

FIRST Robotics Competition

By Connie Haynes and Joel Edwards

The FIRST Robotics Competition (FRC) is one of four Progression of Programs of FIRST—an international not-for-profit K-12 organization founded by inventor Dean Kamen to inspire young people's interest and participation in science and technology. Frequently described as an event that is part science fair, part sporting event, and part rock concert, FRC is referred to as a Sport

for the Mind.

Each year, teams of high school students design and build robots weighing up to 120 lb (54 kg) that then compete in a preselected game requiring the ro-

bots to complete tasks, such as slinging Frisbees into goals, throwing inner tubes onto racks, climbing pyramids, and even balancing on beams.

For the 23rd year of the competition, nearly 3,000 teams with nearly 75,000 students from 19 countries joined the competition. The competition in the FRC has extended to an increasingly international slate of schools, including teams from Australia, China, Canada, Chile, Turkey, Israel, the United States, and Mexico, which all have more than ten teams in the competition.

The game changes every year, keeping the excitement fresh and giving each team a more level playing field. The



Figure 1. The FIRST Robotics Competition logo. (Photo courtesy of Georgia FIRST.)

game details are revealed at the beginning of January, and the teams are given only six weeks to construct a competitive robot that can operate autonomously as well as when guided by wireless controls to accomplish the game's tasks. Each team is given a standard set of parts, but they are also allowed a budget and encouraged to buy or make specialized parts as long as they conform to the FIRST rules. The result of all the thought and strategy is some radically different robots. A team can choose to create a multifunctional robot that has the potential to excel at all aspects of the game or one that specializes in a particular function, such as blocking or passing. The scope of possibilities and the short time frame are designed to push students' intellectual and creative boundaries to new heights.

"The point of FIRST, and events like the FRC, is to push kids past what they think they can do," explains Dan LaFleur, an engineer at Coca-Cola and a Georgia FIRST mentor in his 12th year with the organization. "It is teaching them to do the math, to pick up a drill, and build the robot that can throw a Frisbee and hit a target from 54 ft away. It is hard not to just do it for them, but this [is] how we help to build great engineers" (Figure 2).

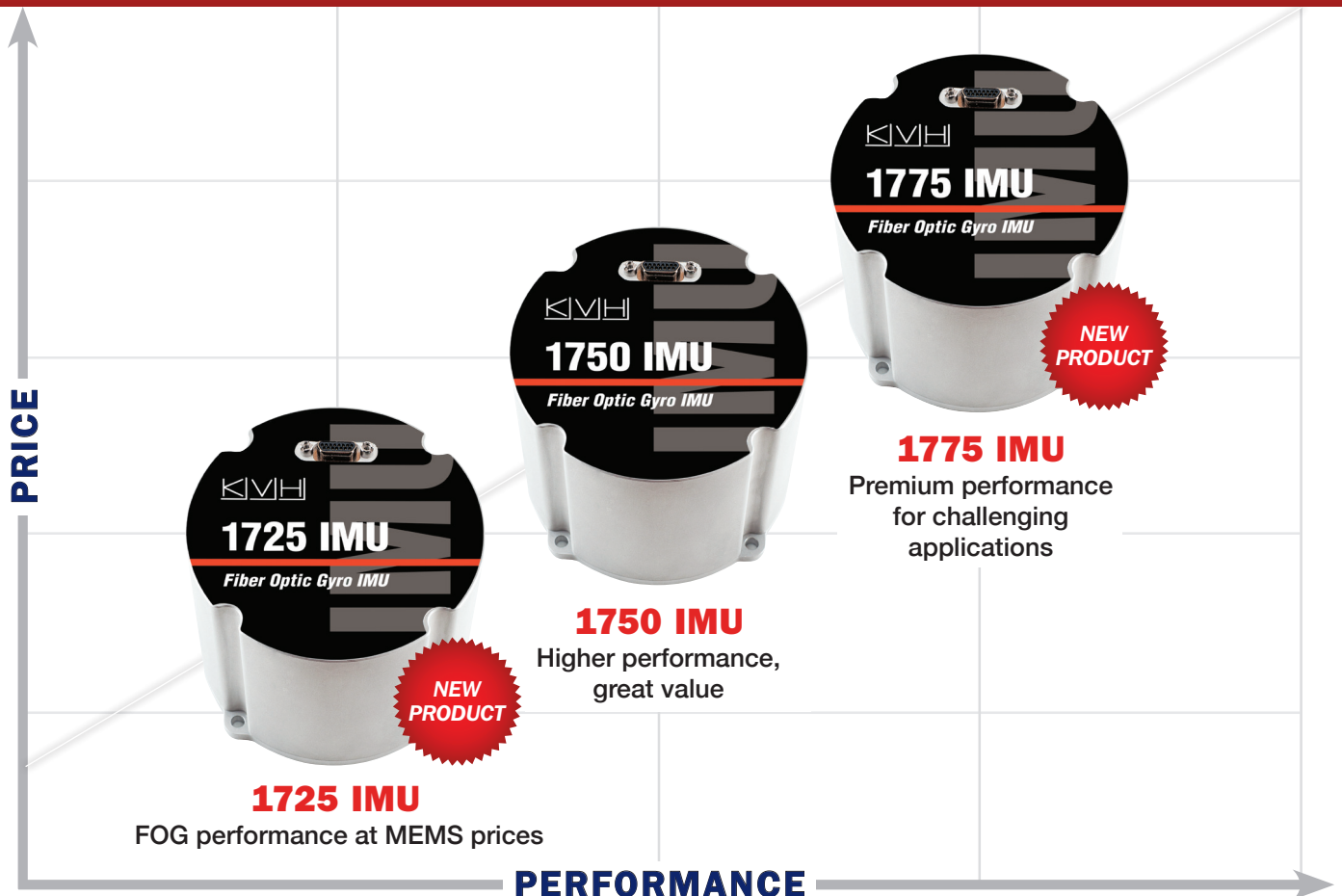
Perhaps the most compelling aspect of the competition, beyond the sheer challenge itself, is that no team can win alone. Every game is designed to partner randomly selected teams into two, three-on-three alliances that must compete as teams to overcome obstacles and score to move up and ahead in the competition. Teams learn to leverage others' strengths and overcome weaknesses in their alliances to reach the best result. FIRST refers to this ideal of ultimate



