

## SUMMARY

The Personal Data Acquisition System is a user-friendly device that allows real-time data collection and visualization from a range of sensors. The system's modular design allows users to easily connect various sensor modules to the central data logger. Users can view and configure the collected data via a simple user interface. The system is powered by an internal battery, enabling dynamic outdoor use. The design focuses on inclusivity and affordability, aiming to bridge the gap between expensive and complex data acquisition systems and inaccurate "hobbyist" systems.

## ENGINEERING REQUIREMENTS

- **Easy to Understand** - 9 out of 10 users will configure the sensors and afterwards report "The configuration process was easy."
- **Mobile** - The system will operate normally for at least 1 hour on a single charge.
- **Modular** - The system will operate normally after having the sensor sub-system pulled against the logger sub-system with at least 5lbs of force.
- **Precise** - The system will output data with a resolution of at least 8 bits
- **Sample Rate** - The system will output data at least at 100HZ for analog voltage and acceleration data and at least 5Hz for GPS data.
- **Storage** - The system will store an hours worth of data collected by the system.
- **User Feedback** - The system will display data on the UI that updates according to the state of the sensors within 30 seconds of the real-world sensor state change.
- **Works with Mikroe Sensors** - The system will include at least 1 "mikroBUS" connection that will work with at least 1 Mikroe product.

