



# Raspberry PI based temperature monitoring network at the SLR Station Riga 1884

Poster B15

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## Hardware and Software

- The network is based on Rapsberry PI units, each with two DS18B20 temperature sensors.
- Operating system: Raspbian Stretch.
- Software language: Python.
- The code version "*write data once*" was selected to be used in conjunction with cron.
- Each sensor data channel is saved on independent daily files.
- Data is written to the local SD cards, and can be accessed remotely at any time over SSH.
- Units time sinchronization via NTP protocol.
- Full information can be found at:  
<https://github.com/chararchter/temperatureSensorDS18B20>



## Network Timeline

- 2017-08-07: First unit with sensors at the Laser Room and the receiver chain block.
- 2018-04-12: Second unit at the control room, with one sensor at the CFD NIM rack.
- Early 2019: Third unit at the Time Service+GPS receiver+SBS3 rack.

## Some Applications already done

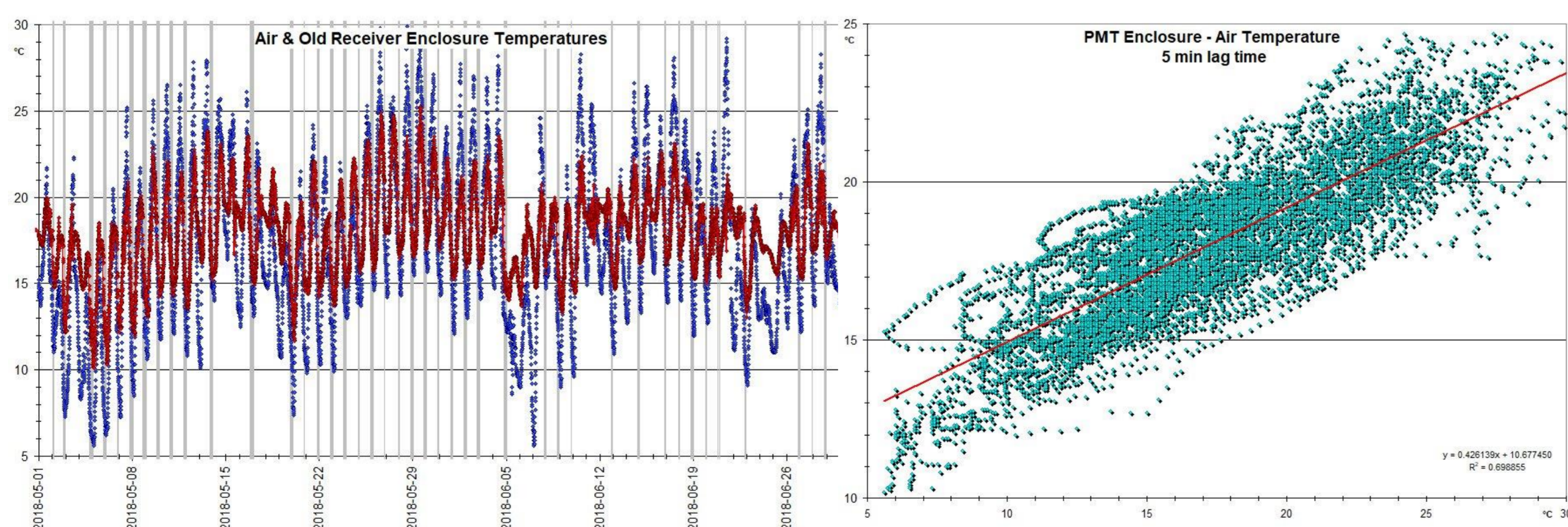
- Measured the CFD unit sensitivity to temperature changes.
- Evaluated the long term laser room temperature stability.
- Identify factors influencing on the laser loom temperature fluctuations.
- Used as a benchmark for evaluating the new upgraded receiver enclosure thermal isolation improvement.



