened to me.

At first, it should have been no surprise that my favorite part of robotics practice was putting together, rehearsing, and making props for a skit that related to the theme of that year's robotics challenge. The realm of robot building and programming was something that I felt best left to the more knowledgeable team members. But, before I knew it, I was old enough to be classed with the more experienced, whether I liked it or not, and I was needed to help with the programming aspect of the competition.

If I had to pinpoint a moment where I started to truly get into engineering, this was it. I became so fascinated with programming that I started teaching myself as much as I could. I found books, borrowed supplies, and signed up for online courses.

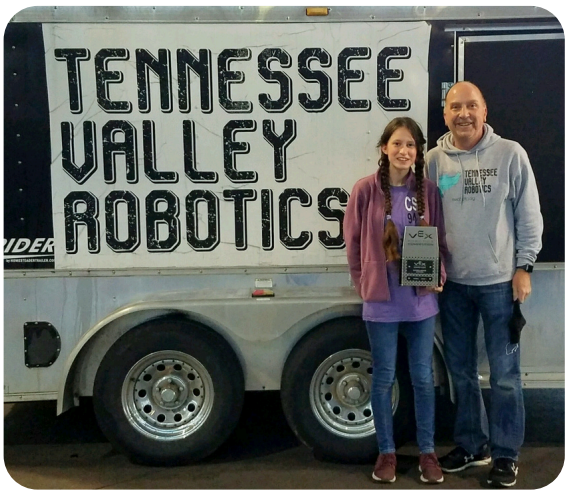
Thanks to the funding from Tennessee Valley Robotics, my teammates and I often had the opportunity to take robot supplies home and practice our skills, so I ended up designing my own course of challenges that I had to program the robot to do.

My parents were constantly annoyed with the tape lines I was putting on our garage floor when mapping out some new program.

Little did I know it, but, in addition to all the math that programming required, which I soon began to truly love, plenty of my “artsy” side could come out, too. First, it was with the obstacles that I was designing for my programs. Then, it was in finding creative ways to solve them. Finally, it was in documenting all of this. Recording our team’s use of the engineering design process, which required both concision and replicable detail, soon became a new art to learn, and even my notes at school began to take on the same style.

In retrospect, developing a love for programming, math, and the engineering design process could lead a person down many different paths, from mechanical, software, or electrical engineering, to project management or something in between. But isn’t electrical the “why” behind it all? The robots we build and the code we write wouldn’t be possible without the electrical engineering in our power grid, computers, robot motors, batteries, and sensors.

So, even if competitive robotics may have exposed me more directly to the programming and mechanical side of engineering, the skills that robotics developed will surely help me charge ahead into electrical engineering at Tennessee Tech, my next big adventure.



In reality, it was the development of these skills, made possible by Tennessee Valley Robotics, that first pushed me down a path toward engineering, where creativity and a love for art are just as important as when I dreamed, so long ago, of becoming an artist.

Our Partners

TVA employees & retirees and TNVR have been involved with robotics & STEM programs for 20 years as we understand the importance of assisting in the development of our future workforce.

20 years ago, robotics was just a dream for many companies and only on the cusp of becoming integral in industry. **Now robotics is not only indispensable in manufacturing but has become a necessary part of warehousing & distribution in addition to retail establishments.** Now with artificial intelligence becoming a part of robotics, robots are learning how to cope in the ever-changing environment of today's industrial and commercial operations.

As stated by TVA Board Chair Bill Renick at a recent TVA Board meeting, "Chair Renick proceeded by highlighting the Jackson Area Robotics Team from Jackson, Tennessee, which is a student STEM group that won first place in the VEX Robotics World Championships in Dallas, Texas. Chair Renick emphasized the importance of this groundbreaking achievement for the local robotics community."

TNVR and its corporate partners are working together to continue to help develop the interest in robotics & STEM in our student population in the TN Valley.