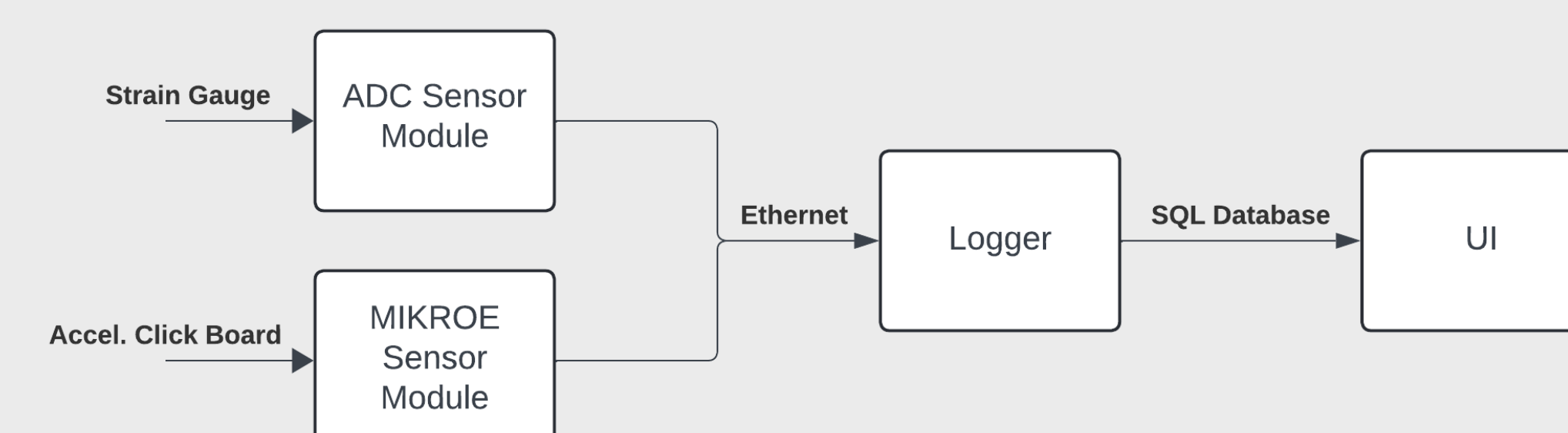


# PERSONAL DATA ACQUISITION SYSTEM

## Real-time data feedback from modular sensor system

## SYSTEM EXPLANATION

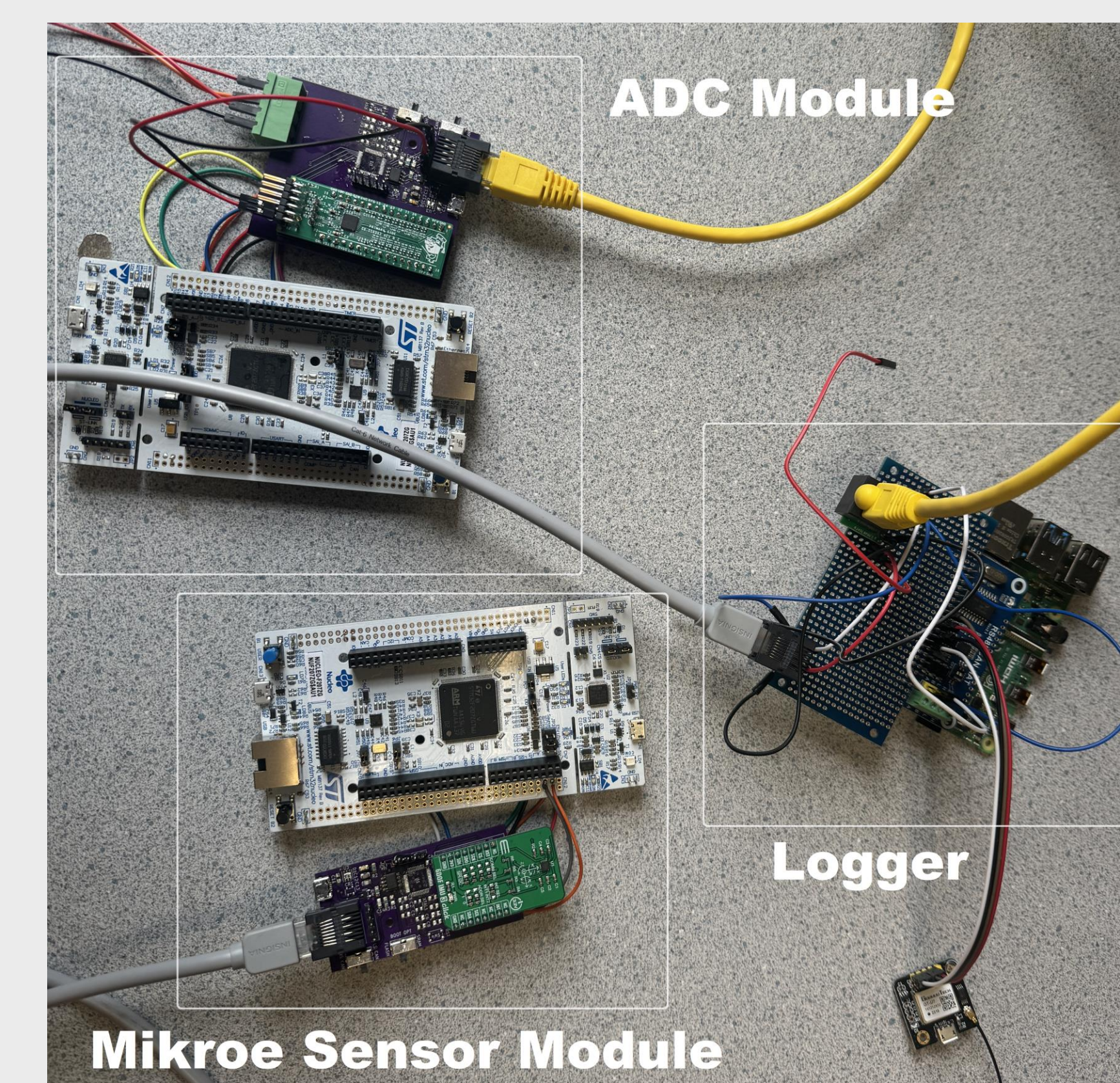
- Sensor modules can be easily swapped and connected to the system
- Sensors modules communicate with the logger using CAN bus protocol
- Developed sensor modules include ADC and accelerometer modules
- One sensor module features an industry-standard sensor connector (mikroBUS™), enabling easy integration with several hundred commercially-available sensor modules
- The logger uses a Raspberry Pi to store data into a local SQL database and serve the UI to the user
- The UI allows the user to visualize and configure data from their custom sensor setup



