DIGITAL TWIN TOWARDS ZERO-DEFECTS MANUFACTURING (ZDM) AND CIRCULAR ECONOMY

eit Manufacturing

EIT Manufacturing is supported by the EIT, a body of the European Union

January 2020

725K€ EIT Funding

24 months lasting project

March 2020
Requirements definition

December 2020
Feasibility Study

December 2020
First draft exploitation report

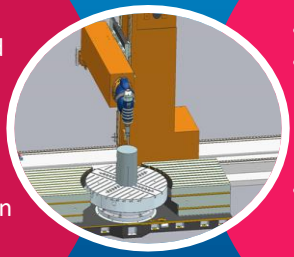
Along 2021 – integration of systems

CHALLENGE

- Zero defect manufacturing approach with the focus on commissioning manufacturing solutions faster, earlier, and with higher productivity and quality.

SOLUTION

- The SOLUTION is based on DIGITAL TWINS models for process/machine/flow optimisation and performance evaluation



BENEFITS

- Reduced cycle times
- Increase workpiece quality by improving toolpath and clamping position.
- Address wear and remaining lifetime of tool and machine elements

MAIN PROJECT RESULTS IN 2020

2 LEARNING NUGGETS CREATED IN 2020

10% REDUCTION ON COMMISSIONING COSTS

4 APPS FOR INCREASED MANUFACTURING EFFICIENCY

"EIT grant has allowed the connection among different stakeholders of the value chain and the identification of win-win collaborations"

JOSEBA BILBATUA
SENIOR Innovation Manager MONDRAGON Corporation
TWINGOALS Project
AIM: Digital Twin towards zero-defects manufacturing (ZDM) and circular economy

mondragon-corporation.com

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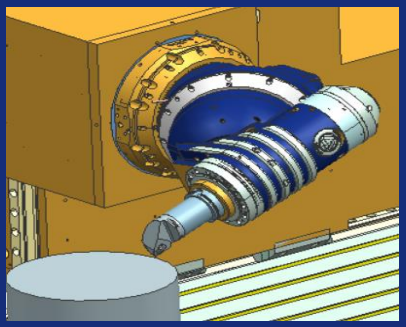
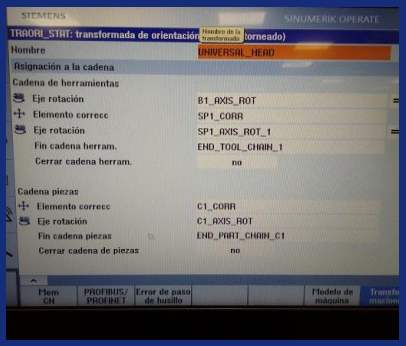
PROPOSED SOLUTION

The aim of TWINGOALS is to bring a new SOLUTION to the VIRTUAL REPRESENTATION MODELS for manufacturing assets with the focus on commissioning manufacturing solutions faster, earlier, and with higher productivity and quality.

The solution is based on DIGITAL TWINS models for process/machine/flow optimisation and performance evaluation from industrial pilots proposed by production companies, machine tool builders and automotive manufacturers.



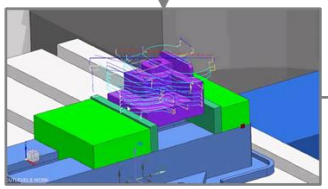


Feedback loop

Process Adaption

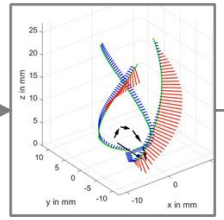
Targets:

- Stable process -> equipment sustainability
- First time right -> waste reduction



NX CAM

- Tool path
- Tool geometry
- Material (aluminum, steel)
- Processing parameter



Siemens CT

- Process forces
- Spindle torques

NX MCD (SORALUCE/IDEKO)

- Machine stiffness
- Physical effects on machine

"This project (20019 TWINGOALS) has received funding from the European Union's Horizon 2020 research and innovation programme under the grant agreement EIT/EIT Manufacturing/SGA 2020/1"

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MANUFACTURING & SOCIETAL CHALLENGES

ECO-EFFICIENCY is about "doing more with less" by generating more social and economic value with a lower environmental impact. Eco-efficiency aligns closely with Lean principles: they both aim to enhance value creation by eliminating waste and pollution.
At TWINGOALS we will apply concepts around digital twin and advanced simulation to avoid some problems associated with production and manufacturing that have the greatest impact on the environmental footprint.

DEFECTS
Rework, scrap, faulty information, failure to meet requirements

OVER-PRODUCTION
Waste from making more product than the customers demand

WAITING
Wasted time spent waiting for the next process step

HUMAN POTENTIAL
Under-utilization of people's skills and knowledge

TRANSPORT
Unnecessary movements of products and materials due to system layout

MOTION
Unnecessary movements by people due to poor work station layout

INVENTORY
Excess products and materials not being processed

OVER-PROCESSING
More work or higher quality than is required by the customer

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EIT FUNDING & SUPPORT

This EIT grant provided us with the chance to create connections on one side among different stakeholders of the manufacturing value chain (machine tool builders, technology providers and OEMS from the automotive sector, and from the other side to integrate already existing modelling and simulation solutions that together provide answers for the minimization of scraps and reworks through the first-time right approach.

MONDRAGON HUMANITY AT WORK

SORALUCE

IDEKO

CHALMERS UNIVERSITY OF TECHNOLOGY

SIEMENS

VOLVO VOLVO GROUP

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