



INDTECH2018

Innovative industries for smart growth

29-31 October, 2018
Vienna, Austria

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PILLAR 1

Session 1.5

A Cyber Physical System that combines new enabling technologies to optimise and enhance control of the injection moulding process

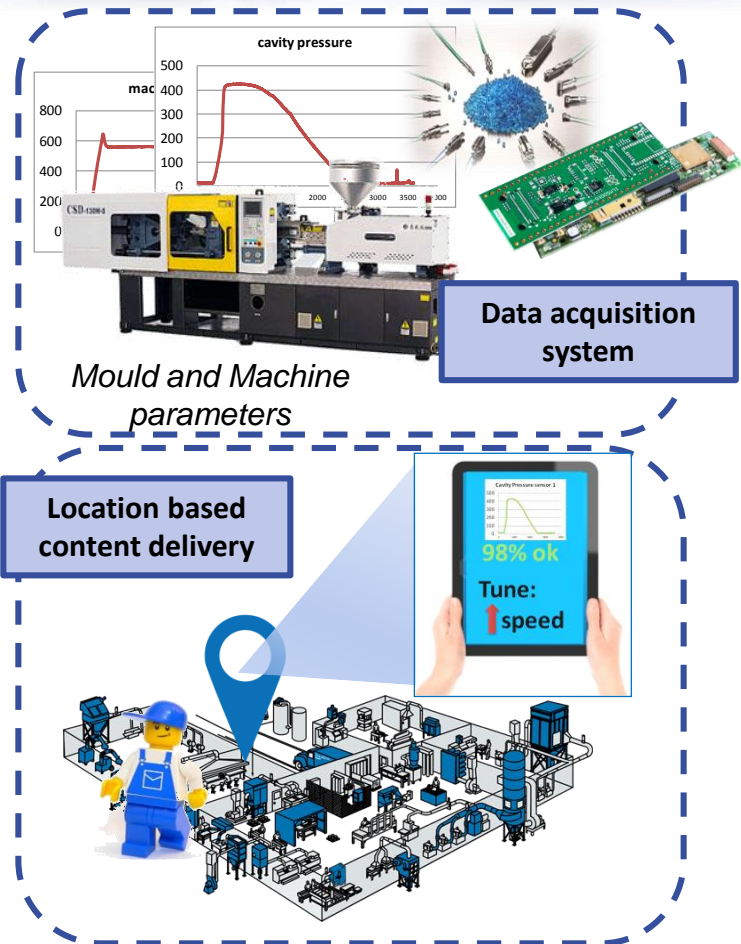
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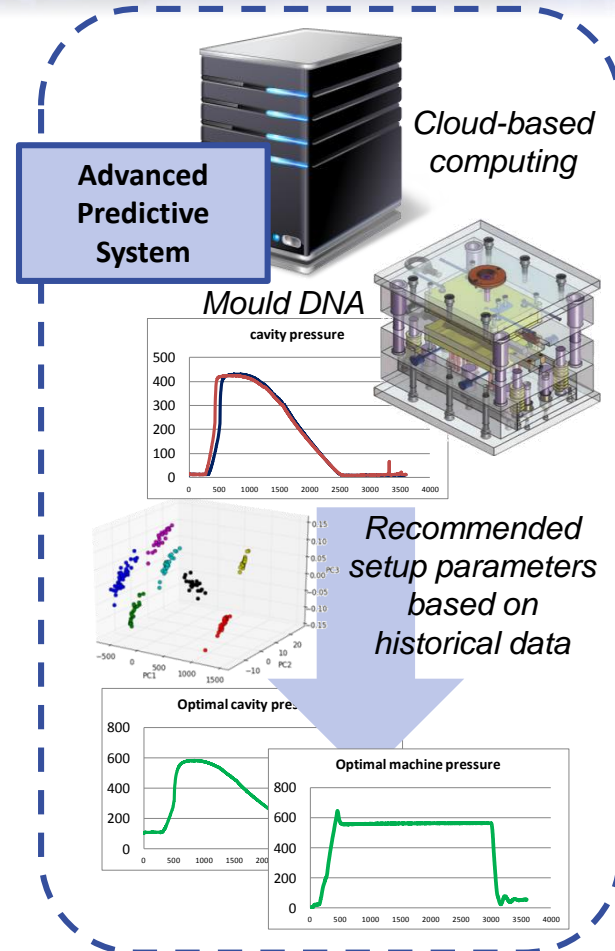
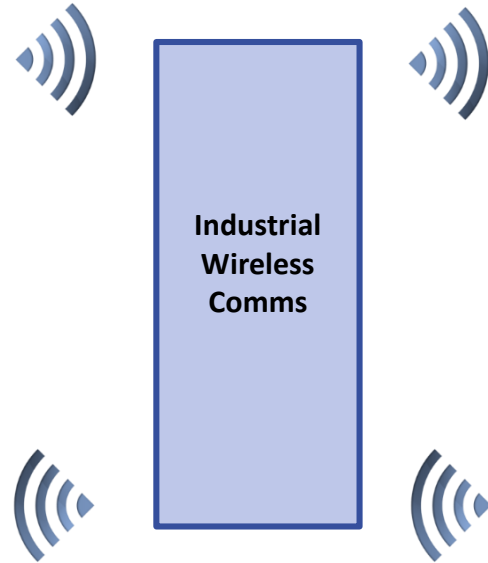
EURECAT

31 October 2018



Physical

The Challenges



Digital



PREVIEW Components

Data Acquisition System (DAS)

- Monitors
- Digitalises
- Stores



Advanced Predictive System (APS)

- Analyses
- Optimises
- Predicts

Wireless Capability (WCNs)

- Collects
- Transmits
- Communicates



Location Based Content Delivery (LBCD)

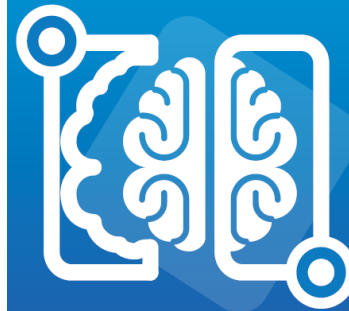
- Displays
- Interacts
- Informs



Digitising Industry and Improving Working Conditions

Data Acquisition
System (DAS)

