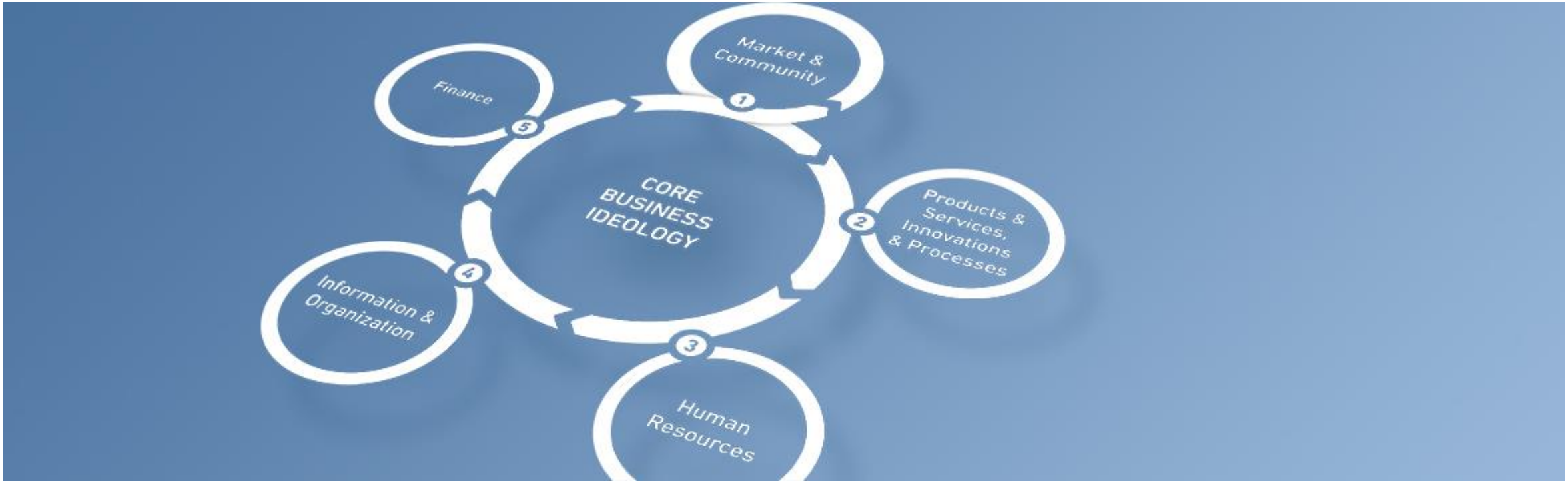


CAREER AT ROSEN

ROSEN
empowered by technology

WHO AM I

ROSEN
empowered by technology

Artur Miller

 Electrical Engineering

 @arturmillerblog

 amiller@rosen-group.com

 Senior Data Scientist

 https://github.com/arturmiller

OVERVIEW

- ROSEN in general
- Inline Inspection tools and sensors
- Challenges
- My projects
  - AutoScan
  - Autonomous Underwater Vehicles
  - Deep Field Analyze
  - EMAT
- How to get into Contact?

INTRODUCING THE ROSEN GROUP

ROSEN
empowered by technology

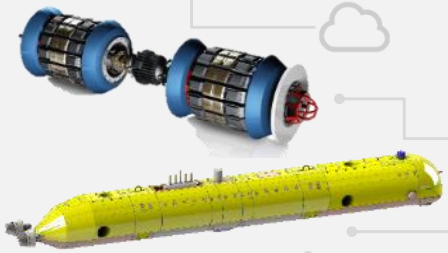
ROSEN develops and manufactures equipment, software, and methods for the inspection, diagnosis, and protection of industrial structures in a wide range of industries.

Because damage can cause serious impacts!

