Focus Consortium Project Retrofitting for Industry 4.0

Cost-efficient digitization of production environments

Key Facts

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Fraunhofer IPT

fir an der RWTH Aachen

*We are currently in cooperation negotiations with further research partners.

MOTIVATION

Why is everyone talking about retrofitting

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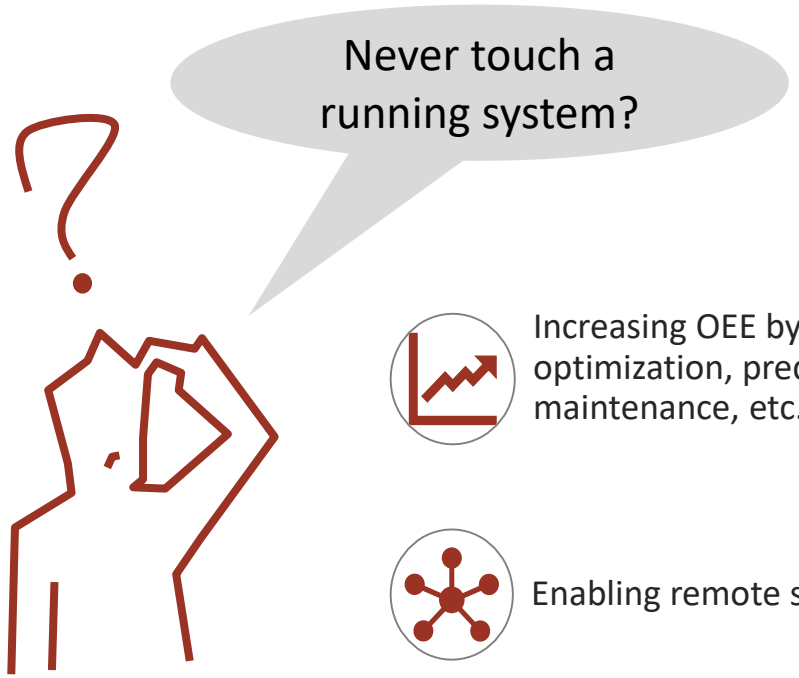
- **Heterogeneous machinery**: Especially medium-sized companies have facilities, partly grown over decades. In many production facilities, equipment, machines and plants often date back three or four different decades and work independently on a single order without being linked to a higher-level production system. Loosing efficiency and reducing the reaction time to failures.

- **High manual effort** due to heterogeneous interfaces: Data must be read, noted and filled into (Excel) lists or production systems. This is time-consuming, error-prone, expensive and inefficient. In addition, it is always accompanied by a loss of information.



Increasing OEE by process optimization, predictive maintenance, etc.

Enabling remote services

Increase lifetime of machinery

Get transparency to identify errors

Create insights for transferability across different sites

Reduce manual effort

Create data for informed decisions

Compliance with legal requirements

WHY A CONSORTIUM PROJECT?

Benefit from synergies

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Synergy & scaling effects

Your invest:

- 4-10 PT*
- 18.000 €

Networking:

**

The results:

Learn how to upgrade your legacy equipment by retrofitting activities for the digitization of your production processes.

- Get a structured handbook how to start retrofitting with a structured guideline what decisions should be made in what order
- Get a structured overview of best practices and use cases according to your questions for the assets and industries you are interested in
- Approx. 5 deep dives selected by an election of the consortium on implementation challenges and evaluation of resources, provider comparison or ROI calculation for a defined use case***
- Networking with a cross-industrial consortium, renowned research entities, technical solution providers and implementation partners

*Recommendation: 2 employees á 3 meetings, 4 days preparation

** Excerpt of more than 250 former consortium partners

***Optional addition:** Individual use case evaluation for your own use case that was not selected by the consortium (additional fees apply)

PROJECT TIMELINE

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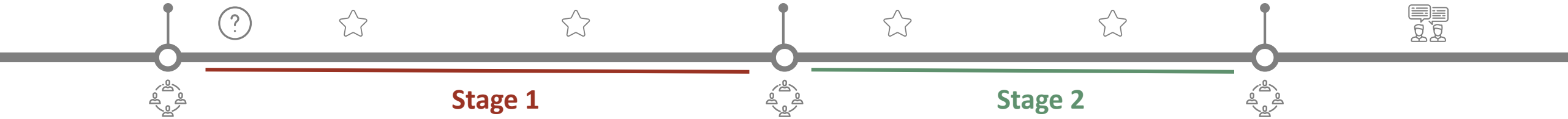
Kick-off
Q3 2020

1st Report Meeting
Q4 2020

Final Meeting
Q1 2021



Stage 1

3 months
Guideline & Application Scanning

- **Handbook** of key questions for retrofitting. Giving a **structured guideline** and rules to find the appropriate solution connecting your legacy equipment to your existing IT
- **Scanning & scouting** for cross-industrial applications from research to market-ready solutions of **specific topics of interest** for the consortium within the focus areas of retrofitting
- **Pre-evaluation of each solution** giving you the possibility to select the most promising ones, matching your business requirements
- You decide in a democratic election what use cases should proceed to stage 2

