

# A view from the 'other' side

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# The 'other' side

- Master in Science of Industrial Engineer (Mechanics)
- 3 years by Caterpillar and Toyota – Engines – Development, Quality and Customer Support
- Application for job vacancy @ CERN
  - 3 years contract BUT unique opportunity to work on such a project – LHC construction

- **Project Engineer – components used in the LHC quadrupole and dipole magnets**
  - specifications, call for tender, contract management & customer support (CERN) - components originating from 4 different European companies
- **Project Engineer – LHC interconnections**
  - Installation follow-up and quality assurance

- Eventually 5 years contract due to LHC project delay; from 2003 to 2008
- Possibility to continue at CERN but job's proposal not corresponding to my wishes as a next professional step
- Most experience in technical areas (not an expert but very diverse)
- CERN offered career reorientation

# Back to the 'other' side

- All positions in relation with Customers
- Very keen in having a more commercial function, still related to technical products
- Sales advisor degree & German courses

# Back to the 'other' side

- In 2008 = economic crisis... One could think that completely changing career orientation isn't the best idea!
- Having worked at CERN was most of the time seen by potential employers as a huge benefit
- Started the job interviews at the company I worked for, just after CERN, on the first day I was back from Germany

# A Springboard for your Career

- International environment
- Team work
- At the cutting edge of technology
- Daily contacts with very high skilled and talented persons in lots of fields




Gilles Santi  
Co-founder and CTO



# Personal Introduction

- PhD in physics (Geneva; theoretical condensed matter physics)
- Several postdocs: UC Berkeley (US), Bristol (UK), Århus (DK), Geneva, EPFL
- Fields: Exotic pairing superconductivity (high-T<sub>c</sub>, ferromagnetic,...), ab initio electronic structure, phonon and electron-phonon interaction calculations
- Co-founder and CTO (software and sensor physics side) of Sensima, Sedect and AIMsight, chairman of Sedect.
- Have gone through the academia – industry “phase transition” @ 35–40

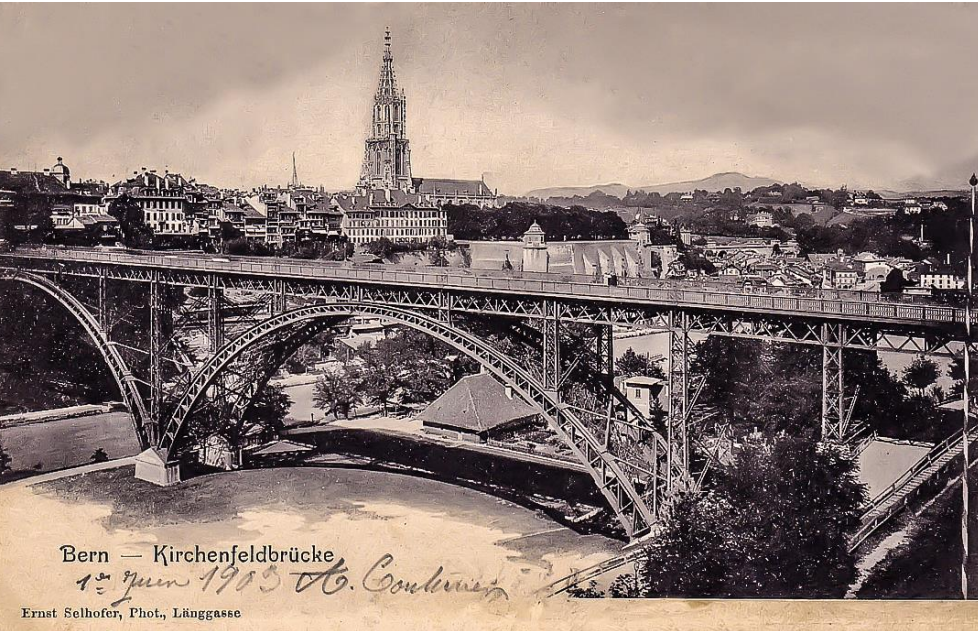
# Sensima's (Brief) History

- 2009: foundation of Sensima inspection
  - Development of high-res magnetic “camera” based on IC Hall sensors (CMOS) and a novel inspection tool for enhanced crack characterization for **ALSTOM** (now General Electrics )
  - Development of IC for eddy current inspections: “Instrument in a chip”
  - Special probe development and inspection techniques (“Blade project”)
- 2015: foundation of Sedect
  - Development of threat detection solutions at airport security checkpoints
- 2017: foundation of AIMsight (100% owned by Sensima)
  - Development of solutions for structural health monitoring (SHM)