WHAT WE DO – TOP TECHNOLOGIES FOR THE PROTECTION OF PEOPLE AND THE ENVIRONMENT

ROSEN
empowered by technology



Accurate **Data**

Reliable **Information**

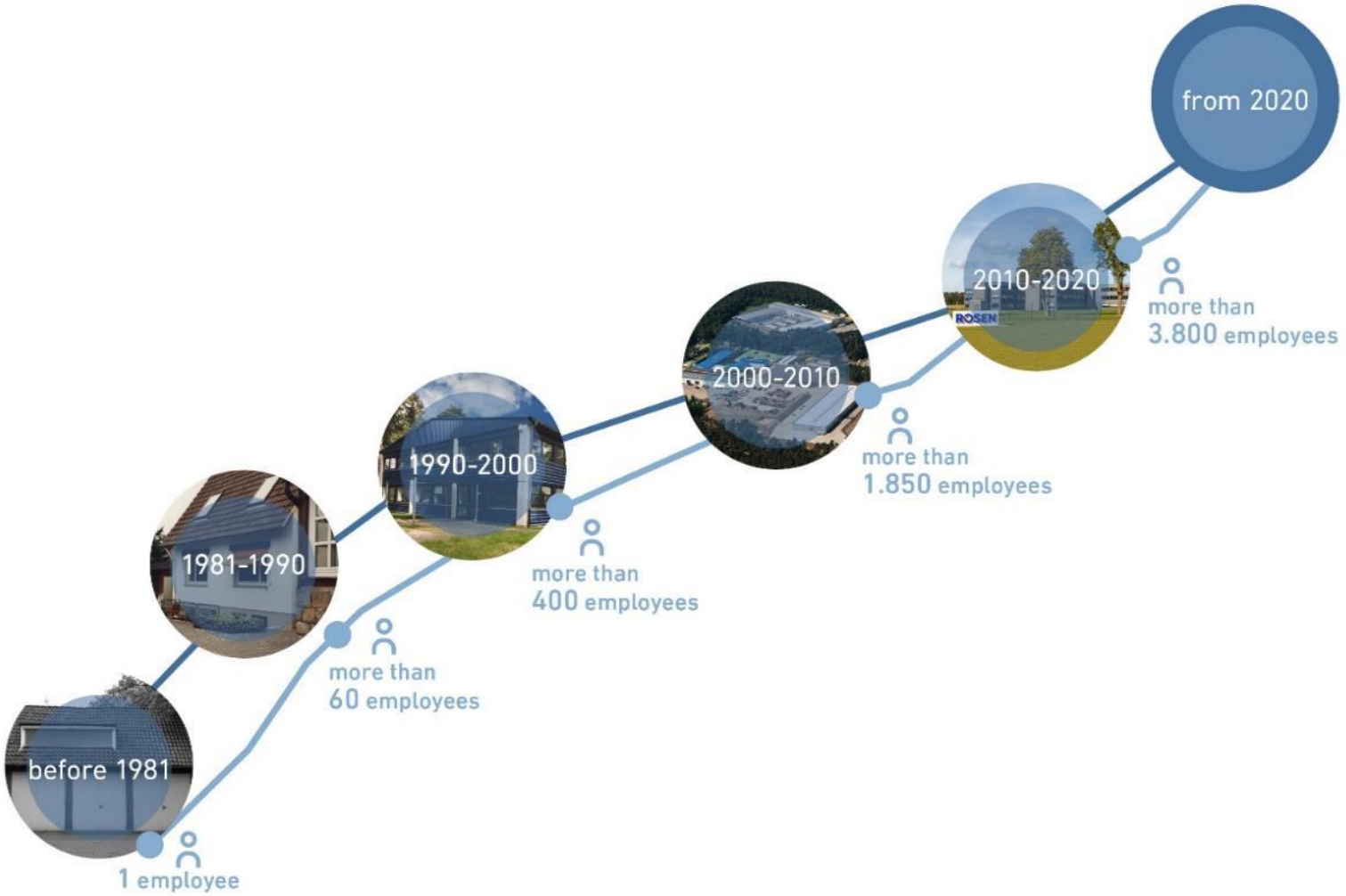
IT Infrastructure

Smart **Decisions**

for the safe and efficient operations

DEVELOPMENT OF ROSEN GROUP EMPLOYEE NUMBERS

empowered by technology



Employees at the location Lingen (Ems):
over 1,400

Percentage of graduates
(bachelor to doctorate):
~ 43 percent

Average age: 37 years

ROSEN WORLDWIDE

- Continuity through change: The ROSEN Group uses its technologies in over 120 countries.
- New business fields outside the oil and gas industry are being explored thanks to our extensive experience and know-how.

