CABUREK SIM M4DT
2021 - 2023

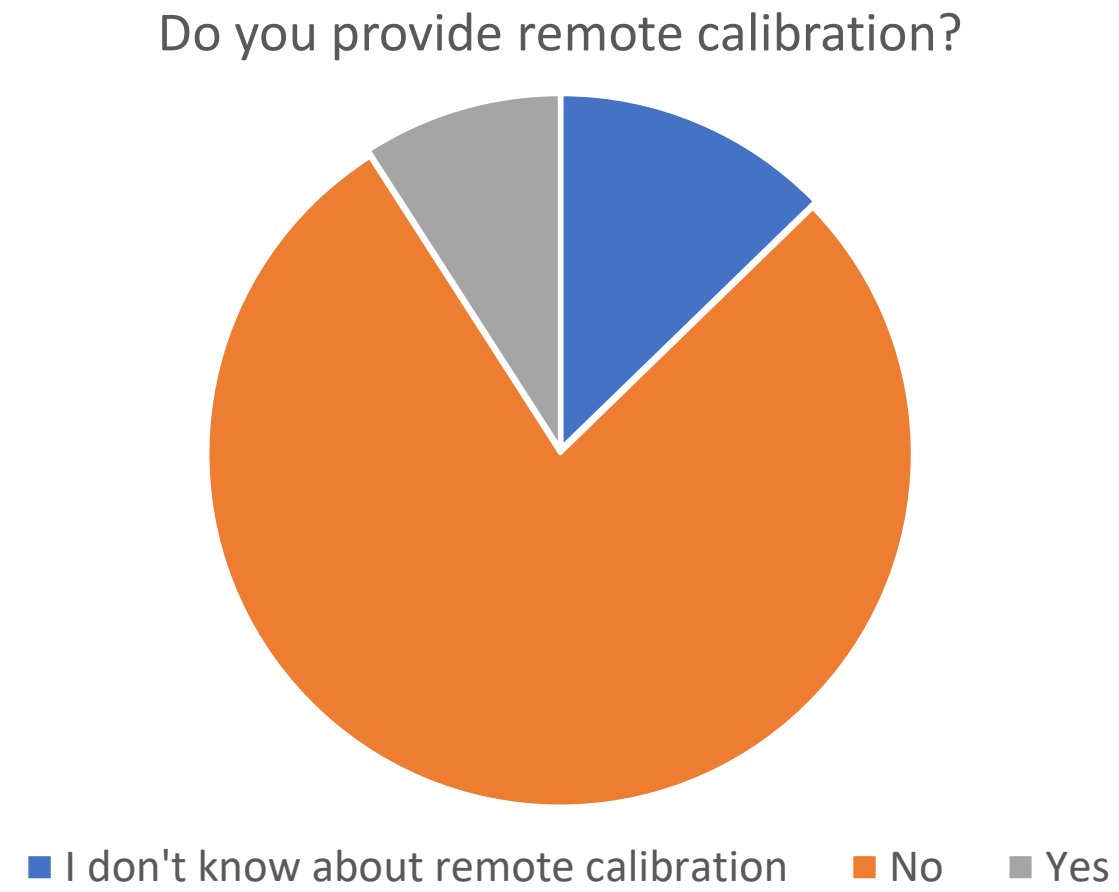
Implementation of new NMI services related to DT
IDB Project