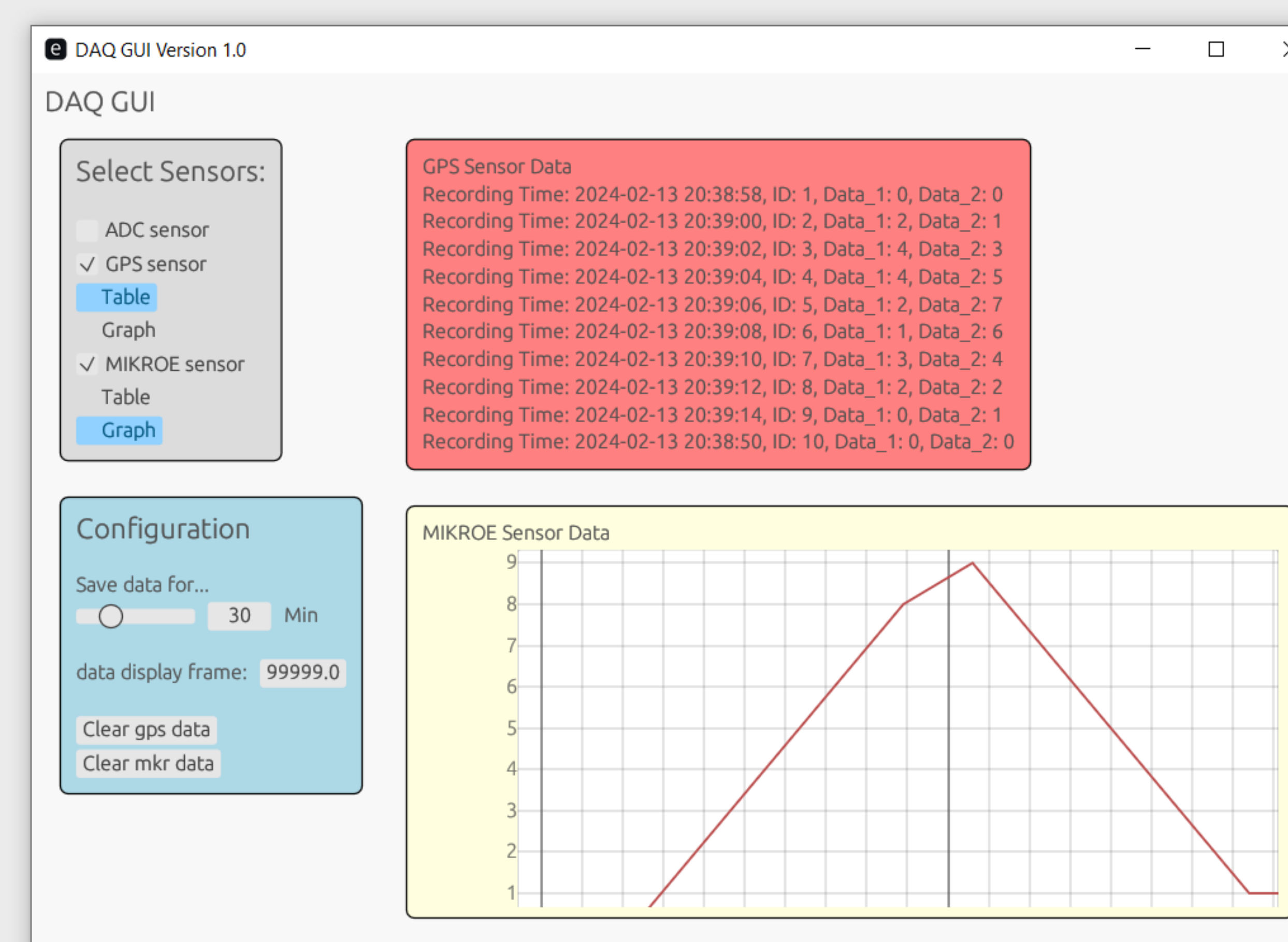
## UI EXPLANATION

- User can select connected sensors
- User can configure data visualization for each connected sensor
- User can change data save period with slider
- User can adjust data display time frame
- User can manually clear data to save space

## SYSTEM IMPLEMENTATION



- Uses STM32F207ZGT microcontrollers to acquire data on the sensor modules.
- Sensor modules connect to the logger module through RJ-45 connectors and ethernet cables.
- Plug-and-play system only needs a cable connection to begin collecting data.

