

Introduction of a

# **Monitoring & Control System**

for common lab applications

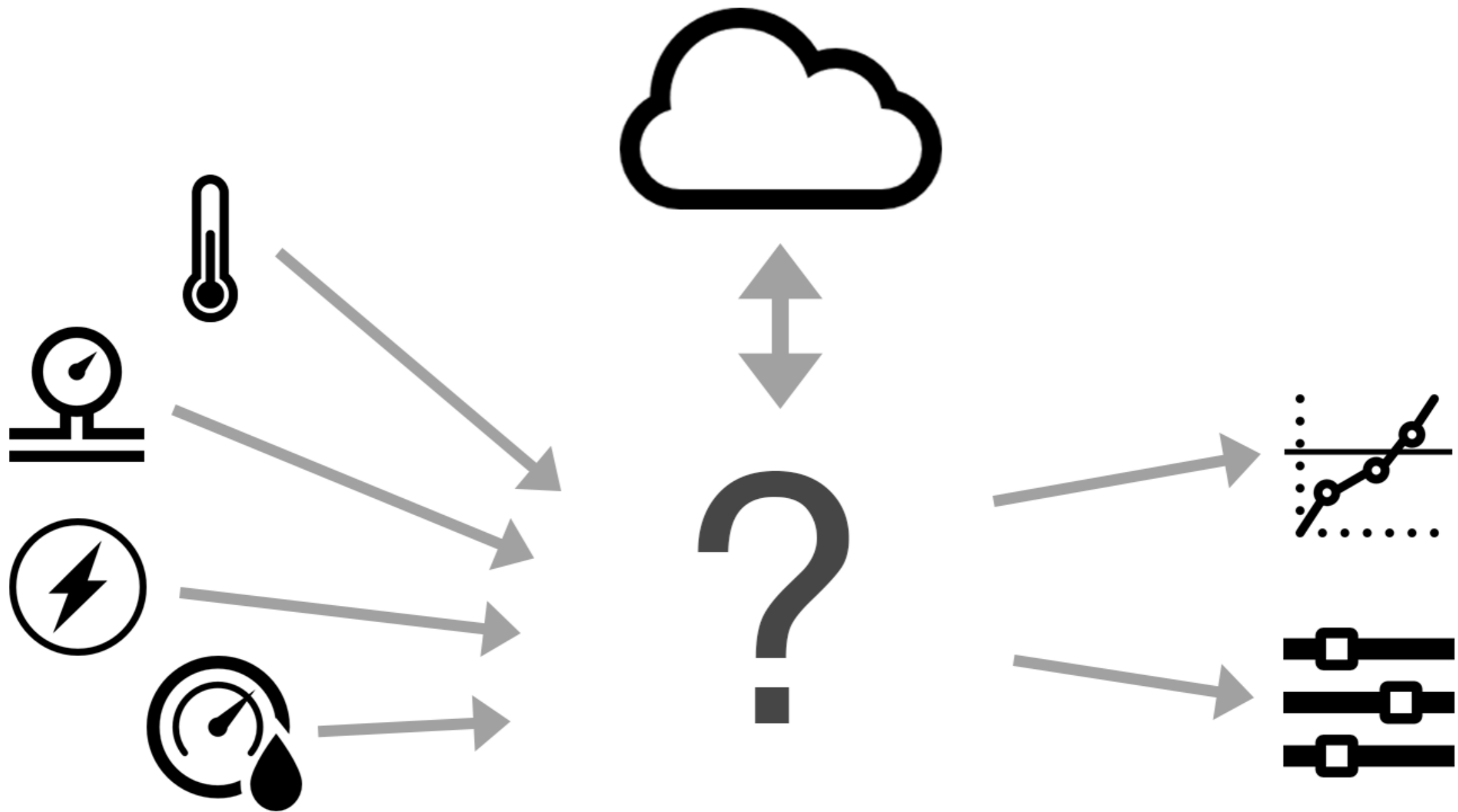
Florian M. Brunbauer

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