Upgrading
Industrial
Equipment



Advanced Predictive
System (APS)

Artificial
Intelligence

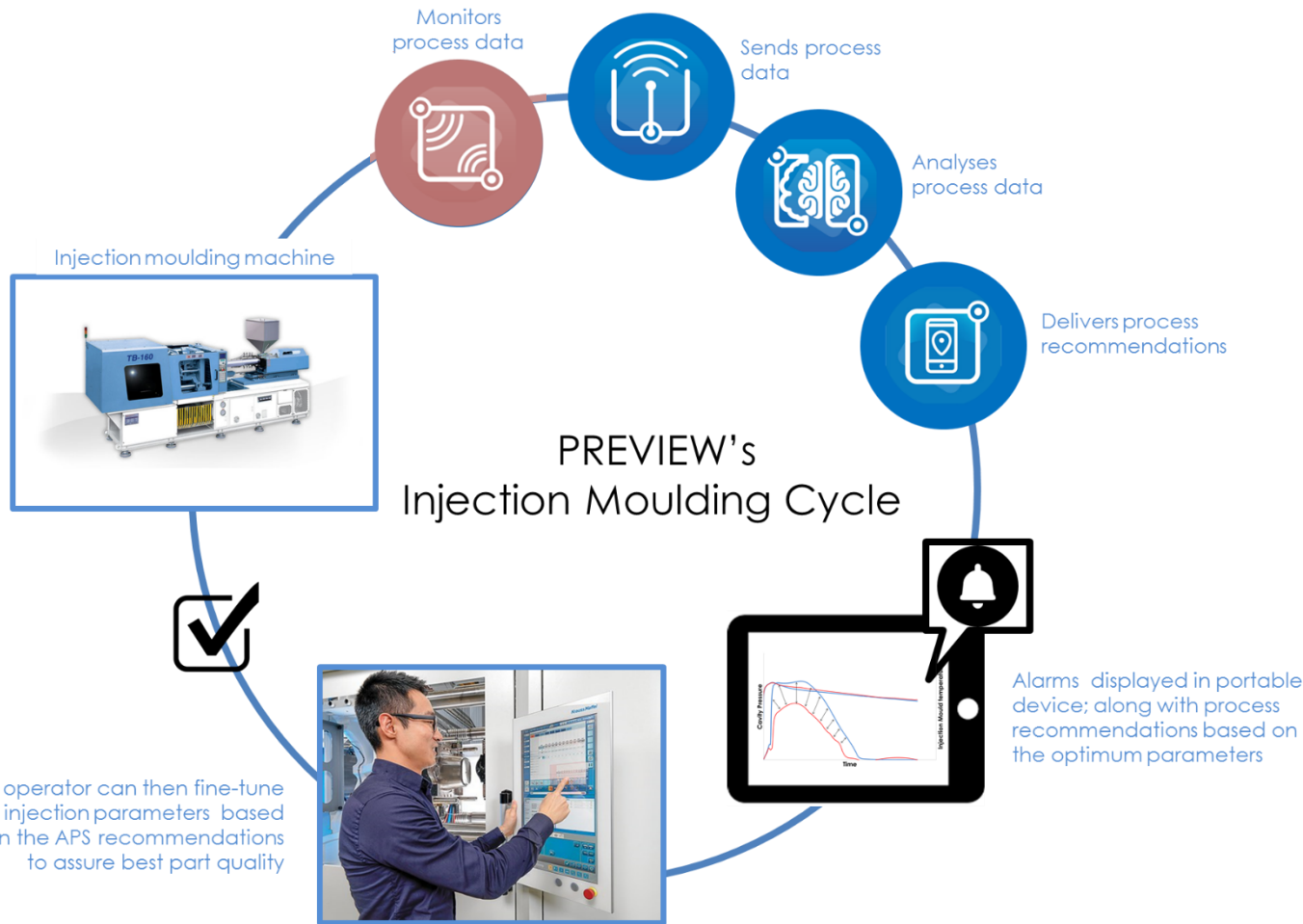
Wireless Capability
(WCNs)

Security and
Resilience



Location Based Content
Delivery (LBCD)

Human Factors
& Ethics



Upgrading Industrial Equipment



Data Acquisition System

Design and develop hardware modules responsible for the adaption, amplification and digitalisation of the cavity



