Metrology for the Factory of the Future

EMPIR 17IND12 Met4FoF (06/18 – 05/21)

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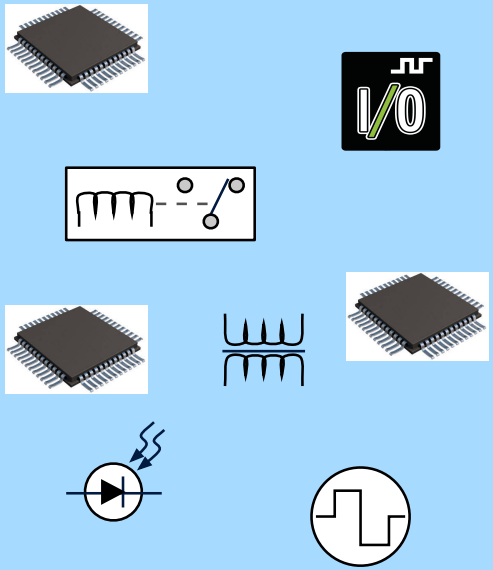
Overall aims of Met4FoF

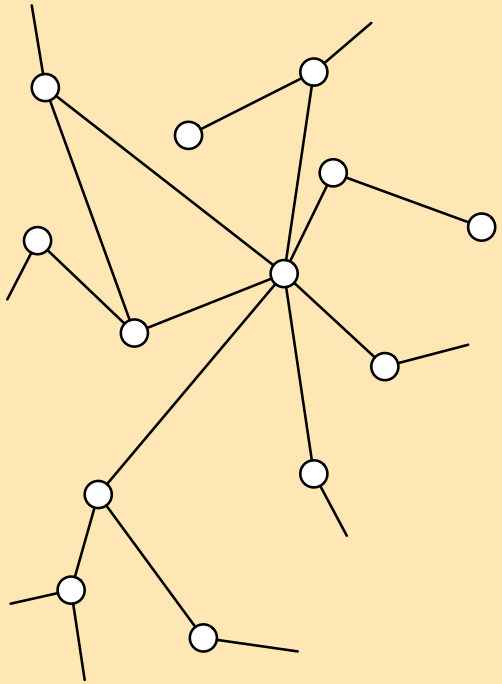
EURAMET

Digital sensors and smart traceability



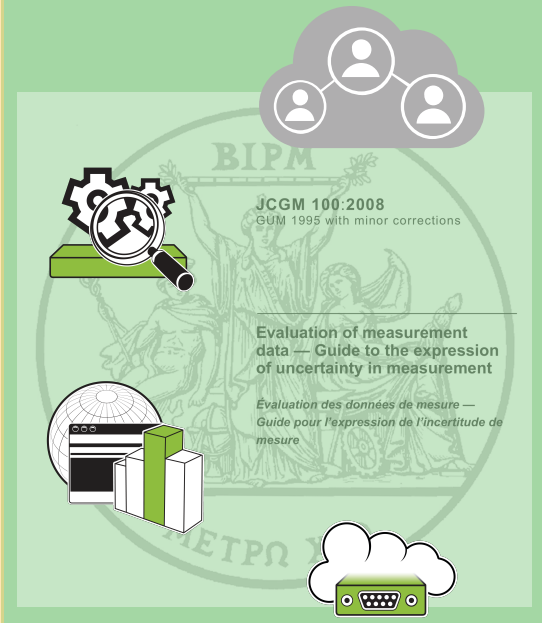
Dynamic, digital-only output and low-cost MEMS sensors

