

Introduction and Motivation

Mobilization techniques are therapeutic techniques used to relieve pain and improve joint mobility.

Teaching these techniques to physical therapy students becomes difficult when textbooks and lectures are the only modes of instruction. The Trine University Physical Therapy program discovered this issue and proposed the creation of a device that enhances student techniques with live feedback during mobilization practice.

An initial version of this device was previously created but required significant improvement and innovation to be practical for the intended use by PT students and faculty.

Design Specifications

- All wires were required to be flexible and minimally robust.
- Wire and sensor junctions needed to be durable and design for longevity.
- Sensors needed to be protected from repeated use by using sensor protection.
- Software must be reliable and provide the customer with visual feedback with an interface that is easy to use and interact with.

Testing

Hardware Validation

- Circuit resistor selection
- Wire junction mobility and durability
- Sensor reliability

Software Validation

- Fast feedback testing
- Data analysis functions

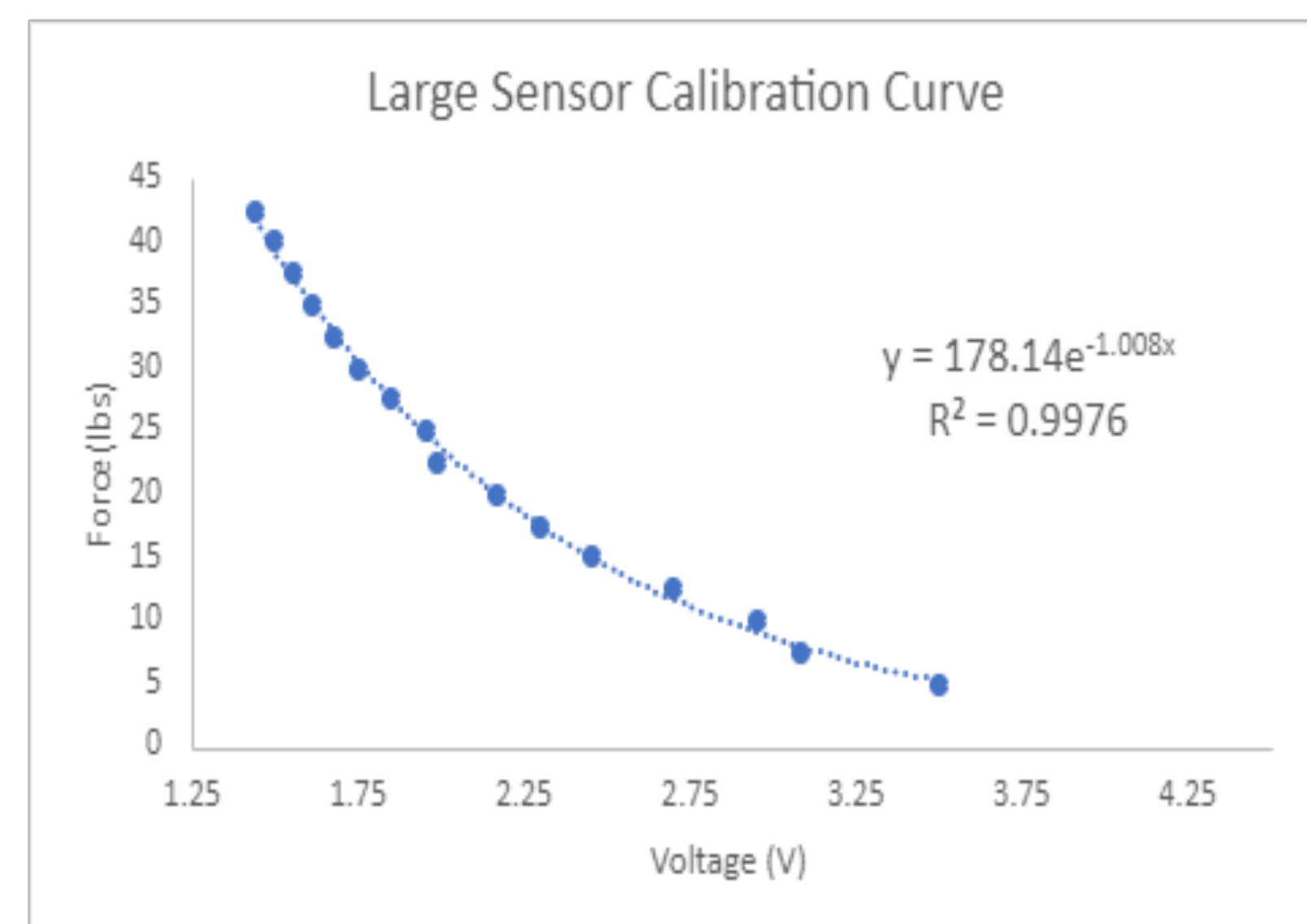
Integration Validation

- Software integration testing
- Calibration curves

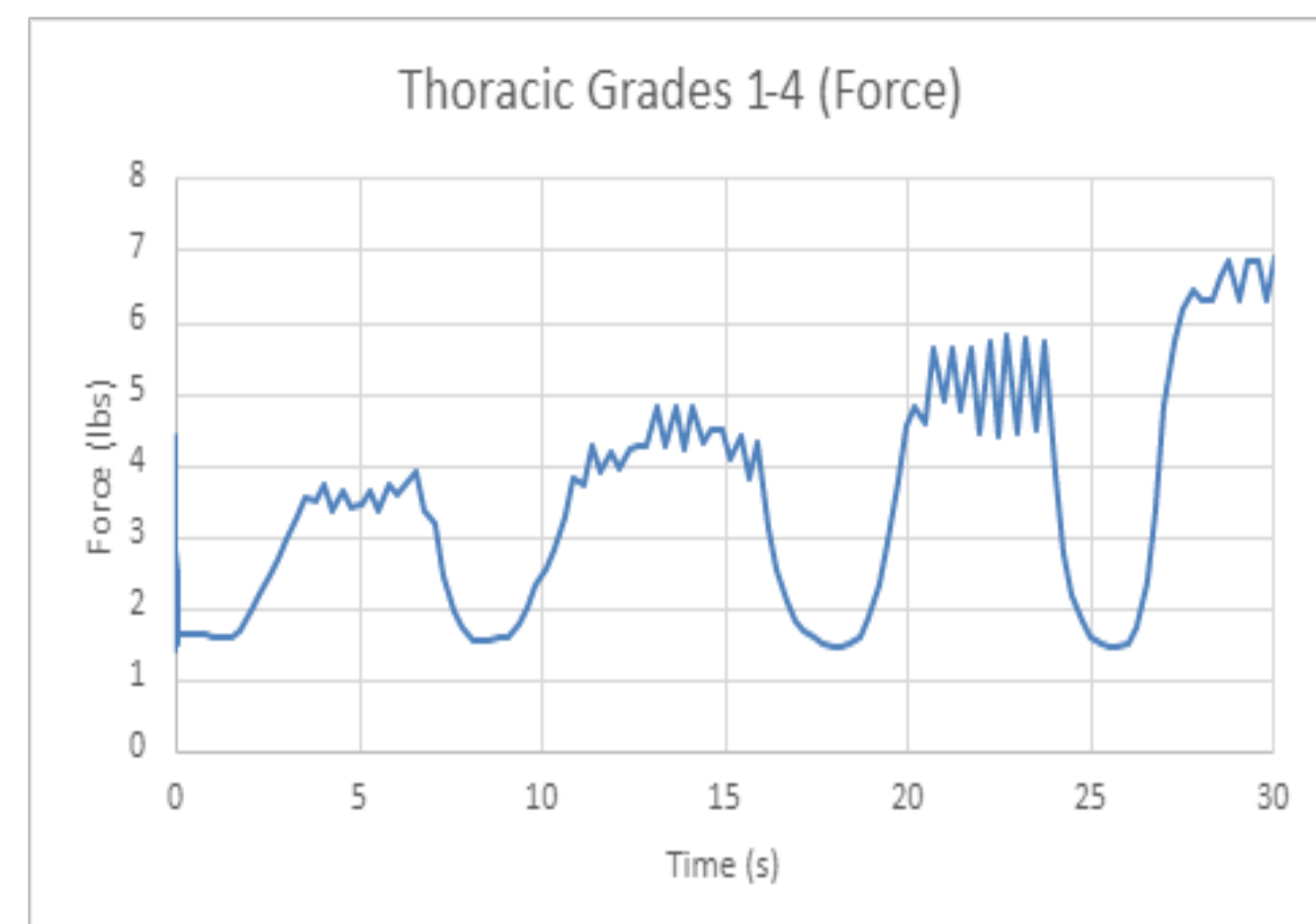
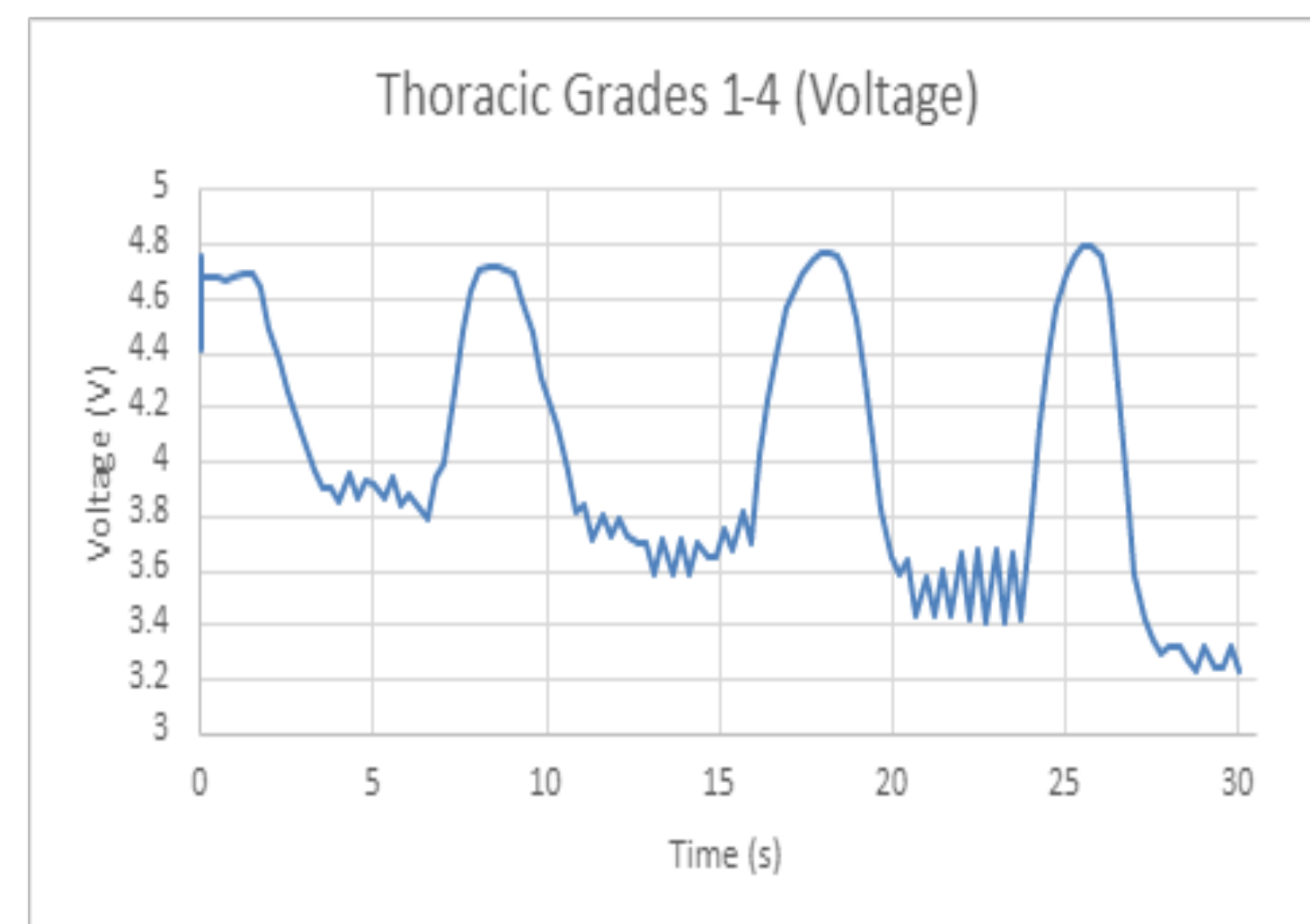
Other Validation

