

# First Results from Environmental Monitoring System

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## First Results from Environmental Monitoring System

A previous memo described the selection process for a System on a Chip (SoC) microcontroller appropriate for deployment in the end stations, with Hall B being the initial one chosen. Figure 1 shows the box located on the top of a rack on the forward carriage in Hall B. The white cable is the network cable which both provides power via Power-over-Ethernet as well as networking.

Small modifications to the code were needed after the first deployment in Hall B, namely it was found that there were occasionally delays in fully initializing the network interface which would cause the setup to the ActiveMQ broker to fail, this was fixed by simply attempting to connect to the broker multiple times before finally failing. Currently the code will attempt to connect up to 10 times, in observations over several power cycles it was found to never take more than 3 attempts. The other modification was to avoid sending the first data sample from the sensor chip to EPICS as the first reading was always incorrect. Currently this is believed to be due to initializing the oversampling on the chip, but limited access to the Hall prevented further debugging thus the solution to simply discard the first value was chosen.

- **The first prototype was installed in Hall B with data taken and sent to EPICS where it was archived**
- **Similar pressure measurements and improved temperature resolution was found when comparing other existing sensor data**



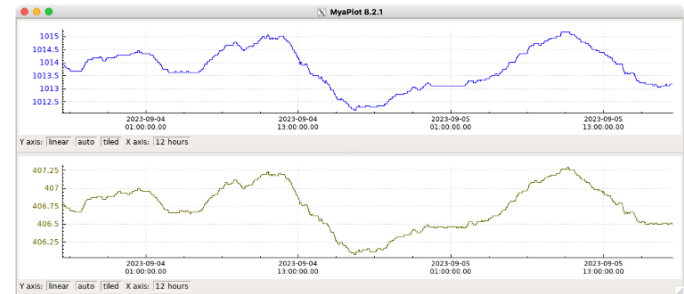
Deployed box circled in magenta

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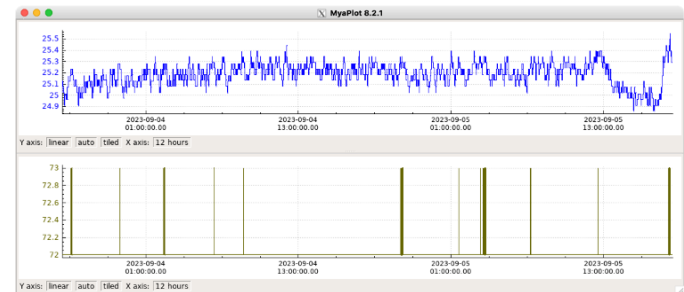
Figure 2 shows comparison of the ambient pressure of the new system compared to an existing pressure sensor, note that the units are different; hPa for new and inWC for the existing. Figure 3 is a similar comparison for the temperature, again with different sensor units; degrees C for the new sensor and degrees F for existing. All of the plots are from myaPlot which retrieves the archived PV data.

As can be seen from the plots the ambient pressure measurements track the existing sensor data while the ambient temperature as significantly increased resolution compared to the existing sensors. To conclude, the initial results from the SoC measured values archived via EPICS PVs show that the system can be well integrated into the existing software and provide increased accuracy to ambient measurements.

Top/Blue = new sensor  
Bottom/Brown = existing sensor



Ambient Pressure Comparison



Ambient Temperature Comparison