Stage 2

3 months
Technology Assessment or Business Case

You agree within workshops on one of the following topics or combinations of it, answering your questions:

- **Detailed technology assessment** how could you measure specific values and what protocols are needed to connect to the plc
- **Implementation guideline, vendor comparison** and effort estimation for the realization step by step based on an agreed use-case
- **ROI calculation** of the selected application comparing effort with possible benefits e.g. for maintenance or production efficiency including TCO comparison of legacy equipment vs. new machines

Questionnaire

Consortium meeting

Optional Workshops with partners/experts/start-ups

Optional network/platform meetings after project end

PROJECT APPROACH

Structured overview of best practices

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Top-Down Analysis – Market Trends

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Hardware retrofit

Digital Retrofit

Internet of Things

Uptime-as-a-serivce

Future Product and Service Requirements

New Technological Possibilities

Applications & Technologies & Competencies

Sensors

Edge Processors and PLCs

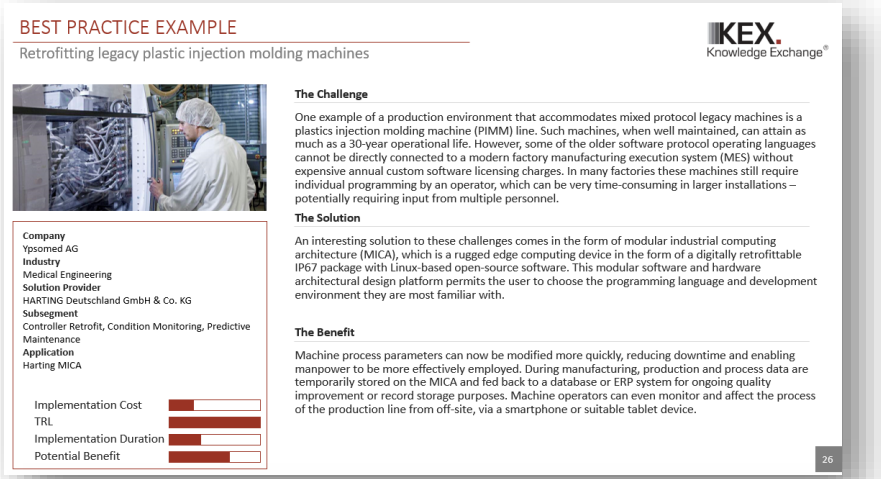
IoT Gateways

Middleware

Human machine interfaces

Data Analytics

Bottom-Up Analysis – Technology Trends


BEST PRACTICE EXAMPLE

Retrofitting legacy plastic injection molding machines

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The Challenge

One example of a production environment that accommodates mixed protocol legacy machines is a plastics injection molding machine (PIMM) line. Such machines, when well maintained, can attain as much as a 30-year operational life. However, some of the older software protocol operating languages cannot be directly connected to a modern factory manufacturing execution system (MES) without expensive annual custom software licensing charges. In many factories these machines still require individual programming by an operator, which can be very time-consuming in larger installations – potentially requiring input from multiple personnel.

The Solution

An interesting solution to these challenges comes in the form of modular industrial computing architecture (MICA), which is a rugged edge computing device in the form of a digitally retrofittable IP67 package with Linux-based open-source software. This modular software and hardware architectural design platform permits the user to choose the programming language and development environment they are most familiar with.

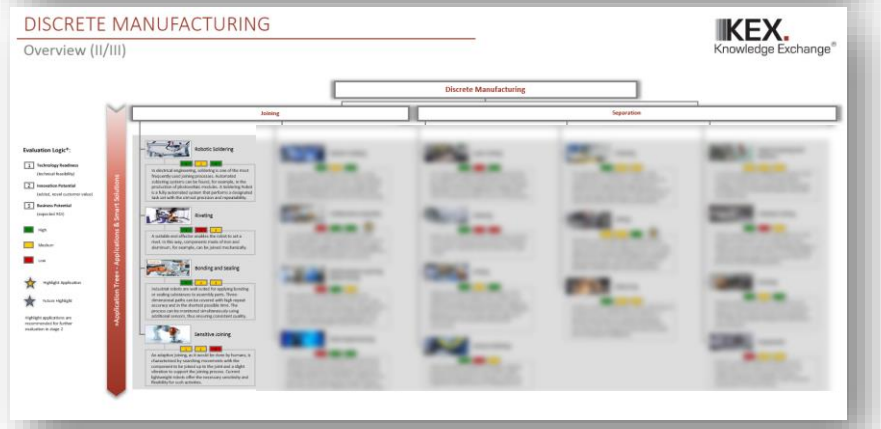
The Benefit

Machine process parameters can now be modified more quickly, reducing downtime and enabling manpower to be more effectively employed. During manufacturing, production and process data are temporarily stored on the MICA and fed back to a database or ERP system for ongoing quality improvement or record storage purposes. Machine operators can even monitor and affect the process of the production line from off-site, via a smartphone or suitable tablet device.