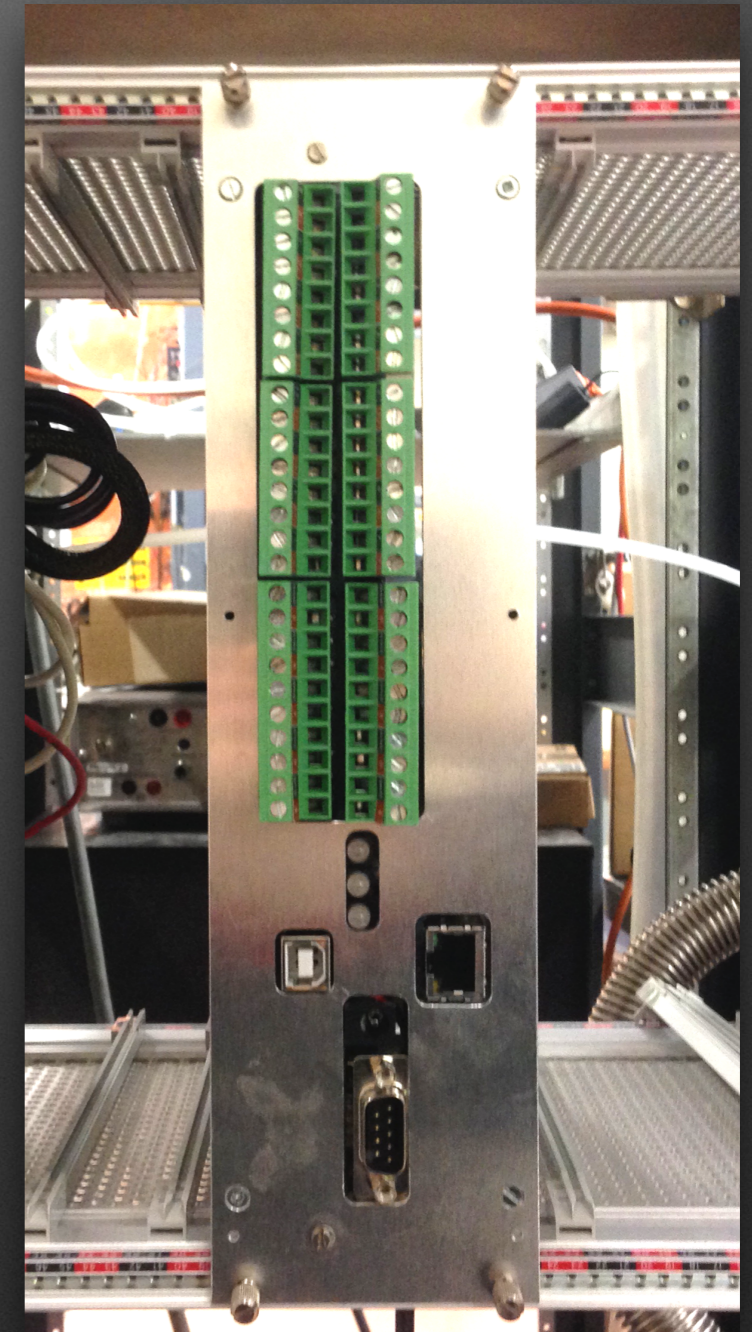
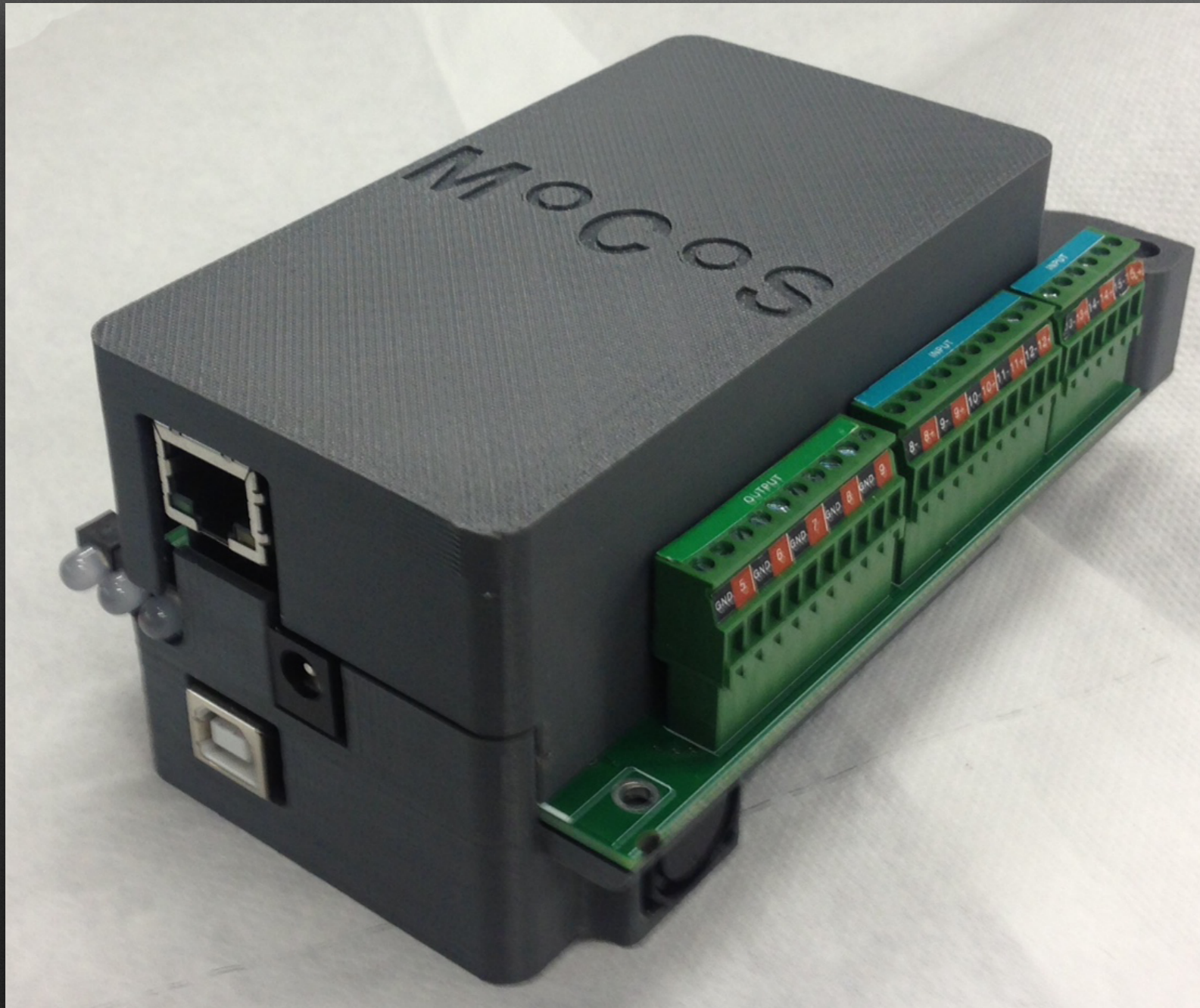
- **Goals**
- **Devices**
- **Capabilities**
- **Application Example**