Remote calibration

September 8, 2021

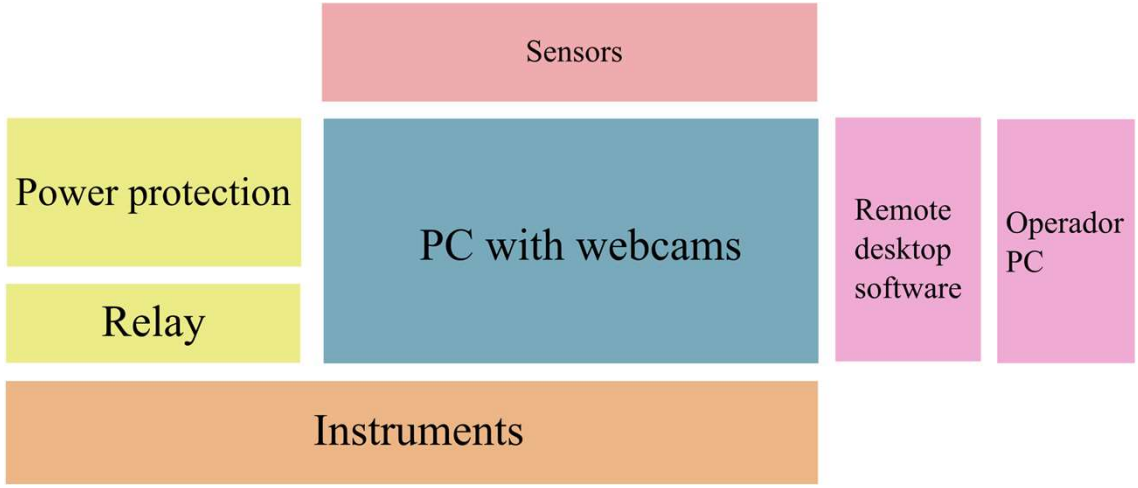
Working topics

- Review of the state of the art - Definition of remote calibration
- Toolbox
- Possible trends
    - Remote calibrations
    - Calibration by remote desktop
    - Online calibration
    - Wireless Instruments
- Possible applications
- Good practice


Do you provide remote calibration?
I don't know about remote calibration
No
Yes

Toolbox

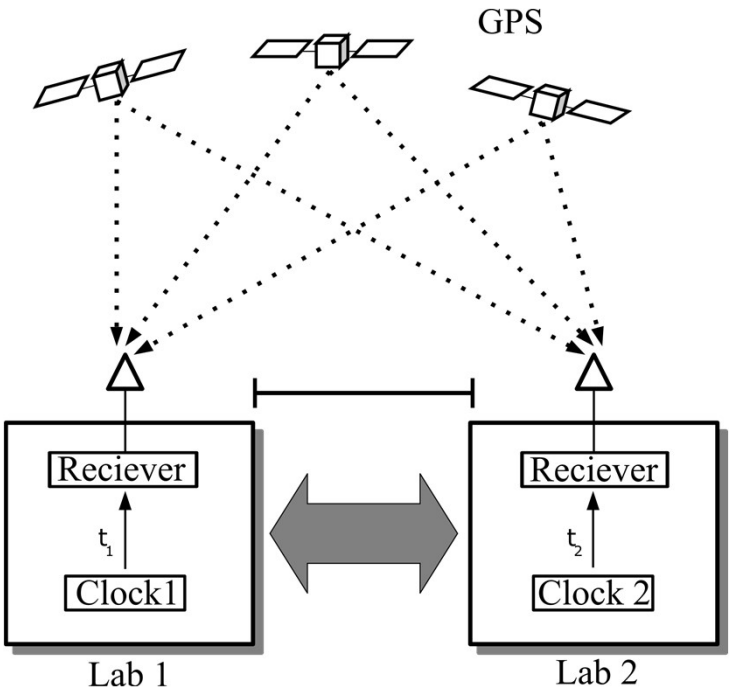
- Remote Desktop: RealVNC, OpenVPN, TeamViewer
- Notebook, mini-pc or Raspberry
- Video, photos and OCR (optical character recognition)
- Measurement of environmental variables
  - Temperature, humidity, pressure
  - Measurement during transport (vibration?)
- Programming (Python or LabView or Proprietary Software)
- Power control

