Hands-On Flight

It's time to get hands on

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Background

Drones are currently controlled through unintuitive and cumbersome handheld controllers. Hands-On Flight focuses on making human machine interaction natural. Using simple hand/finger gestures you can control a drone. The hand/finger movements you perform are sent to and processed by a phone application that will make it possible to control the drone.

Overview

When wearing the glove, users are able to make simple hand/finger gestures to control a drone versus the traditional remote controller.

Throttle is controlled with the capacitive strain element located on the middle finger of the glove.
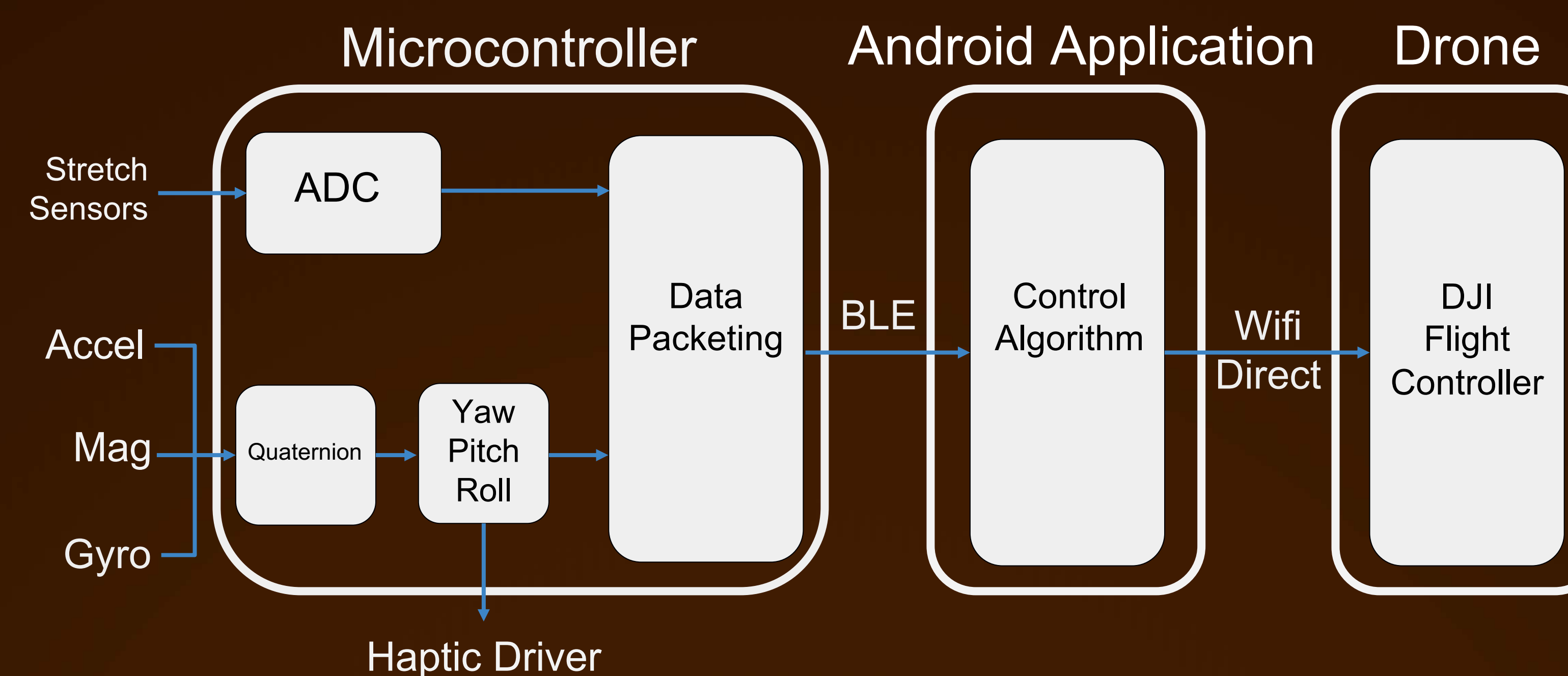
The capacitive strain elements located on the thumb of the glove controls the yaw direction.