INLINE INSPECTION TOOLS AND SENSORS

ROSEN
empowered by technology

- Largest tool fleet in the market, combined with full in-house production, offers high availability and flexibility covering a wide rage of defects:
  - Geometry
  - Mapping
  - Metal loss detection (MFL-A, MFL-C, UTWM)
  - Crack detection (UT and EMAT)
- Combination of technologies on one ILI tool provides higher accuracy that allows for improved integrity assessments

INLINE INSPECTION TOOLS AND SENSORS

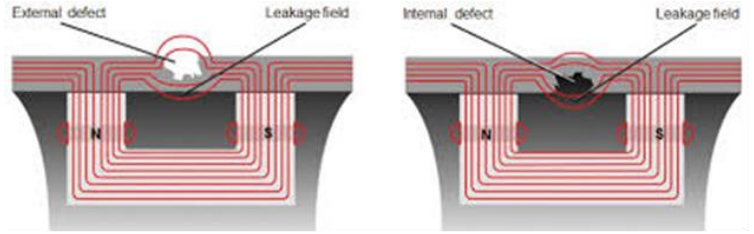
- Largest tool fleet in the market, combined with full in-house production, offers high availability and flexibility covering a wide rage of defects:
  - Geometry
  - Mapping
  - Metal loss detection (MFL-A, MFL-C, UTWM)
  - Crack detection (UT and EMAT)
- Combination of technologies on one ILI tool provides higher accuracy that allows for improved integrity assessments

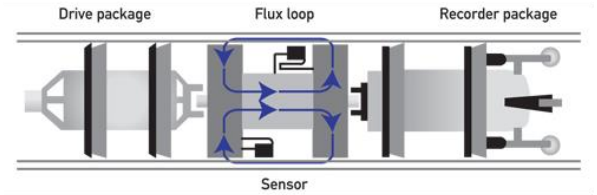


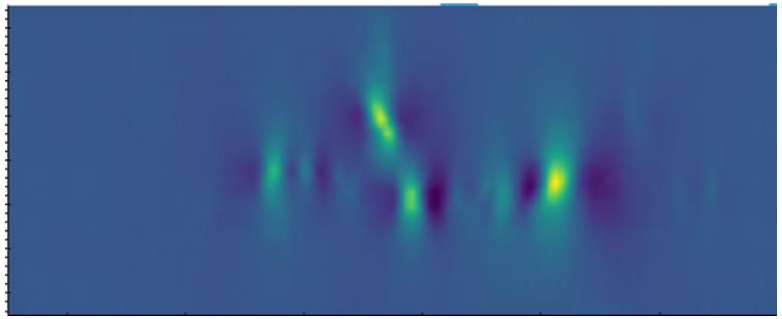


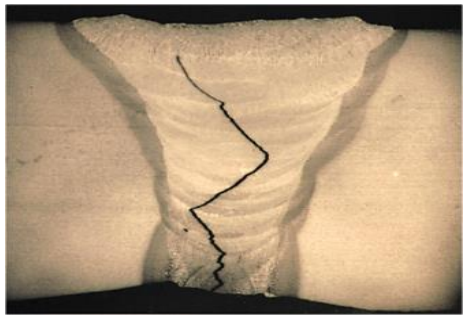
CHALLENGES

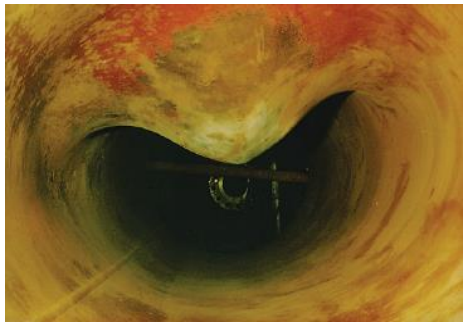
- **Classification** of installations and anomalies and accurate **estimation** of severity of defects.
- These are often **inverse problems.**
- Our tools record **a lot of data**, up to multiple terabytes per run.
- Severe defects threaten the integrity of the pipelines, therefore there is a **high risk** for environment and clients.