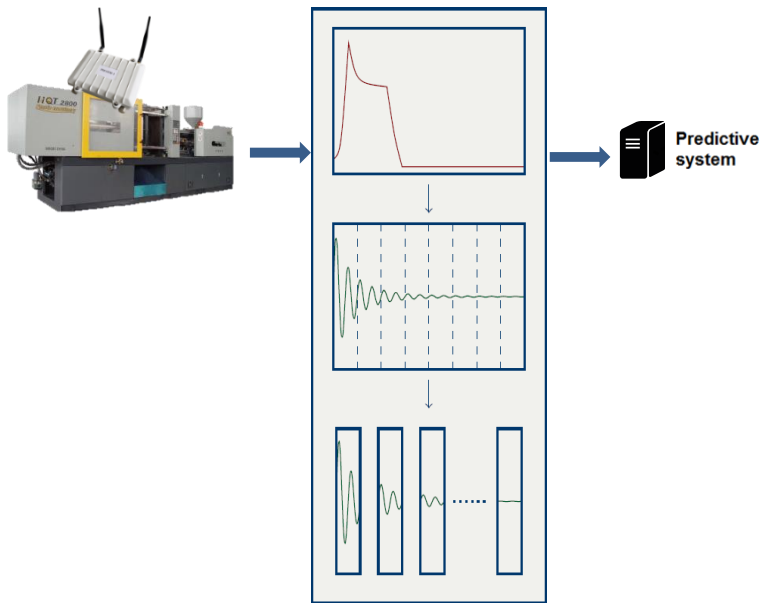
Refurbishment for Digitisation

Cavity parameters

Secure and resilient industrial network to transport collected data

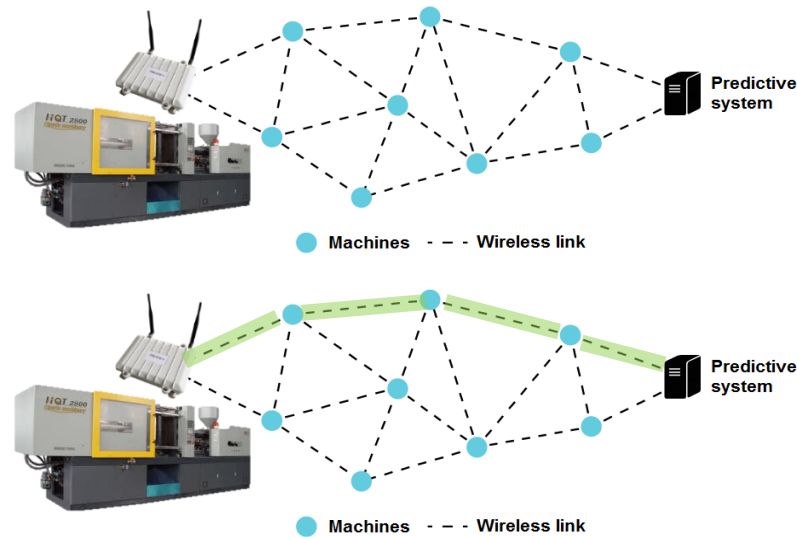
Prioritized information is sent first

- *Information is transmitted in blocks
- *Each block improves accuracy
- *Important data is prioritised



Self-configurable network topology

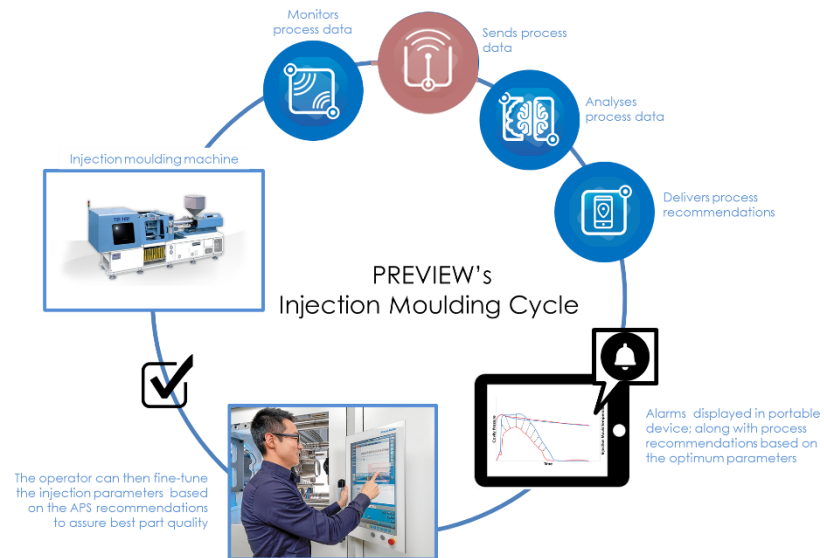
- *Protocols for small and large factories
- *Reliable, robust, and fairness between nodes
- *Multi-hopping for improved transmission





Wireless Communications

A robust wireless network to transport sensor data to the Advanced Predictive System