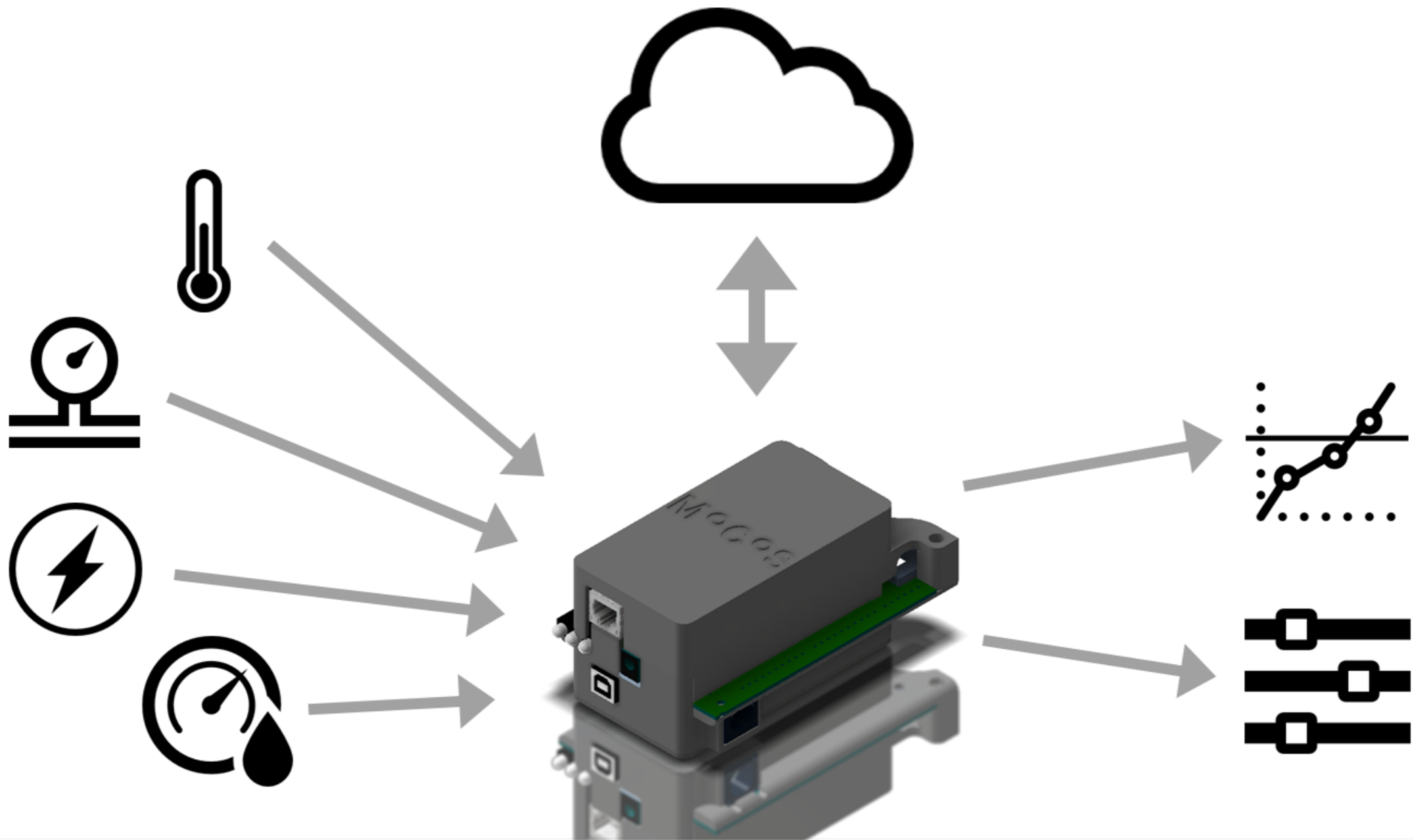
# Goals

- Making common lab tasks more efficient
- Online accessible data collected from sensors
- Controlling devices
- Intuitive and low-cost