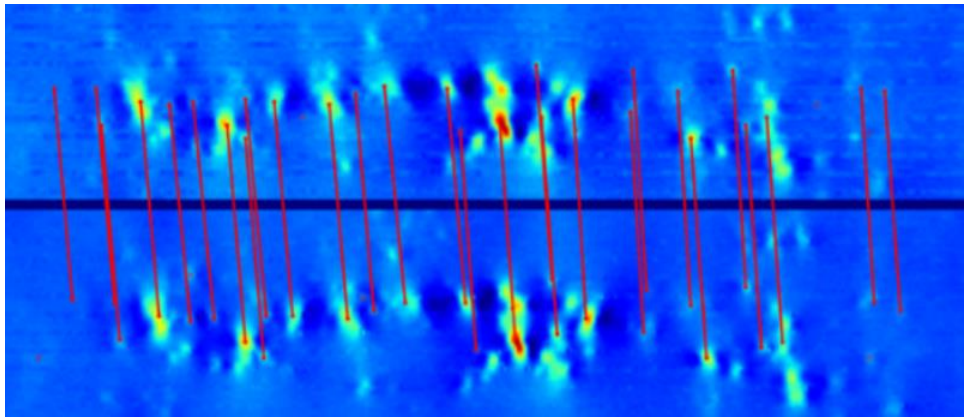


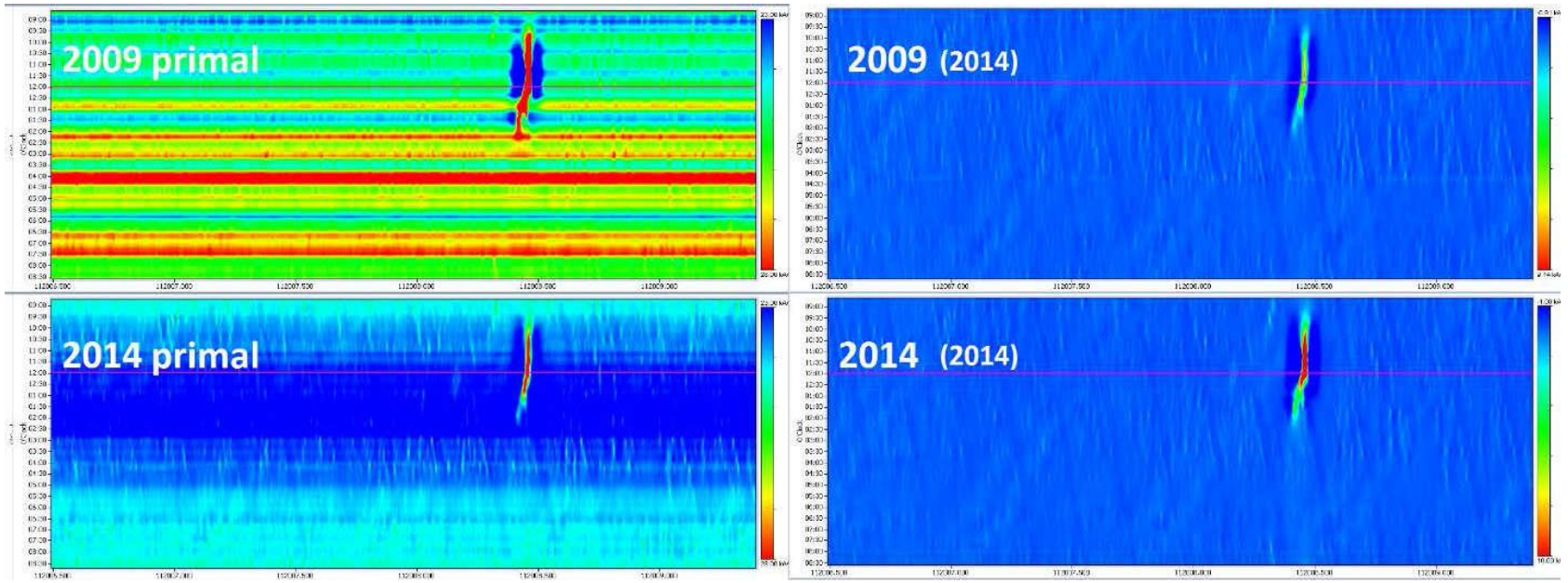




AUTOSCAN

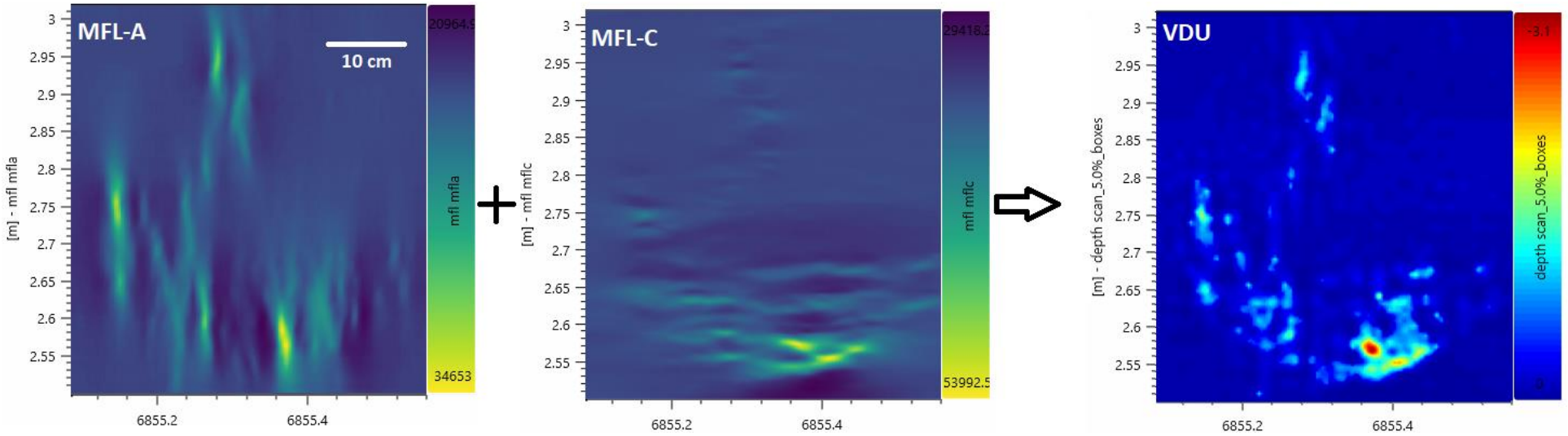
- Comparison of recent and historic data
- Data normalization
  - Tool characteristics
  - Resolution
  - Data artifacts
- Data alignment
- Identify the same defect
- Growth estimation