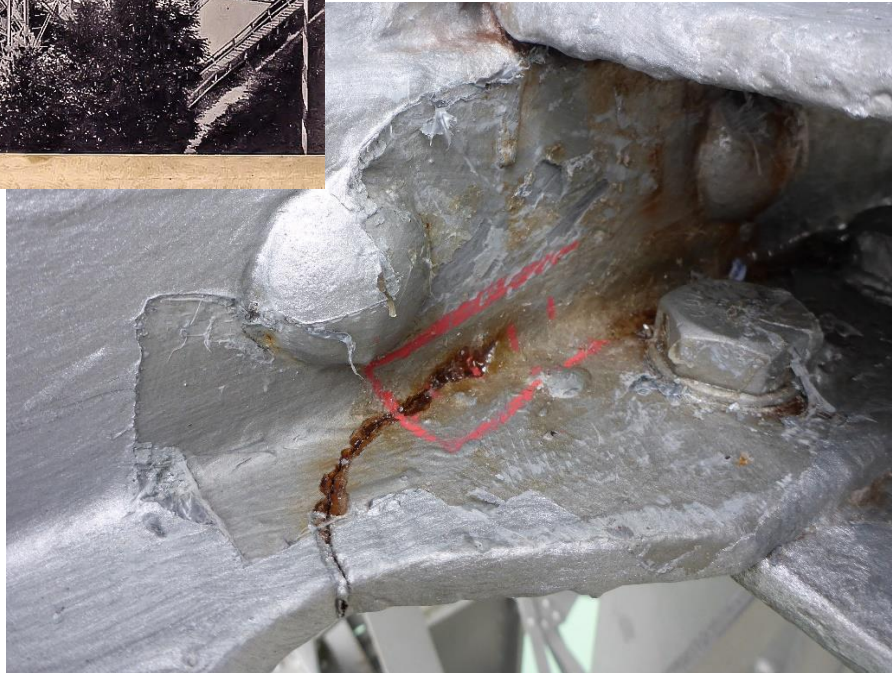
# What kind of profile(s) are we looking for?

- Let's present a few real applications first:
  - Structural health monitoring: crack and dynamics
  - Acquisition electronics and multisensory platform
  - Data storage and reporting tool
  - Visualization of complex data
  - In situ gas turbine blade inspection
  - Quality control of Additive manufacturing parts