Figure 2. FIRST mentor and student work on a team robot at the Peachtree Regional competition. (Photo courtesy of Georgia FIRST.)

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Figure 3. Alliance team members strategize during the Peachtree Regional competition. (Photo courtesy of Georgia FIRST.)

sportsmanship as *coopertition*. At FIRST, coopertition is displaying unqualified kindness and respect in the face of fierce competition. There is simply no smack-

FIRST refers to this ideal of ultimate sportsmanship as *coopertition*.

talk but no sticky-sweet platitudes either. Knowledge, competition, and empathy are comfortably blended, even as veteran teams take on the

role of mentor for rookie teams, which later become competition.

"We always look forward to meeting up with team 5109 (rookie Deus Machina) because we've been mentoring them over the past year, and I'm really pumped to see what they can bring to the competition," said senior Michael

team to develop and follow an effective business plan where funds are raised to pay for the costs of the regional and global competitions; an outreach program to ensure the teams are visible in the communities that support them; an ongoing recruiting program to attract students to science and technology; and an overall focus on the quality of the programs, robots, and pits. Nonengineering mentors are business professionals who help guide students in this aspect of the competition, which often engages students who would otherwise have limited interest in robotics. In fact, of the many awards given at the FIRST FRC events, many are not focused on the competition but rather on the team attributes and overall quality of each team's overall business plan.


Cao of the Techno Titans in John's Creek, Georgia. "We want to do well, obviously, but we've really done our best if 5109 shows up," added Cao, explaining the fulfillment of seeing the team that he has mentored become successful in its own right (Figure 3).

Equally important in the competition is the ability of a

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Figure 4. The Georgia FIRST Robotics logo. (Logo courtesy of Georgia FIRST.)

In Georgia, the Peachtree Regional, held in Atlanta 26–28 March 2015, is currently entering its 12th year of competition with over 60 teams competing for a spot in the 2015 FIRST Championships. Activity in the Peachtree area has grown to the point where an additional regional competition is now being held to ensure that all teams in the Georgia region have the opportunity to compete and gain a spot in the 2015 FIRST Championship at the Edward Jones Dome, 22–25 April 2015, in St. Louis, Missouri. The second regional, the Georgia Southern Classic, was held in Perry, Georgia, from 27 February to 1 March 2015. If you are interested in becoming a FIRST mentor for your local team or would like to volunteer at a Georgia FIRST, regional event or become a sponsor, please visit www.gafirst.org or contact Connie Haynes, director of Georgia FIRST, at chaynes@gafirst.org or Joel Edwards, Kimberly-Clark Corporation, the lead judge for the FIRST Robotics Peachtree Regional at jedwards@kcc.com (Figure 4).

For information on FIRST events outside of Georgia, please visit www.usfirst.org 

PRESIDENT'S MESSAGE *(continued from p. 6)*

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Figure 1. From left: Raja Chatila and Antonio Bichi, VP Publications Activities.

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