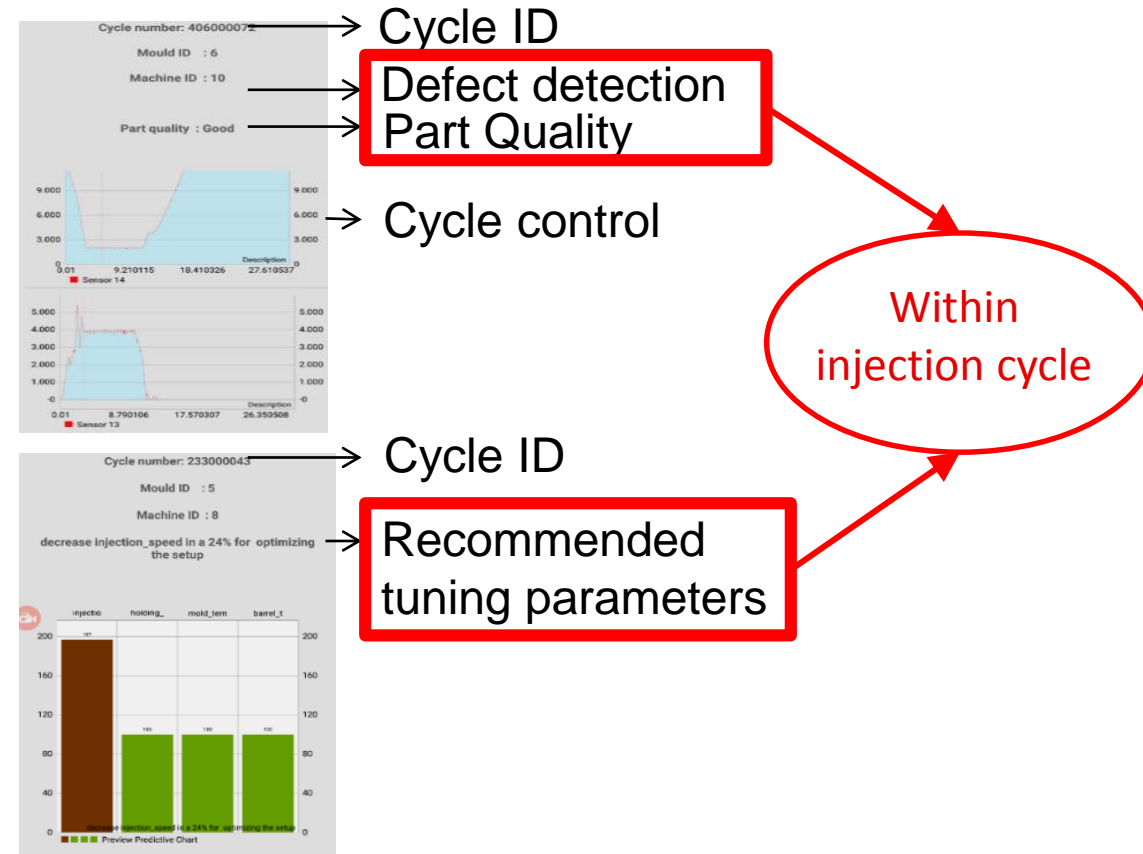
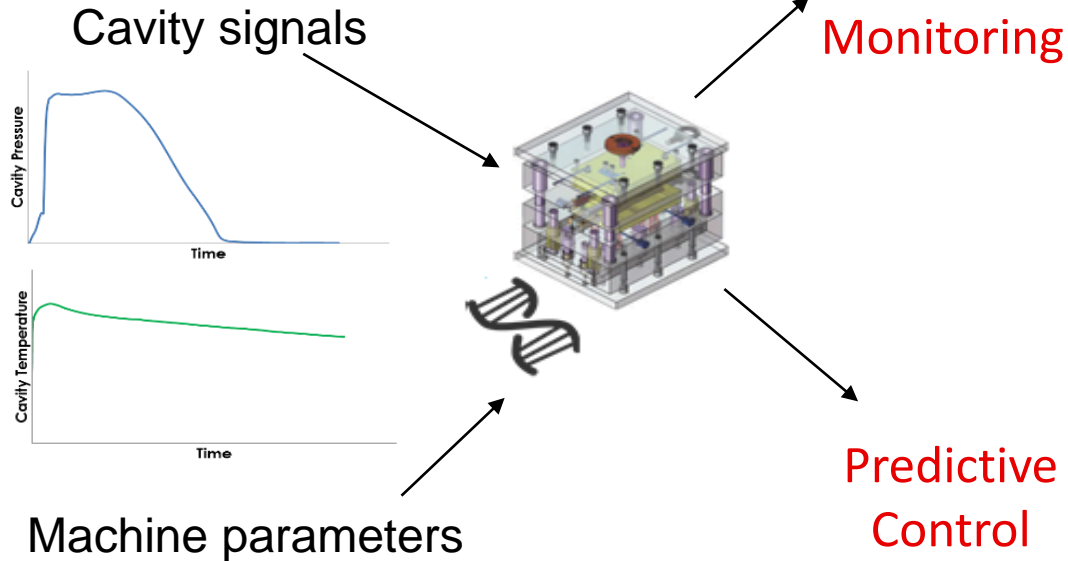


Real-time Quality Monitoring and Predictive Production Control




Advance Predictive System

A system to optimise the injection moulding process by reducing mould set up time and providing a quality control system



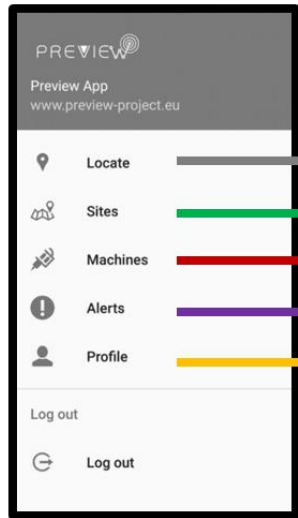


Human Factors: Usability and Ethics



Location Based Content Delivery
A software application in charge of automatically delivering useful machine and process information to the user's portable device

PREVIEW'S app



In-door positioning



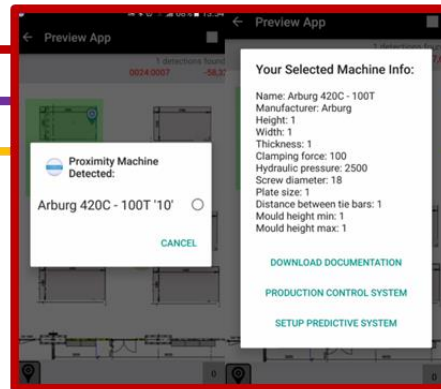
Machine Information displayed by bluetooth recognition

Facility's recognition



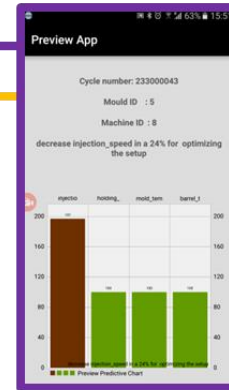
Site's information can be conveyed by creating a production site profile

Machine related information



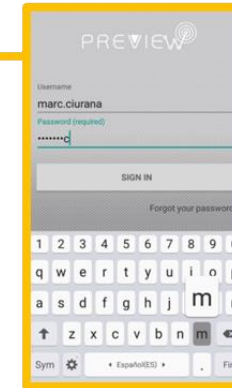
Access to the APS PCS and SPS information (e.g. dynamic) and machine documentation, i.e. manuals, equipment maintenance documents (e.g. static information)

Process' notifications

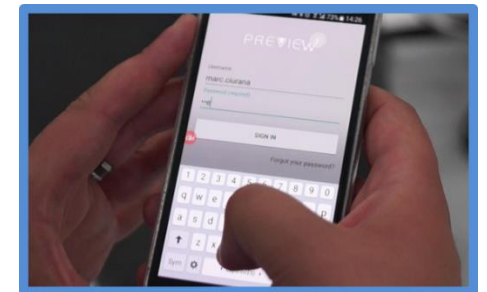


Process deviations and part quality are notified as alerts

User's information



Operator/users can create individual profiles



2-3 m positioning error
1-2 m radius detection



Industrial Impact Achieved

Before	With PREVIEW	Evaluation
Reduction of setup time (targeted value = 50%)		
From 1h to 6h depending on the complexity of the geometry of the mould	When mould is used in the preferred machine the optimum parameters are reached with a set up time of less than 10 samples (considering 30s+30s cycle time). Examples during PREVIEW, on average the optimum parameters (start to produce good parts) where achieved with 2-3 parts. Before it was 7 to 10 parts.	80% in time (50min/60min) 43% in parts (3parts/7parts)
Reduction of scrap and energy consumption (targeted value = 20%)		
Reduce scrap in set up time	Examples during PREVIEW, on average the optimum parameters (start to produce good parts) where achieved with 2-3 parts. Before it was 7 to 10 parts.	43% in parts (3/7)
Energy consumption	Calculations based on estimated scrap reduction of 50%	50%
Flexibility of resources (targeted value = 30%)		
1 operators supervising 2 machines	1 operator supervising 3 o 4. Based on the estimations of end users	33% to 50%