First Unit assembly

Testing the First Unit

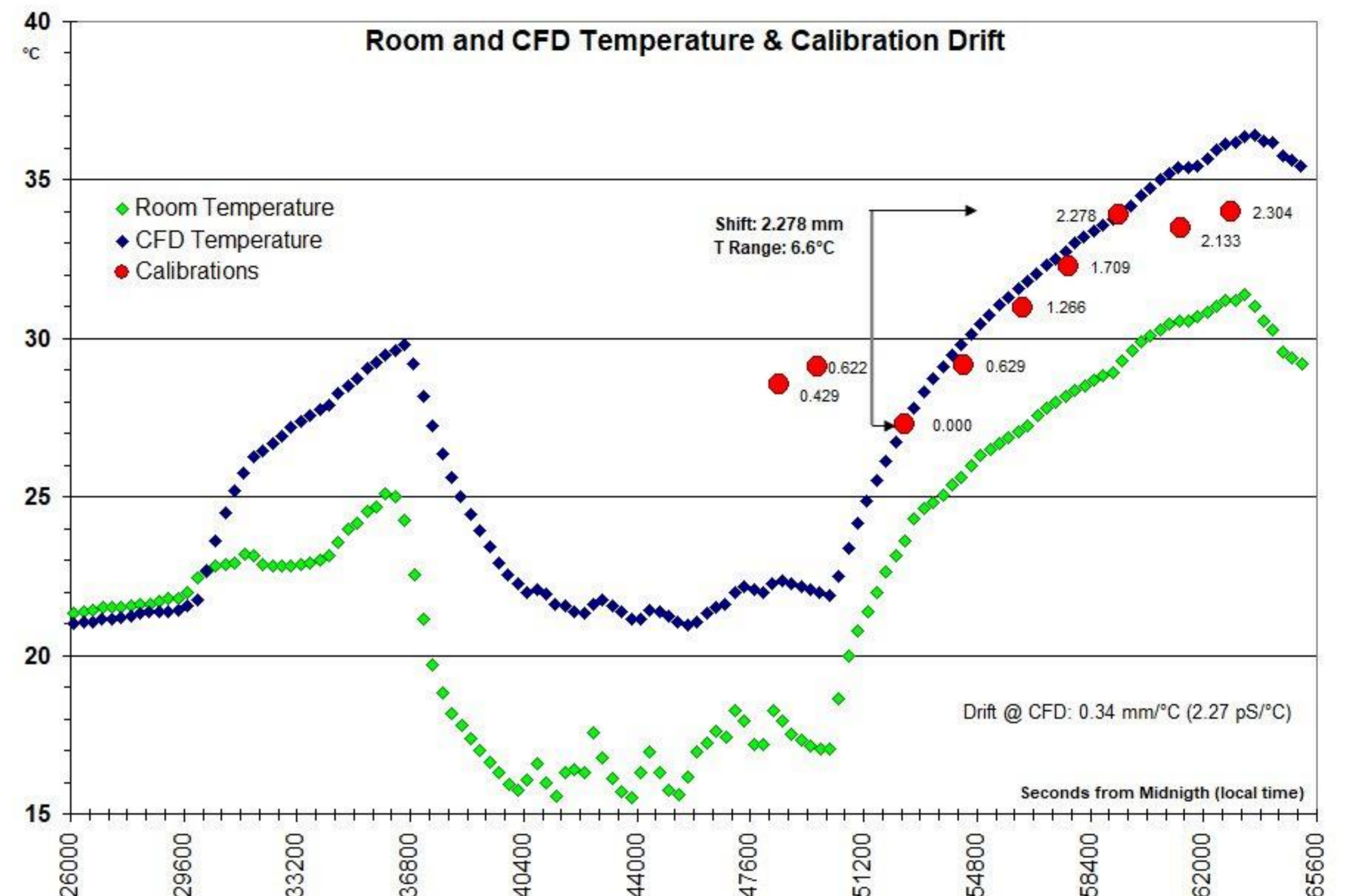
Second Unit sensors



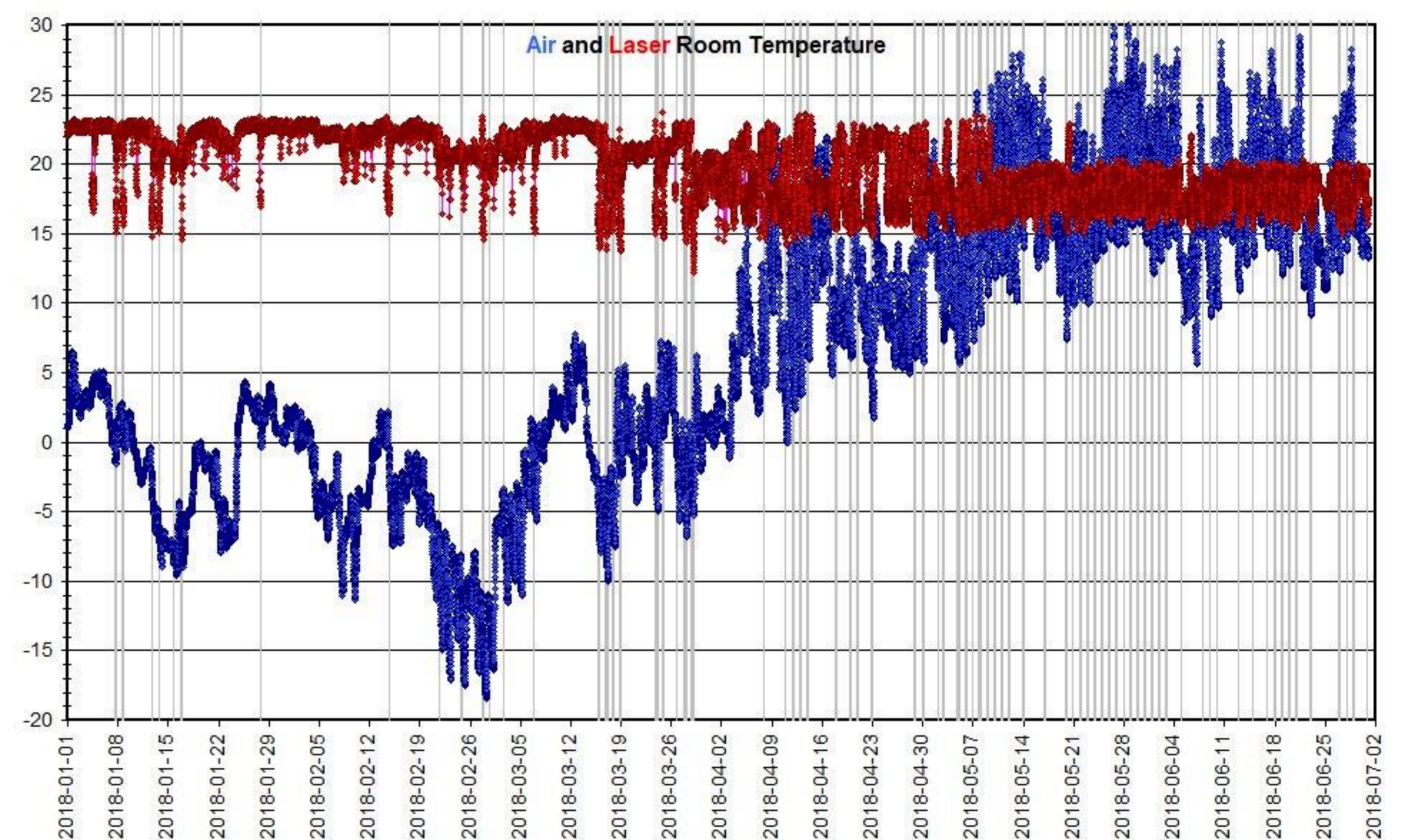
In Summer the temperature inside the old detector enclosure follows the ambient temperature oscillations with a reduced amplitude. The temperature inside the new detector enclosure *should* be more constant and have a lower slope in relation to the ambient temperature, (ideally a 0 slope).

