3PfD status: WP Sensor integration

GNSS-timing: Galileo PRS-receiver connected to external clock

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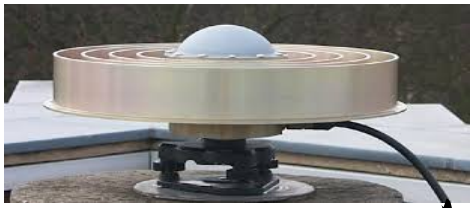
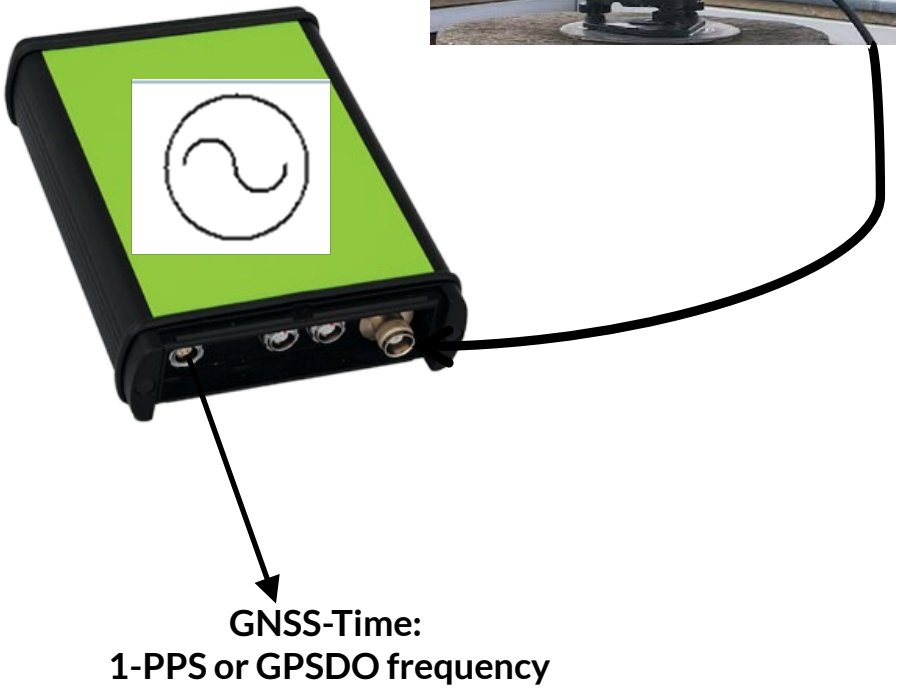
GNSS and timing

Basic setup

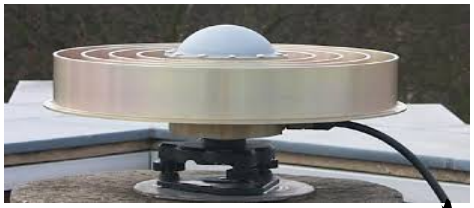




- Enough for many timing applications
- Outputs:
  - Synchronized 1-PPS
  - Disciplined frequency (GPSDO)

GNSS and timing

Time transfer setup



This configuration is needed for National Time Lab-level of timing applications

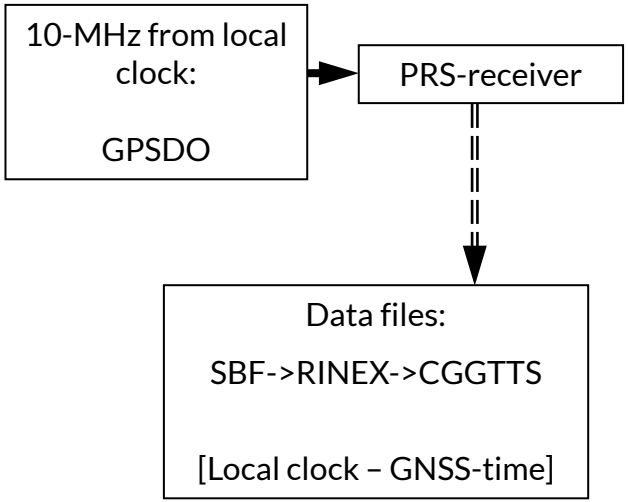
Extract data files for Time difference and **time transfer** applications

External clock signal inputs for timing applications:

- Coherent 10 MHz and 1-PPS.
- The internal oscillator is locked to the external clock signals. Thus, in effect all observations are timed by the external clock.