- Customer Satisfaction Survey
- Usability and Setup Testing

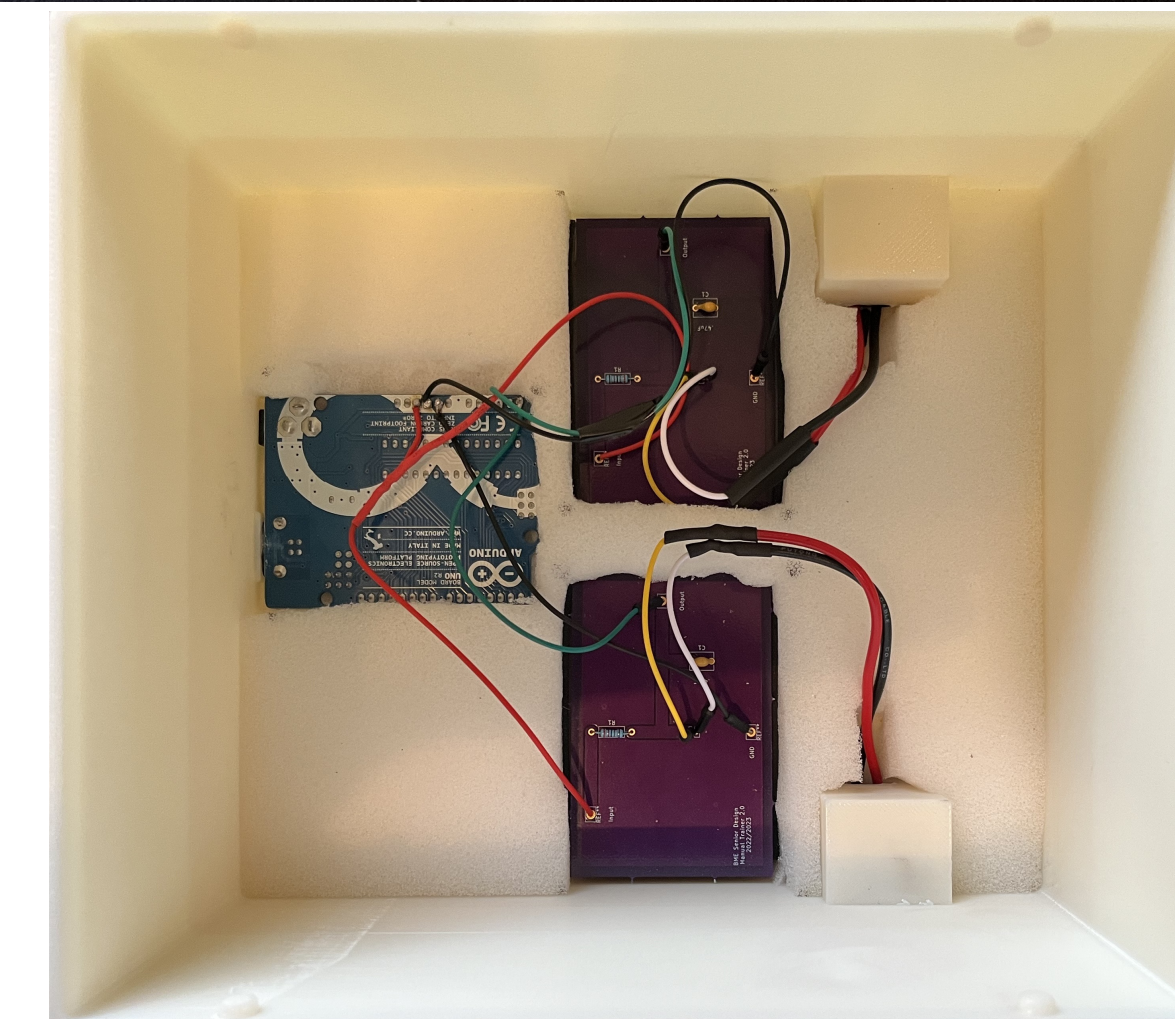
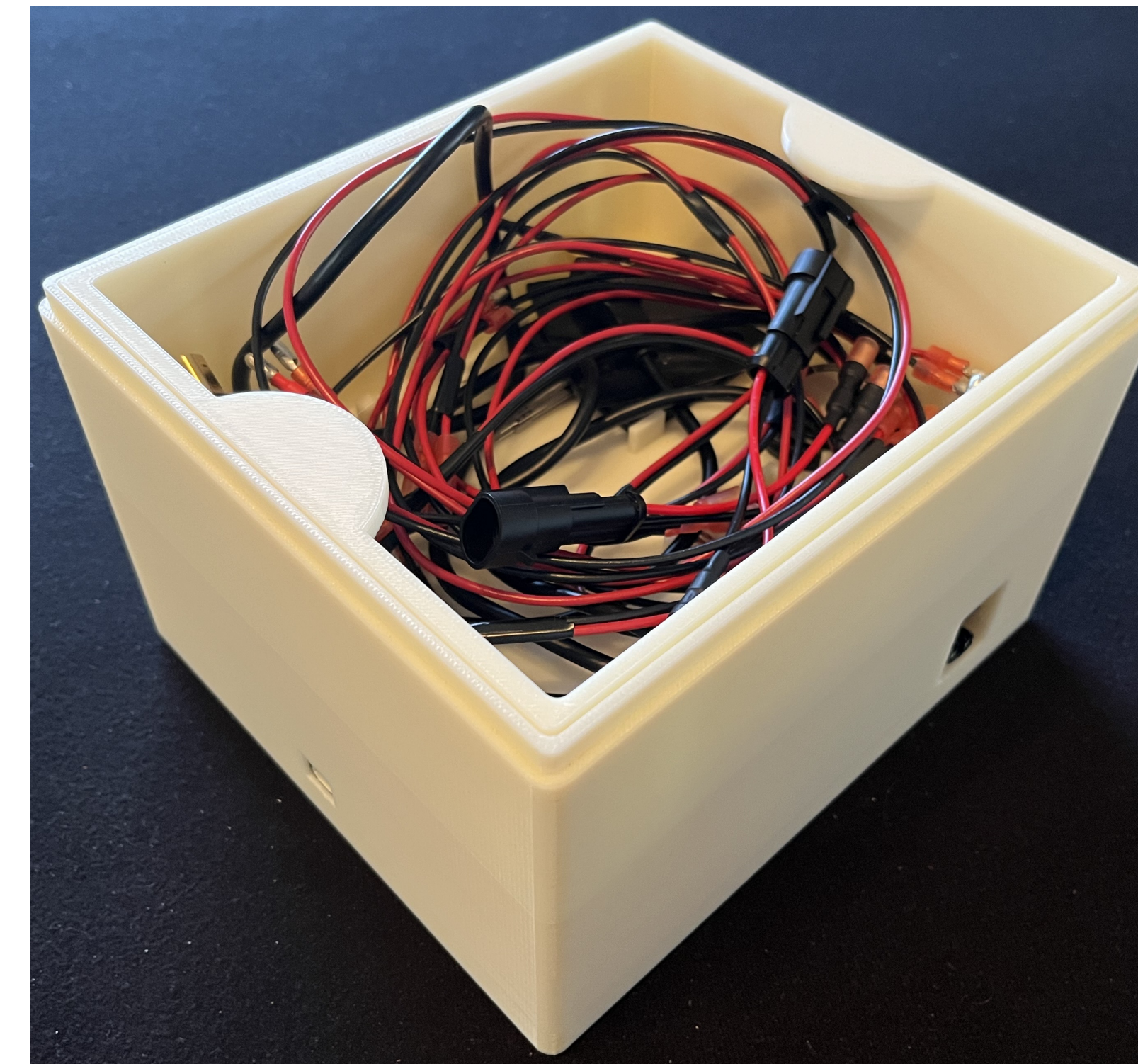
Calibration Curve