### Acknowledgements:

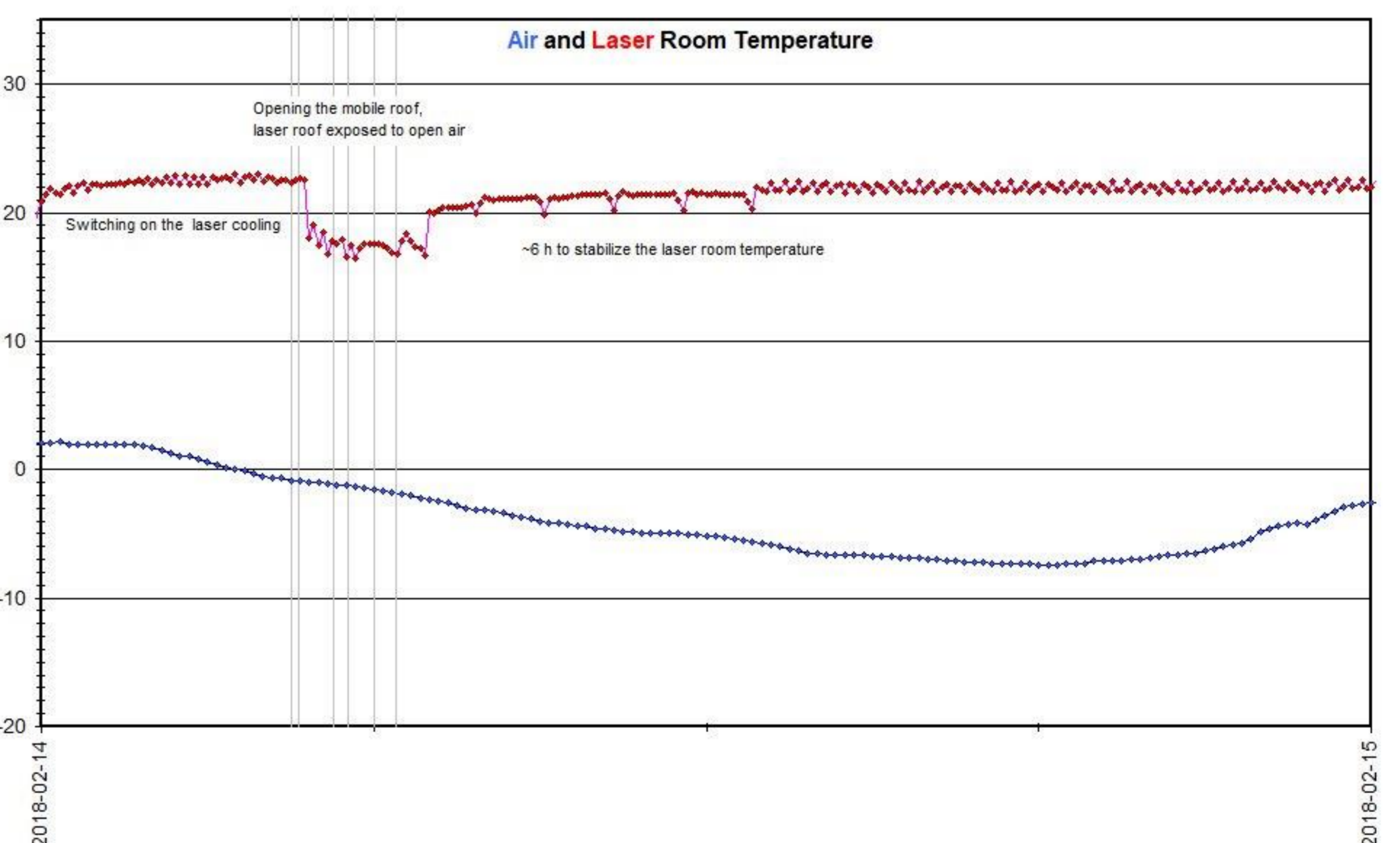
\*The first Rapsberry PI module assembly and programing was done in 2017 by Dalbiņa, L. A. and Leimane, V. in the frame of the *Interreg SpaceTEM* project internships.



Each calibration is the mean of 5 calibrations (600 laser shots each)  
Referencing the lowest calibration as 0, the calibration differences shown in mm.



Long Term Laser Room temperature stability  
The air conditioning temperature was set to 18°C for the summer.



The grey lines are the epoch of actual SLR observations.  
The laser room roof insulation should be improved!

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