# Devices





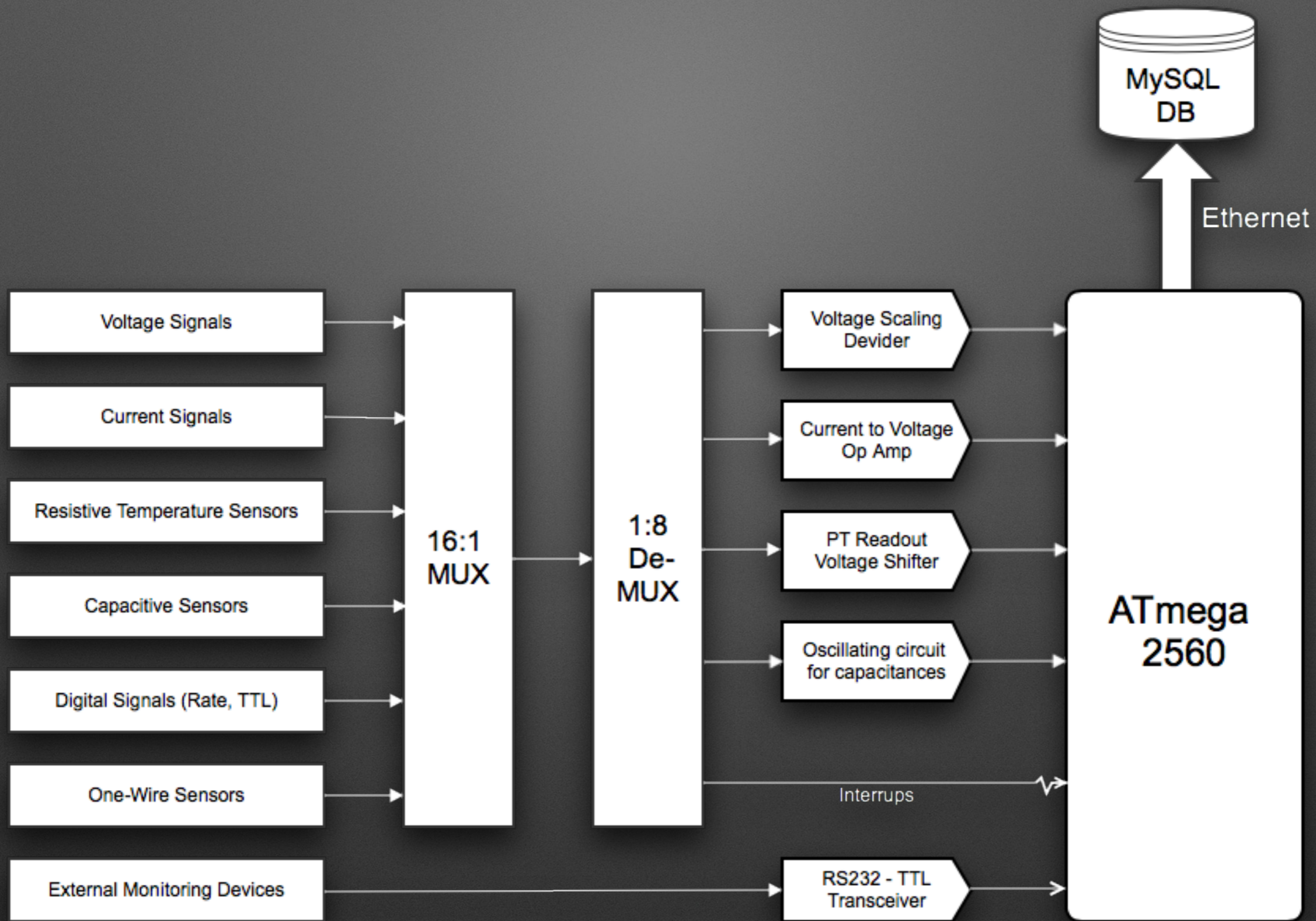
# Technical Details

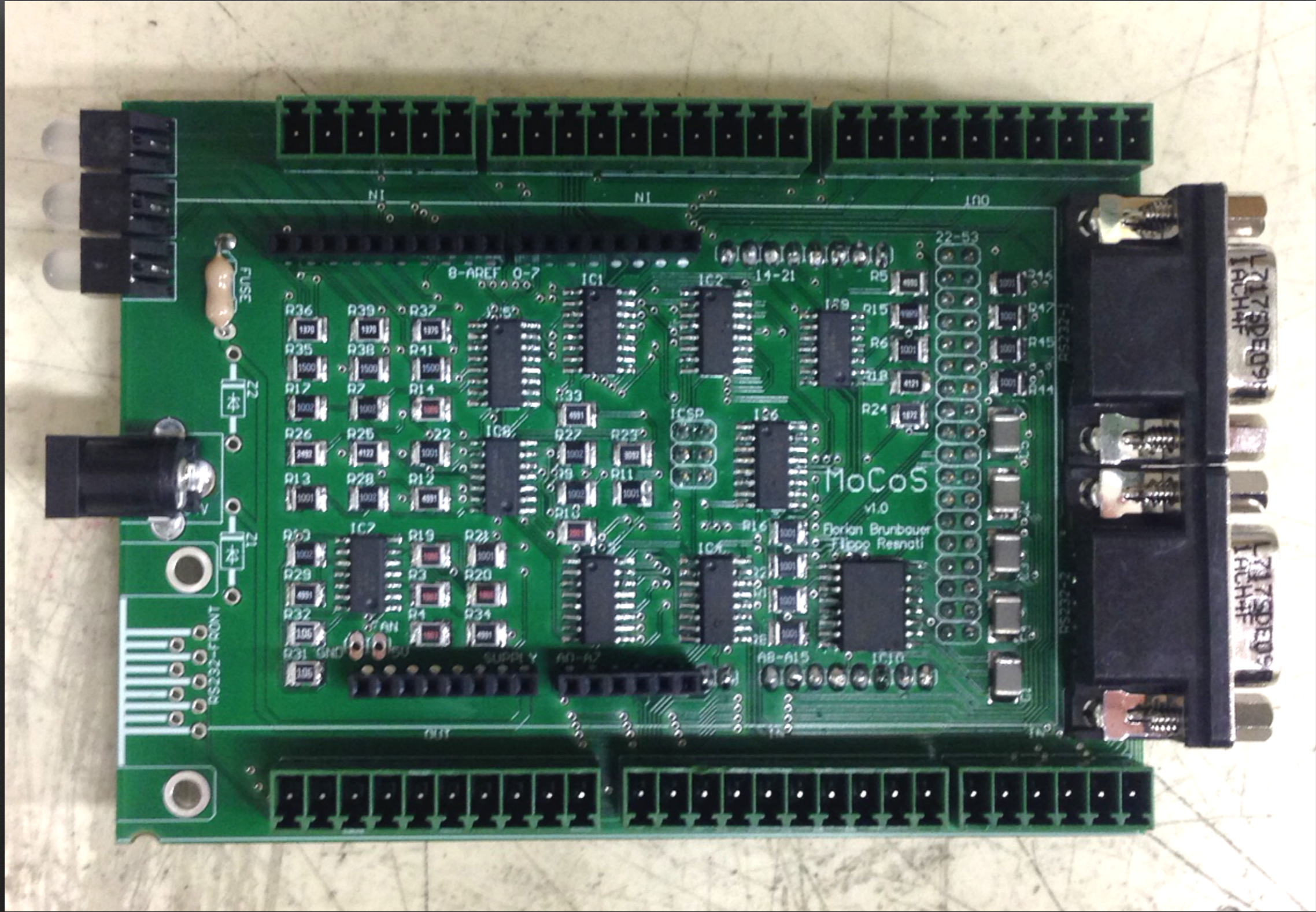
- Based on Arduino (ATmega 2560 microcontroller)
- Internal signal conditioning
- Communication via Ethernet and USB
- Data logged online and on SD card
- 16 universal inputs + 2 RS232 ports
- 10 control outputs

