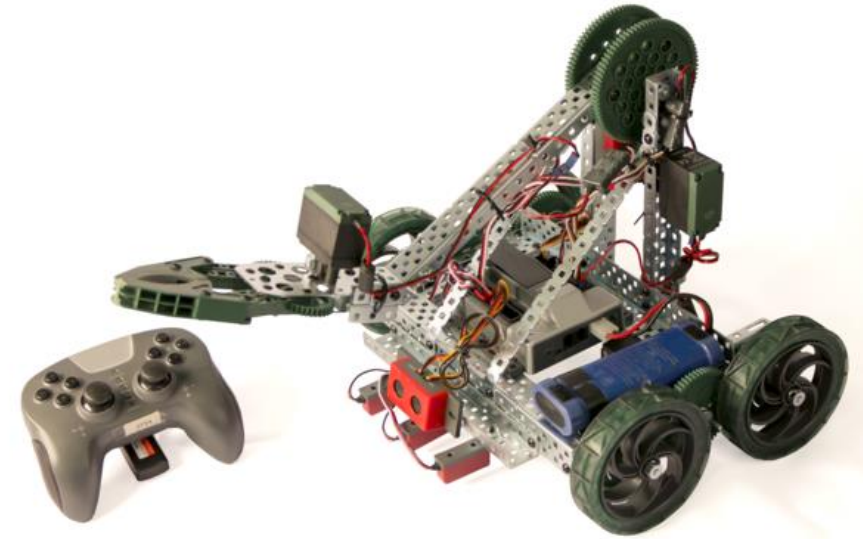


Introduction to VEX Hardware

By MathWorks Student Competition team



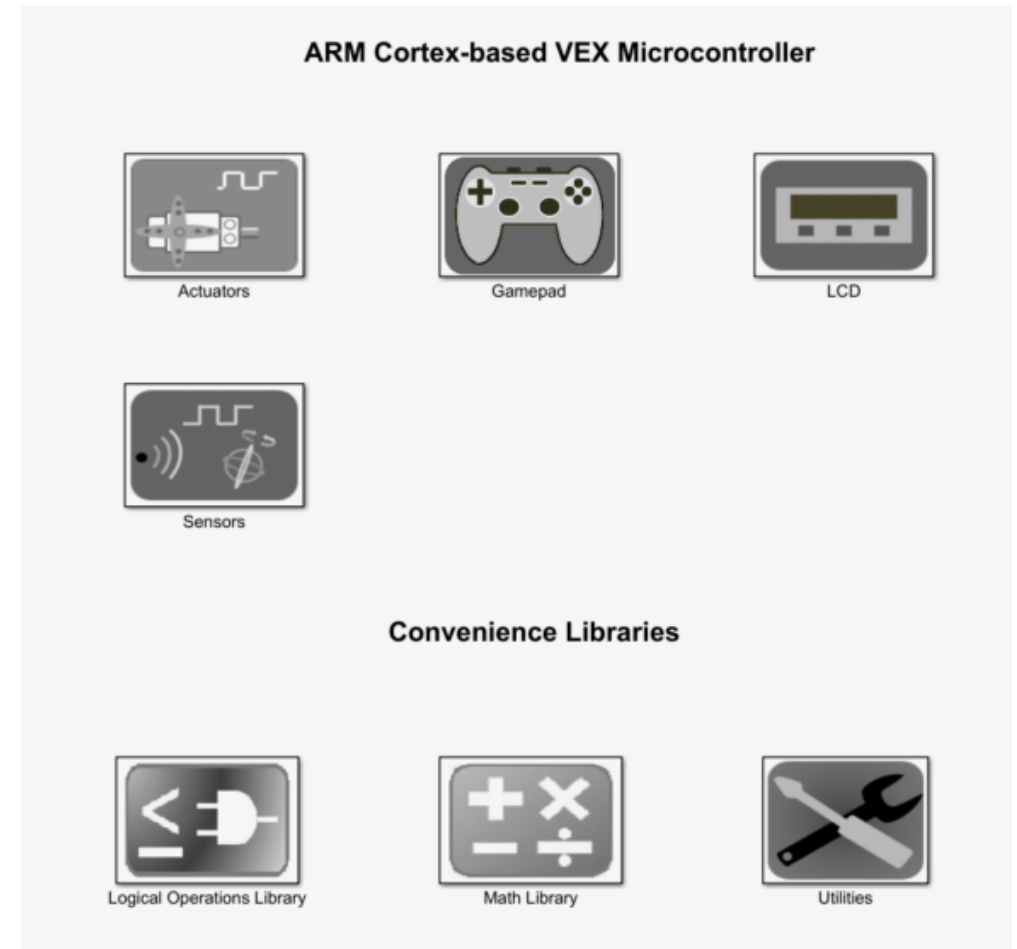
