MATLAB EXPO 2016
Connecting to hardware and rapid prototyping

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Have you ever had to design, implement and tune a controller running on a piece of hardware?
Challenges:

- Designing a robust controller
- Tune controller for optimal performance

Solutions:

- Rapid prototyping
- Plant modelling

Benefits:

- One-click deployment
- No need for hand-written C/C++
- Same model throughout the design process
Connecting, deploying to hardware

- Fully supported hardware targets
- Over 400 third-party partners
- FileExchange submissions
- Support for custom targets
Controlling the quadcopter

Controller
  deployed to the processor

Quadcopter

motor commands

states:
  - position
  - velocity
  - acceleration
  - attitude

Estimator
  deployed to the processor

sensor fusion:
  - sonar
  - camera
  - accelerometer
Thrust estimation
Benefits of plant model

• Parametric sweeps
• Failure injection
• Design optimization
Rapid prototyping workflow

- Change model architecture, Deploy
- Thrust estimation
- **Query** data
- Parametrize plant
- MATLAB®
- Simulink®
- Simulink Projects
- Embedded Coder®
- Simscape Multibody®

Find the model at:
https://github.com/Parrot-Developers/RollingSpiderEdu

Modelling Physical Systems in Simscape: Steve Miller, introductory Track