# Data Acquisition

- Analogue signals (voltage, current)
- Digital signals (rate, TTL)
- Resistive temperature sensors
- Capacitive sensors
- RS232 devices
- One-Wire sensors









# Data Logging


- Internal logging
- Online logging
- Custom logging intervals
- Accessible via web service

# Web Service

- Configuration of inputs and outputs
- Monitoring system status
- Trend charts
- Downloadable data files

No Data  
Temperature0


  
20.5518 C  
Ambient Temp 1 


  
20.25 C  
Ambient Temp 2


  
0.0005  
mbar  
Pressure Gauge 1


  
0.00001  
mbar  
Pressure Gauge 2


No Data  
Temperature53


  
3.40282e38  
mA  
Femto Box


  
899.271  
mbar  
Am. Pressure

  
20.0246 C  
Chamber


  
20.1564 C  
Bottom


  
19.8928 C  
GEM

  
20.8154 C  
Top

  
45.45 %  
Humidity

51.0449 C  
Cold End

  
20.9472 C  
Cold End

  
21.2108 C  
Hot End

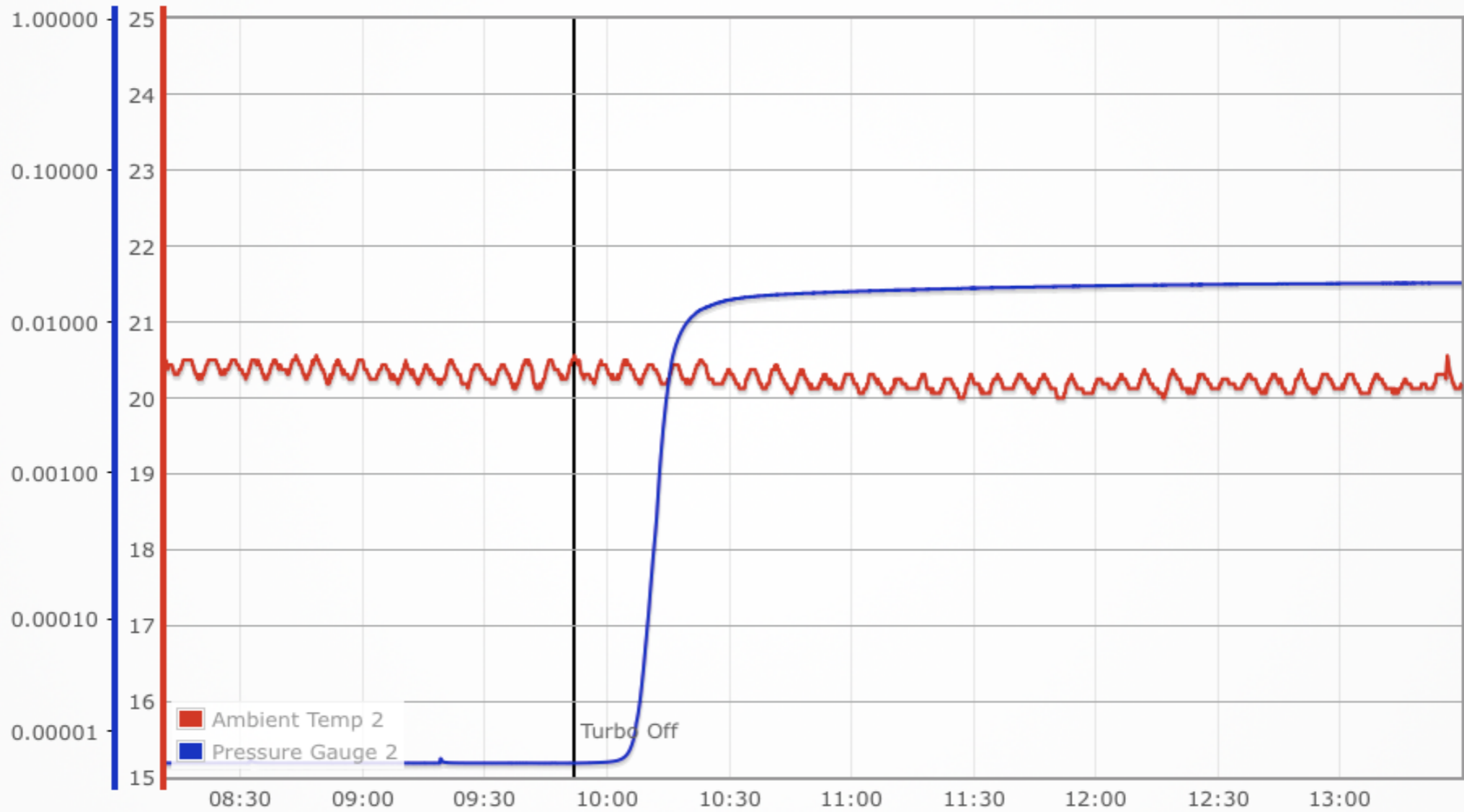
Logbook

Trend Plotting

Download All  
Data

Configuration  
Log

Show data range:     Custom range:  to

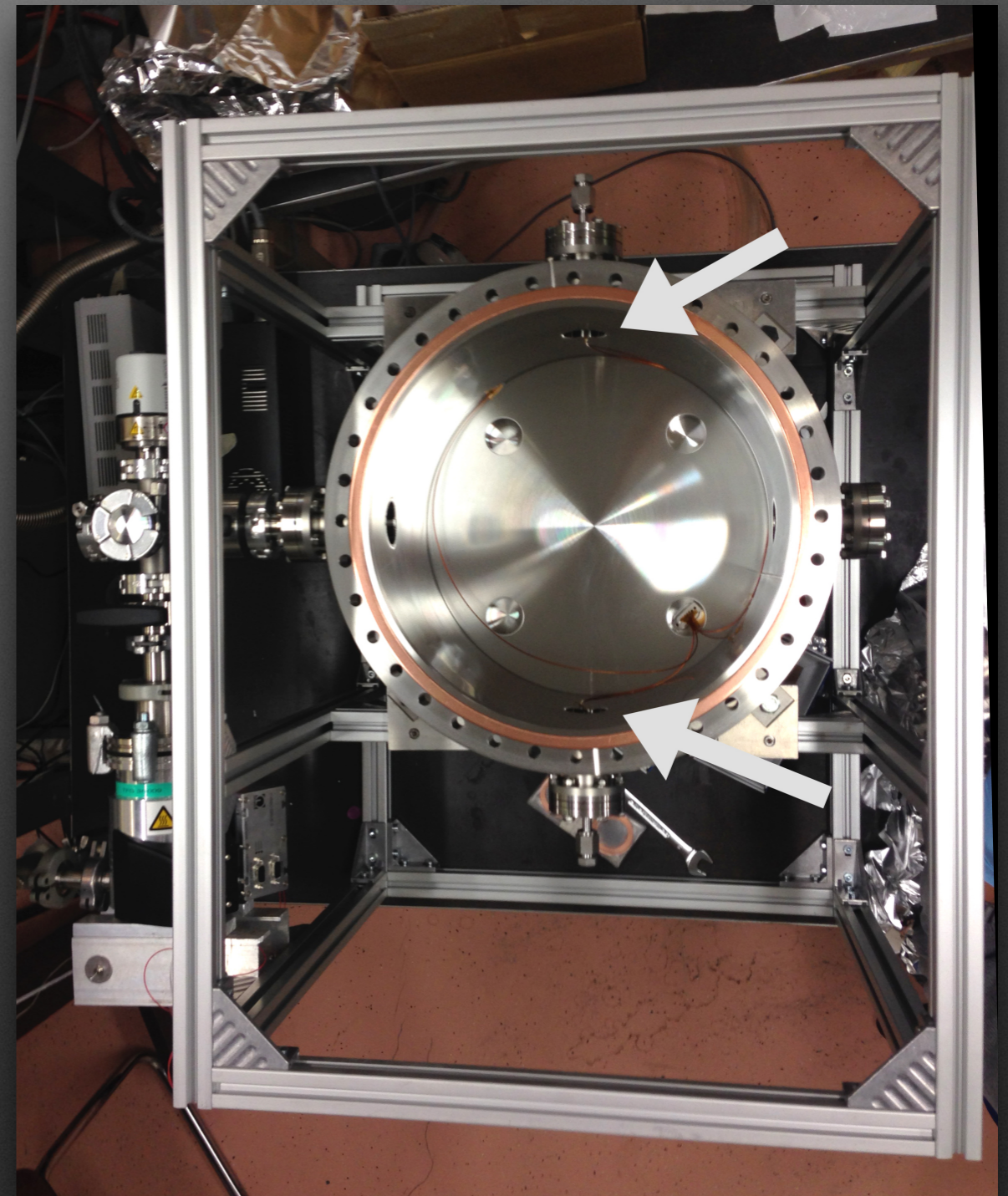


