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

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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 synchronization 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.

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.

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).