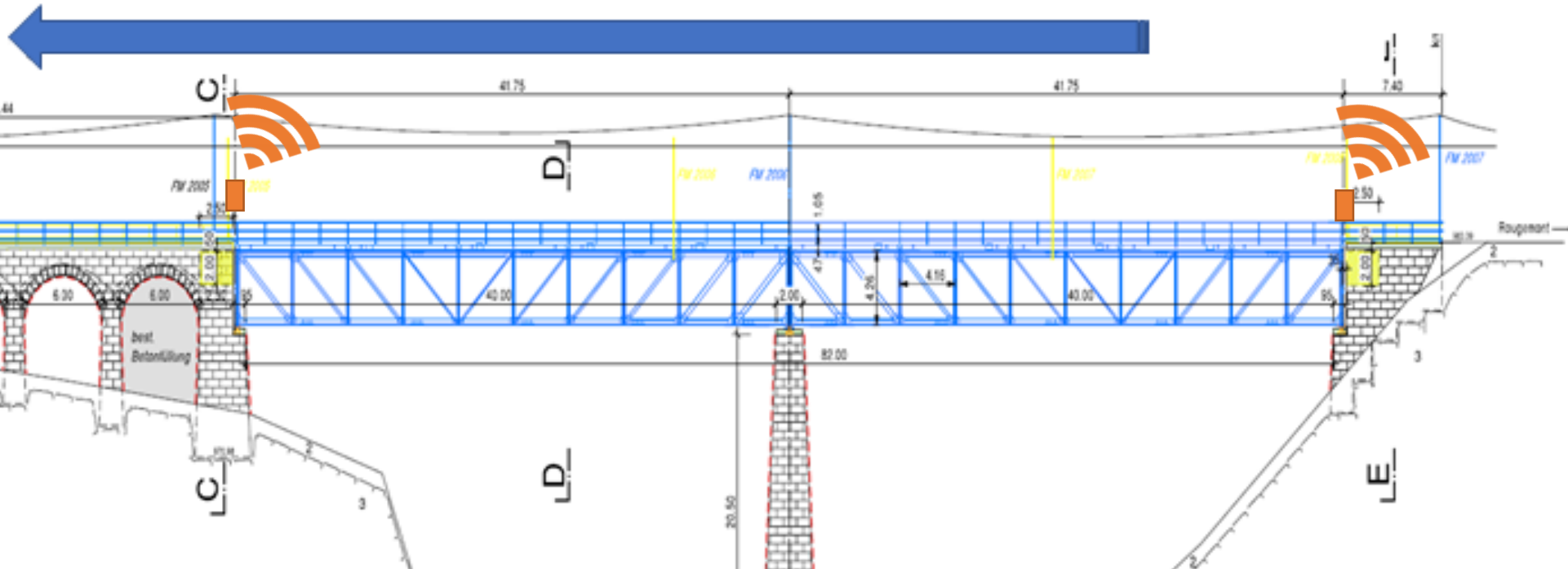
# Crack length sensor on a real crack (Bern)



- Historical bridge: cannot be replaced
- Conformable sensor (flexible): crack rarely develop within flat and nice surfaces



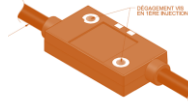
# Bridge dynamical response: decentralized measurement system