Reliable smart sensor networks



Synchronisation, co-calibration and sensor fusion

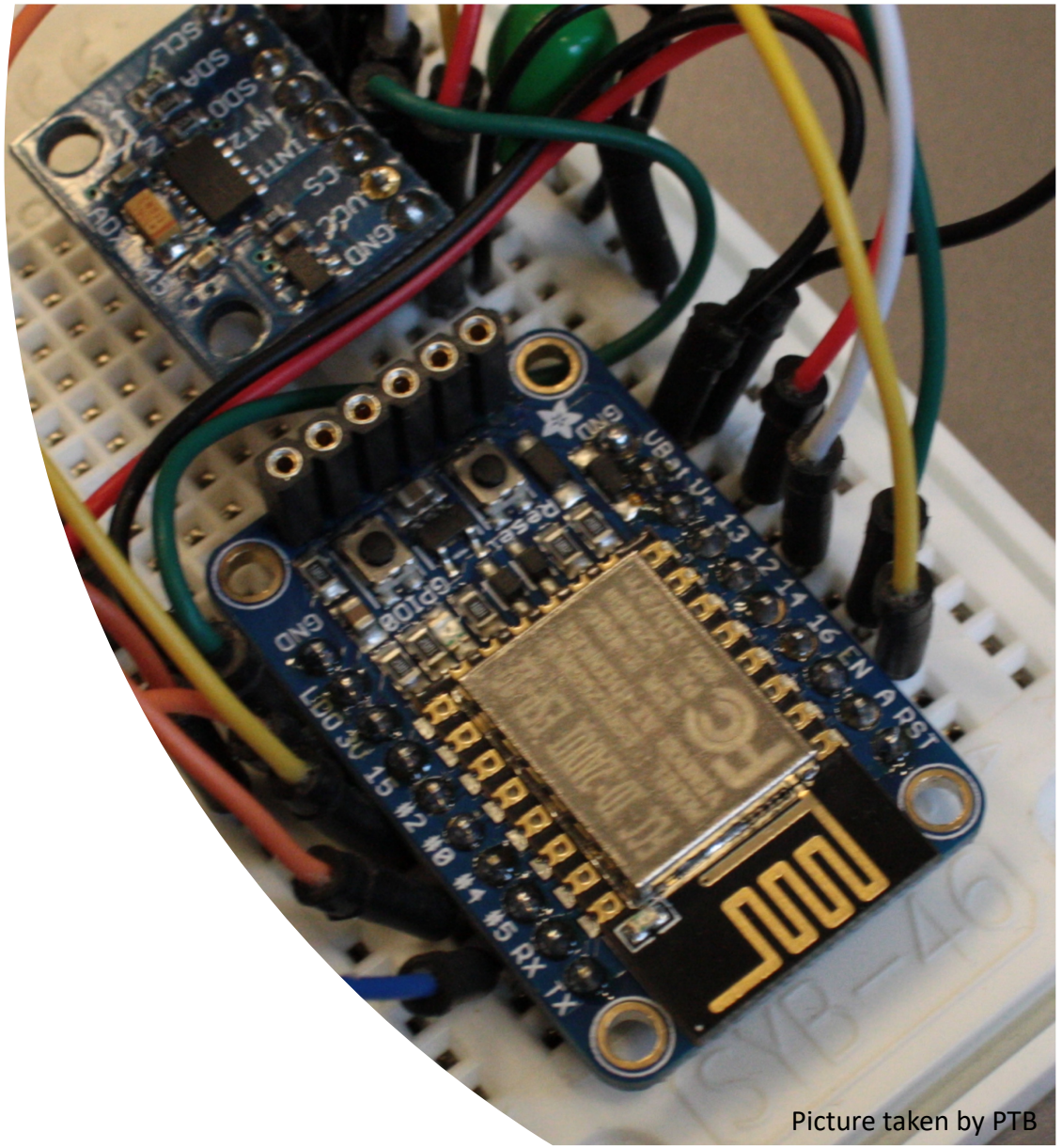
Confidence in smart data analysis methods



