AHRS Motion Sensor Algorithms
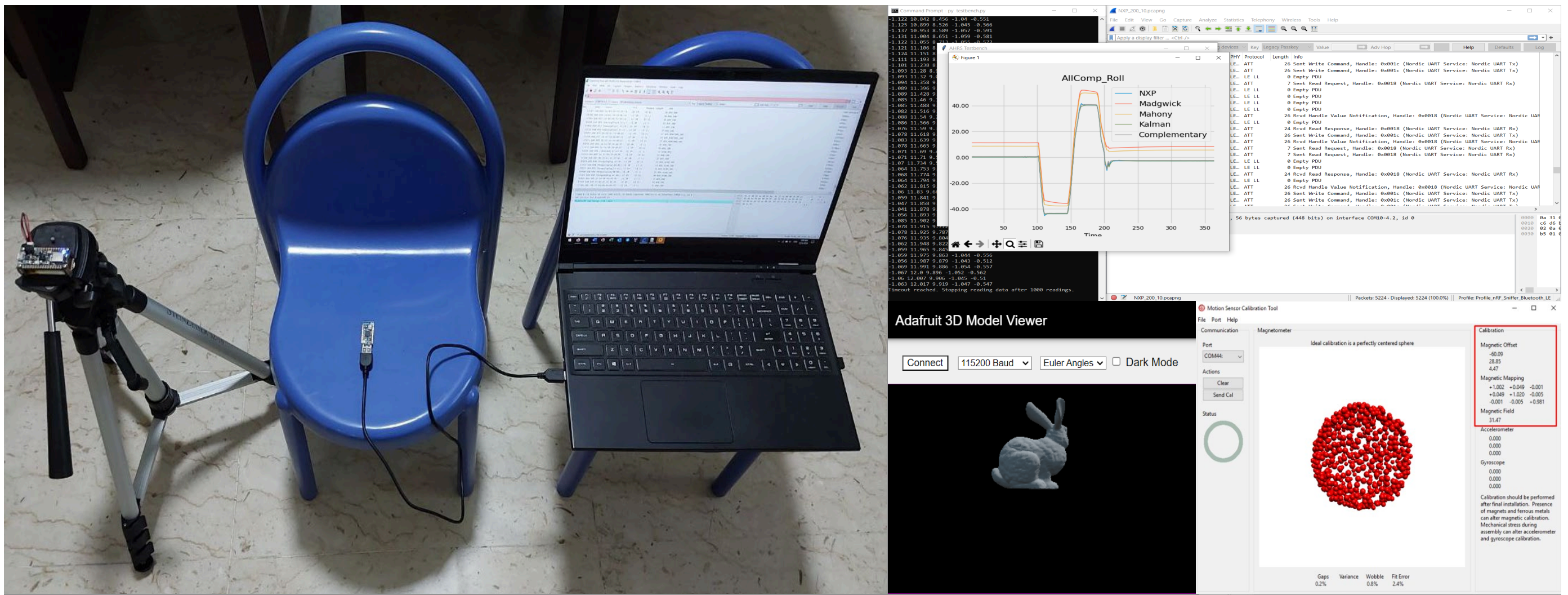## Analysis of Performance with Bluetooth Low Energy (BLE)

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Project Objectives:

This project investigates the performance of three distinct motion sensor algorithms: NXP, Madgwick, and Mahony, implemented on the Nordic NRF52840 System-on-Chip (SOC) through Bluetooth Low Energy (BLE) communication. The study utilizes the Adafruit Feather Sense board as the experimental platform for evaluating the algorithms' efficacy in providing accurate motion tracking and orientation estimation. It also explores the impact of BLE communication on the transmission of the orientation data, considering the constraints of the NRF52840 SOC.

The end goal is to provide valuable insights into the AHRS algorithms' suitability for real-world applications, The findings of this study contribute to the understanding of the trade-offs involved in selecting a motion sensor algorithm for BLE-enabled devices, with implications for applications such as wearable devices, Internet of Things (IoT) sensors, and other motion-sensitive devices.

Microcontroller Features:

- ARM Cortex M4F running at 64MHz
- Arduino IDE & CircuitPython support
- Support for USB & 3.7V Li-Po rechargeable battery for wireless power usage
- ST Micro series 9-DoF motion - LSM6DS33 Accel/Gyro & LIS3MDL magnetometer
- Bluetooth Low Energy (BLE) compatible 2.4GHz radio

Adafruit Feather nRF52840 Sense: