Gettin' ready to rack 'n' roll

G-C, Morristown students build robot for competitions

Derek Smith
Staff Writer

Greenfield

Greenfield-Central didn't have class Monday, but senior T.J. Tucker had plenty of work to do in figuring out how to build a robotic arm.

Tucker is part of a team of about 28 students from G-C and Morristown high schools who are building a 4-feet -tall robot to compete in the 2007 For Inspiration and Recognition of Science and Technology (FIRST) Robotics Competition - a competition that challenges young engineers from seven countries.

More than 1,300 teams from the United States, Brazil, Canada, Israel, Mexico, Holland and the United Kingdom will compete in this year's FIRST Robotics Competition events, according to www.usfirst.org.

The robotic team, dubbed the Full Metal Jackets, includes sub-teams of students working in animation, computer-aided design, manufacturing and programming. Other sub-teams are in charge of community relations and the FMJ Web site.

G-C is in its second year of robotics participation, while Morristown has been participating for eight years.

This year, FMJ and other teams learned the rules of the 2007 FIRST competition on Jan. 6. Each team received a common kit of parts and a manual of game rules and regulations. Teams have six weeks to design, build and test their robots.

"In this year's game, the students' robots are designed to hang inflated colored tubes on pegs configured in rows and columns on a 10-foot high center 'rack structure,'" a FIRST press release explained. "Extra points are scored by robots being in their home zone and lifted more than 4 inches off the floor by another robot before the end of ... the match."

On Monday, FMJ members spent several hours working on their robot.

The local team is ahead of where it was at this point last year, said Gary Wynn, G-C's faculty advisor, who is among a group of engineers and mentors who are assisting the students.

"The robot is student-driven," he said. "We make sure that everything stays on task, and we're a sounding board for ideas."

Students from the two high schools work together well, Wynn said.

"There isn't any small school-big school (issue)," he said. "There's no division. The students are all the same."

Bryce Greider, co-captain of the FMJ's manufacturing team, said the robot's drive system will be built with stability and traction in mind.

FMJ's computer-aided design team created different three-dimensional designs for the robot on the computer.

The CAD team's conceptual designs will be helpful in building the robot.

"We can literally transfer that from a blueprint to a robot," he said.

After a couple of days of generating ideas, Greider's team began working out the logistics for the robot's chassis, motors and wheels. The robot will feature two chassis so that other robots from FMJ's alliances can get off the ground at the end of competition.

"We have to take our designs and figure out height, weight, materials - whatever the best thing is going to be," he said.

Tucker's manufacturing team was also thinking about weight considerations.

His team had considered at least five different designs for the robotic arm. On Monday, the team used a cardboard model to work out logistics. The plan is to have four pegs on the robotic arm, with the bottom two pegs moving up and down to grab and release the plastic tubes.

Morristown junior Jeremiah Hardwick is the captain of FMJ. Hardwick has the most experience in robotics among the FMJ students, Tucker said.

"Jeremiah just floats everywhere and helps where he can," he said.

FIRST has established rules related to the height, weight and dimensions of robots.

In building a 4-feet tall robot, FMJ cannot exceed a 120-pound weight limit.

The FMJ robot will be about 52-inches tall, Hardwick said, but it will recline so that it is under the 48-inch limit. The robot's arm will be able to reach almost 9 feet.

Since they can earn points by lifting other robots off the ground, FMJ is devising how to build ramps for other robots.

"We have to decide what we think most of the other robots will do," Tucker said.

FMJ will complete their robot next month. They will then compete March 1-3 in a field of more than 60 teams at the NASA Langley Research Center/Virginia Commonwealth University FIRST Robotics Regional in Richmond, Va.

The local team will then compete in a field of 55 teams at the Buckeye Regional FIRST Robotic s Competition March 22-24 in Cleveland, Ohio.

Teams compete in preliminary matches, and then the top teams select other teams to be in their alliances for the final rounds.

Top teams at FIRST events will be invited to the championship event at the Georgia Dome April 12-14 in Atlanta. Teams can also win awards like the General Motors Industrial Design Award that FMJ received last year.

Robotics participants are also eligible to receive more than $7.5 million in scholarships to elite

science and engineering schools.

Wynn said FMJ is one of only 26 Indiana teams participating in FIRST robotics. FMJ receives sponsorships from corporations like Rolls-Royce, but the cost for competing is high.

The team receives no tax money and welcomes donations year-round.