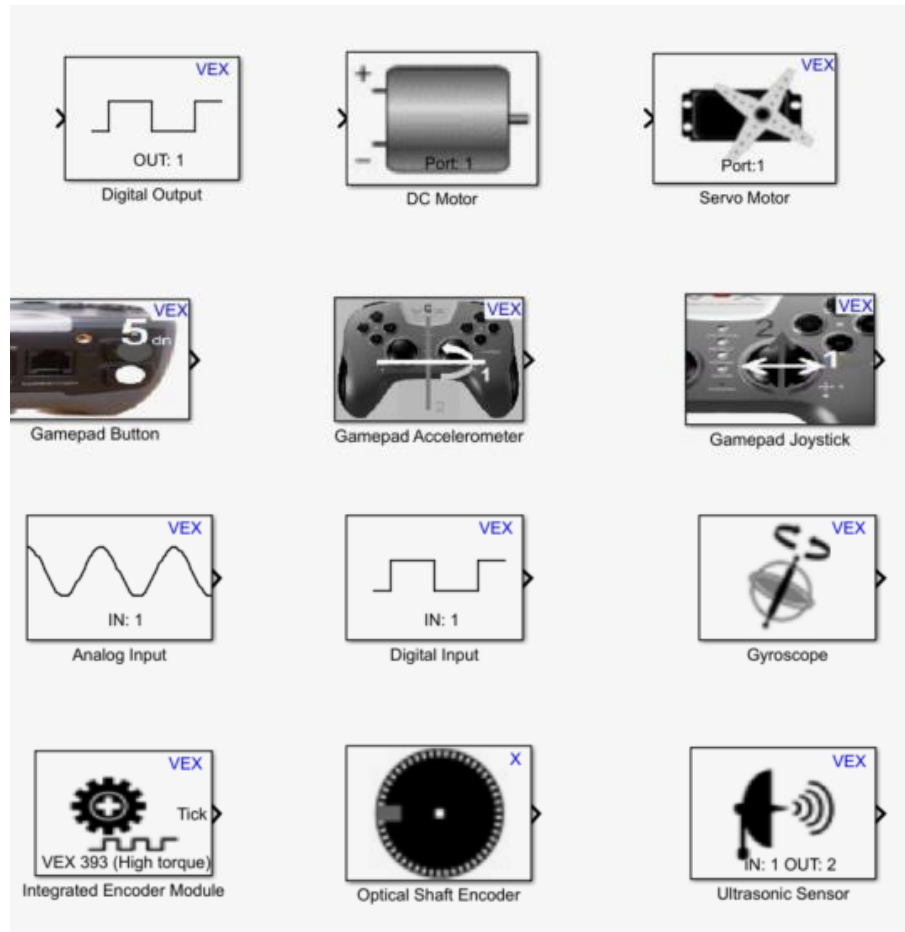
The Hardware – VEX EDR V5 and Cortex

- VEX Based Microcontroller (Brain)
- Gamepad Controller
- Actuators (Motors)
- Sensors