Pitch and roll direction is controlled with the inertial measurement unit on the wrist of the glove.
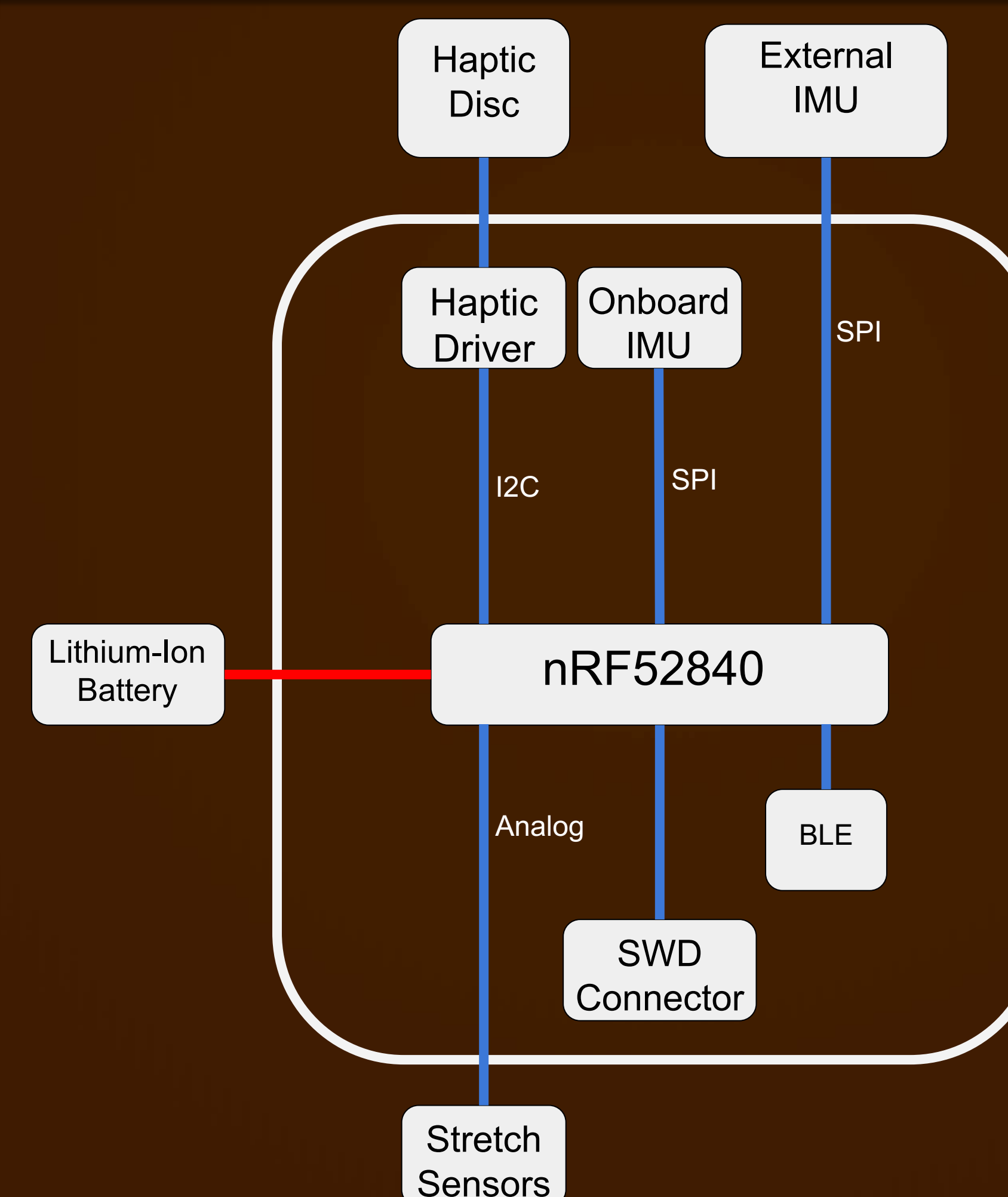
User-feedback through vibration is relayed to the user when maximum roll is reached.
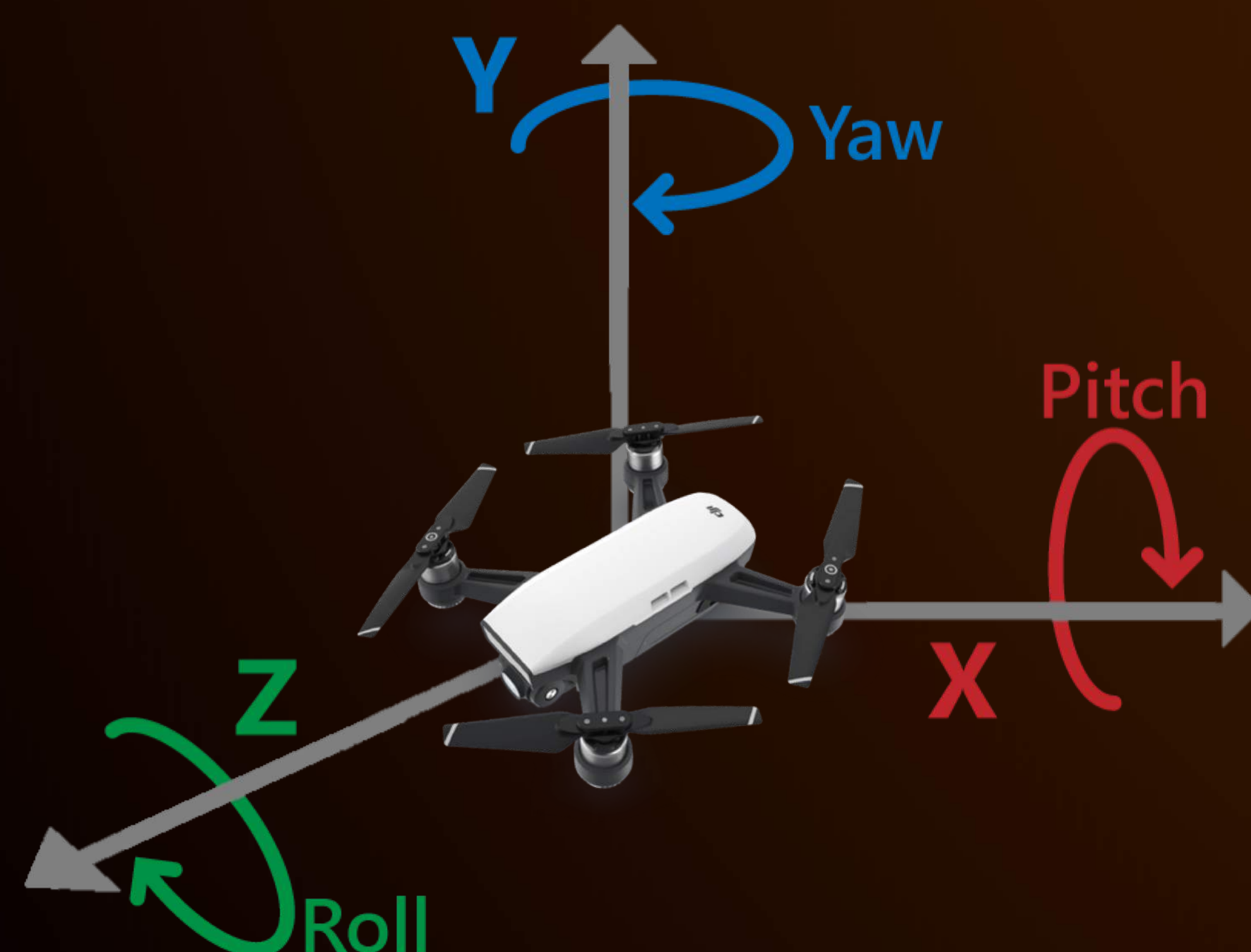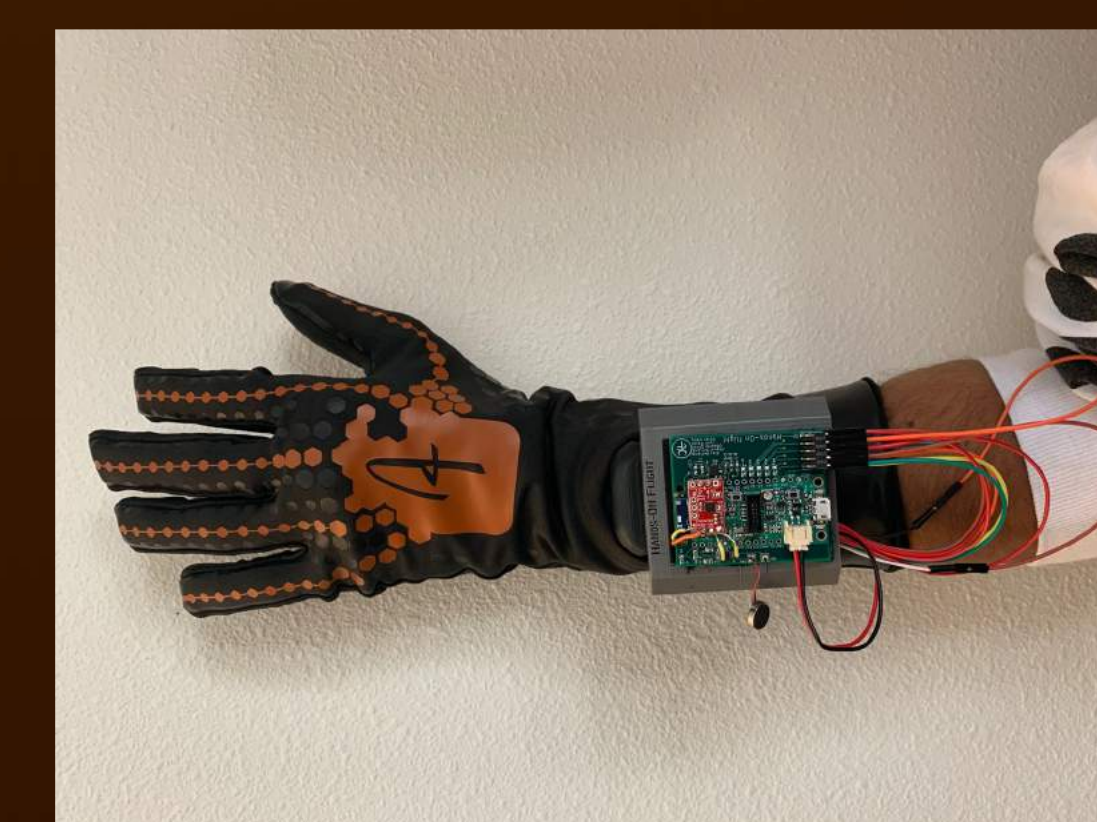

Signal Flow Diagram

Hardware Block Diagram

The Hands-On Flight Glove

Printed Circuit Board

Assembled Product

Final Product

Critical Hardware

nRF52840 IC
- 64 MHz Arm® Cortex-M4 with FPU
- Bluetooth 5 multiprotocol radio
- QSPI/SPI/TWI/I²S/PDM/QDEC

StretchSense Capacitive Strain Element
- 1.77-2.34 mm Predictive Accuracy
- 692-815 pF Base Capacitance
- 13.5-16.7 pF/mm Sensitivity

MPU-9250 IC
- Digital-output X,Y, Z-Axis angular rate sensors and integrated 16-bit ADCS
- 1MHz SPI interface w/ registers
- 20MHz SPI interface reading sensors

DRV2605L IC
- Wide Voltage Operation (2 V to 5.2 V)
- PWM Input with 0% to 100% Duty-Cycle
- I2C-Controlled Digital Playback Engine

Vibrating Mini Motor Disc
- 11000 RPM at 5V
- Voltage: 2V-5V

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