Galileo PRS-receiver connected to external clock 10-MHz frequency

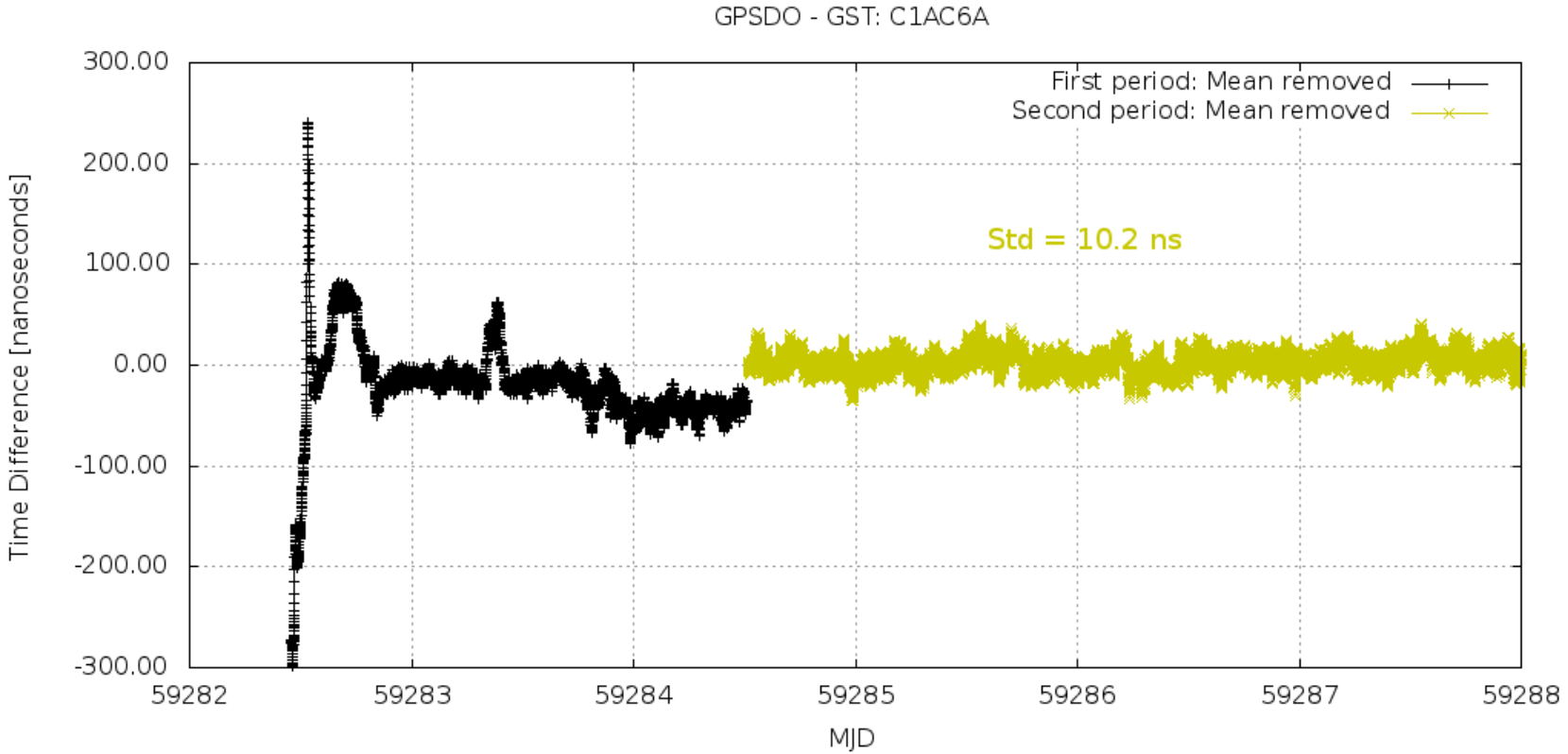
- PRS receiver installed at RMA in Belgium
- External clock: GPSDO 10-MHz, **no 1-PPS**
- PRS-receiver raw data files collected at RMA
  - converted to RINEX-files at RISE
  - converted to CGGTTS-files at RISE using RISE software RISEGNSS