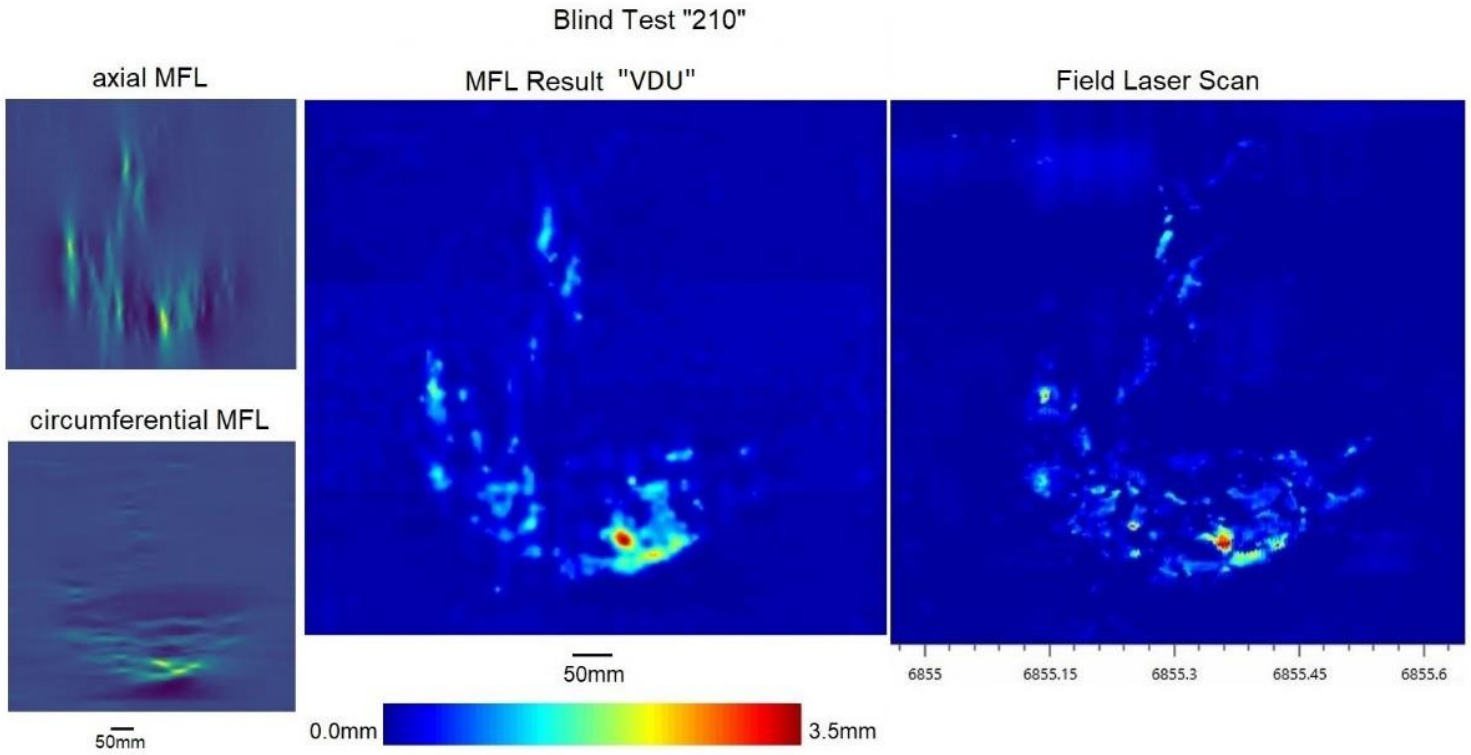
DEEP FIELD ANALYZE

- From boxes to **depth grid**
- Usage of FEM simulations
- Depth grid estimation as **optimization problem**
- Combination of MFL-A and MFL-C



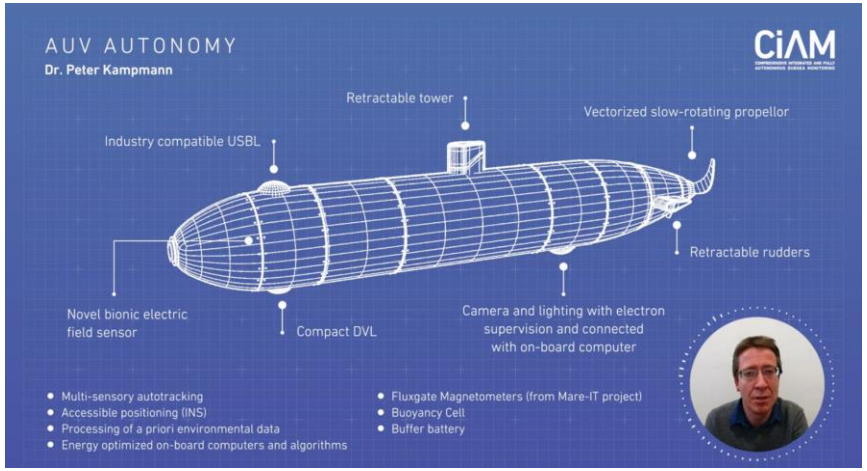
DEEP FIELD ANALYZE

- Completely new way to analyze MFL data
- Similar results to a laser scanner
- **Virtual dig up**