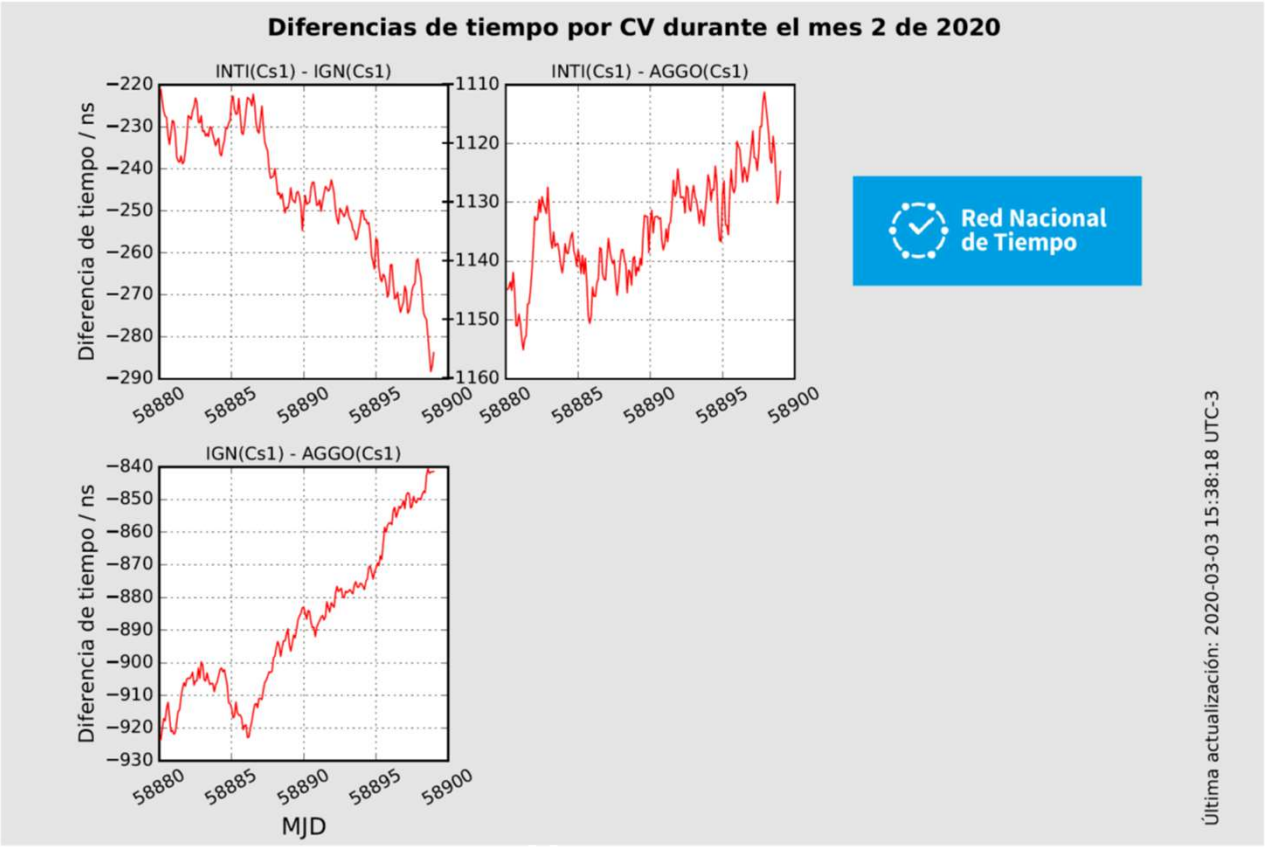


Remote calibration

- INTI: Instituto Nacional de Tecnología Industrial
- ONBA: Observatorio Naval de Buenos Aires
- IGN: Instituto Geográfico Nacional
- AGGO: Argentine-German Geodetic Observatory