Agile Collaborative Research



Agile Collaborative Research

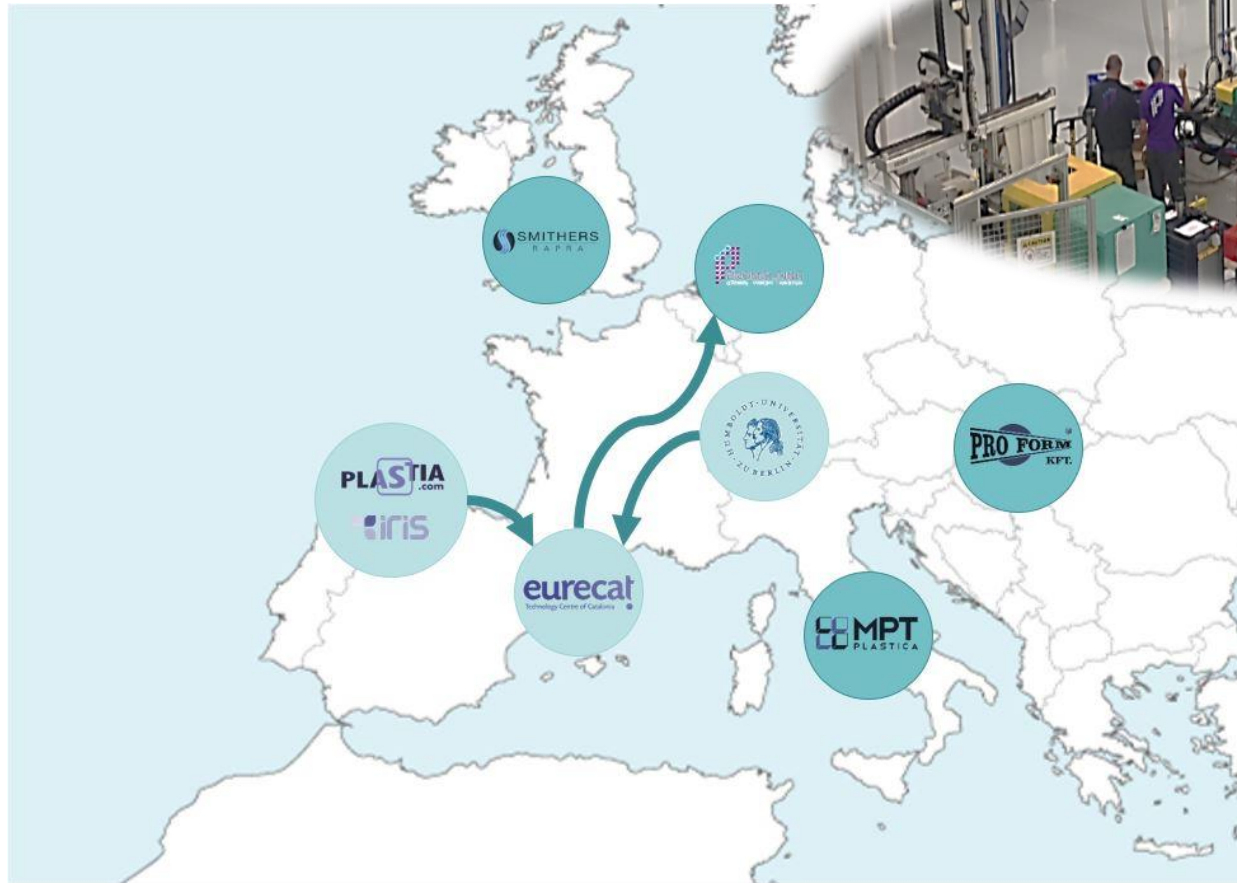


Agile Collaborative Research

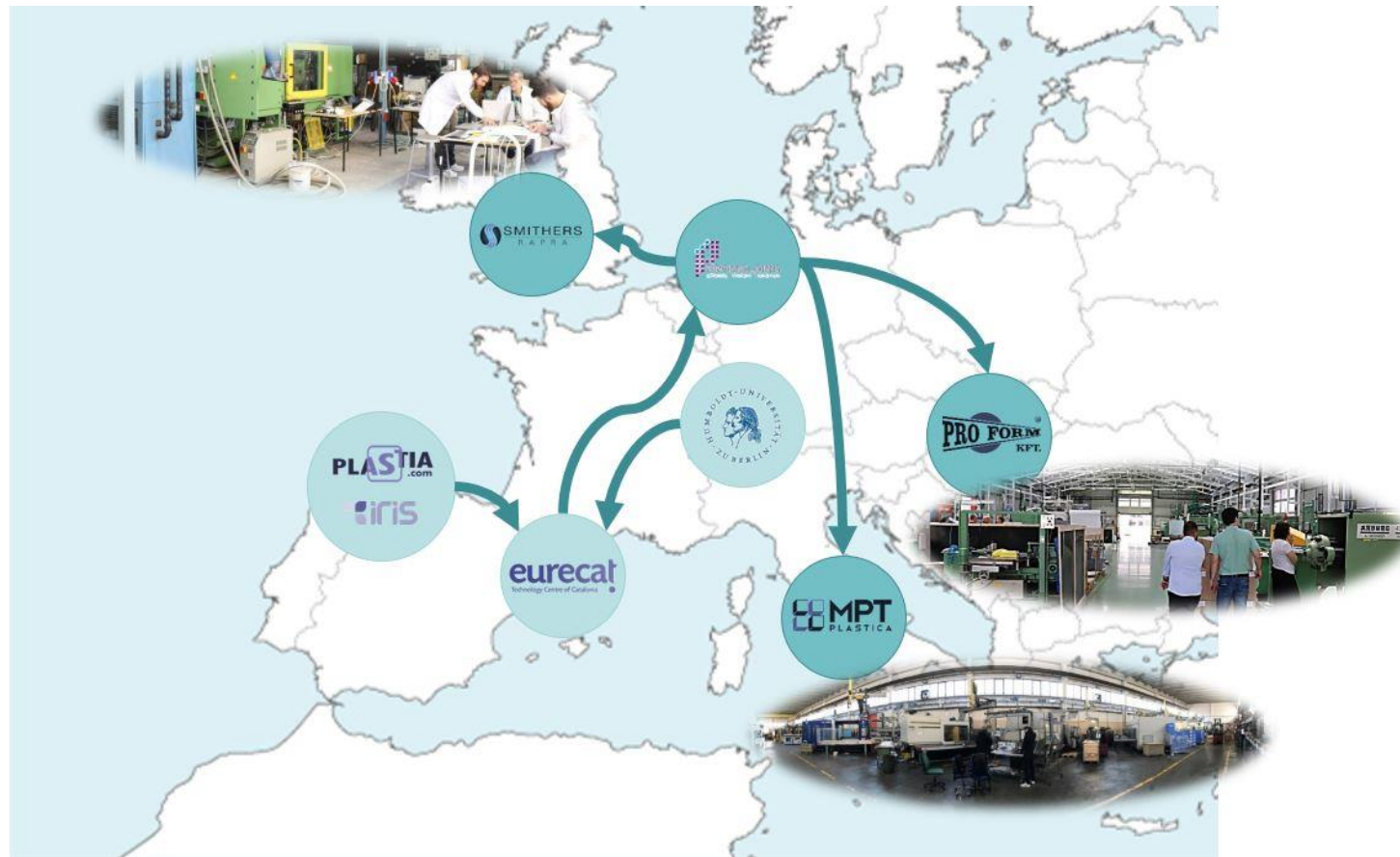




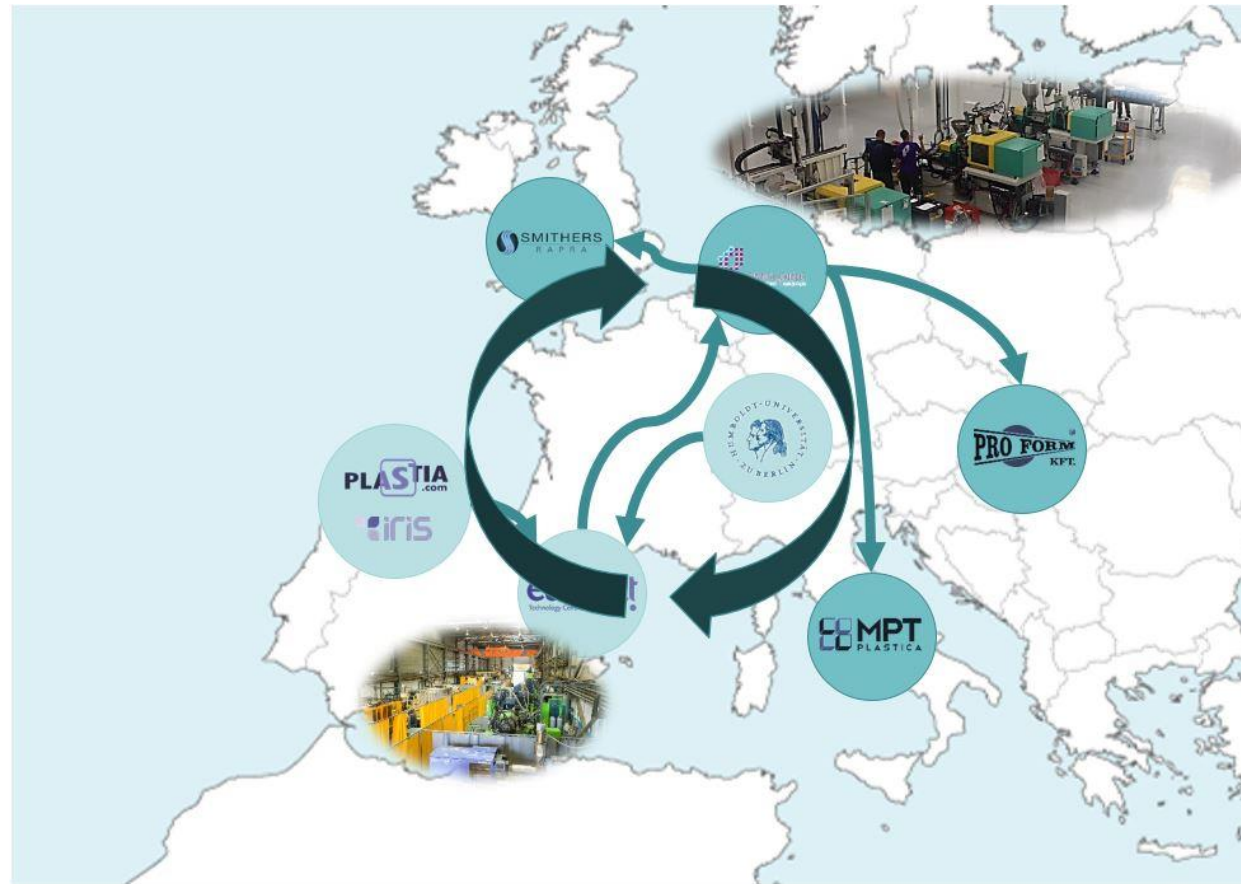
Agile Collaborative Research



