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Technology

FIRST Tech Challenge New Android-Based Technology

For more information:

- Read the full ***FIRST* Press Release about the FTC new Android-based technology**
- Follow the **FTC Tech Talk video blog** by Ken Johnson, Director of *FIRST* Tech Challenge
- Join the conversation on the **FTC Technology Forum**

FAQ

Why was the *FIRST* Tech Challenge platform changed?

The LEGO® NXT controller is being discontinued. FTC considered a wide variety of candidates for the next generation platform. The Android platform offers the best set of features including; processing and memory, user interface, built in sensors, programming options, and ability to evolve on pace with wider Android operating system and device development. The Android platform and Android devices are available around the world and are aligned with the increasing number of non-proprietary options for FTC teams.

Who was involved in the design of the new platform?

The *FIRST* Tech Challenge team, Qualcomm Technologies, Inc., and Modern Robotics are the main groups involved in the new platform. The Android devices are standard off the shelf products. The programming interfaces and electronics modules were developed to allow these standard devices powered by Snapdragon processors to be used in a robotics environment.

What is the wireless communication architecture of the new Android system?

The new system will communicate using Wi-Fi direct. Using this system a persistent connection between team's two devices powered by Snapdragon processors is established and maintained for team-to-robot communication.

What are the programming options with the new platform?

Android's native programming environment is Java. *FIRST* teams will have several Java options including a basic Application (App) that includes a configuration wizard, full text based Java programming, and MIT App Inventor. Teams will no longer use RobotC or LabVIEW

How will *FIRST* Tech Challenge teams learn the new programming options?

Web-based training will be offered showing teams how to install and use the new programming options.

How will events be different with the new platform?

The annual game and competition formats will not change. The central control system including the field control computer, field mounted joysticks and cabling, and router will no longer be used. Teams will compete at events via a direct, point-to-point connection between their two devices powered by Snapdragon processors. One of these devices will be mounted to the robot; the other will serve as the driver's station. The driver's station Android device will be wired to one or two driver control Logitech Gamepads, the same ones currently used in FTC. As is done currently, an event scoring system will assign matches and Alliance pairings, and track and report team standings.

What differences can be expected at events with the move to the new platform?

The new platform should allow teams to more quickly get started competing at events. Teams will no longer need their Samantha devices "flashed" with event passwords or need to test their robots on the competition field

control system. Teams will primarily go through basic mechanical inspections only.

How will event organizers be affected by this change?

It should become easier to setup and run events. Event organizers will avoid setting up the field control computer, router, cabling and joysticks. Event organizers will still setup the field and game components as well as the scoring software and display.

How will matches be controlled without a central control system?

Teams will be required to start and stop based on the central play clock as instructed by the referee. This "sports start" format is common to most sports and was used in the 2009/2010 season by FTC. Templates can be created in the software for autonomous and tele-operated modes and assigned specific times in accordance with the annual game. If robots score points or gain advantage outside of the match time referees will correct for this by disallowing points or possibly assigning penalties.

What does my team need to do to convert my existing robot over to the new platform?

Register with *FIRST* Tech Challenge for the 2015/2016 season and order (2) Android devices, the Legacy Module and Power Module. The Legacy Module allows current LEGO® NXT sensors and DC and Servo Motor Controllers to work in the new system. The Power Module is a terminal block allowing for easier power distribution. This is all you need to convert your existing robot. You can continue to use all your existing sensors, motors, battery and motor controller. You will no longer need your Samantha module or LEGO NXT.

Why are there additional new parts (beyond Android devices, Legacy Module and Power Module) offered as part of the new platform?

Android wired communication is via USB. New teams, and veterans who wish to upgrade, can purchase USB Motor Controllers (DC and Servo) and an Advanced Sensor Module which will accept standard, off the shelf, sensors.

Can my team use my current NXT controller in FTC next year?

No, the new Android based system with devices powered by Snapdragon processors communicates in a point-to-point fashion between the two Android devices (one mounted to the robot, the other at the driver's station). This eliminates the central field control system required by NXT, FTC controllers.

When can FTC teams order the new devices?

Orders may be placed by North American teams when FTC registration opens for the new products through a *FIRST* digital storefront. Shipments of the new products to teams are expected June 1 or earlier.

Can my team use any Android device to compete in FTC?

In year one *FIRST* has arranged a large purchase of Android devices at a significant discount and will pass this along to teams to minimize the cost to convert. Each North American FTC team will purchase their Android devices via *FIRST* for the 2015/2016 season. This will also allow coaches, partners, and others to use devices that have been thoroughly tested for this application. It also allows for uniform training to be created for teams to make the conversion. *FIRST* has successfully tested several Android devices on the new platform. In future years it is envisioned that teams will use Android devices sourced from a variety of vendors, however in year one *FIRST* is providing and supporting two specific Android devices. Game rules will not preclude the use of alternate Android devices, and *FIRST* will create a list of specifications for suitable Android devices; however teams will be on their own to determine if those devices work. Our desire is that all North American FTC teams will use the supplied Android devices in year one.

What skills will teams require from coaches or mentors different from what they need now?

All current coaches/mentors will be able to make the transition. Those with skills in Java programing will be happy to see these skills used by teams and should be able to help teams make the transition.

How does this platform change better position student team members for college, work, and real world?

The new FTC platform uses technology that is current and quickly evolving. The Android operating system and devices that run Android are among the fastest growing, most dynamic in use today. This will allow students to learn technologies that are in demand now. The Java programming language is among the most popular in use

today and is the basis for many advanced placement courses.