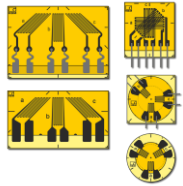
### EMX – eddy current array

- Crack size, crack initiation



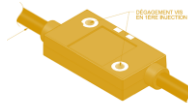
### VIB – seismic-grade accelerometer

- Vibration measurement, modal analysis
- Wire-break detection, impact detection



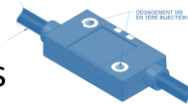
### ADS – strain gauges

- Strain measurements, concrete crack gauges



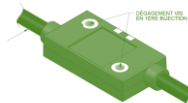
### ADI, ADV, ADD – Analog sensors

- Displacement measurements, industrial sensors



### MPP – Digital sensors & I/O

- LIDAR vehicle counter
- Frequency measurements, rpm, encoders



### PoE Cameras

- 2D displacement measurements, site surveillance

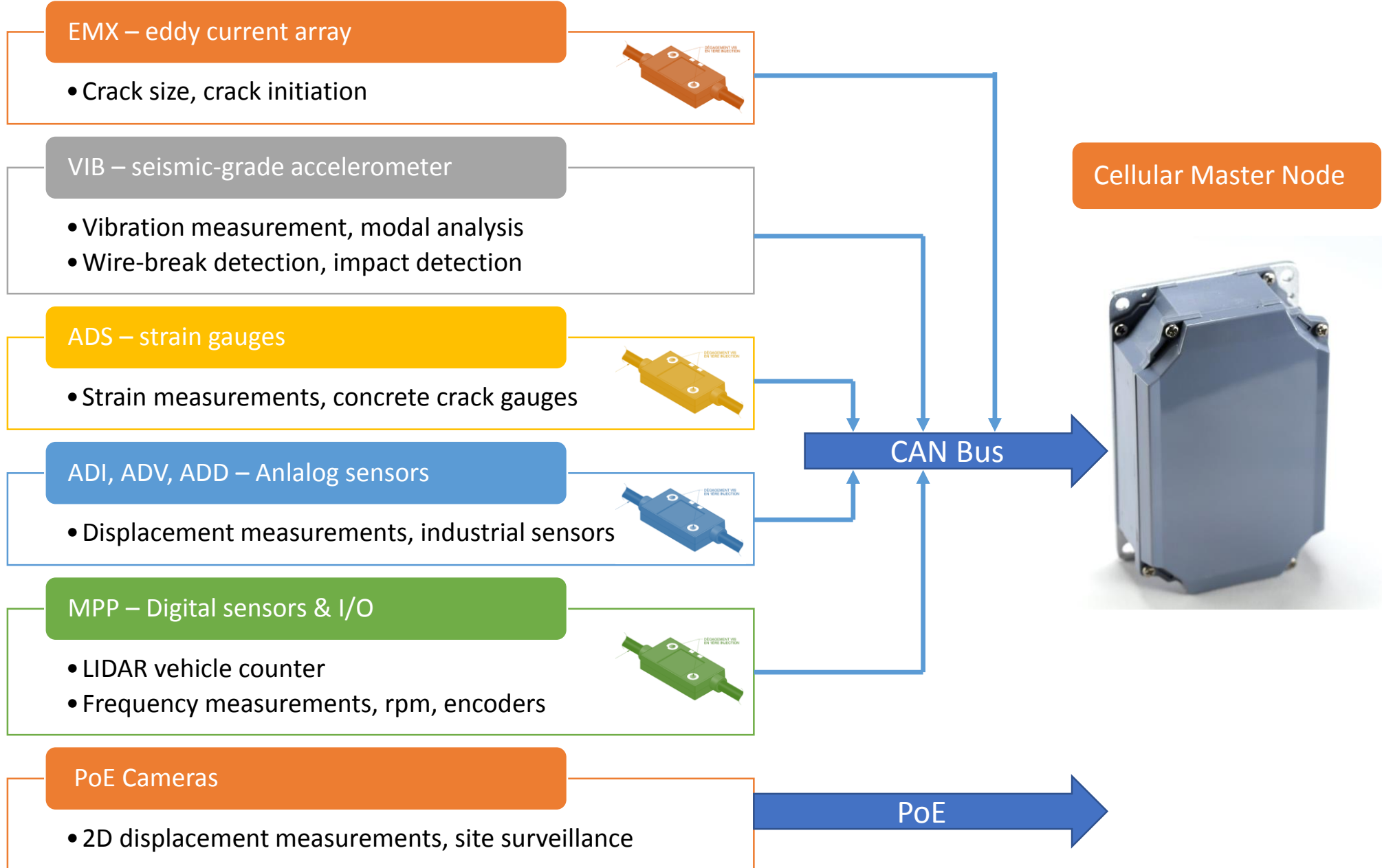


### Cellular Master Node



CAN Bus

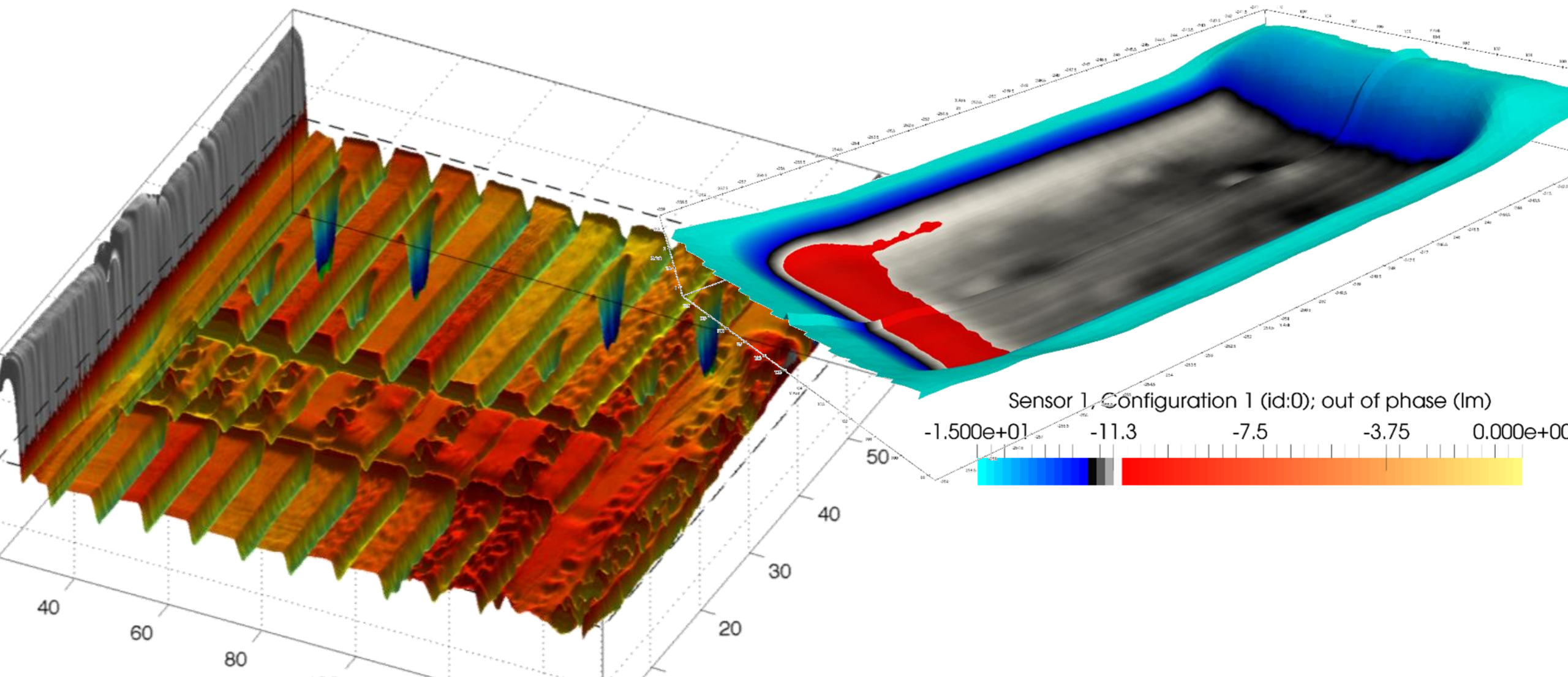
PoE



# SHM+NDT: Web interface & Reporting

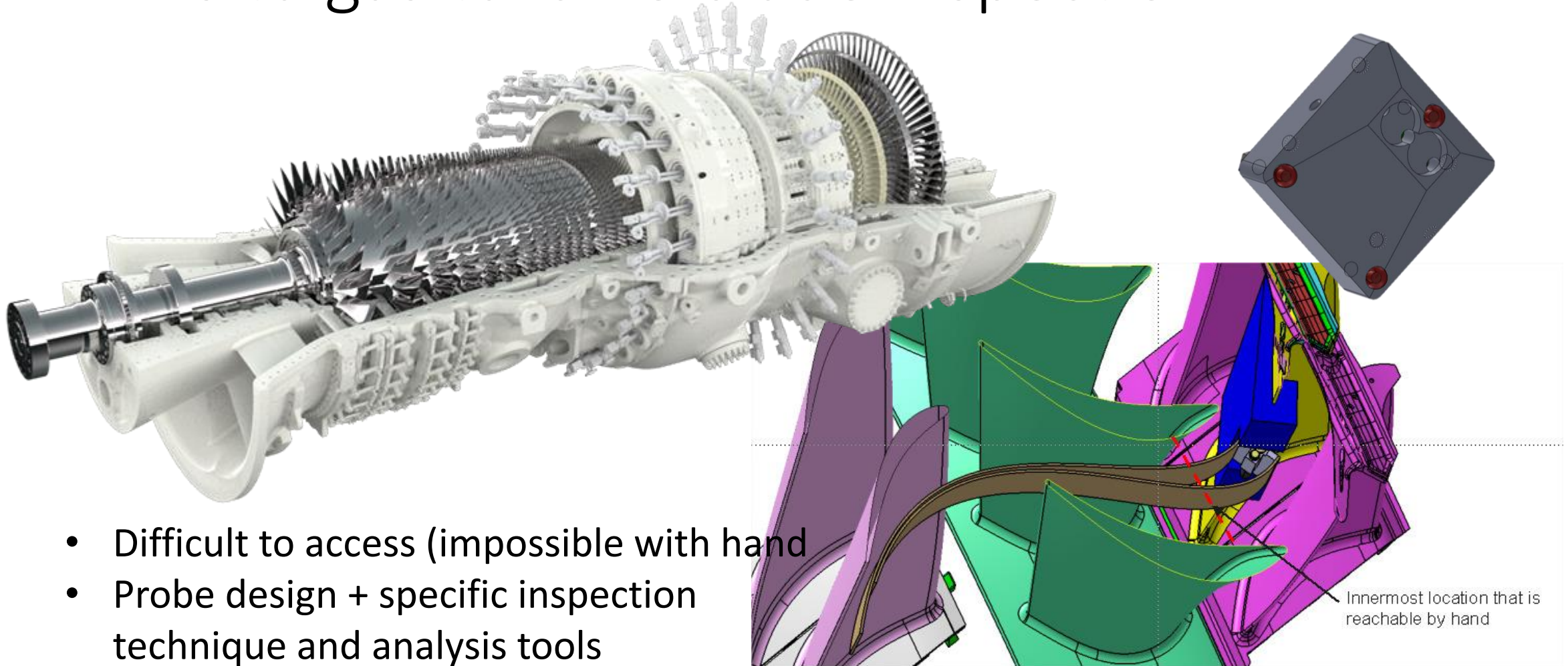
The screenshot displays a web interface for SHM+NDT. On the left, a world map shows several colored markers (green, yellow, red) indicating global locations. Below the map is a sidebar menu with options: Reports, Certificates, Personnel qualification, Instrumentation calibration, Structures, and World Map. A language dropdown is set to English. The main content area is titled 'Norderelbbrücke' and features a satellite view of the bridge over a river. A 'Resources' section includes thumbnails for 'Hauptansicht Norderelbbrücke', 'Norderelbbrücke Südansicht', and 'Schadensdoku...'. A 'Flags & POIs' section lists 'Endquerträger West' and 'Solaranlage'. The interface includes a search bar, a user profile 'Administrator (logout)', and a bottom navigation bar with icons for home, search, and other functions.

