

Students and teachers: Save 65% on Adobe Creative Cloud when you prepay. [Join now](#) Limited-time offer.

Popular Mechanics

TRY: Hottest Cars Ever / Best DIY Tips / Best Gadgets Ever

Homepage / Technology / Engineering / Robots / The Ball-Playing Robots of FIRST NYC 2014

The Ball-Playing Robots of FIRST NYC 2014

High school robot builders gathered in New York City this weekend for one of our favorite events, the FIRST Robotics regionals.

By Will Dietrich-Egensteiner

4

Like 87

Tweet 19

8+1



April 7, 2014 5:00 PM

TEXT SIZE: A . A . A

This weekend 66 high school teams from the tri-state area, Brazil, Canada, Turkey, and the U.K. came together to compete in the New York City **FIRST (For Inspiration and Recognition of Science and Technology) Robotics Competition**. PopMech stopped by the Javits Center in Manhattan to check out the competition and see what approaches the students took to meet the challenge.

The 2014 edition of the high school robotic Olympics asked kids to build machines that could compete in a hybrid hockey/volleyball game. Box-shaped goals were positioned at each corner of the rectangular court, and high goal slots sat above each end. Each team was paired up with two other teams for the 3-on-3 matches; robots scored points for getting balls into the squares or shooting them into the higher slots. The robots had to run autonomously for the first 30 seconds of each match, after which their human operators could take over.

The cleverly named Fe Maidens—Fe is the chemical symbol for the element iron—from the Bronx High School of Science wanted to make their robot a top-goal sniper. "We assumed it would be like a volleyball game," Ashley Hu, 18, said. So the team went for height. The Maidens' bot uses a ramp that descends with a roller at the

top to drag a ball into the machine. Pistons and bungee cords lift the assembly back up, and another piston punches the ball out using compressed air, shooting it toward the goal.

The Mechanical Bulls from Smithtown, on New York's Long Island, wanted their robot to be primarily an offensive shooter, so they built in a catapult molded to fit the game ball. A single-motor winch brings the scoop back and launches the ball up to 19 feet. Brian Sheridan, 17, said that the team molded the catapult arm out of two PVC pipes, making it durable and flexible. In fact, the Mechanical Bulls are working on a patent for their model.

- 1 Programmable Robot Kit
- 2 Robot Building Kit
- 3 Military Robot

CONNECT WITH POPULAR MECHANICS:

FEATURED VIDEO



The John Dewey High School team from Brooklyn, N.Y., wanted to mix things up with their robot. "Our team decided to do something new," Ihar Husar, 16, said. Front claws wrap the ball and flip it up onto a catapult, which uses a lightweight pneumatic system for rapid launching. The team ran into some trouble when balls kept rolling off the back of the catapult, so they installed the poles on either side for more secure handling. The team's bot made all its shots during the autonomous periods, and Mei Vi, 16, credited Husar for his programming of the robot.

The team from Miller Place, N.Y., went for versatility with their robot. During the six weeks the teams had to build, Miller Place designed two prototypes; the one they brought to FIRST could reverse, pass the ball, and shoot. A ramp dropped, and gears at the top of it turned to bring in the ball. Once the ramp lifted and the ball was secured in the catapult, pneumatics and a spring-loaded assist would flip the hoop up, launching the ball. FIRST is a demanding competition, though: When PM stopped by their booth, the Miller Place team was scrambling to make repairs, as some of the wells had broken in a previous match, and fluid had gotten into the electronics.

Students from Plainview–Old Bethpage Central School District on Long Island took a different approach to the game. The robot sported a mallet, which team member Michael Saltzman, 17, said they nicknamed Thor's Hammer. The mallet can swing backward almost 270 degrees before swinging back down to kick the ball. And it's adjustable: The team can add or drop weight for more or less range on their shots. They installed two motors on each side, ensuring that their robot had a steady platform and wouldn't get pushed around by the other competitors.

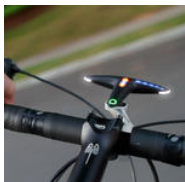
The coolest part of the Tomahawk robot by Townsend Harris High School students from Queens, N.Y., is the ultrasonic sensors. With these the bot can sense a ball in front of it and deploy two side hoops to pick it up. The sensors also flashed a red light on the back when the robot was within range so the operators would know when to take a shot. The robot's range was only 8 to 10 feet, but Vinay Khemlani, 17, and Vijay Sookai, 16, said the team had learned to take running shots to maximize the distance.

TAGS: [New York](#), [Robotics](#), [FIRST Robotics 2014](#), [robots](#), [FIRST Robotics](#)

- 1 Robot Building Kit
- 2 Robotics Engineering
- 3 How to Build a Robot
- 4 Robotics for Kids

You May Also Like

Sponsored Content by nRelate



10 Ingenious Bike



10 Car Options the



Homeowners Get a



Sample Size for

GIVEAWAYS



Enter for the Chance to Win a Trip to NYC!

[ENTER NOW >](#)

[See All Giveaways](#)

Save 65% on Adobe Creative Cloud.
Students and teachers, get our best deal when you prepay.

[Join now](#) Limited-time offer.

MORE FROM POPULAR MECHANICS

- [10 Myths About Natural Gas Drilling](#)
- [10 Biggest Oil Spills In History](#)
- [10 Awesome Accidental Scientific Discoveries](#)
- [Why Is There a Helium Shortage?](#)
- [How to Sell Scrap Metal for Money](#)
- [The 13 Most Important Numbers in the Universe](#)
- [Did the Soviets Actually Build a Better Space Shuttle?](#)

FROM OUR PARTNERS

- [The BOSTITCH® Mechanics Tool Set](#)
- [Dickies, Pants for Any Job](#)
- [New Nest Protect. At The Home Depot.](#)