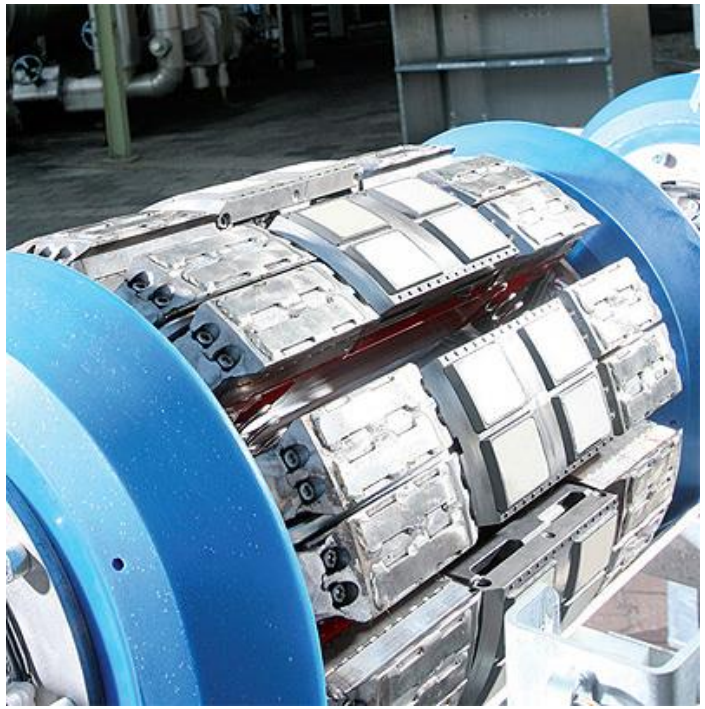
AUTONOMOUS UNDERWATER VEHICLES

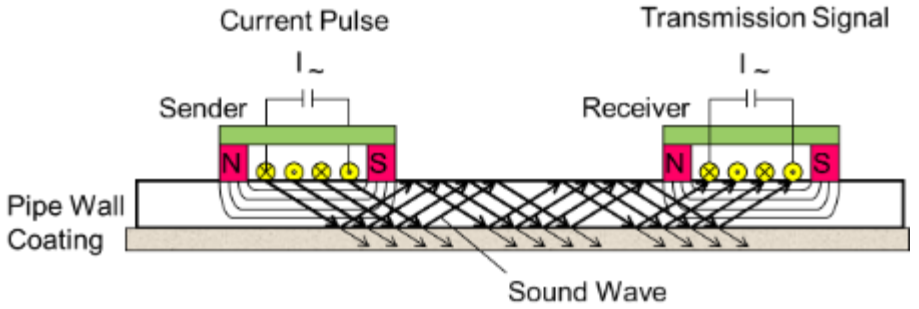
- New field for ROSEN: **Underwater robotics**
- **Completely autonomous**
  - Multiple sensors and actuators
  - High complexity
  - Large software suite
  - Simulation software



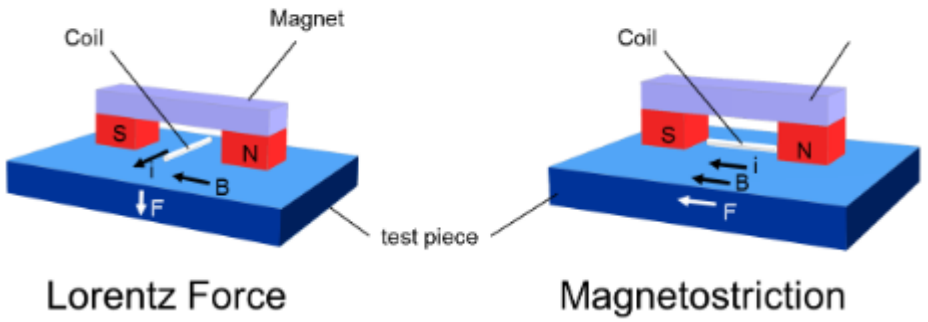
EMAT

- Electromagnetic coupling of an acoustic wave into the steel
- No coupling medium required
- **A lot of data and a complex data analysis**





Electro-Magnetic excitation of sound waves



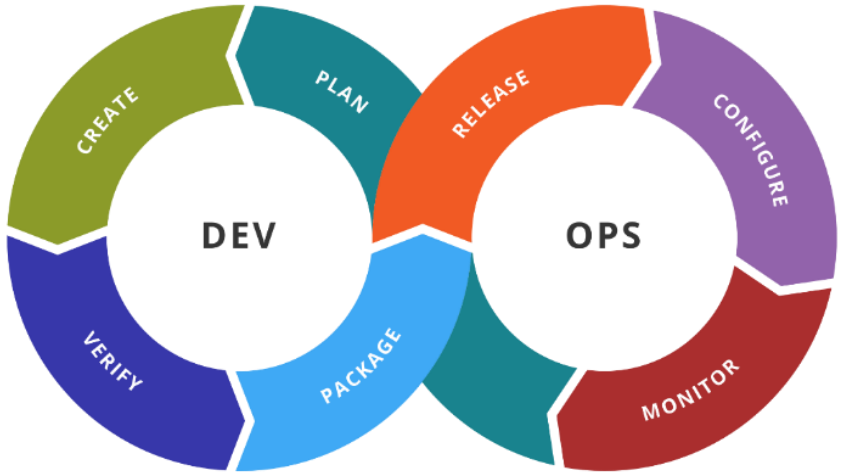
NEW BUSINESS
FLOW METERING SOLUTIONS

- Non-destructive EMAT Flowmeter to measure
  - Gases
  - Liquids
  - Steam

- Technology based on electro-magnetic acoustic transducers (EMAT)