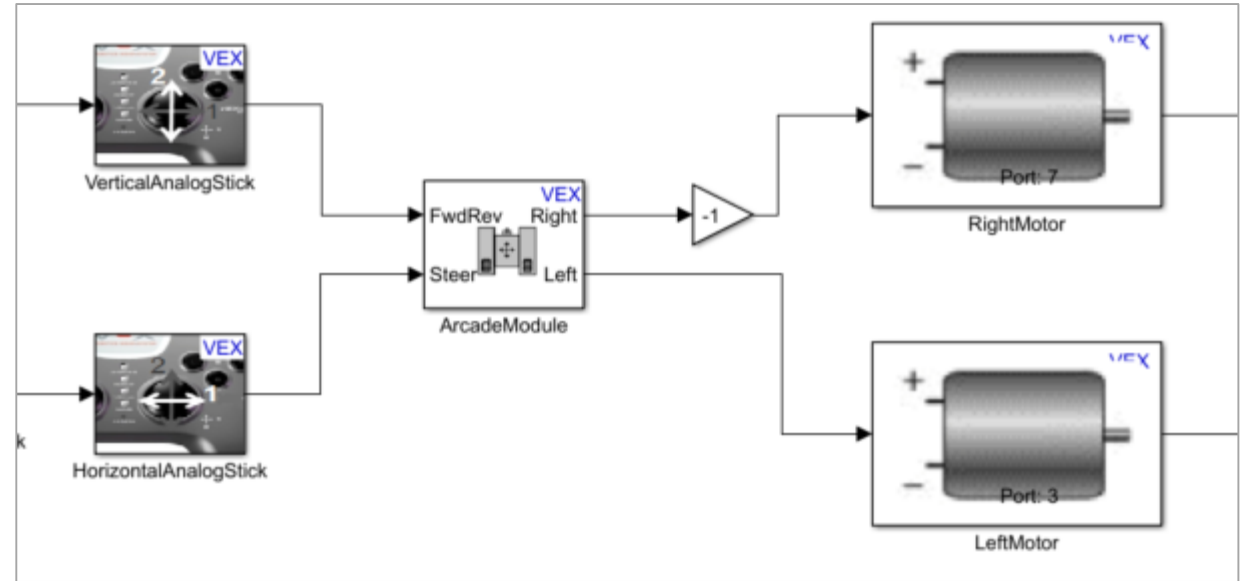
Simulink Library

- Blocks for all supported functionality

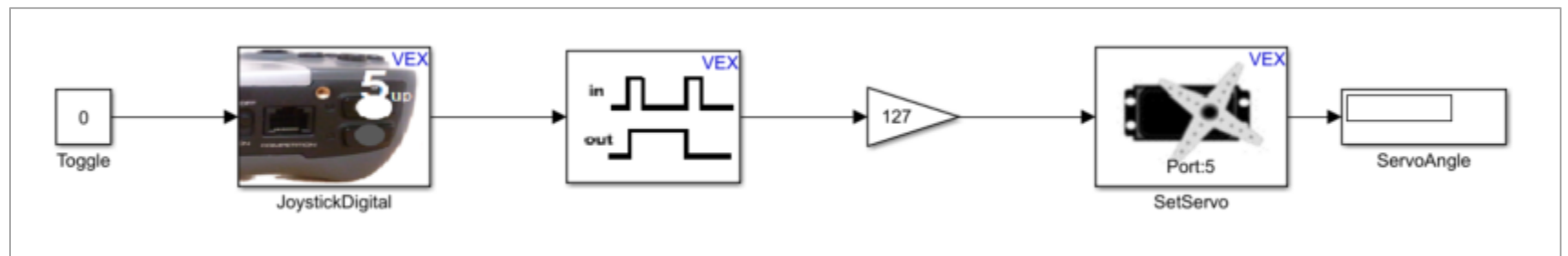


Examples using VEX Blocks

– Arcade Control

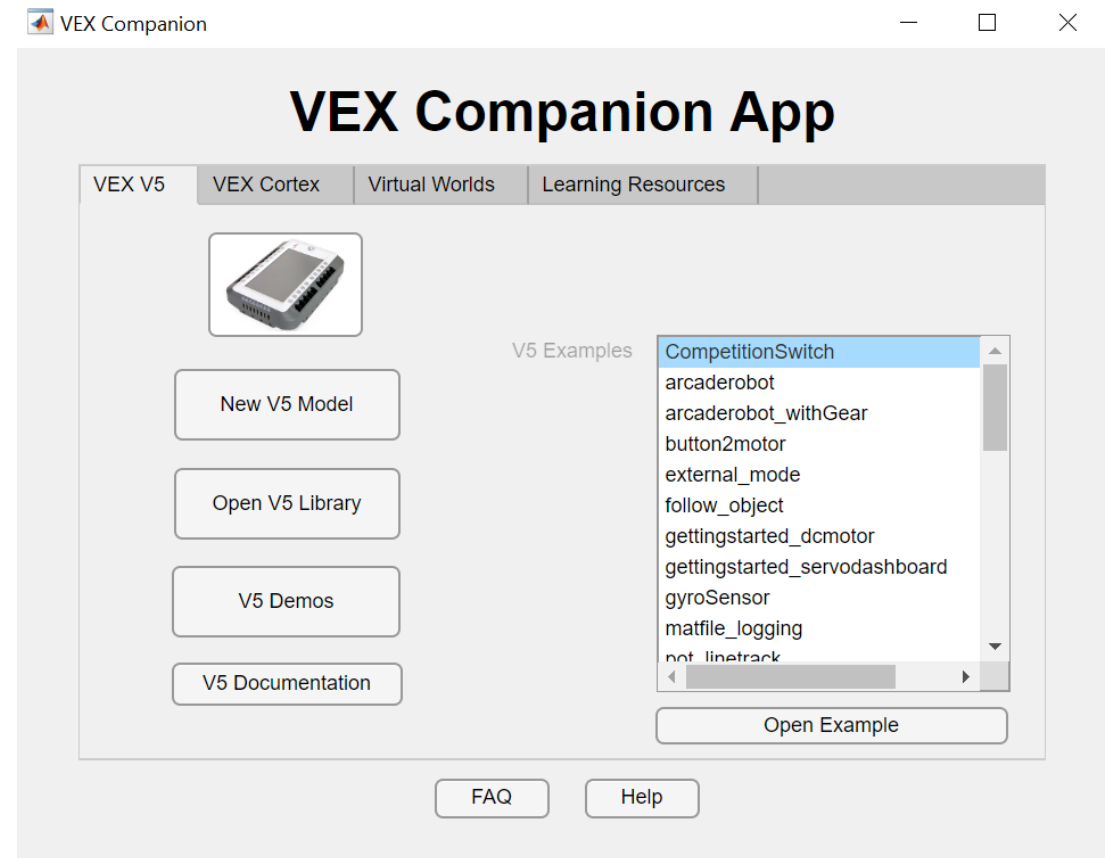
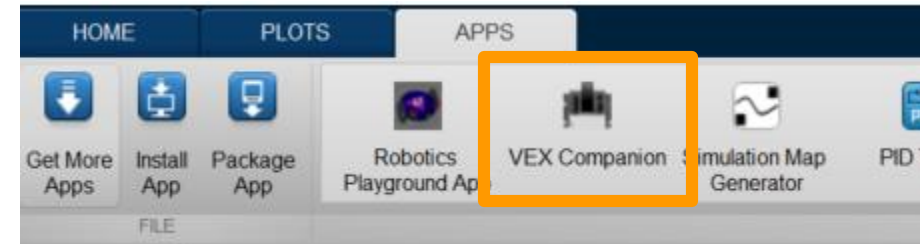


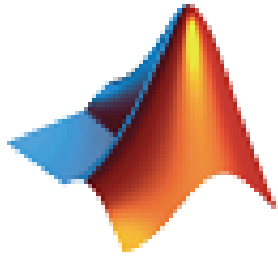
– Single Button Motor Control



VEX Companion App

- All Resources in one place
- Install after support package installation
- Extensive list of examples






MATLAB and Simulink Robotics Arena



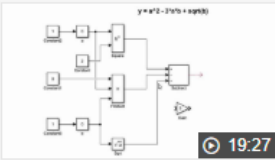
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17:35




MATLAB and Simulink PASS Competitions Hub: Simulink Quick Start for Student Competition Teams

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5:29



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MATLAB and Simulink PASS Competitions Hub: Path Navigation Using the VEX Robotics Motor Encoders

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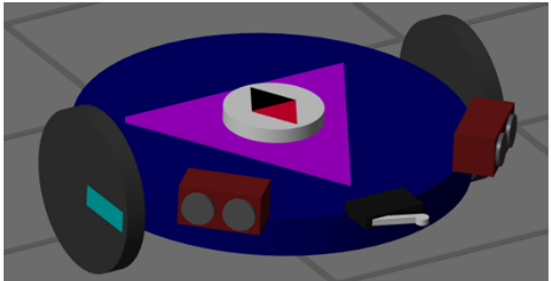
 **José Nicolás Avendaño** shared a link. 20 hrs

Want to learn how to program robots but don't have one yet?