Measurement uncertainty in machine learning and AI

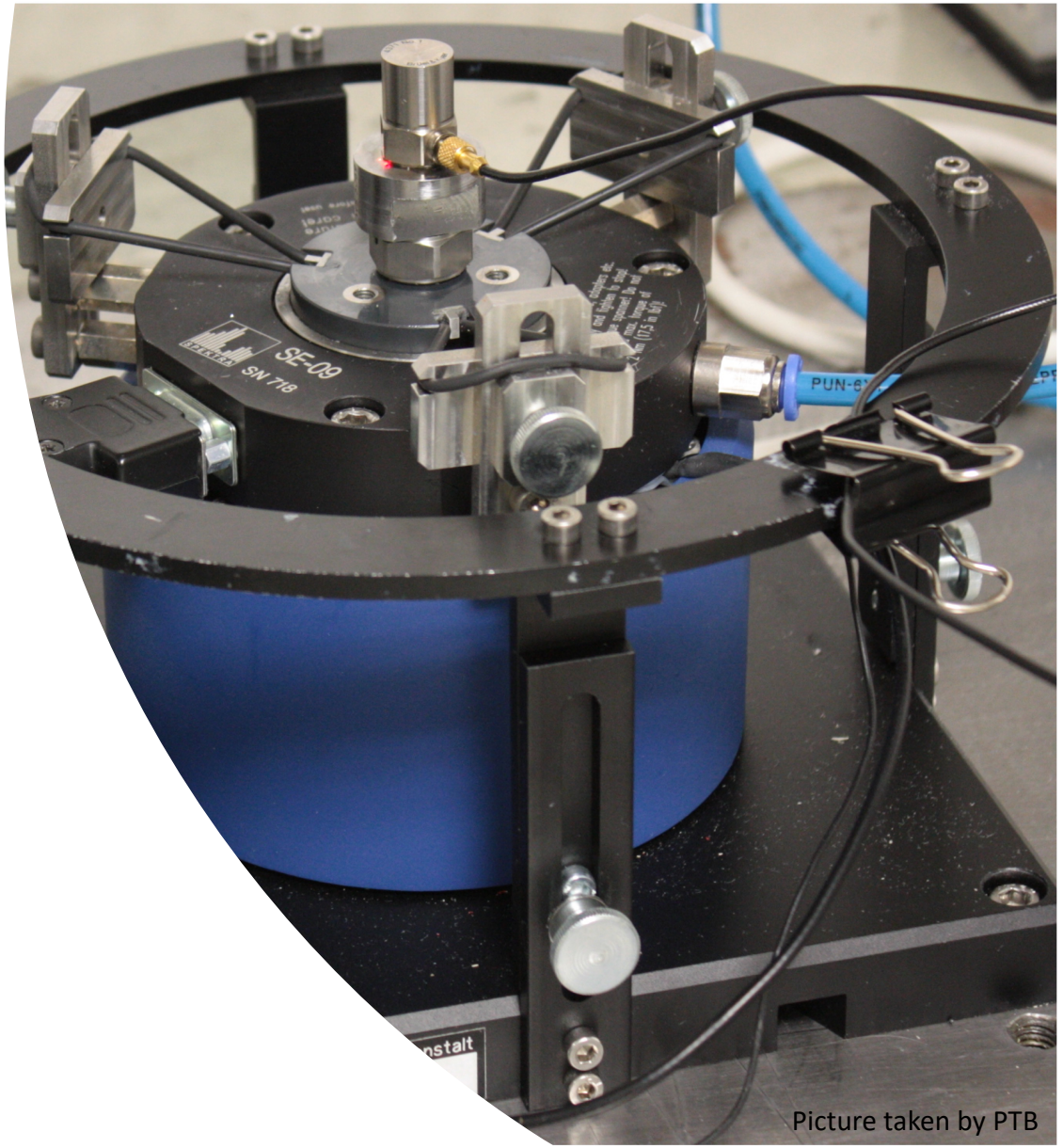
Scientific objectives

- Develop calibration framework for sensors with digital pre-processed output and internal signal processing
- Develop reference system for in-situ calibration of MEMS measuring ambient conditions.
- Develop metrological infrastructure for real-time data aggregation and machine learning in industrial sensor networks
- Implement the methods and frameworks developed in industry-like test environments



State of the art

- Traceable dynamic calibration of sensors with analogue output (EMRP IND09)
- Sensor network metrology for electrical power grids (e.g. EMRP ENG63)
- Application of MEMS temperature sensors in IoT without traceable calibration
- Machine learning for industrial sensor networks without uncertainties



Picture taken by PTB

WP1 - Calibration frameworks (61 PM)

- Dynamic calibration of digital sensors
- “Smart Traceability“ sensor prototype
- Automated test bed for MEMS for traceable *in situ* calibration

Calibrated sensors

Modelling

WP2 - Mathematical frameworks (90 PM)

- Uncertainty components in IoT networks
- Sensor co-calibration and redundant measurement
- Uncertainty for machine learning

Data

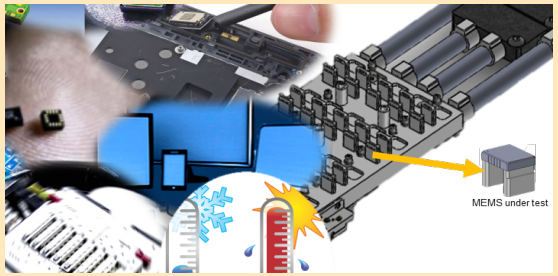
Sensors

Data

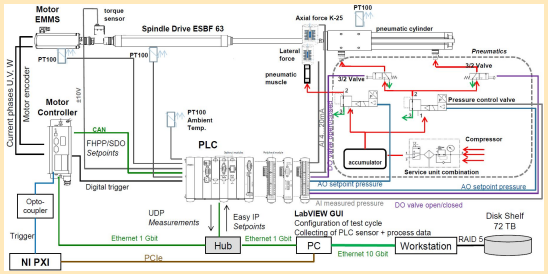
Methods

WP3 - Industrial test beds (45 PM)

ATE for *in situ* traceable calibration of MEMS temperature sensors



Machine learning with uncertainty for traceable condition monitoring



Machine learning with uncertainty for improved process optimisation