Graphical Output



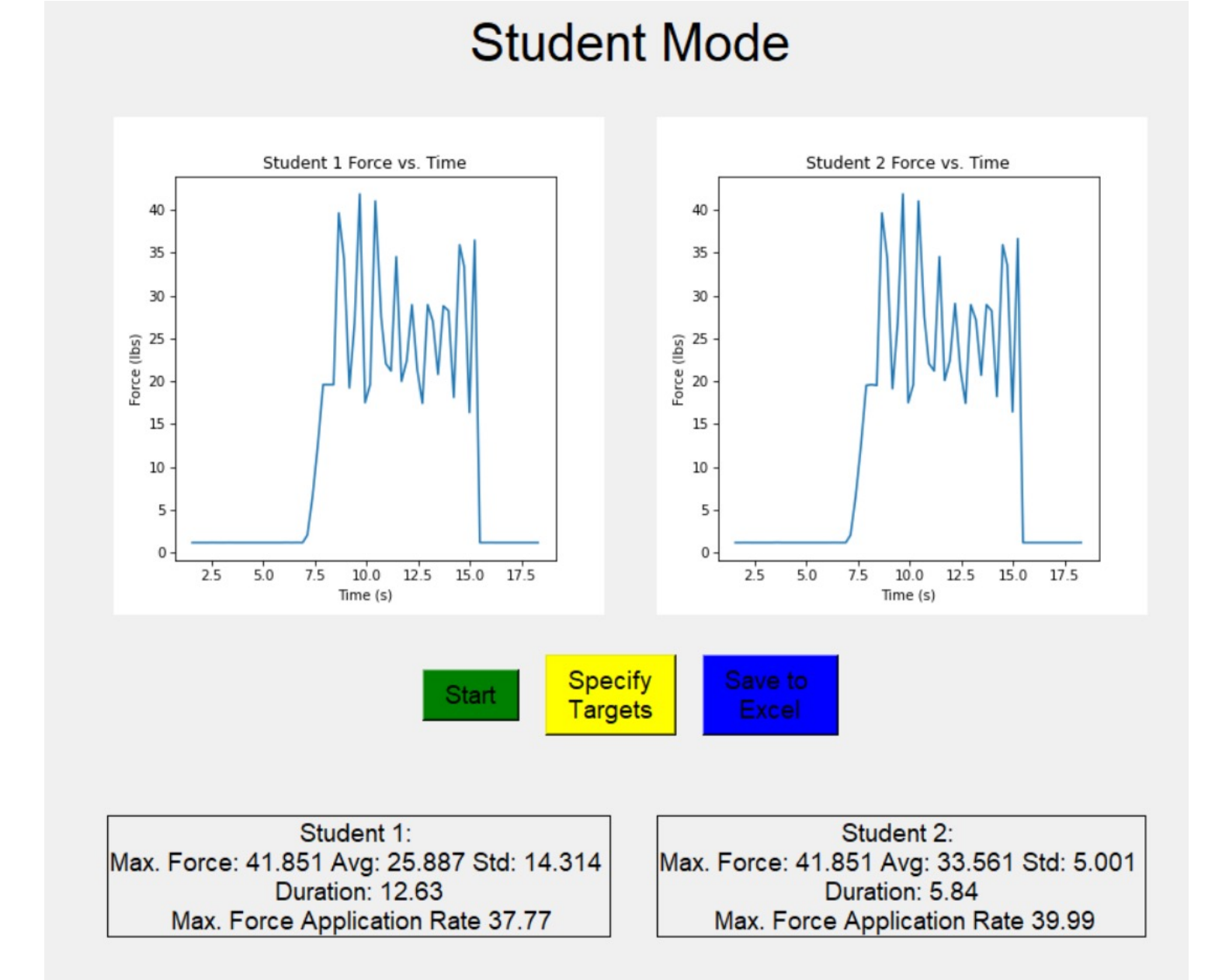
Box Design



Modular Ports



Graphical User Interface



Conclusions

Modular Design

- Interchangeable sensors
- 2ft extension cables
- USB A/B Cables

Intuitive Software

- User friendly Interface
- Professor/Student Mode
- Live force data
- Customizable targets

Durable Circuitry

- Printed Circuit Board (PCB)
- Soldered circuitry components
- Foam padding between circuit components

Acknowledgements

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