# Data visualization



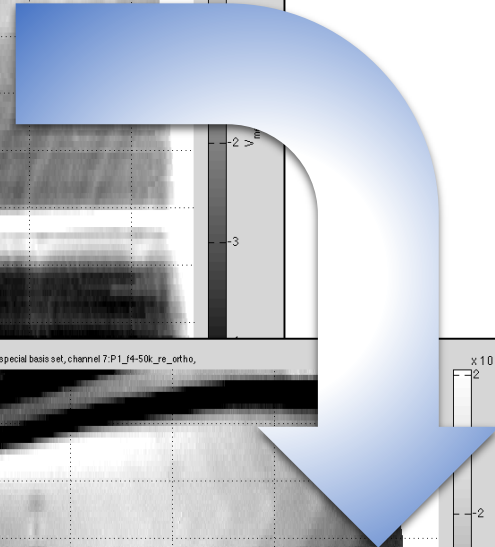
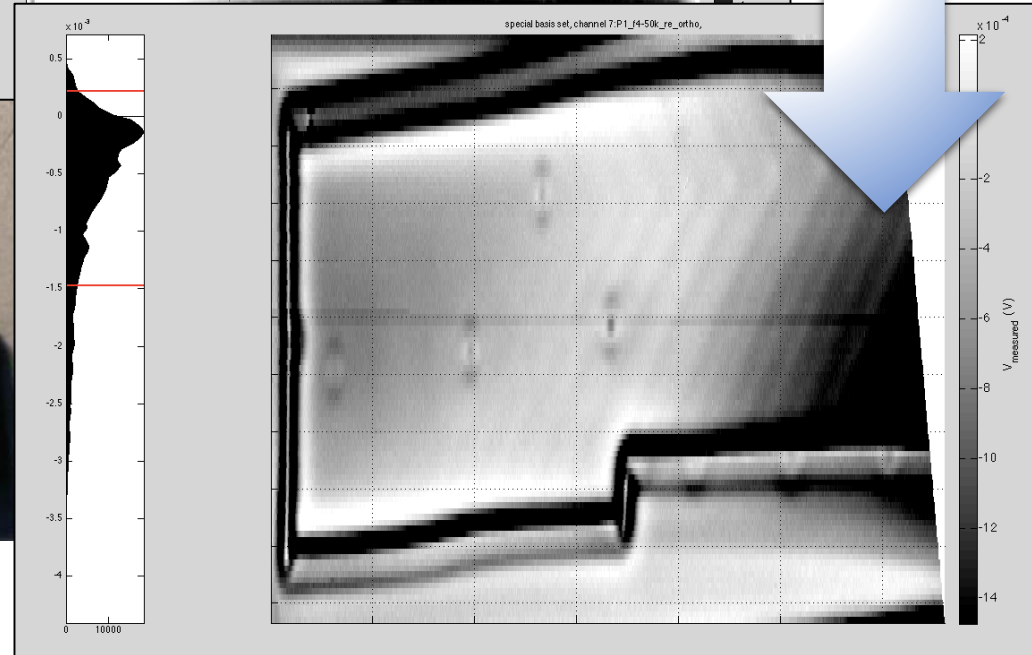
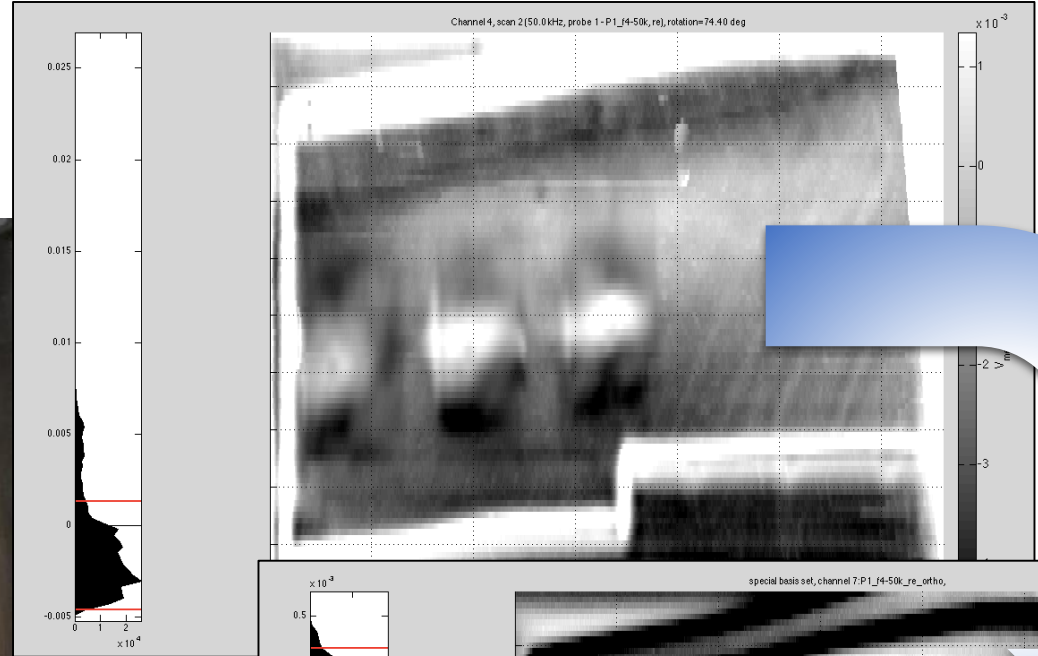
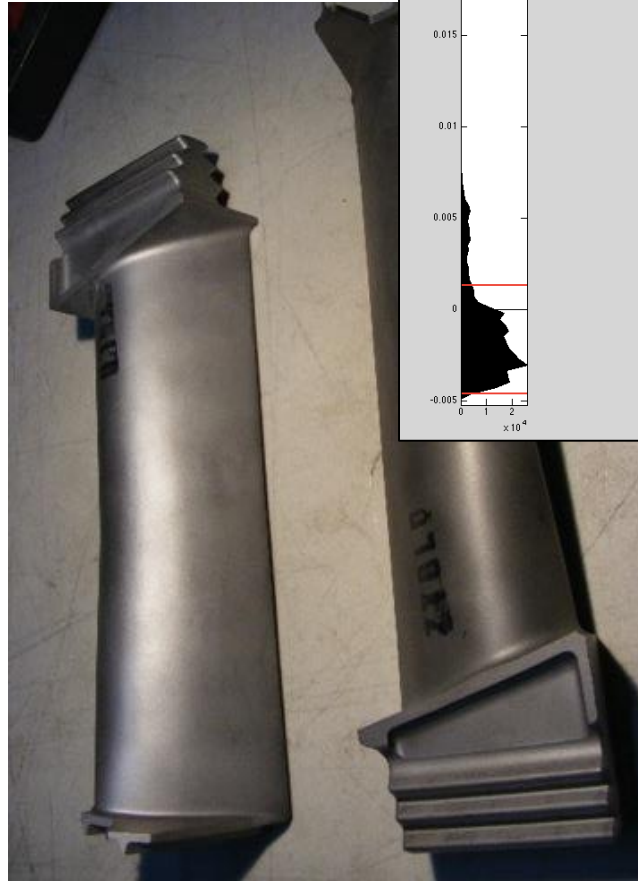
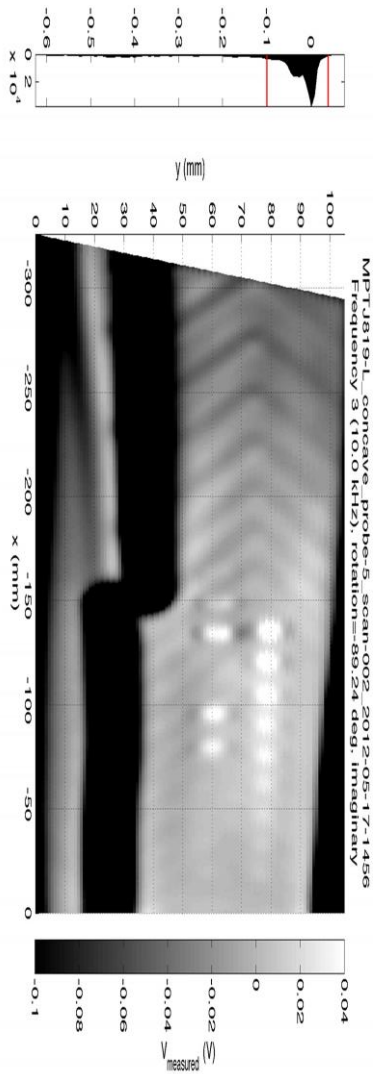
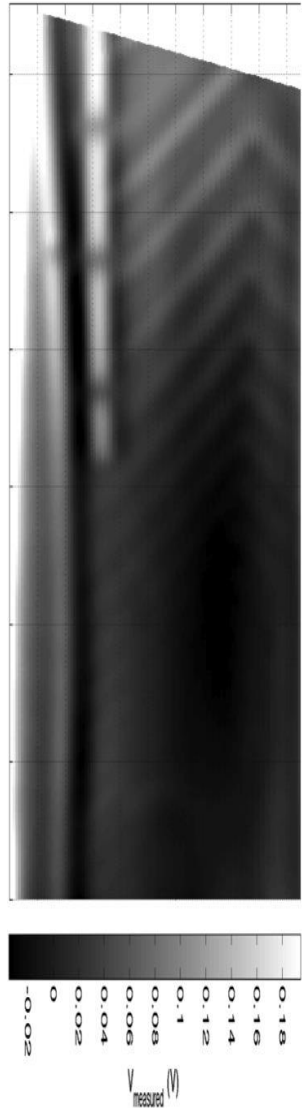


# In-situ gas turbine blade inspection



- Difficult to access (impossible with hand)
- Probe design + specific inspection technique and analysis tools
- Mechanical system to move probe around region of interest

# Some EC results



# What are we looking for?

## Ability to

- Understand customers' needs and translate them into technical requirements (even if customer not able to do so)
- Communicate with customers and colleagues
- Find fast(est) track to solution/prototype
- Think about the future (think products)
- Debug/solve problems independently + know when to look for help

# More specifically...

Knowledge about / experience in

- Integration of sensors into mechanical systems
- Electronics around sensors (analog) and microcontrollers (digital)
- Software development (Python for high level, C for firmware). Object-oriented. Orientation towards efficiency.
- Electromagnetism and eddy currents in particular