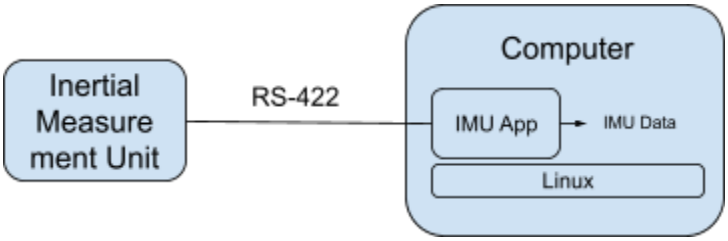
FIGURE

CASE STUDY: IMU Subsystem Test Automation

This is Figure.

Figure is equipped with a high grade **Inertial Measurement Unit** (IMU) and a main computer running Linux.

The **IMU App** on the **Computer** receives the accelerations and angular rates from the IMU over RS-422 at 2 Khz. It estimates the attitude (roll and pitch) using a complementary filter. Finally, the IMU App outputs the accelerations, angular rates and attitude information over shared memory for consumption by other applications.



This **IMU subsystem** is composed of the IMU device itself, the RS-422 link and the IMU App on the Computer. The IMU subsystem has the following requirements:

REQ-001: The published attitude shall have an accuracy of +/- 0.1 degree.

REQ-002: The message error rate on the RS-422 link shall not exceed 1e-5.

REQ-003: The delay for a physical event to the data being published by the IMU app shall not exceed 2 ms.

Your mission is to automate testing of this subsystem.

For this case study you are asked to provide a 45 minutes presentation about:

- Your background and hobbies (10 minutes)
- Your answers to the case study questions (35 minutes)

Questions:

1. What are your assumptions?
2. What test setup would you use to test all the requirements of the IMU subsystem? Please propose a block diagram.
3. To cover these requirements, what are the tests you would perform? What test procedures would you recommend?
4. You would like to hand-off the build of the test platform to a technician:
    a. What documentation do you need to prepare?
    b. Can you provide examples of materials you would create to document the test platform design?
5. For one of the test cases, can you draft an implementation in Python? You will assume that there is an existing test framework, and it includes an ideal Application Programming Interface (API).
6. To work on this project, with whom do you expect to interact with, and what are some of the processes and tools you would expect to facilitate these interactions?