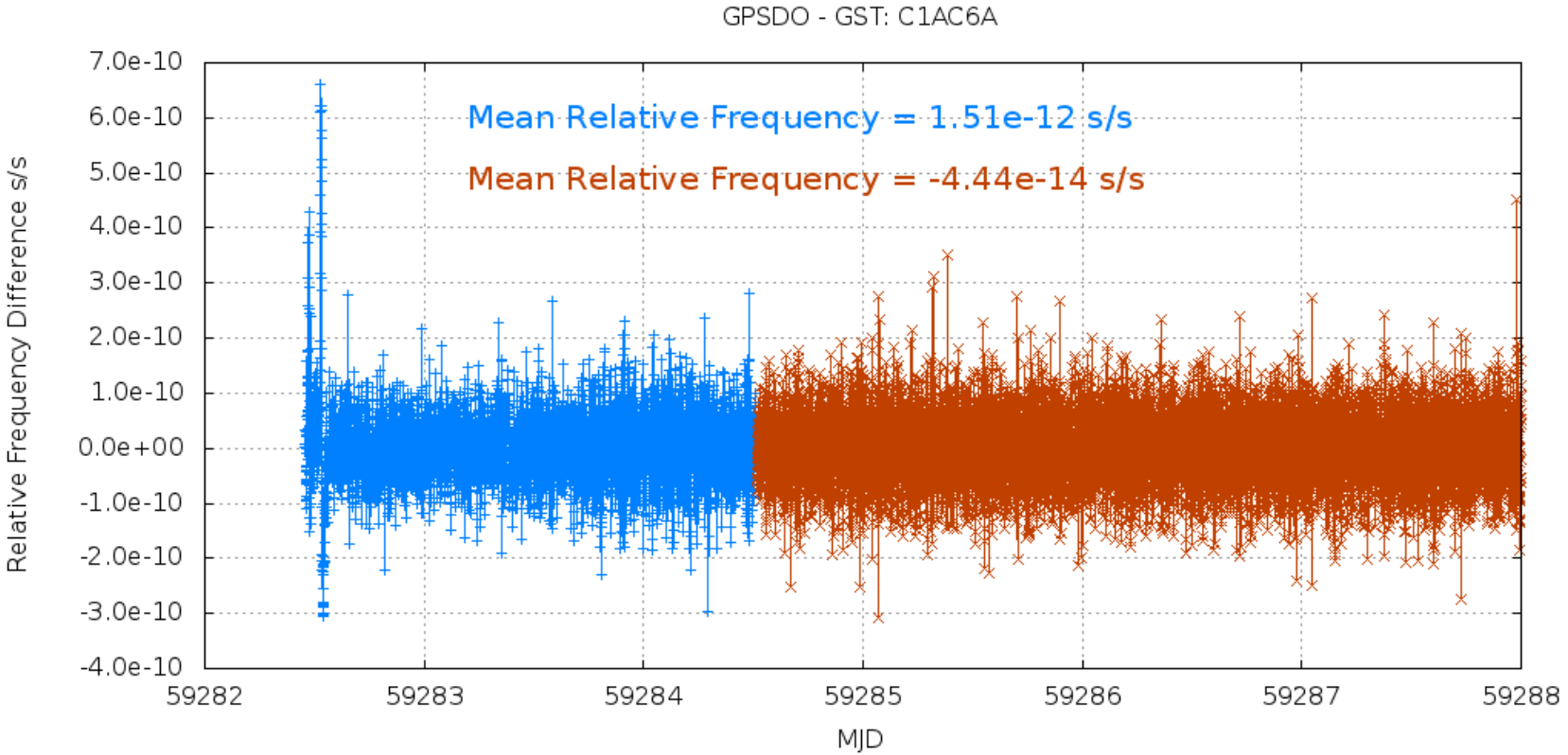
Results

- CGGTTS data files contain results of [Local Clock – GNSS-time]
  - GNSS-time is GST in this test
  - Local clock is the GPSDO 10-MHz
- Galileo PRS codes C1A and C6A analysed
  - and ionosphere free linear combination C1AC6A
- Timing results are arbitrary (no 1-PPS input; no delay calibration)
- Frequency results are correct. Calculated as derivative of time

PRS timing solution: GPSDO 10-MHz input



PRS frequency solution: GPSDO 10-MHz



Conclusion and suggested work

- Relevant results achieved in this test for frequency estimations using Galileo PRS signals
- Additional tests with 1-PPS needed for investigation of time signals
  - 1-PPS IN for time scale reference
  - 1-PPS OUT for characterisation of GNSS-time output
- Time transfer between two receivers
  - Requires two simultaneous installations
  - Compare with open GNSS signals

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