2.03 - TXST Thunderbirds

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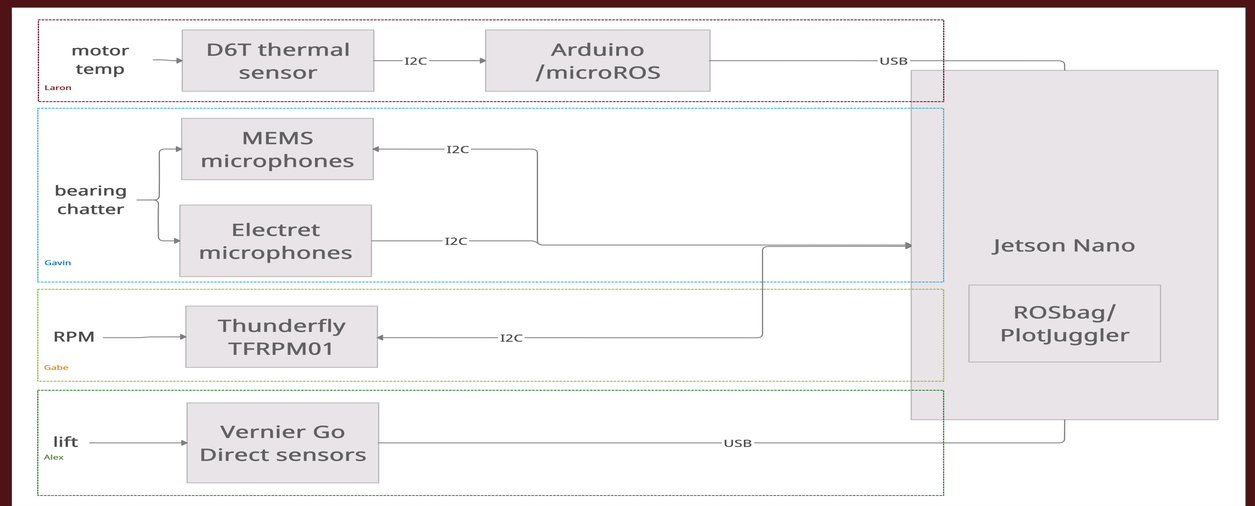
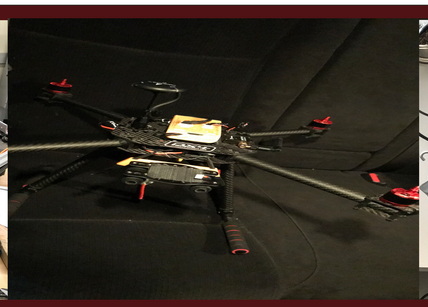
Problem Statement

The more drones are used the need for a solution to prevent drone's inflight failure is very needed. Accordingly, to a Roma Tre University study found that 32.88% of in-flight failure for commercial drones is caused by motor failure.

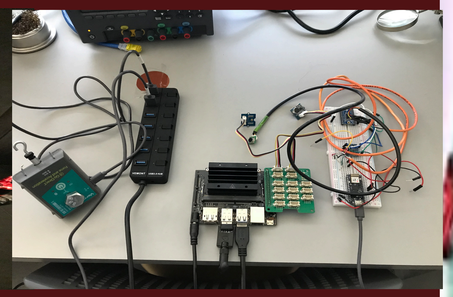
Top Level Diagram



Landing Pad



NXP Hovergames Drone



Hardware

Delivered

- ROS nodes have been created for each sensor
- Data can be captured via PlotJuggler for streaming in real time
- GO/NO GO webportal
- Automated Arm Actuator

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Solution's Approach

- Our approach to solve the problem is having an array of sensors that includes RPM, Temperature, Sound, Ultrasonic, and Force sensors using ROS(Robotic Operating System) that are set on our landing pad
- The drone will land after it runs its mission, and a preflight and post-flight test will be done to tell the motor's health though data analysis.

Why ROS?

- ROS(Robotic Operating Systems) is a very useful middleware suite that can be used for central control of many sensors.
- From terminal you could obtain responses for all sensors in the 'graph'.
- MAVROS that is a ROS package that enables MAVLink extendable communication between computers running ROS or any MAVLink enabled autopilot, ground station, or peripheral.
- MAVLink or Micro Air Vehicle Link is a protocol for communicating with small unmanned vehicle.

Scope

- Determine a faulty motor in a pre-flight maintenance test
- Develop ROS nodes for each sensor
- Use ROS to extract data from the sensors and plot in real time to see the motors health

Acknowledgments

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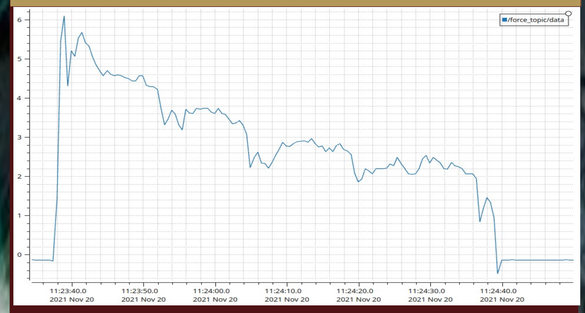
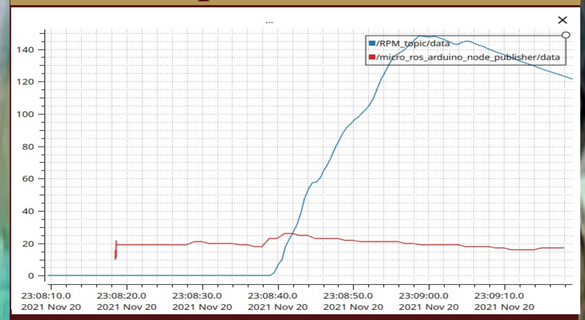
Results

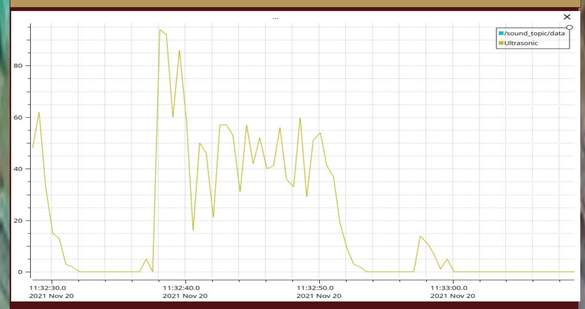
Force



Temperature/RPM



Ultrasonic



Sound