Company
Ypsomed AG
Industry
Medical Engineering
Solution Provider
HARTING Deutschland GmbH & Co. KG
Subsegment
Controller Retrofit, Condition Monitoring, Predictive Maintenance
Application
Harting MICA

Implementation Cost
TRL
Implementation Duration
Potential Benefit

26


DISCRETE MANUFACTURING

Overview (II/III)

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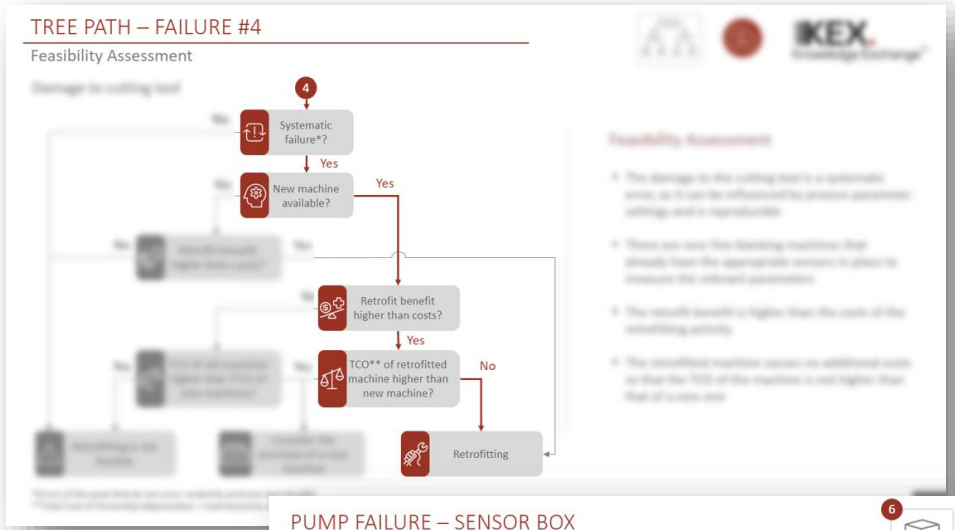
Discrete Manufacturing

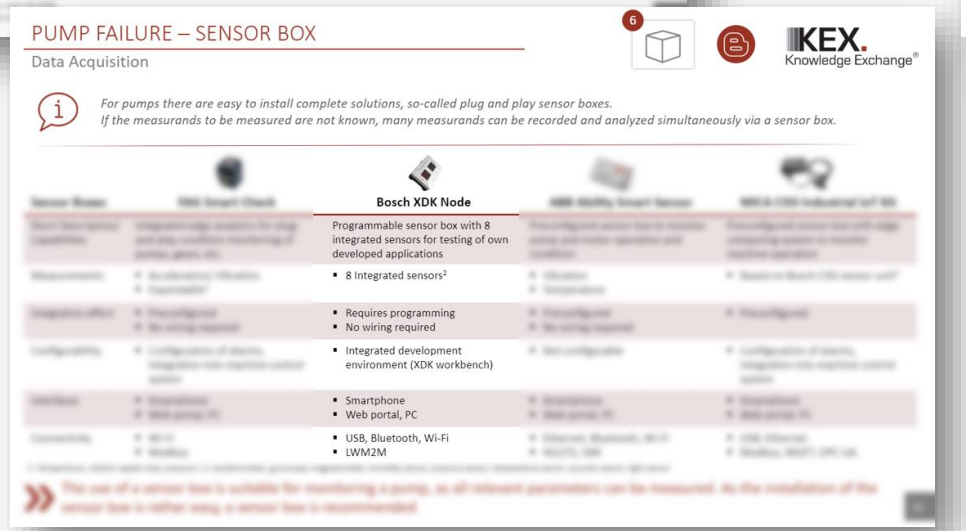
Joining

Separation

PROJECT APPROACH

Handbook and deep dives





REFERENCE PARTNER

Former KEX Consortium Partners

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» More than 250 previous Consortium Partners*

* all mentioned companies are partners of a former consortium project hosted by KEX AG and it´s research partners

FRAMEWORK CONDITIONS AND CONTACT

Retrofitting for Industry 4.0

Framework Conditions

Start: Q3 2020

End: Q1 2021

3 meetings at the technology campus Aachen

Results:

- **Broad structured best practices overviews for all selected* focus areas**
- **Handbook with guidelines condensed from several projects**
- **Selected* focus cases providing deep insights, answering your questions**
- **Cross-industrial network of key partners and technology experts**

Resources: 5-10 PD**

Participation Fee: € 18,000

*Selection of areas of interest by the project participants

**Recommendation: 2 employees á 3 meetings, 4 days preparation

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