EMAT CLOUD NATIVE

- Existing MVP -> Actual product
  - Classification of anomalies
  - Accelerate manual data analysis
  - Large tech stack
- Focus on **DevOps**
- **Cloud native**



kubernetes

xarray

TensorFlow

CAMUNDA

Azure DevOps

Kubeflow

scikit learn

JOBS

- Scientist (m/w/d) für Deep Learning
- Data Scientist in the field of Water Line Integrity Solutions (all genders welcome)
- Data Scientist
- Physicist for the Development of FlowMeters (multiphase)
- PRAKTIKUM/ ABSCHLUSSARBEIT IM BEREICH ZERSTÖRUNGSFREIE PRÜFTECHNIK
- MASTERARBEIT IM BEREICH QUANTUM COMPUTING
- Scientist for Robotic Applications (all genders welcome)
- Pipe Material Data Analyst (all genders welcome) -Material analysis of pipeline systems-
- PROCESS PROFESSIONAL WASSERSTOFFLABOR
- C++ Developer for Quality Assurance for Autonomous Diving Robots (all genders welcome)
- Scientist (m/w/d) für Autonome Roboter
- Materials Engineer (all genders welcome)
- And many more…

COME IN CONTACT WITH US

ROSEN
empowered by technology

General

- https://www.rosen-group.com

Carreer

- https://jobs.rosen-group.com
- https://www.rosen-deutschland.de

LindedIn

- https://ch.linkedin.com/company/rosen

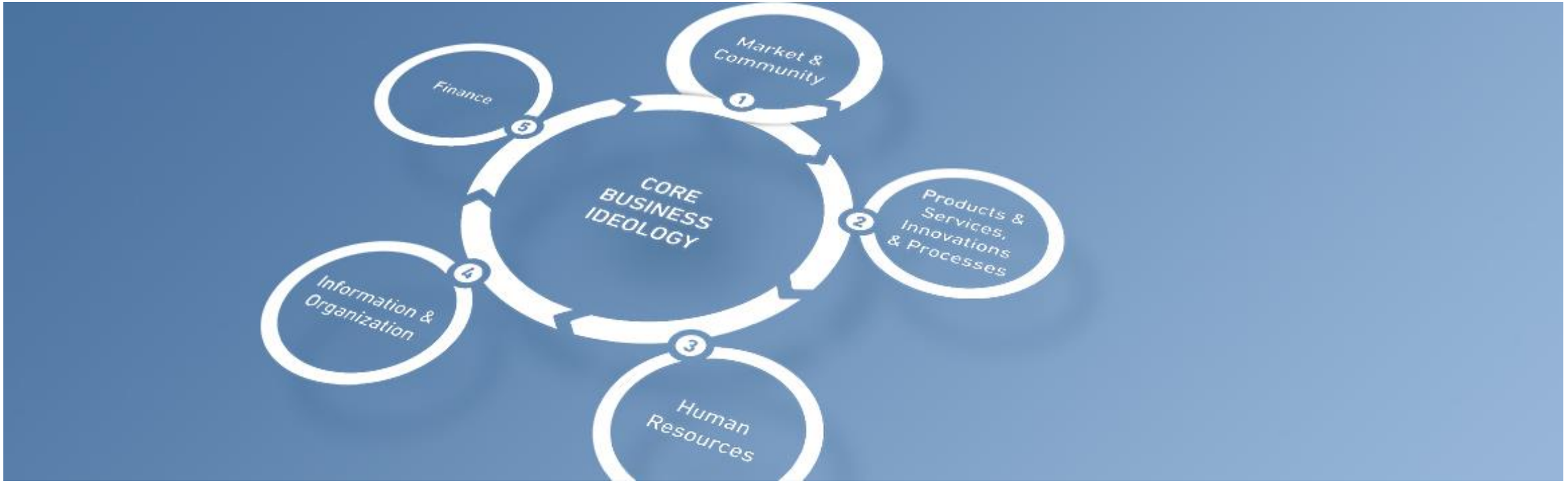
Youtube

- https://www.youtube.com/@ROSENGroupOfficial

GitHub

- https://github.com/rosen-group

Visit us at our booth!



THANK YOU FOR JOINING THIS PRESENTATION.

ROSEN
empowered by technology