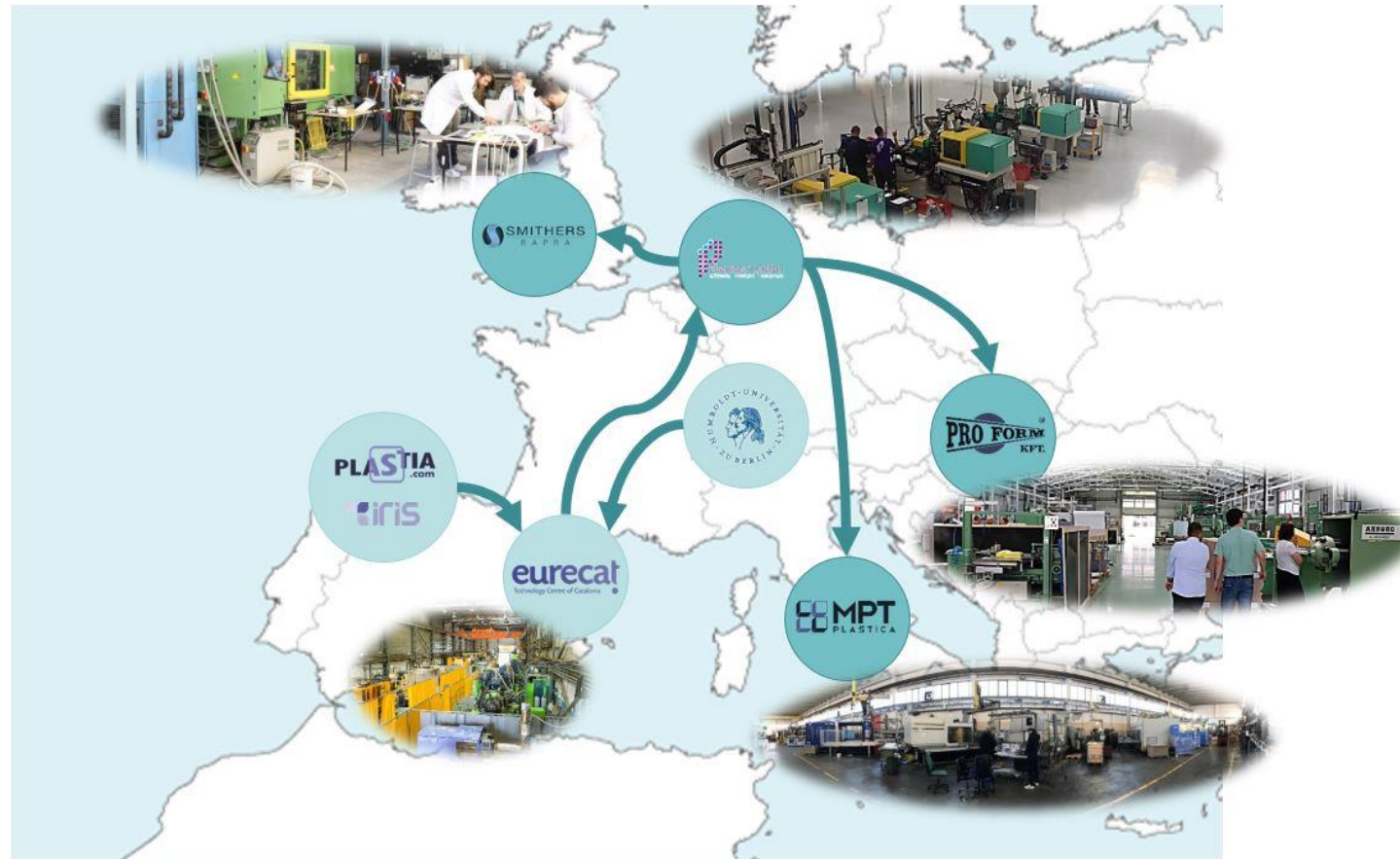
Agile Collaborative Research



Agile Collaborative Research



PREVIEW as a Networked Manufacturing Facilities

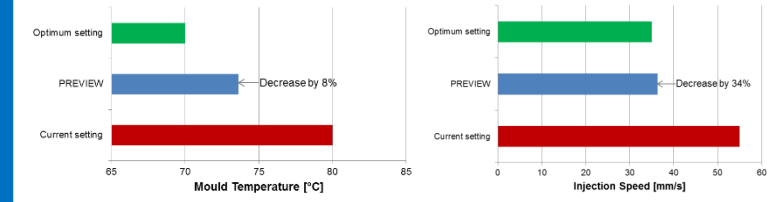
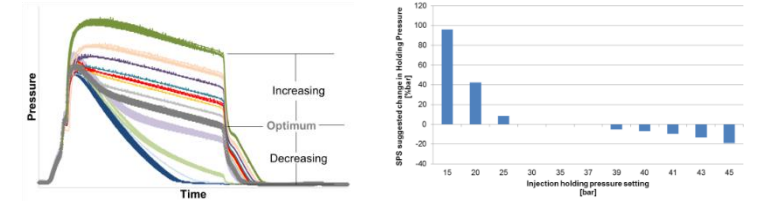