Remote calibration





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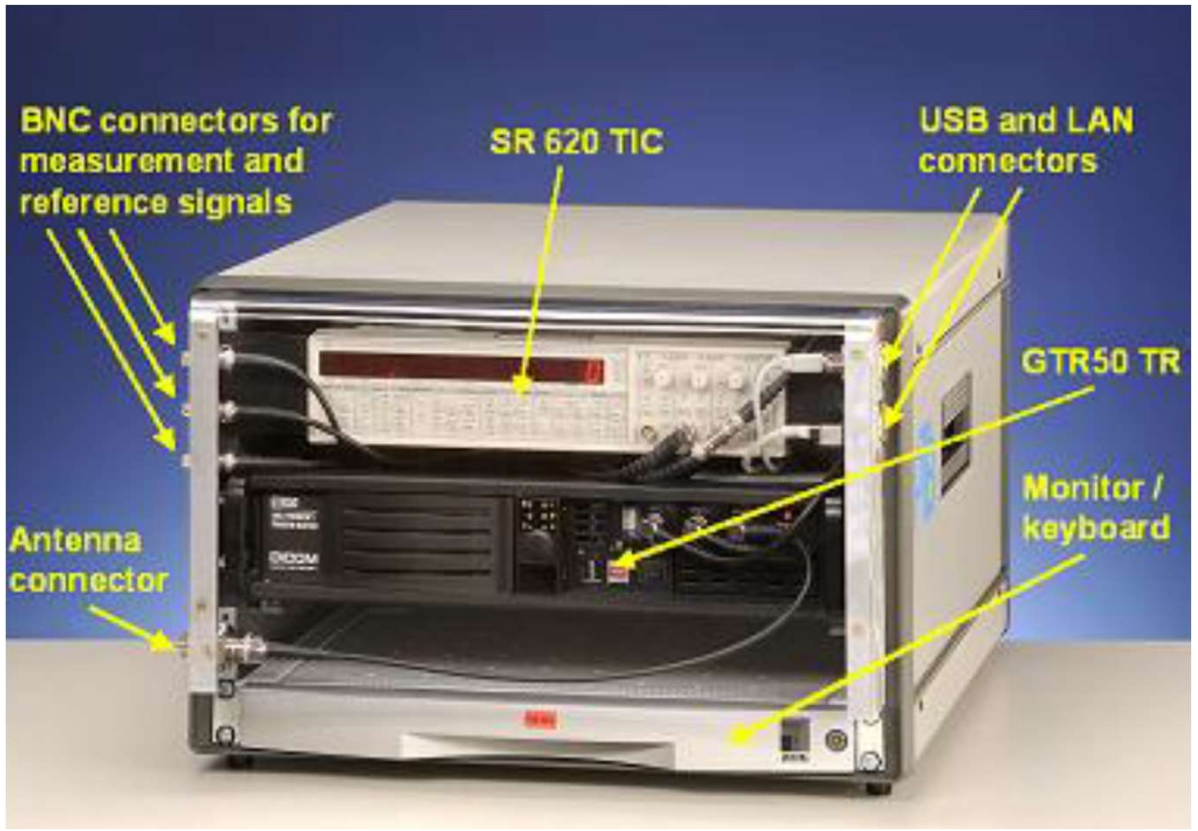
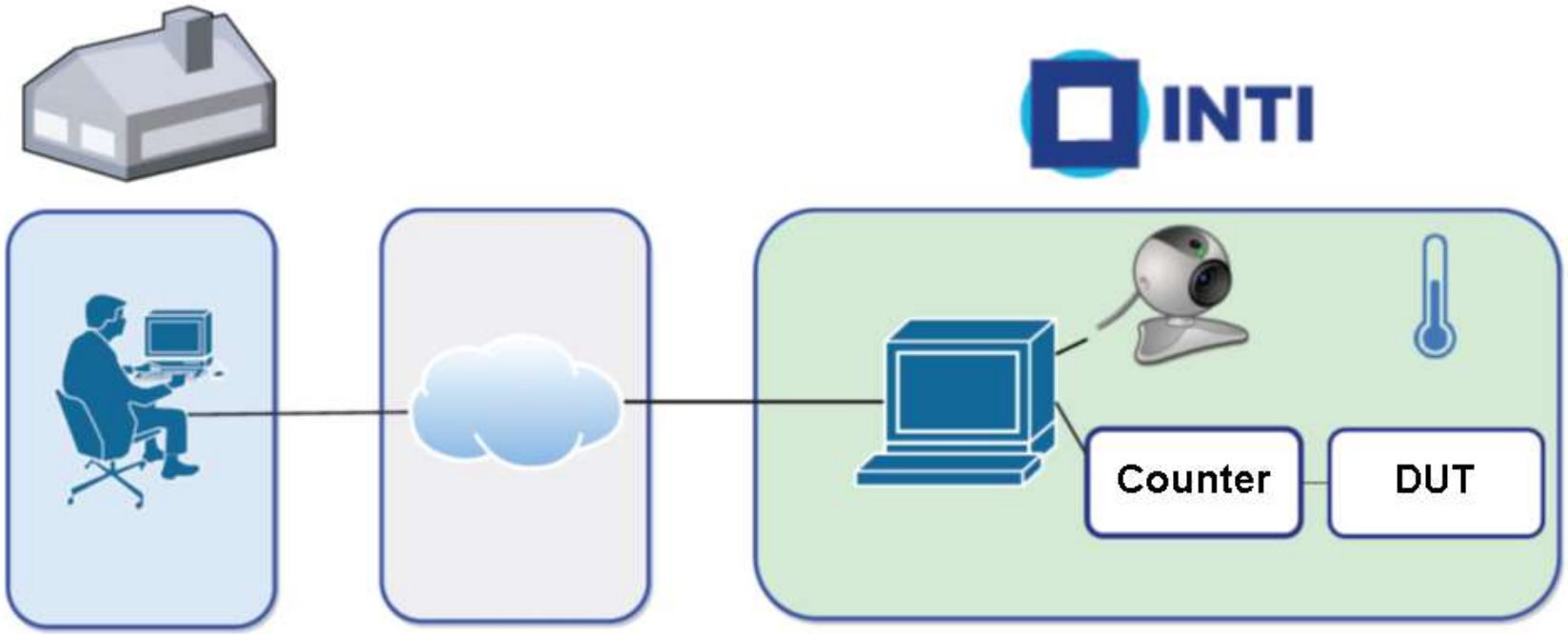