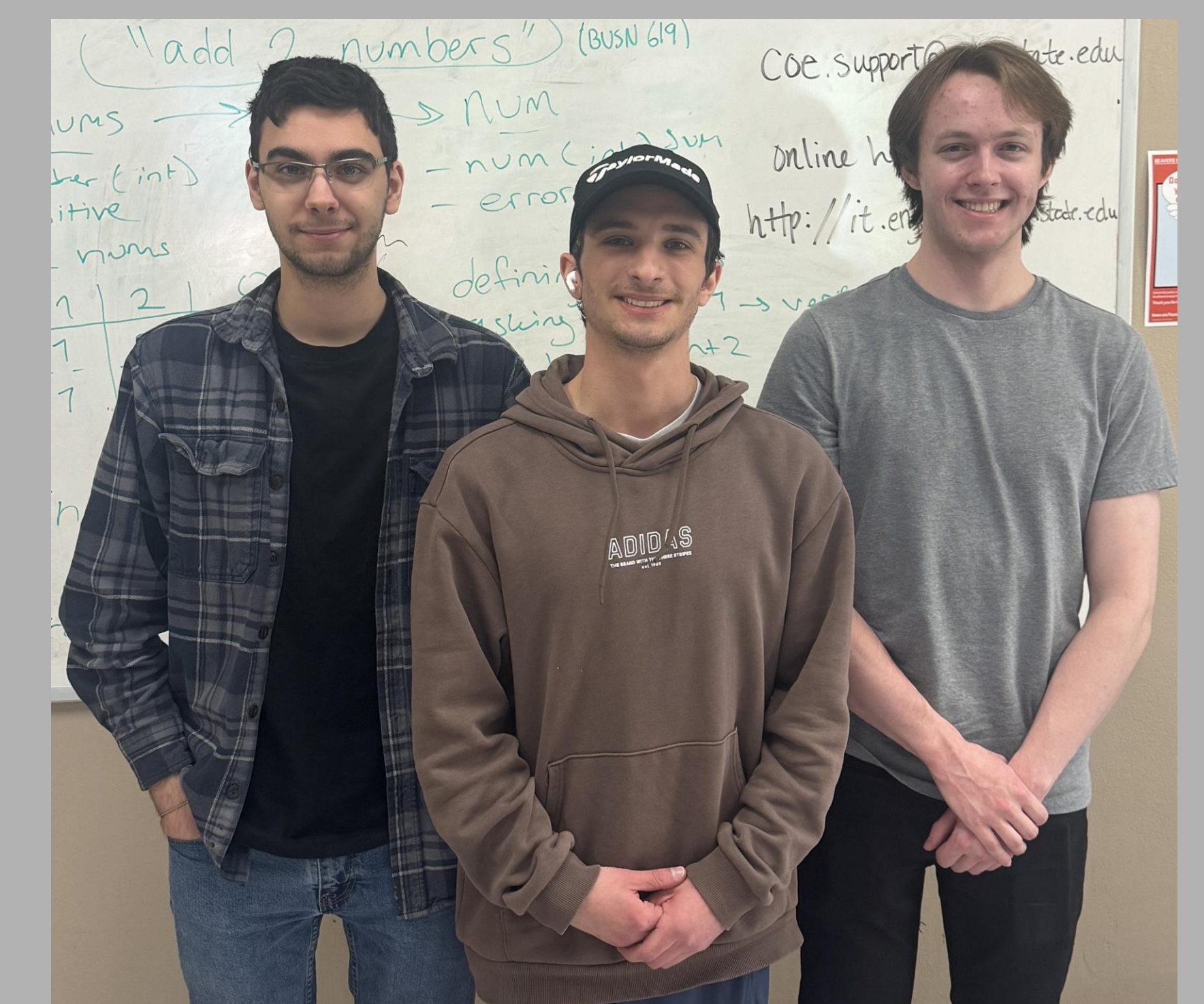


## MIKROE SENSOR INTEGRATION

- Mikroe Click Sensors are compact add-on boards that interface with systems via a mikroBUS™ socket
- The socket supports communication and power as specified by the mikroBUS™ standard
- In our system, the inclusion of this socket enables quick integration of new sensors without extensive hardware modifications
- The image below shows our Mikroe Sensor Block in a case. Our custom PCB (purple) is connected to a Mikroe Click Sensor (green) through a mikroBUS™ socket



## TEAM MEMBERS



From left to right:

- **Julian Henry** - henryju@oregonstate.edu  
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