DATA: new resources to take care about (Skills and Infrastructure)



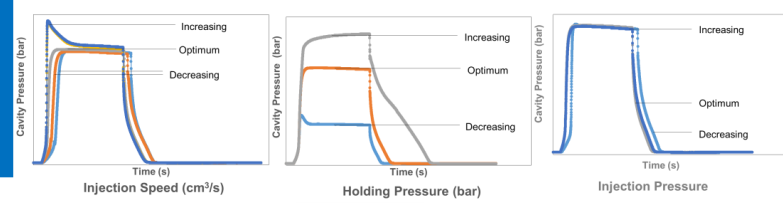
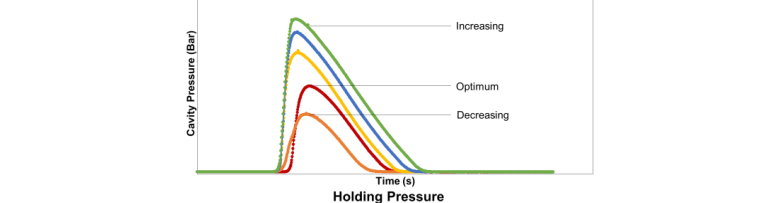
300 hours of testing in industrial environment



400MB of information produced a day per one machine with an cycle time of 15 seconds.



An average EU SME with 10 injection machines would generate 80GB of data per month

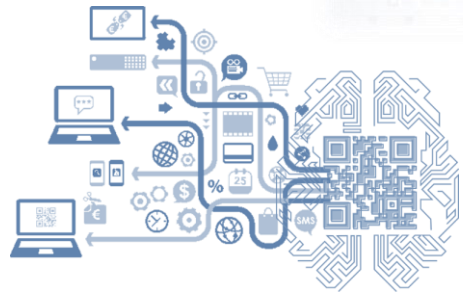




What's next for PREVIEW?

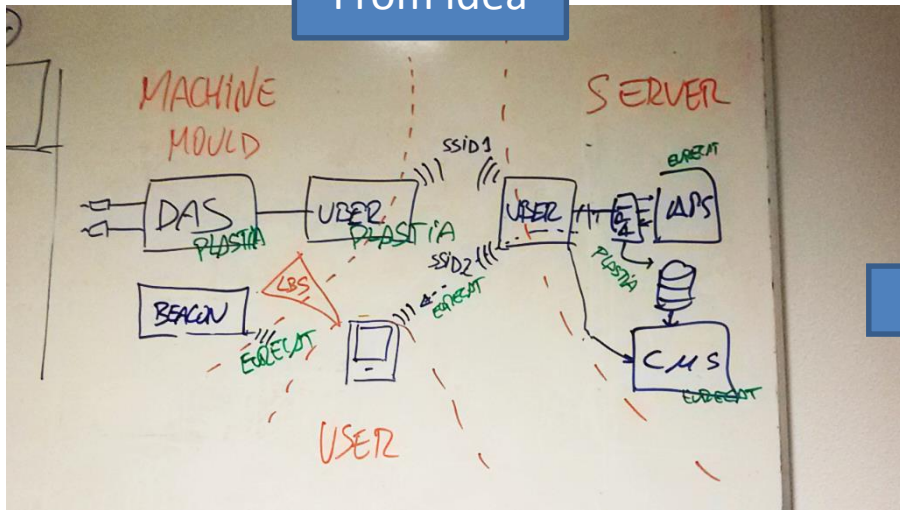


BLOCKCHAIN

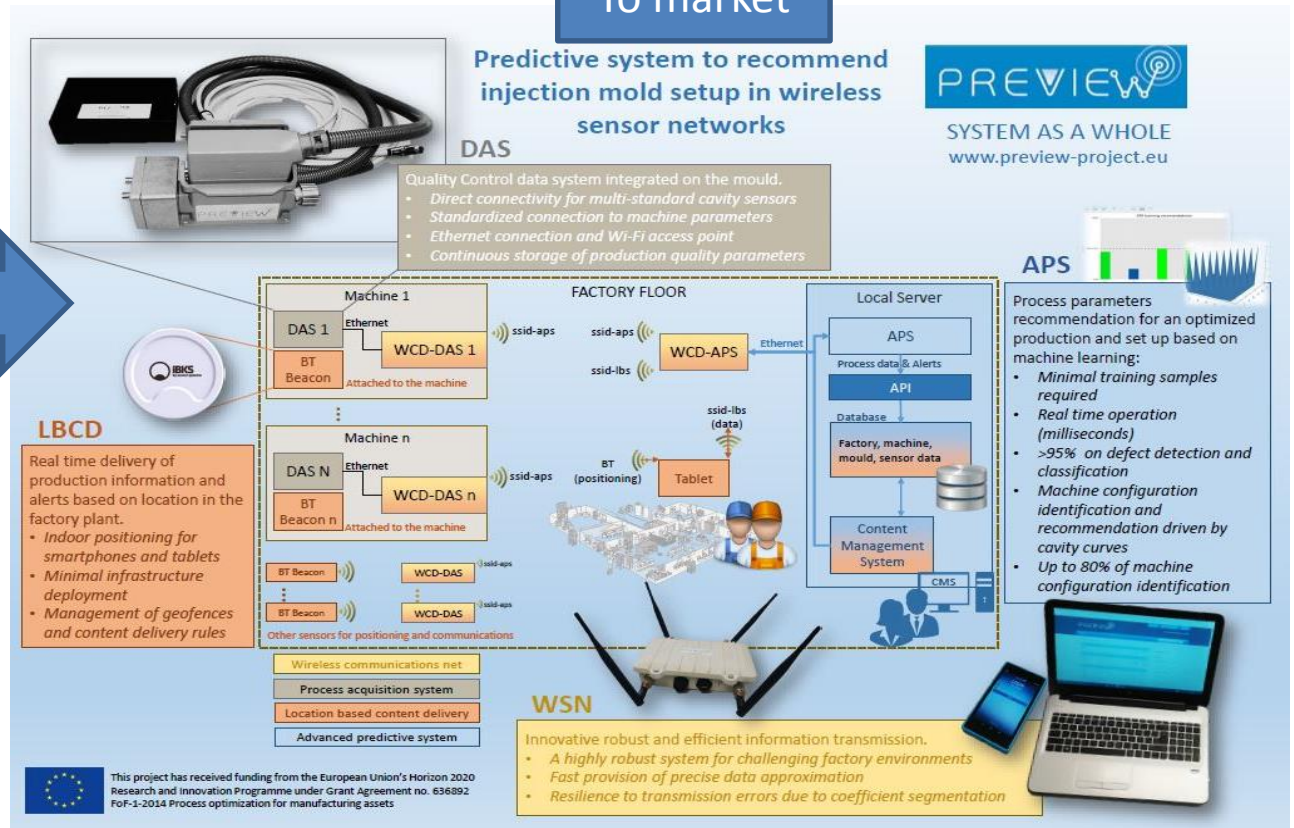


THANK YOU!

From idea



To market



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