# Control

- Threshold based control outputs
- PID-controller outputs
- 0-5V, TTL

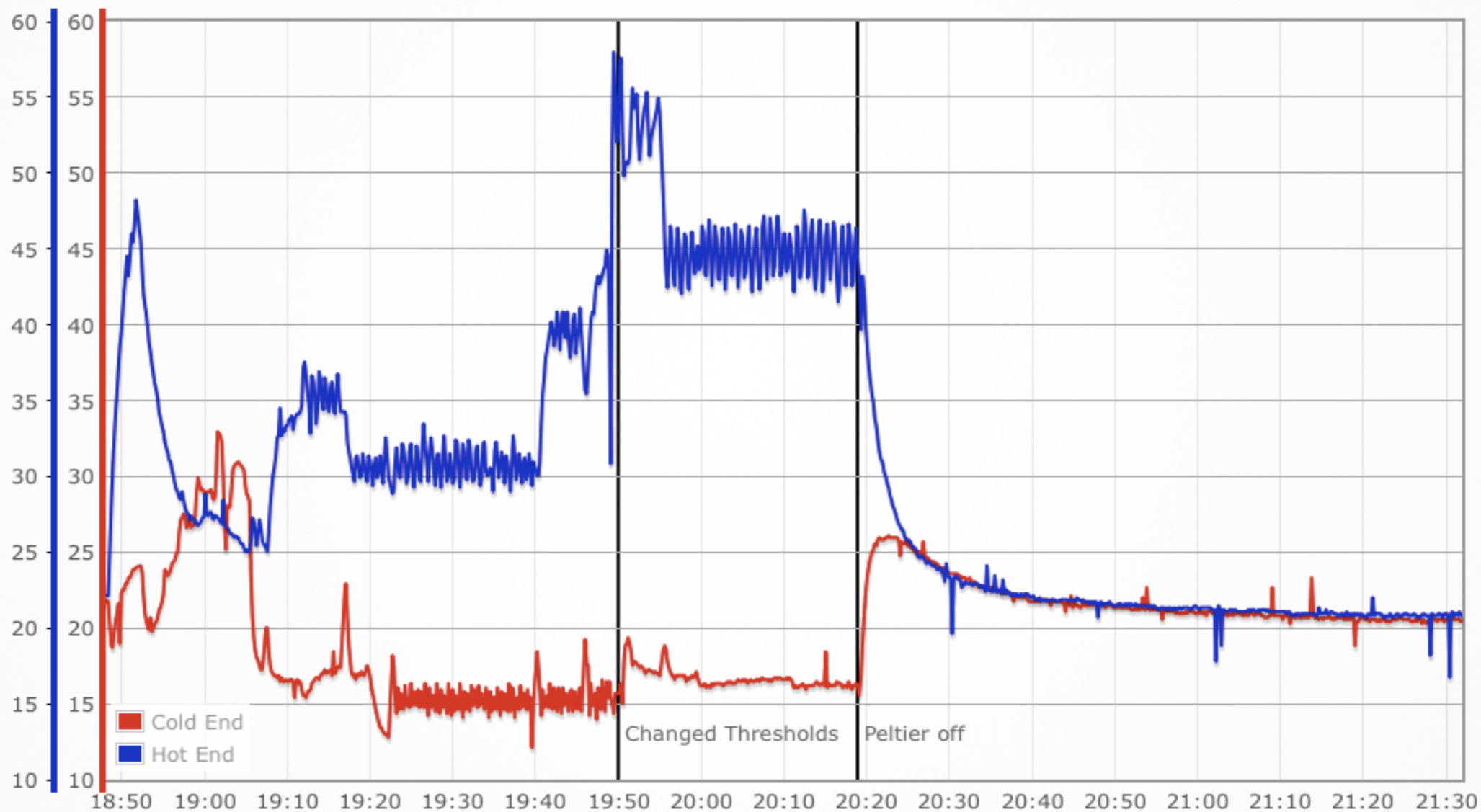
# Application Example

- Gas circulation system based on convection
- Controlling of heating and cooling Peltier elements
- Thresholds based on PT1000 sensor in vacuum chamber





Show data range:     Custom range:  to



# Summary

- Monitoring of 16 sensors
- Online data access and trend graphs
- Control based on thresholds and PID-logic
- Portable device and Eurocrate version

**Thank You**