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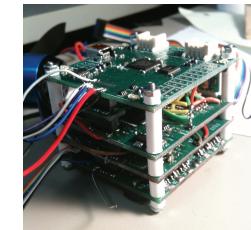
Revolution Robotics
PARTNER PROJECT

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**TEXAS
INSTRUMENTS**

Falcon

Flight Controller



The falcon flight controller is a complete solution for **aerial vehicle motion control**. It is designed to provide stability control suitable for **autonomous robotics applications**.



Gyroscopes and Accelerometers measure how the platform is moving



A TI Piccolo Processor estimates platform orientation based on sensor data



An Atmel AVR XMEGA Microcontroller controls propeller speed according to sensor data to stabilize the platform



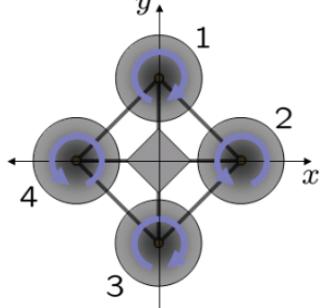
A Brushless DC Motor Controller controls communication of four motors

Thank You!

To everyone who has helped to make this project possible.



The **Propulsion System** consists of four propellers arranged as follows:

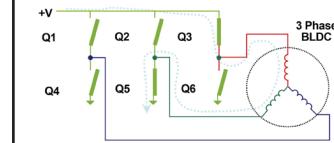


Platform Motion is controlled by the speeds of the motors:

Roll: 4 faster than 2

Pitch: 3 faster than 1

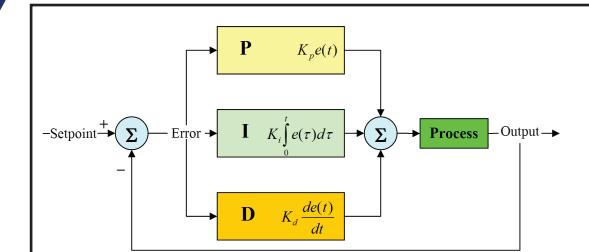
Yaw: 4&2 faster than 1&3



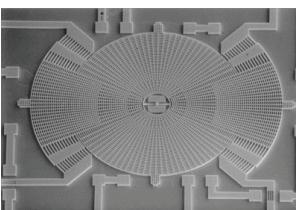
Brushless DC Motor Controllers produce high current commutation waveforms which spin motors according to the speed commanded by the PID control system.



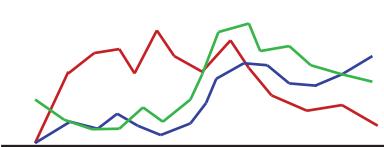
A **human or Computer Pilot** sets the desired orientation.



A **PID Feedback Control System** is set to maintain orientation based on the orientation estimate.

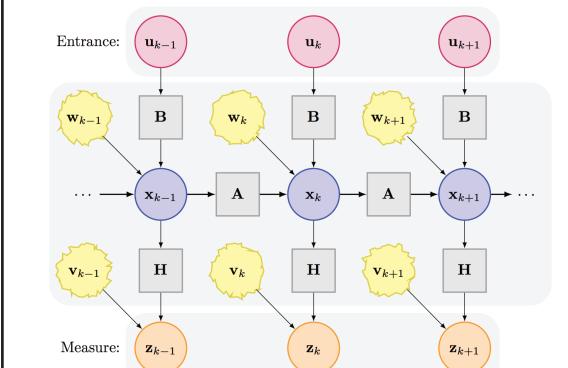


MEMS Gyroscopes and Accelerometers measure platform rotation and acceleration



Data from MEMS sensors is sampled with a 16-bit **Analog to Digital Converter** at 1 kHz.

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A **Kalman Filter** combines noisy data from accelerometers and gyroscopes to estimate the platform orientation.