Try our Robotics Playground. This library contains free Simulink virtual environments that will help you get started programming mobile robots. If you participate in a student competition you can already install it and try it out using your complimentary MATLAB license.

<https://www.mathworks.com/.../filee.../67157-robotics-playground...>

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Robotics Playground - File Exchange - MATLAB Central

Simulink virtual environments designed to aid in the teaching of basic concepts in mobile robotics

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Veer Alakshendra, Christoph Hahn and 7 others

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Resources – FREE Training on Mobile Robotics

Student Competition: Mobile Robotics Training

The training materials in this video series will enable your team to get started with designing and simulating common mobile robotics algorithms in MATLAB and Simulink. You will learn how to design open and closed loop feedback control systems for your robot to perform tasks like dead reckoning, line following and obstacle detection. You will also understand how to use the custom simulation tools to test your algorithms within Simulink before deploying them to an actual robot.

- Part 1: Controlling Robot Motion
- Part 2: Using PID Controllers
- Part 3: Line Following Algorithms
- Part 4: Obstacle Detection Algorithms
- Part 5: Path Navigation


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Resources – BEST Robotics

- MathWorks Competition Webpage
<https://mathworks.com/best-robotics>

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BEST Robotics

BEST Robotics is an annual middle-school and high-school competition that engages students in the study of engineering, science, and technology as they create remotely operated machines. Students build a robot from scratch and program the VEX ARM Cortex Microcontroller for the BEST Robotics mission. Applying Model-Based Design with MATLAB and Simulink lets your team efficiently design and build a functioning robot for the competition.


MathWorks presents the Simulink Design Award at the BEST Robotics Regional Championships to the teams that make the best use of MATLAB and Simulink to program their robots.


- » [View past winning videos](#)
- » [Apply for the BEST Robotics Simulink Design Award](#)



BEST Robotics Kickoff: Simulink Support for VEX Cortex Microcontroller

MathWorks provides BEST Robotics teams complimentary access to MATLAB and Simulink, as well as training and technical support. Teams can use MATLAB and Simulink, on a PC or a Mac, to design, test, and download the control algorithms to your BEST r...







Complimentary Software

MathWorks provides complimentary software for this competition. If your team is participating in this competition and needs software, fill out the software request form.

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MATLAB and Simulink Primary and Secondary School Competitions Hub



Learn how to use MATLAB and Simulink to design algorithms, create simulations, and speed up development for primary and secondary school competitions.

[Watch videos](#)



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Simulink Design Award

- Award prizes include \$1000 dollars for your team! BEST Robotics

- Learn from previous winners

<https://www.mathworks.com/academia/student-competitions/best-robotics/simulink-award.html>

- Apply:

http://www.bestinc.org/b_simulink_award.php

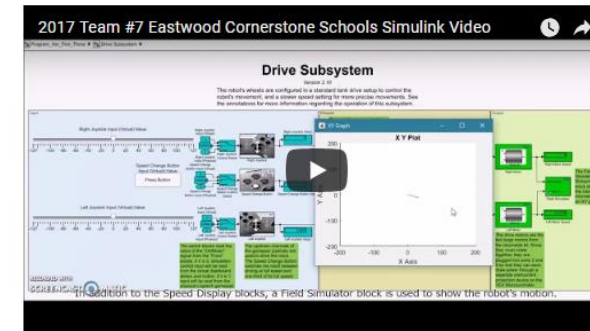
2017 Winners



Texas BEST Regionals

Ereckson Middle School CoCo BEST

This model shows a Stateflow chart that implements custom joystick controls for the robot. The team also implemented a redundant firing mechanism with two buttons to prevent unwanted firing.



South's BEST Regionals

Eastwood/Cornerstone Schools War Eagle BEST

This team implemented Simulink simulations with two different inputs using dashboard buttons and a gamepad, as well as dynamic controls to change between left-handed and right-handed drivers seamlessly.



Frontier Trails BEST Regionals

Council Grove High School Kansas BEST

The Simulink model takes advantage of dead bands to improve the drivability of their robot. The team was also able to verify their logic with simulations before programming the robot hardware.