Thorsten Feldmann, Andreas Bauch, Dirk Piester, Michael Rost, Elizabeth Goldberg, Stephen Mitchell, and Blair Fonville, “Advanced GPS-based time link calibration with PTB´S new GPS calibration setup”, *42nd Annual Precise Time and Time Interval (PTTI) Meeting*

Calibration by remote desktop



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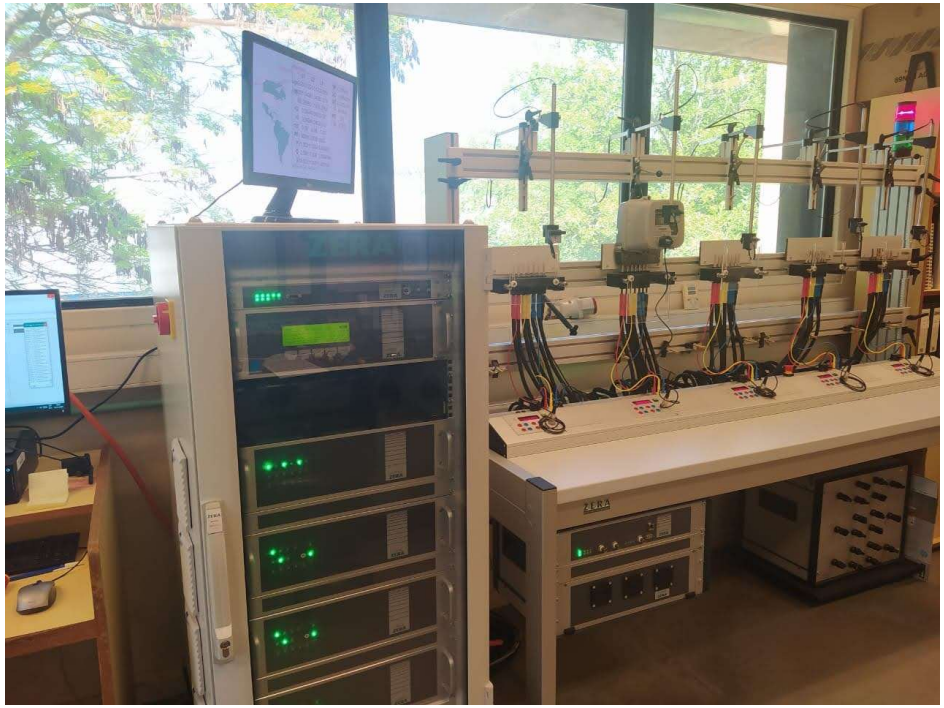
Calibration by remote desktop



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In-line calibration

How do you calibrate a sensor if it is located far away from the control panel (indicator)?

Roberto Benitez, and Roberto Benitez, **“Wireless calibration for Industry 4.0”,** 19th International Congress of Metrology, 22001 (2019).

Wireless instruments – digital readout

Posible national projects of CABUREK participants

- develop or strengthen remote calibration services
- develop calibration service with remote supervision
- develop traveling standard
- develop in-line calibration services of sensors and sensor-networks for industry

Good practice

- The remote services must meet the ISO/IEC 17025 requirements.
- The experiences must be summaries in a “good practice” document.
- This document can help to build the service and to perform the review process.

Thank you

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